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NEW SOUTH WALES.

# ANNUAL REPORT

OF THE

DEPARTMENT OF MINES AND AGRICULTURE,

NEW SOUTH WALES,

FOR THE YEAR

1893.

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Printed in accordance with Resolutions of both Houses of Parliament.

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SOLD BY: CHARLES POTTER, GOVERNMENT PRINTER.

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# ANNUAL REPORT.

To the Honorable Thomas M. Slattery, Esq., M.P., Minister for Mines and  
Agriculture, &c.

Sir,

I have the honor to submit to you the following report upon the working of the Department under your control during the year 1893, having regard, however, chiefly to the progress of mining and the results obtained during the year.

STATEMENT of the Number of Papers registered and Letters despatched by the several Branches of the Department of Mines and Agriculture.

	Papers Registered.		Letters Written.	
	1892.	1893.	1892.	1893.
Mines proper.....	*21,282	*19,690	†16,004	†15,102
Lease Branch, applications and plans registered .....	1,591	1,342	.....	.....
Account Branch .....	15,245	14,764	.....	.....
Agriculture .....	‡12,724	‡16,025	15,981	9,045
Stock Branch .....	†15,050	†11,919	5,034	4,924
Public Watering Places .....	‡10,955	‡12,588	‡3,165	‡5,999
Prospecting Votes and Chief Inspector of Mines.....	{ 8,198 1,140	{ 5,282 3,002	{ 3,996 315	{ 2,649 1,875
Diamond Drills .....	2,268	1,318	984	516
Geological Branch.....	2,013	1,810	3,243	2,719
	90,466	87,740	48,722	42,819

\* Exclusive of applications to lease. † Returns and circulars not registered this year. ‡ Exclusive of caretaker's reports. § This number is exclusive of *Gazette* and seed applications. || This number includes partly printed advices and particulars of seeds and publications despatched. ¶ Exclusive of printed forms, circulars, and telegrams, and Executive minutes.

The depression which was referred to in my report for 1892 I regret to say has continued throughout the year 1893. Advantage has been taken of this fact to clear off arrears and to get the work into such shape as shall enable the staff to cope with any accession of work that may be cast upon it by reason of any revival of mining enterprise, or the passage of new legislation.

During the year the mining division of this Department was deprived of the valuable services of the Assistant Under Secretary, Mr. G. E. Herring, in consequence of the need for retrenchment, and of the Chief Draftsman, Mr. W. S. Campbell, who was transferred to the position of Chief Clerk in the Department of Agriculture and Forests. Both of these gentlemen were connected with the Mining Department since its establishment. The services of Mr. Geological Surveyor Anderson were also dispensed with for the same reason.

It affords me great pleasure to acknowledge the zeal and ability with which the heads of branches and the officers under them have performed their duties, and the ready assistance they at all times afford me.

To Mr. David McCulloch I am specially indebted for the valuable assistance he has given me in the compilation of this report.

With respect to the acquisition of lands for mining purposes:—

The number of applications made to lease Crown lands for mining purposes during 1893, was 869, or 199 less than the number made during 1892. Of these 869 applications to lease made during last year, 603 were for auriferous land, comprising an area of 3,587 acres 1 rood 14 perches, and 266 were for mineral land, comprising an area of 13,908 acres 2 roods 36½ perches.

The number of applications dealt with in 1893 was 828—a decrease of 584 as compared with 1892. Every effort has been made to deal speedily with such applications.

Of the 828 applications dealt with, 547 were for gold-mining leases, embracing an area of 3,233 acres 2 roods 26½ perches, and 281 were for mineral leases, comprising 15,593 acres 2 roods 3 perches.

The area of auriferous land applied for in 1893 was less by 399 acres 1 rood 23 perches than the previous year, and the area of mineral land applied for during the same period was less by 9,966 acres 2 roods 31½ perches.

LAND applied for to be leased during 1893, and minerals to be mined:—

	a.	r.	p.		a.	r.	p.
Gold	3,587	1	14	Ochre	20	0	0
Antimony	488	2	0	Ochre and bismuth	80	0	0
Bismuth	20	0	0	Opal	1,352	2	0
Chrome and iron	100	0	0	Paint	20	0	0
Chrome, ochre, and pigments	60	0	0	Silver	1,520	0	0
Coal	2,379	0	29½	Silver and lead	826	2	33
Coal and shale	1,180	0	0	Silver, lead, and copper	711	3	14
Coal, shale, and iron	1,280	0	0	Silver, lead, and iron	365	0	0
Copper	60	0	0	Silver, lead, and limestone	240	0	0
Copper and platinum	60	0	0	Shale	80	0	0
Diamonds	400	0	0	Scheelite	10	0	0
Graphite	40	0	0	Tin	1,888	0	0
Ironstone	20	0	0	Tin and diamonds	60	0	0
Kaolin and tin	40	0	0	Tin, silver, and lead	102	0	0
Limestone	20	0	0	Tin and wolfram	114	0	0
Manganese	45	0	0	Tungsten	40	0	0
Manganese, copper, and silver	40	0	0				
Marble	236	0	0				
Mineral pigments	10	0	0				
					17,496	0	10½

The above table shows a decrease of over 10,000 acres on the land applied for in 1892, which occurs principally in coal, gold, silver, silver and lead and tin, but there is a slight increase in opal, diamonds, and several other minerals. The reduction in the area of land taken up for coal is no doubt due to the depression in the coal trade, and the low price of silver has had the effect of reducing the demand for land containing deposits of silver and lead. The decrease in the area of auriferous land taken up in 1893 may be to some extent due to the general depression, but it is probably to some extent attributable to the increased demand for permits to search for gold on alienated lands.

AREA held under application to lease on 31st December, 1893:—

	a.	r.	p.		a.	r.	p.
Gold	1,135	1	13	Opal	777	3	0
Antimony	222	0	0	Paint pigments	100	0	0
Bismuth	20	0	0	Shale	80	0	0
Coal	2,199	0	29½	Scheelite	10	0	0
Copper	20	0	0	Silver	160	0	0
Copper, silver, and lead	291	3	14	Silver and lead	150	0	0
Diamonds	360	0	0	Silver, lead, and iron	140	0	0
Ironstone	20	0	0	Silver, lead, and limestone	20	0	0
Infusorial earth	20	0	0	Silver, lead, and tin	40	0	0
Kaolin and tin	40	0	0	Tin	404	0	0
Manganese	45	0	0	Tin and wolfram	20	0	0
Manganese, copper, and silver	40	0	0				
Marble	236	0	0				
Ochre	20	0	0				
					6,571	0	16½

The area held under application to lease on the 31st December, 1893, as shown by the foregoing table was 6,571 acres 16½ perches, as compared with 12,160 acres 2 roods 37 perches so held on the same date 1892, a decrease of 5,589 acres 2 roods 20½ perches. This is, of course, due to the reduced number of applications to lease made during the year.

TABLE showing the area of Crown lands held under lease, and the minerals to be mined:—

Minerals.	Mining Act, 1874.			Mining Act Further Amendment Act, 1884.			Crown Lands Occupation Act, 1861.			Total.		
	a.	r.	p.	a.	r.	p.	a.	r.	p.	a.	r.	p.
Alum and alumstone	600	0	0							600	0	0
Antimony	716	0	9							716	0	9
Bismuth	40	0	0							40	0	0
Chrome ochre and pigments	60	0	0							60	0	0
Cinnabar	120	0	0							120	0	0
Coal	2,193	1	7	32,859	0	21	2,324	0	0	37,376	1	28
Coal and shale	368	2	29	12,773	3	34½				13,142	2	23½
Copper	480	0	0							480	0	0
Diamonds	617	1	16							617	1	16
Diamonds and tin	333	3	15							333	3	15
Emeralds	60	0	0							60	0	0
Emeralds and tin	40	0	0							40	0	0
Gems	100	0	0							100	0	0
Ironstone	33	3	0							33	3	0
Ironstone and limestone	120	0	0							120	0	0
Limestone	160	0	12							160	0	12
Limestone and lead	20	0	0							20	0	0
Manganese and ironstone	40	0	0							40	0	0
Marble	40	0	0							40	0	0
Mineral pigments	40	0	0							40	0	0
Opal	627	3	12½							627	3	12½
Platinum	200	0	0							200	0	0
Silver	1,722	2	19							1,722	2	19
Silver and antimony	17	3	0							17	3	0

Minerals.	Mining Act, 1874.	Mining Act Further Amendment Act, 1884.	Crown Lands Occupation Act, 1861.	Total.
	a. r. p.	a. r. p.	a. r. p.	a. r. p.
Silver and arsenic.....	40 0 0	.....	.....	40 0 0
Silver and bismuth.....	40 0 0	.....	.....	40 0 0
Silver and copper.....	170 0 0	.....	.....	170 0 0
Silver, copper, and platinum.....	40 0 0	.....	.....	40 0 0
Silver and ironstone.....	40 0 0	.....	.....	40 0 0
Silver, ironstone, and limestone.....	70 2 30	.....	.....	70 2 30
Silver and lead.....	4,555 0 37	40 0 0	.....	4,595 0 37
Silver, lead, and antimony.....	20 0 0	.....	.....	20 0 0
Silver, lead, cobalt, and nickel.....	40 0 0	.....	.....	40 0 0
Silver, lead, and copper.....	1,881 0 27	.....	.....	1,881 0 27
Silver, lead, copper, and ironstone.....	374 2 27	.....	.....	374 2 27
Silver, lead, copper, and nickel.....	40 0 0	.....	.....	40 0 0
Silver, lead, and ironstone.....	993 3 27	.....	.....	993 3 27
Silver, lead, ironstone, and limestone.....	280 0 0	.....	.....	280 0 0
Silver, lead, ironstone, and marble.....	480 0 0	.....	.....	480 0 0
Silver, lead, and limestone.....	796 3 1	.....	.....	796 3 1
Silver, lead, and platinum.....	8 0 0	.....	.....	8 0 0
Silver, lead, and tin.....	480 3 19	.....	.....	480 3 19
Silver and limestone.....	148 3 13	.....	.....	148 3 13
Silver and mineral pigments.....	40 0 0	.....	.....	40 0 0
Silver and tin.....	4 0 0	.....	.....	4 0 0
Sulphate of alumina and potash.....	55 3 17	.....	.....	55 3 17
Tin.....	3,389 0 24½	396 0 28	.....	3,785 1 12½
Tin and precious stones.....	120 0 0	.....	.....	120 0 0
Tin and wolfram.....	13 2 10	.....	.....	13 2 10
Wolfram.....	40 0 0	.....	.....	40 0 0
Gold.....	7,223 1 33	1,392 2 32	.....	8,616 0 25
Not specified.....	20 0 0	.....	37 1 33	57 1 33
<b>Total</b> .....	<b>30,157 1 25</b>	<b>47,461 3 35½</b>	<b>2,361 1 33</b>	<b>79,980 3 13½</b>

The above table shows a considerable decrease on the previous year, and is due principally to the cancellation of a large number of leases, either for the non-observance of the labour conditions or for non-payment of rent, a few being either surrendered, or abandoned. The total number so cancelled was 1,633 embracing an area of 52,202 acres 1 rood 18 perches, of which 608 were gold-mining leases covering an area of 4,252 acres 3 rood 39 perches, the balance being mineral leases comprising an area of 47,949 acres 1 rood 19 perches. The total number of leases cancelled in 1892, was 1,690 covering an area of 92,156 acres 3 roods 2½ perches.

The number of application received for permits or authorities under sections 27 and 28 of the Mining Act to mine on, or under reserves during last year was 219, an increase of 38 as compared with the number received during 1892. The number of permits dealt with in 1893, was 186, as compared with 224 in 1892, a decrease of 38. The area of land embraced by the permits and authorities granted in 1893, is less by 90,803 acres 0 roods 36½ perches than the area so granted in 1892. The principal decrease being in coal, and coal and shale, the decrease in the coal being 8,003 acres, and in coal and shale 28,255 acres.

Table showing area of reserved land comprised in permits and authorities granted during the year 1893, and the minerals to be mined thereunder:—

Coal.....	1,941 1 4
Coal and shale.....	13,661 2 0
Shale.....	1,280 0 0
Tin.....	6 2 20
Gold.....	268 0 21
Silver.....	60 0 0
Antimony.....	50 0 0
	<b>17,267 2 5</b>

Table showing area of reserved lands comprised in authorities (secs. 27 and 28) issued prior to 1893, and minerals to be mined:—

Coal.....	18,540 0 32
Coal and shale.....	653 3 0
Shale.....	8 2 32
Limestone.....	10 0 0
Tin.....	144 0 14
Copper.....	59 2 18
Antimony.....	7 1 15
Gold.....	25 2 21
Silver and lead.....	3 0 0
Copper and cobalt.....	4 0 28
	<b>19,455 2 0</b>

Table showing areas comprised in authorities (secs. 27 and 28) which were in force on 31st December, 1893:—

	a.	r.	p.
Coal .....	18,563	0	6
Coal and shale.....	1,293	3	0
Shale.....	8	2	32
Limestone.....	10	0	0
Tin .....	144	0	14
Copper .....	58	2	18
Copper and cobalt .....	4	0	28
Antimony .....	57	1	15
Gold .....	98	0	14
	<u>20,239</u>	<u>3</u>	<u>7</u>

The foregoing tables comprise all lands occupied for mining purposes other than alienated land, and Crown lands held under miners' right or mineral licenses. The area comprised in these exceptions is considerable, but the exact area is not known.

The following information has reference to the search for, or the removal of, minerals from alienated lands:—

The number of applications for permits under section 45 of the Crown Lands Act of 1884 to dig and search for gold received during 1893 was 278, as compared with 194 received in 1892, an increase of 84, and the number dealt with in 1893 was 259, as compared with 148, the number dealt with in 1892, an increase of 111. The total number of permits in force on the 31st December, 1893, was 151, an increase of 12 in the number in force on the 31st December, 1892.

The number of applications for authorities under the Mining Act of 1889 to dig and search for gold or other minerals received during 1893 was 422, being an increase of 213 on the number received in 1892. The number dealt with was 412, an increase of 206 on the previous year. The number of permits in force on the 31st December, 1893, was 169, as compared with 96, the number in force on the 31st December, 1892.

The number of applications for permits under section 7 of the Crown Lands Act of 1884 to win and remove gold and minerals reserved under the Crown grants of private lands received during 1893 was 189, an increase of 95 on the previous year. The number of such applications dealt with in 1893 was 132, an increase of 76 on 1892. The number in force on 31st December, 1893, was 224, and the number in force on the 31st December of the previous year was 185, an increase of 39.

The royalty received from alienated land during 1893 was £3,544 10s., and from Crown lands £14,463, an increase of £1,204 on the royalty received in 1892 from alienated lands, and of £6,759 13s. on the royalty from Crown lands, as compared with the previous year.

#### PROSPECTING BOARD.

During the year 1893 the Prospecting Board visited, amongst others, the following places:—

Adelong	Boro	Denison Town	Mandurama
Albury	Bowling Alley Point	Drake	Markdale
Alectown	Box Ridge	Dungog	Mogo
Araluen	Braidwood	Elsmore	Moruya
Armidale	Bredbo	Emmaville	Mount Hope
Ashford	Brimbramalla	Eugowra	Mount McDonald
Bald Nob	Brown's Creek	Forbes	Mullion Creek
Ballina	Bungendore	Forest Reefs	Muttama
Barmedman	Bungonia	Galley Swamp	Nana Creek
Barraba	Burnt Yards	Glen Elgin	Nerrigundah
Bateman's Bay	Cadia	Gloucester	Newbridge
Bathurst	Caloola	Grenfell	Pambula
Bear Hill	Canowindra	Gulgong	Peak Hill
Bega	Captain's Flat	Gundagai	Rivertree
Bell's Creek	Carcoar	Hanging Rock	Sofala
Binda	Cargo	Harden	Swamp Oak
Bingara	Clear Creek	Hargraves	Temora
Black Range	Cobar	Hillgrove	Tingha
Blayney	Cobargo	Inverell	Trunkey Creek
Bodalla	Coolac	Kerr's Creek	Tuena
Bolivia	Cowra	Kookabookra	Uinaralla
Boloko	Crookwell	Lewis Ponds	Walcha
Bombala	Dalmorton	Long Creek	Windellama
Boonoo Boonoo	Deepwater	Major's Creek	Young

There were 1,004 applications for aid received during the year, which were disposed of as under:—

Aid granted in .....	344 cases.
Aid refused in .....	561 „
Applications abandoned .....	52 „
Applications not dealt with .....	47 „

1,004

The results obtained from the disbursement of the Vote during the past year have, on the whole, been satisfactory, so far as the number of discoveries made is concerned, but it is open to doubt whether the

the country receives the full benefit of these discoveries, inasmuch as, from various causes, the development of deposits is not in all cases prosecuted. This may possibly be due in some measure to the financial depression, which has rendered difficult the securing of the necessary capital. The experience of the past year in regard to subsidising parties sent out in search of new fields has been no less unsatisfactory than that of previous years.

The following extracts are taken from reports on the work of parties who are in receipt of aid from the 1893 Prospecting Vote:—

1. The Warden's clerk at Dalmorton reports that the Tower Hill Gold-mining Co. have struck the reef in their long tunnel, and free gold can plainly be seen in some of the stone. A lot of prospecting work has been done by this Company.
2. Carver and party, on Hawkins Hill, Hill End, struck a vein about 14 inches wide, which is estimated to carry from  $1\frac{1}{2}$  to 2 oz. of gold per ton. This is considered payable, and later reports say that the prospects are improving.
3. W. J. Blunt and party were aided to prospect a site situated at Cell's Creek, about 60 miles easterly from Walcha. The Warden at Kempsey, reporting on their operations, states that the party are now on a big lode showing free gold all through the stone and that steps are being taken to have a battery erected at once. This site is in comparatively new country.
4. R. Stoddart and party, at Copeland, received aid to sink a shaft on their claim at Cobark, about 14 miles from Copeland. At 46 feet the party were successful in striking the reef, which proved to be unusually rich, the stone being thickly studded with gold. This is a very important discovery, and has tended to liven up mining matters in this district considerably, which for some time past has been in a languishing condition.
5. John Bolhorn and party were aided to put in a tunnel at Quartz Ridge, 15 miles from Hill End, and at about 400 feet struck a large reef loaded with mundic, and carrying fine gold. This is a very promising reef, and the party propose having a bulk test of the stone made in Sydney.
6. Thomas Dwyer and party, Mount Carrington, Drake (so the Warden's clerk at Drake reports), made a rich discovery of gold at the Great Northern Mine. While engaged cutting a drain to direct the water from the shaft the party struck some large blocks of stone which proved to be of extraordinary richness, some of the specimens being about one-fourth gold. The party have been in receipt of prospecting aid for some time, and were making preparatory arrangements to resume sinking when the discovery was made.
7. Oxenbridge and party have been receiving aid for some considerable time to test certain alluvial ground at Tia, about 17 miles from Walcha, and after putting in about 400 feet of tunnelling, they have succeeded in striking good gold, with splendid prospects. The present wash-dirt is stated to carry on an average  $1\frac{1}{2}$  oz. per load, occasionally showing some very pretty nuggets. The wash-dirt at this place is overlapped with basalt, and is supposed to be a continuation of the lead formerly worked at Nuggetty Gully, Nowendoc. The old river-bed can be traced in that direction from Tia for over 12 miles.
8. Aubery, Fox, and party were aided to further test the Hong Kong lease at Mount McDonald, and the Warden's bailiff reports that a parcel of 28 tons of stone yielded 106 oz. of gold.
9. John Weinhold, in receipt of aid to prospect a piece of ground near the township of Trunkey, struck a very rich leader in the 20-ft. drive which is estimated to go about 100 oz. per ton. In the drive at the 40-ft. level the party struck a vein averaging about 2 feet thick, and estimated to yield from 2 to 4 oz. per ton.
10. Henry Fitch and party received aid during the early part of the year to further prospect their mine, known as the Young O'Brien, near Grenfell. Their shaft was continued to a depth of 175 feet, when a new make of stone was met with, quite distinct from the old blocks of stone above, and which showed very fair gold. The party opened out at this level, and drove 71 feet north and 20 feet south along the reef. The reef has now been proved to be  $4\frac{1}{2}$  feet thick, and has every indication of being more persistent than most other veins in the locality. A crushing of 218 tons of stone from the 171-ft. level yielded 162 oz. 5 dwt. of gold, the result of nine weeks' work. The two previous crushings from the drive were 95 oz. from 126 tons, and 99 oz. from 147 tons. These returns are highly satisfactory, and have given quite an impetus to reefing in the Grenfell district.
11. Warden Wotton reports that Sutton and party, who were receiving aid to test their claim near Hill End, have struck a splendid reef about 15 inches thick, and 400 lb. weight of the stone taken from the cap of the reef yielded 30 oz. of gold.
12. Maloney and party were aided to put in a tunnel into the Red Hill at King's Plains, and were successful in striking a very nice sandy rubble wash, about  $2\frac{1}{2}$  feet thick, which prospects about 3 dwt. to the load. Its width has been proved to be about 180 feet, and is expected to pay well when the party get into full work.
13. Heinz Hooper and party have been in receipt of aid for some time back to thoroughly prove the Township Hill at Kinndra for alluvial gold, and have at last struck a very promising wash, yielding fully 1 dwt. of gold to the load, which is considered very satisfactory. Their tunnel is over 500 feet into the hill.
14. R. McPherson and party, working the Drysdale Mine at Mount Billagoe, near Cobar, write to the Department as under:—"No further prospecting assistance is required for our Perseverance Claim at Mount Billagoe, as we have struck good payable gold." This discovery has led to the vigorous resumption of prospecting operations on this field, a large number of men being now on the ground. A crushing from this claim of 125 tons yielded the magnificent return of 1,297 oz. of smelted gold, and silver at the rate of 5 oz. per ton.
15. Penhall and party, whose claim is at the Old Billagoe, about  $2\frac{1}{2}$  miles north of the Drysdale Mine, are also obtaining payable gold. This mine was aided out of the 1892 Vote.
16. M. Lynch and party, Tichborne, received aid about the end of the year to test a piece of entirely new ground, situated about 4 miles from Parkes, on the Forbes Road. They bottomed at a depth of 93 feet on nice dry wash, about 1 foot thick, which yielded 42 dwt. from 7 loads of dirt. The width of the wash has been proved at this point to be 16 feet, and is comparatively dry. The party have named it "Slee's Lead," in honor of Mr. Slee, the Chief Inspector of Mines, who, as a member of the Board, inspected the site and recommended the aid in this case.
17. E. Lawlor and party received aid about the middle of 1892 to sink a shaft at Forest Reefs on church and school lands. After about fifteen months' work the party have been successful in striking the wash at a depth of 170 feet, which is proved to be 72 feet wide, averaging 12 inches in thickness, and yielding  $\frac{1}{2}$  oz. of gold to the load. This party hold an area of 25 acres, and it is expected this discovery will shortly lead to the employment of a large number of men.
18. Chesher, Sully, and party were aided during the year to sink a shaft on the South Lead, near Forbes, and have succeeded in bottoming at a depth of 210 feet on very good prospects. It is believed this lead can be traced for miles, and although the water is somewhat troublesome, it is hoped that before long employment will be found for a large number of men in the locality.
19. Thomas Elliott and party were also aided to test their gold lease at Chambigne, about 17 miles from Grafton, by driving from the bottom of their 60-foot shaft. At a point 63 feet from the bottom of the shaft the reef was struck, which was highly charged with mineral and very promising in appearance. Its value has been tested by a bulk sample being treated in Sydney, which yielded 3 oz. per ton. Reef, 15 inches wide.
20. J. G. Mylcharane and party received aid during the year to further test their claim on the London Reef at Boney's Rock, in the Canowindra District. After sinking 250 feet they commenced to drive at the 250-ft. level, and from this drive raised 10 tons 7 cwt. of quartz, which returned 63 oz. 3 dwt. of gold.

21. Alexander Barnett has been in receipt of aid for some time to continue prospecting operations on Finch's Bald Hill, near Stuart Town. After putting in a tunnel a distance of 600 feet they struck payable wash,  $3\frac{1}{2}$  feet in thickness, which continues to thicken and prospect better as they go in. The ground is perfectly dry, and this discovery has been the means of starting several other tunnels along the hill in search of the same lead. It is considered that a large area of ground will be opened up in consequence, and provide much-needed employment to a large number of men in the district.

22. Alfred Luttrell received aid for his claim near the New Chum Hill, Kiandra, and the Warden reports that he has struck wash-dirt 9 feet in depth, averaging 2 grains to the dish. As the wash is at a very shallow level, he proposes to work it by sluicing.

23. Dalton and party were granted a small sum to cut a granite bar for the purpose of draining a swamp at Little Snowball Creek, in the Braidwood district. By this means the creek was made workable, and a considerable quantity of nuggetty gold has been got. The last nugget got weighed over 19 oz.

24. Marshall Bros., Specimen Gully, Hill End, have been in receipt of aid for some considerable time to continue operations in the above-named gully, and their perseverance has at last been crowned with success, having struck a vein 6 inches thick, estimated to yield 100 oz. per ton, with a prospect of its thickening as it goes down. In cross-cutting from another shaft, they also struck a mullocky vein, which shows payable gold.

25. The Baker's Creek (No. 1) Extended Syndicate, Hillgrove, were aided to further test their mine, and were successful in striking Smith's reef, and the big reef worked by the Baker's Creek Co., both carrying gold. This will probably lead to the employment of a large number of men.

Mr. James Taylor, Government Metallurgist, has rendered valuable service to the Board in supervising the treatment of bulk samples, and advising as to the best methods of dealing with ores from different localities.

A parcel of 5 tons from the New Hargraves Company's mine was sent to Melbourne to be treated by the Otis process. This parcel was from a very large dyke met with in driving, but the returns from the stone did not come up to expectations.

#### GEOLOGICAL SURVEY.

The Government Geologist proceeded to Bowling Alley Point and Nundle on the 5th February, and made an examination of the belt of serpentine which traverses this country, and of the deposit of chromite which occurs in it, with the object of advising upon the question of specially reserving the land for mining for chrome iron ore.

On the 24th of the same month he visited Burradoo, and made an examination of a supposed diamondiferous drift in the parish of Mittagong, near Doudle's Folly Creek. Three small diamonds were said to have been found in the preliminary prospecting of this drift, but, although an expensive diamond-washing plant had been erected prior to Mr. Pittman's visit, and a considerable quantity of drift was treated, no more diamonds were discovered, and the work was ultimately abandoned. Mr. Pittman also visited the quartz-pebble drift, known as Southey's diamond-mine, and situated about 7 miles south-east of Mittagong. This drift somewhat resembles in character the diamondiferous drift of Bingara. It is stated that more than twenty small diamonds have been found in Southey's mine at different times, and it also contains fine gold, zircons, &c. A shaft was sunk some years ago to a considerable depth, and the spoil heap shows that it passed for some distance through a volcanic breccia. The shaft being full of water, no examination of the mode of occurrence of this rock could be made, and, with the object of throwing light upon the question as to whether there is any analogy between this deposit and that at the celebrated Kimberley mines of South Africa, a sum of money was granted out of the Prospecting Vote to aid the sinking of another shaft. The applicants for the aid, however, failed to take up the money, and in due course it lapsed.

In March, Professor David and Mr. Pittman made a joint examination of the Devonian rocks, in the neighbourhood of Rydal, with the object of settling a disputed question as to whether the fossil plant, *Lepidodendron Australe* does, or does not occur in rocks of greater age than the lower carboniferous. They proved that it does occur, associated with the marine fossils of the Devonian rocks. The question is of importance in connection with the classification of the geological formations. On the 20th March, Mr. Pittman inspected, and subsequently reported upon a galena lode, known as "Meyer's Reef," near Tarrago. He subsequently inspected the auriferous reefs at Scrubby Rush (between Woodstock and Mount McDonald), where several applications had been made for aid out of the Prospecting Vote.

On the 6th June he visited Bowning, and advised as to the reservation from sale for mining purposes of a considerable area within Bogalara run.

In July he visited the Sugar-loaf reef, near Newbridge, and reported upon a number of applications for aid from the Prospecting Vote.

On the 23rd September, he inspected the Pitt Town settlement, and reported upon the question of the probability of artesian water being obtained there by boring.

In October, he inspected the Wellington temporary common, and reported upon a proposal to alienate a part of it. He also visited the Mitchell's Creek Mine, and inspected the working of the M'Arthur Forest process, which is in operation there upon a large heap of tailings. Owing to the presence in the tailings of a certain amount of copper, it is doubtful whether this process is the most suitable one that could be adopted, for not only is a considerable proportion of the cyanide of potassium wasted in dissolving

dissolving the copper, but the dissolved copper is subsequently deposited on the zinc shavings, and retards the action of the latter in precipitating the gold. Moreover the precipitated gold is found to be mixed with a large proportion of copper, with which, in the final smelting, it forms an alloy.

He, subsequently, inspected some land at Lewis' Ponds, which it was proposed to alienate.

During the greater part of November he, in company with Mr. Boulton, was engaged in travelling over a considerable area of the western district. He reported upon proposals for putting down bores for artesian water at Tarrion, near Brewarrina, and at the Quarry Reserve, near Bourke, and also reported upon a supposed auriferous deposit on Fort Bourke run. The deposit, however, proved to be worthless. During this trip he acquired much valuable information in regard to the cretaceous water-bearing basin, besides making several corrections on the geological map of the Colony.

He subsequently visited Gulgong, and conferred with the District Surveyor in regard to a proposed curtailment of the Common.

In December he inspected the newly discovered auriferous reefs north-east of Narrandera, and reported upon the question of the resumption of the conditional purchase in the parish of Fennel, upon which they are situated. He subsequently inspected the outcrop of a coal seam at Burragorang, and reported as to the advisability of prospecting it by boring with the diamond-drill. The seam is 5 feet 10 inches thick at its outcrop, and appears to consist of coal of good quality, with one half-inch band.

During the progress of the No. 2 Cremorne bore, which was put down under the supervision of the Superintendent of Diamond Drills, the Government Geologist made a detailed geological section of the strata passed through, and as the coal-seam was struck during his absence from Sydney, Professor David was good enough to examine the last 30 feet of the core.

During the first six months of the year Mr. Geological-Surveyor Wm. Anderson continued the detailed survey (begun the previous year) of the valley of the Shoalhaven River. His work was performed very satisfactorily, but on account of the financial depression, it became necessary to reduce the staff, and on the 30th June his services were dispensed with.

Mr. Geological-Surveyor J. E. Carne, F.G.S., has been absent nearly the whole of the year, having left Sydney on the 23rd January for Chicago, where he had charge of the New South Wales mineral exhibits at the World's Fair. The arrangement of these exhibits has met with general commendation, and reflects great credit upon Mr. Carne's care and industry. Mr. Carne visited a number of mines and smelting works in America. It is of interest to note that in some of the large silver smelting works he found that the coke used contained a much higher percentage of ash than the coke manufactured in this Colony, besides being of much lower density. He was informed that better results (from an economical point of view) were obtained, taking into consideration the difference in price between the American coke and the best imported.

Mr. Geological-Surveyor G. A. Stonier, F.G.S., has done a considerable amount of travelling during the year, having been engaged for the most part in investigating applications for aid out of the Prospecting Vote, and in examining areas of land within gold-fields, and reporting as to any objections to their alienation, &c.

Mr. Geological-Surveyor J. B. Jaquet, A.R.S.M., F.G.S., has devoted part of his time to the preparation of his report upon the geology of the Broken Hill lode, and also to the plans and sections illustrating it. The monograph is now in the press, and will probably be found to be well worth the time and labour which has been bestowed upon it.

Mr. Jaquet also made a careful examination of the Mount Allen Mine in connection with the question of paying compensation to the New Mount Hope Copper-mining Company on account of the resumption of their M.C.P., on which the Mount Allen Mine occurs. He also reported upon a silver lead lode at Balconon, near Queanbeyan; the gold and silver bearing lode, at Back Creek near Rockley; the alluvial gold deposits at Neville, near Carcoar, and the recently discovered auriferous deposits in Marsden's paddock, near Blayney.

Towards the end of the year Mr. Jaquet proceeded to Braidwood to take up the work which had been interrupted by the retirement of Mr. Anderson, and he is now engaged in mapping the auriferous drifts of the Shoalhaven. In a recent report by Mr. H. G. M'Kinney, M.I.C.E., to the Minister for Works, the practicability of bringing a supply of water sufficient to work these drifts by hydraulic sluicing is favourably spoken of, and it is hoped that the work now being performed by Mr. Jaquet will, in connection with that already foreshadowed by the officers of the Works Department, result in the providing of employment for a number of miners.

The recently appointed Curator of the Geological Museum, Mr. G. W. Card, A.R.S.M., F.G.S., has performed the duties of his office very satisfactorily, and has been of considerable assistance in the microscopical examination of rocks.

As a part of the necessary scheme of retrenchment, the building formerly occupied as a geological museum has been transferred into offices for a part of the Agricultural staff, and the mineral collection has been removed to the building in the Domain, lately used as the Technological Museum. This building is not altogether suitable for the display of the final collection now placed in it, and it is hoped that the arrangement will be only a temporary one.

A large amount of work has been done in the laboratory by and under the supervision of Mr. J. C. Mingaye, F.C.S. A total of 3,015 samples were received for analysis and assay during the year, and included in these were analyses of artesian and well waters, complete analyses of rocks, soils, fireclays, coals, &c., besides assays for various metals.

The Palæontologist, Mr. R. Etheridge, junior, has been engaged at the Australian Museum during the greater part of the year, in accordance with the request of the Trustees, and on account of the absence on sick leave of Dr. Ramsay, the Curator. Nevertheless, he has managed, with the assistance of Mr. Dun, to keep the current work of this Department fairly well up to date.

The management of the caves has been well looked after by the Superintendent, Mr. W. S. Leigh. On the 20th February, the keeper of the Jenolan Caves, Mr. J. Wilson, discovered another large and distinct branch of the Imperial Cave. The new cave is in point of beauty and interest equal to anything yet found. It has been reported upon by Mr. Leigh, who, in company with Messrs. Etheridge and Barber, has also during the year explored a number of caves in the Coolaman limestone, about 20 miles north-east of Kiandra.

During the year a new edition of the geological map of the Colony, embodying all geological work up to date, has been issued under the superintendence of the Government Geologist. Owing to the excellence of the colouring and lithographing the new map is considered to be a considerable improvement on anything of the sort previously issued by the Department. The printing was done in the lithographic branch of the Lands Department. The map has been awarded a medal at the Chicago Exhibition.

#### MINING SURVEYS, &c.

The number of mining surveys made during last year was 600; of these 386 were gold leases, 87 mineral leases, 32 mining permits, and 95 mining tenements; 559 were made by salaried, and the balance by non-salaried surveyors. The number of salaried surveyors employed was 5; and one—Mr. Edward Thomas—was also engaged for a considerable time in surveying the workings in various collieries in the Newcastle district; and the necessity for this work is shown by the serious discrepancies between the colliery plans and those prepared by Mr. Thomas. The number of applications awaiting survey on the 31st December was 45 gold leases, 7 mineral leases, 4 mining permits, and 9 mining tenements; total, 65, against 85 at the end of 1892.

#### *Charting.*

The total number of lease cases dealt with during the year was 752, as against 1,241 during the previous year, but as only 4 draftsmen were employed upon this class of work during 1893, the result is, I think, satisfactory. The number of 27th and 28th section applications dealt with was 208.

There has been a considerable increase in the number of applications for permits to search and to remove minerals and gold; and in connection with this work I wish to record the loss sustained by the Branch by the death of Mr. E. P. Mayes, who was a diligent and efficient officer and one highly esteemed by his comrades. Since May last this work has been entrusted to Mr. W. S. Gray, by whom it is being very satisfactorily performed. The number of applications under this section dealt with during the year was 719.

The work of charting up mining maps for the use of wardens, district surveyors, and mining surveyors has become very heavy indeed—662 having been completed and issued during the year, as against 543 in 1892. It is being performed by Mr. Oom, and, as it will continue to increase in accordance with the completion of new mining maps by the compiling draftsmen, it promises very soon to become greater than he can cope with unassisted.

The notation of plans is a valuable and responsible work, and is being very satisfactorily performed by Mr. James, who, during the year, has noted 5,387 plans, in addition to doing other miscellaneous work.

Owing to the small number of applications to lease which are coming in only four draftsmen are regularly engaged on charting; but a great deal of valuable miscellaneous work—the results of which may

may not be apparent to the general public—is being performed by the other draftsmen. In addition to what has already been specified I may mention that performed by Mr. Lee, which consists in charting proclaimed gold-fields and reserves, preparing descriptions, &c., and necessitates very close attention.

The branch generally is in a thoroughly efficient condition, all the officers appearing anxious to do their work well and quickly, and while an influx of leasing cases can be met promptly, there is enough work of a miscellaneous nature to keep every one fully employed.

#### Compilations.

Efforts are being made to expedite as much as possible the issue of new mining maps, as besides being of the greatest assistance to the public, they obviate the necessity for obtaining the maps in use by the Lands Department—a proceeding which often causes delay; and Mr. Bishop, the head of the compiling room, renders valuable assistance in this direction.

During the year 28 compilations, embracing 64 parishes or parts of parishes, have been put into office use, as against 29 compilations, embracing 47 parishes or parts of parishes, put into use during the previous year. Twenty-eight compilations were examined and completed, 29 compilations, embracing 67 parishes, were published, and 7 remained on hand in various stages.

Eighty-eight proofs of parish and town maps were received from the Lands Department, 87 were revised for mining work and returned, and 52 were adopted as mining maps and put into office use.

During the year an alteration, which is found to work well, was made in the system of compilation by placing maps, constructed by the staff draftsmen and laid down in outline only, in the hands of contract draftsmen specially qualified for the work, to write up and complete.

Herewith is a list of new maps published during 1893, and also a complete list of mining maps in use to date.

#### LIST of New Maps published during 1893.

Parish or part of.	County.	Parish or part of.	County.
Highland Home .....	Gough.	Barra, &c.....	Cunningham and Kennedy.
Lennox and Lewis .....	Wellington and Bathurst.	Freemantle, Worcester, &c.....	Bathurst.
Paradise North, &c.....	Gough.	Walcha .....	Parry.
Strathbogie North, &c.....	do	Tambaroora, Carroll, &c.....	Wellington.
Scone .....	do	Kirk (White Cliff's Opal Mines) .....	Yungnulpra.
Annandale.....	Clive.	Mount Hope and Mount Allen.....	Blaxland.
Nullama.....	Gresham.	Springbrook .....	Gresham.
Adelong, &c.....	Wynyard.	Lake Macquarie .....	Northumberland
Clinton and March .....	Bathurst.	Forbes (reference) .....	Ashburnham.
Frazer and Gibraltar .....	Clive.	Hargreaves .....	Wellington.
Moorkaie and Maharatta .....	Yancowinna.	Abercrombie and Clifford .....	Beresford.
Dalmorton.....	Gresham.	Bombala.....	Georgiana.
Gulph, Cadgee, &c.....	Dampier.	Windeyer, Waratta, &c.....	Wellington.
Mount Gipps .....	Yancowinna.	Dangera, Ettrema, &c.....	St. Vincent.
Bagawa and Comlaroi.....	Fitzroy.		

#### Complete List of Mining Maps in use to date.

Parish.	County.	Mining District.	Gold-field.
Abercrombie .....	Beresford	Tumut and Adelong .....	Umaralla.
Adelong .....	Wynyard	do do .....	Adelong Creek.
Do (part of) .....	do	do do .....	do
Ainsley .....	Parry	Peel and Uralla .....	Swamp Oak and Niangala.
Airly .....	Roxburgh	Mudgee .....	
Albert.....	Yancowinna	Albert .....	Albert.
Alberta .....	Farnell	do .....	do
Albury .....	Goulburn	Tumut and Adelong .....	Black Range (partly).
Alma .....	Yancowinna	Albert .....	Albert.
Do (town of) .....	do	do .....	do
Anderson .....	Gough	Peel and Uralla .....	Tingha.
Annandale.....	Clive	New England .....	Emmaville (partly).
Anson (part of).....	Bathurst	Bathurst .....	
Antimony .....	Buller	New England .....	Boorook and Lunatic.
Arkell (part of).....	Bathurst	Bathurst .....	Caloola Creek (partly).
Arvid .....	Gough	New England .....	Kinnaville.
Aston .....	Hardinge	Peel and Uralla .....	Tingha.
Awaba .....	Northumberland	Hunter and Macleay .....	
Badjerrigarn .....	Farnell	Albert .....	Albert.
Bagawa .....	Fitzroy	Clarence and Richmond .....	Orara.
Bald Nob .....	Gough	Peel and Uralla .....	
Ballallaba (part of) .....	Murray	Tumut and Adelong .....	Molonglo (partly).
Ballandean.....	Clive	New England .....	
Ballina .....	Rous	Clarence and Richmond .....	Twoed and Richmond River (partly).
Bangheet .....	Murchison	Peel and Uralla .....	Bingara (partly).
Do (part of).....	do	do do .....	Bingara.
Baring.....	Westmoreland	Bathurst .....	Oberon.
Barney Downs .....	Clive	New England .....	Boorook and Lunatic.
Bates (part of) .....	do	do .....	Emmaville.
Berrima .....	Camden	Southern .....	

Parish.	County.	Mining District.	Gold-field.
Bherwerre	St. Vincent	Southern	
Bindera	Gloucester	Hunter and Macleay	Barrington and Gloucester.
Bingara	Murchinson	Peel and Uralla	Bingara.
Do (part of)	do	do do	do
Binghi	Clive	New England	Emmaville.
Blackheath	Cook	Bathurst	do
Blain	Clive	New England	Albert.
Bligh	Farnell	Albert	
Bloxsome	Gough	Peel and Uralla	
Boduldura (part of)	Wellington	Tambaroora and Turon	Macquarie River, Stony Creek, and Iron-barks.
Boiga (part of)	do	do do	Wellington.
Bolaira	Yancowinna	Albert	Albert.
Bolton (part of)	Westmoreland	Bathurst	Oberon (partly).
Bomangaldy	Yancowinna	Albert	Albert.
Bombah	Georgiana	Bathurst	Mulgunnia and Abercrombie.
Bomgadah	Mootwingee	Albert	Albert.
Bookookarara (part of)	Buller	New England	Boorook and Lunatic (partly).
Do do	do	do	do do do
Booloomhayt	Gloucester	Hunter and Macleay	Gloucester.
Boona	Kennedy	Cobar	Bogan.
Do East	Cunningham	do	do
Do West	do	do	do
Boonoo Boonoo (part of)	Buller	New England	Boorook and Lunatic.
Boorook	do	do	do do
Boranel	Gloucester	Hunter and Macleay	Gloucester.
Bowman	Clive	New England	Emmaville.
Boyd	Gough	Peel and Uralla	
Brangalga	Bourke	Tumut and Adelong	Bourke, Cooper, Dowling, and Gipps.
Branxton	Northumberland	Hunter and Macleay	
Bray	Yancowinna	Albert	Albert.
Bringellet (part of)	Bathurst	Bathurst	Caloola Creek.
Broadmeadows	Gresham	Clarence and Richmond	Boyd or Little River
Broulee (and Tomaga)	St. Vincent	Southern	Mogo (partly).
Brundah	Monteagle	Lachlan	Tyagong Creek.
Buangla (part of)	St. Vincent	Southern	Yalwal.
Bullongong (part of)	Murray	Tumut and Adelong	Molonglo (partly).
Bumbaldry	Monteagle	Lachlan	Tyagong Creek.
Bundar	Gough	New England	Emmaville (partly).
Bundawarra	Bland	Lachlan	Temora (partly).
Do (part of)	do	do	do do
Burra	Kennedy	Cobar	Bogan.
Burrandong	Wellington	Tambaroora and Turon	Macquarie River, Stony Creek and Iron-barks, and Wellington.
Burrandong (part of)	do	do do	do do do
Burrill	Kennedy	Lachlan	Bogan.
Byjerkerno	Farnell	Albert	Albert.
Byng	Bathurst	Bathurst	Byng (partly).
Caagee	Dampier	Southern	Gulph (partly).
Calafat	Wynyard	Tumut and Adelong	Adelong Creek.
Callany (part of)	Buller	New England	Boorook and Lunatic.
Caloola (part of)	Mootwingee	Albert	Albert.
Canowindra	Bathurst	Bathurst	Canowindra (partly).
Carroll (part of)	Wellington	Tambaroora and Turon	Wellington.
Cargo	Ashburnham	Lachlan	Cargo and Canowindra.
do (part of)	do	do	Cargo.
Castleton	Roxburgh	Bathurst	Turon River and Kirkconnell.
Cataract (part of)	Buller	New England	Boorook and Lunatic.
Cathcart	Yancowinna	Albert	Albert.
Cessnock	Northumberland	Hunter and Macleay	
Chalmer's (part of)	Durham	Peel and Uralla	Upper Hunter (partly).
Churchill (part of)	Drake	New England	Solferino.
Clare	Hardinge	Peel and Uralla	Tingha.
Clarence (part of)	Buller	New England	Tooloom Creek.
Clifford (part of)	Beresford	Tumut and Adelong	Umaralla.
Clinton	Bathurst	Bathurst	Ophir.
Clive	Gough	Peel and Uralla	Tingha.
Coally (part of)	Evelyn	Albert	Albert.
Cobar	Robinson	Cobar	Bogan.
Cole (part of)	Bathurst	Bathurst	Newbridge (partly).
Collett	Ashburnham	Lachlan	Canowindra.
Colongon	Buller	New England	Boorook and Lunatic.
Comlaroi	Fitzroy	Clarence and Richmond	Orara.
Cooba	Cook	Bathurst	
Coolamin	Wellington	Tambaroora and Turon	Macquarie River, Stony Creek, and Iron-barks.
Coolamigal	Roxburgh	Bathurst	Turon River.
Coonbaralba	Farnell	Albert	Albert.
Cooney	Sandon	Peel and Uralla	Guyra River.
Cooney (part of)	do	do do	do
Coorumbung	Northumberland	Hunter and Macleay	
Cope's Creek	Hardinge	Peel and Uralla	Tingha.
Corella	Cunningham	Cobar	Bogan.
Cordeaux	Camden	Southern	
Corona	Farnell	Albert	Albert.
Corry (part of)	Buller	New England	Boorook and Lunatic.
Coventry	Clarke	Peel and Uralla	Kookarabookra.
Cox	Cook	Bathurst	
Cranbrook (part of)	Clive	New England	Emmaville.
Craven	Gloucester	Hunter and Macleay	Gloucester.

Parish.	County.	Mining District.	Gold-field.
Cullen Bullen	Roxburgh	Bathurst	Turon River.
Cullendore	Buller	New England	
Cummings (part of)	Wellington	Tambaroora and Turon	Wellington.
Curragurra (part of)	do	do do	Macquarie River, Stony Creek, and Ironbarks.
Currajong	Ashburnham	Lachlan	Billabong.
Currambene	St. Vincent	Southern	Coooloongatta (partly).
Currecki	Gloucester	Hunter and Macleay	Gloucester.
Dalmorton (part of)	Gresham	Clarence and Richmond	Boyd or Little River.
Danjera (part of)	St. Vincent	Southern	Yalwal.
Darby	Hardinge	Peel and Uralla	Tingha.
Derra Derra	Murchison	do do	Bingara (partly).
Do (part of)	do	do do	Bingara.
Deriog	Farnell	Albert	Albert.
Dhoo	Yancowinna	do	do
Digby	Pottinger	Peel and Uralla	
Dinoga	Murchison	do do	Bingara.
Do (part of)	do	do do	do
Dumaresq	Gough	New England	Emmaville.
Dungowan	Parry	Peel and Uralla	Peel River.
Dunleary (part of)	Bathurst	Bathurst	Milburn Creek.
Edgar	Yancowinna	Albert	Albert.
Ellerslie	Cunningham	Cobar	Bogan.
Elmsmore	Gough	Peel and Uralla	Tingha (partly).
Enmore	Yancowinna	Albert	Albert.
Do	Sandon	Peel and Uralla	Gyra River Extension.
Eskdale	Roxburgh	Bathurst	Clear River and Kirkconnell (partly).
Ettrema	St. Vincent	Southern	Yalwal.
Euadera (part of)	Wynyard	Tumut and Adelong	Adelong Creek (partly).
Eumur	Darling	Peel and Uralla	Ironbark and Ti-tree.
Eusdale	Roxburgh	Bathurst	Kirkconnell and Mount Lambie (partly).
Fairy Hill	Yancowinna	Albert	Albert.
Falnash	Roxburgh	Bathurst	Turon River (partly).
Fitzroy	Kennedy	Cobar	Bogan.
Flagstone	Gough	New England	Emmaville.
Forbes	Ashburnham	Lachlan	Billabong and Lachlan.
Do (part of)	Wellington	Bathurst	Wellington and Macquarie River, Stony Creek and Ironbarks, and Ophir.
Fowler's Gap (part of)	Farnell	Albert	Albert.
Freemantle (part of)	Bathurst	Bathurst	Ophir (partly).
Frazer	Gough	New England	Emmaville.
Do	Clive	do	
Gadara (part of)	Wynyard	Tumut and Adelong	Adelong Creek (partly).
Gairdner's Creek	Mootwingie	Albert	Albert.
Galbraith	Bathurst	Bathurst	Newbridge and Caloola Creek (partly).
Do (part of)	do	do	Newbridge (partly).
Gibraltar (part of)	Clive	New England	
Giles (part of)	Farnell	Albert	Albert.
Gillgurry (part of)	Buller	New England	Boorook and Lunatic.
Gillenbine	Kennedy	Cobar	Bogan.
Gillindich	Georgiana	Bathurst	Junction Point, Tuena Creek, and Markdale.
Glenken	Selwyn	Tumut and Adelong	Ouranes Creek.
Gneupa	Auckland	Southern	Pambula.
Gooloongolok	Gloucester	Hunter and Macleay	Gloucester.
Gordon	Gough	Peel and Uralla	
Gouron (part of)	Murchison	do do	Bingara.
Graeme	Macquarie	Hunter and Macleay	Nowendock and Gloucester.
Gulgong	Phillip	Mudgee	Gulgong.
Gulph	Dampier	Southern	Gulph.
Guntawang	Phillip	Mudgee	Gulgong.
Hall	Clarke	Peel and Uralla	Kookarabookra.
Do	Darling	do do	Ironbark and Ti-tree.
Do	Murchison	do do	Bingara (partly).
Do (part of)	do	do do	Bingara.
Hamilton	Gough	New England	Emmaville.
Hampton	Bathurst	Bathurst	Belubula (partly).
Haning	Inglis	Peel and Uralla	
Hargraves	Wellington	Mudgee	Wellington.
Hartley	Cook	Bathurst	
Haystack	Gough	New England	Emmaville.
Heathcote	Cumberland	Southern	
Herbert	Gough	Peel and Uralla	Tingha.
Herborn	Raleigh	Hunter and Macleay	Orara.
Highland Home	Gough	New England	Emmaville.
Hughea	Yancowinna	Albert	Albert.
Ironbarks (part of)	Wellington	Tambaroora and Turon	Macquarie River, Stony Creek, Ironbarks, and Muckerwa.
Inverary	Argyle	Southern	Nerrinunga.
Inverell	Gough	Peel and Uralla	
Jamberoo	Camden	Southern	
Jamieson	Cook	Bathurst	
Jellore	Camden	Southern	
Jerricknorra	St. Vincent	do	Shoalhaven and Shoalhaven River (partly).
Jingellie East	Selwyn	Tumut and Adelong	Ouranes Creek.
Joadja	Camden	Southern	
Jocelyn	Westmoreland	Bathurst	Oberon.
Kahibah	Northumberland	Hunter and Macleay	
Kangaloon	Camden	Southern	

Parish.	County.	Mining District.	Gold-field.
Kedumba	Cook	Bathurst	
Kembla	Camden	Southern	
Kirk	Yungulgra	Albert	Albert.
Lake Macquarie	Northumberland	Hunter and Macleay	
Landsend	Gough	New England	Emmaville.
Langdale (part of)	Westmoreland	Bathurst	Oberon (partly).
Lennox	Bathurst	Bathurst	Ophir (partly).
Lewis	Yancowinna	Albert	Albert.
Do (part of)	Wellington	Bathurst	Ophir (partly).
Lidsdale	Cook	do	Mount Lambie (partly).
Loftus (part of)	Parry	Peel and Uralla	Swamp Oak and Niangala (partly).
Macintyre (part of)	Murchison	do do	Bingara (partly).
Maharatta	Yancowinna	Albert	Albert.
Mandamah (part of)	Bland	Lachlan	Barmedman (partly).
Mandolong	Northumberland	Hunter and Macleay	
Mauidra	Ashburnham	Lachlan	Dilga.
Marangaroo	Cook	Bathurst	
March (part of)	Wellington	do	Ophir.
Marsh	Buller	New England	
Martin	Ashburnham	Lachlan	Billabong.
Maryland	Buller	New England	
Mayo	Hardinge	Peel and Uralla	Tingha.
Megalong	Cook	Bathurst	
Merrigalah (part of)	Sandon	Peel and Uralla	Gyra River.
Metz	do	do do	do
Do (part of)	do	do do	do
Mickimill	Kennedy	Cobar	Bogan.
Milring (part of)	Evelyn	Albert	Albert.
Mingelo (part of)	Narromine	Mudgee	Tomingley.
Mitchell	Gough	Peel and Uralla	
Do (part of)	Clarke	do do	Kookabookra and Orara.
Molroy	Murchison	do do	Bingara.
Mongarlowo	St. Vincent	Southern	Mongarlowe River (partly).
Moonam (part of)	Durham	Peel and Uralla	Upper Hunter.
Moorkaie	Yancowinna	Albert	Albert.
Moquilamba	Robinson	Cobar	Bogan.
Moruya	Dampier	Southern	Moruya (partly).
Morandurey	Roxburgh	Mudgee	
Mouin	Cook	Bathurst	
Mount Allen	Blaxland	Cobar	Bogan.
Mount Gipps	Yancowinna	Albert	Albert.
Mount Hope	Blaxland	Cobar	Bogan.
Muckerwa (part of)	Wellington	Tambaroora and Turon	Macquarie River, Stony Creek and
Do	do	do do	Ironbarks, and Muckerwa.
Mugineoble	Ashburnham	Lachlan	Billabong.
Muir	Gough	New England	Emmaville.
Mulgunnia	Georgiana	Bathurst	Mulgunnia and Abercrombie (partly).
Mundi Mundi	Yancowinna	Albert	Albert.
Mungabarina	Goulburn	Tumut and Adelong	Black Range (partly).
Murga	Cunningham	Cobar	Bogan.
Myall	Murchison	Peel and Uralla	Bingara.
Nadbuck	Yancowinna	Albert	Albert.
Naradin	do	do	do
Narrangarril	Argyle	Southern	Argyle, Camden, and King.
Nepean	Cook	Bathurst	
Nerrigundah (part of)	Dampier	Southern	Gulph.
Nerrimunga	Argyle	do	Nerrimunga Creek.
New England Mining District			
Newry	Darling	Peel and Uralla	Ironbark and Ti-tree (partly).
Noorooma	Dampier	Southern	Dromedary.
Do (part of)	do	do	do
Nulluma	Gresham	Clarence and Richmond	Boyd or Little River (partly).
Nundle (part of)	Parry	Peel and Uralla	Peel River (partly).
Nullum	Rous	Clarence and Richmond	Tweed and Richmond Rivers.
Oallen (part of)	Argyle	Southern	Shoalhaven and Shoalhaven River.
Oberon	Westmoreland	Bathurst	Oberon.
Oldcastle (part of)	Durham	Peel and Uralla	Upper Hunter.
Olney	Northumberland	Hunter and Macleay	
Omadaie	Durham	Peel and Uralla	do
Ophara	Yancowinna	Albert	Albert.
Opton	King	Southern	Argyle, Camden, and King.
Orr (part of), Mount Brown	Evelyn	Albert	Albert.
Para	Yancowinna	do	do
Paradise North	Gough	New England	Emmaville.
Parkes	Ashburnham	Lachlan	Billabong.
Picton	Yancowinna	Albert	Albert.
Prospero (part of)	Durham	Peel and Uralla	Upper Hunter.
Purnamoota	Yancowinna	Albert	Albert.
Purvis (part of)	Clive	New England	Emmaville.
Reid (part of)	Buller	do	Boorook and Lunatic.
Robe	Yancowinna	Albert	Albert.
Rock Glen	Clive	New England	Emmaville.
Rock Vale	do	do	do
Romney (part of)	do	do	Deepwater.
Ruby	Buller	do	Boorook and Lunatic (partly).
Rusden	Gough	Peel and Uralla	
Sara (part of)	Gresham	do do	Kookarabookra.
Do	do	do do	do
Sarsfield	Kennedy	Cobar	Bogan.
Soone	Gough	Peel and Uralla, and New England.	Emmaville (partly).

Parish.	County.	Mining District.	Gold-field.
Scott	Gough	Peel and Uralla, and New England.	
Sebastopol	Clarendon	Tumut and Adelong	Sebastopol, Junee, and Eurongilly (partly).
Do	Yancowinna	Albert	Albert.
Seeley (part of)	Clarke	Peel and Uralla	Kookarabookra.
Sentinel	Yancowinna	Albert	Albert.
Severn (part of)	Gough	Peel and Uralla	
Silent Grove (part of)	Clive	New England	Emmaville (partly).
Single	Hardinge	Peel and Uralla	Tingha (partly).
Sofala	Roxburgh	Tambaroora and Turon	Turon River.
Somers (part of)	Bathurst	Bathurst	Gully Swamp and Black Hills (partly).
Somerset	Kennedy	Cobar	Bogan.
Soudan	Yancowinna	Albert	Albert.
Southend	Cumberland	Southern	
South Gundagai	Wynyard	Tumut and Adelong	Adelong Creek and Gundagai.
Springbrook	Gresham	Clarence and Richmond	Boyd or Little River.
Stanford	Northumberland	Hunter and Macleay	
Stephen	Yancowinna	Albert	Albert.
Stockrington	Northumberland	Hunter and Macleay (extn.)	
Stockton	Gloucester	do do	
Do (Town of)	do	do do	
Stonehenge	Gough	Peel and Uralla	
Stowell	Gloucester	Hunter and Macleay	
Strachan	Gough	New England	Emmaville (partly).
Strathbogio	do	New England and Peel and Uralla.	do
Strathbogio North	do	New England	Emmaville.
Strathspey (part of)	Buller	do	Boorook and Lunatic.
Sutton	Gloucester	Hunter and Macleay	
Swinton	Hardinge	Peel and Uralla	Tingha.
Talbragar	Bligh	Mudgee	Gulgong.
Tambaroora (part of)	Wellington	Tambaroora and Turon	Wellington.
Tara	Yancowinna	Albert	Albert.
Tolararee	Gloucester	Hunter and Macleay	Gloucester (partly).
Tenandra	Lincoln	Mudgee	Mitchell's Creek.
Tent Hill	Gough	New England	Emmaville (partly).
Teralba	Northumberland	Hunter and Macleay	
Thornahope	Roxburgh	Bathurst	Mount Lambie.
Tianga	Hardinge	Peel and Uralla	
Timbarra	Clive	New England	Boorook and Lunatic and Timbarra.
Tomaga	St. Vincent	Southern	Mogo (partly).
Tomaree	Gloucester	Hunter and Macleay	
Toogong	Ashburnham	Lachlan	Cargo and Canowindra (partly).
Topi Topi	Gloucester	Hunter and Macleay	Gloucester.
Torrowangee	Farnell	Albert	Albert.
Torrens (part of)	Bathurst	Bathurst	King's Plains.
Tout	Kennedy	Cobar	Bogan.
Triambil (part of)	Wellington	Tambaroora and Turon	Wellington.
Trigalong	Bland	Lachlan	Temora.
Tuena	Georgiana	Bathurst	Abercrombie.
Tuggerah	Northumberland	Hunter and Macleay	
Tumberumba	Selwyn	Tumut and Adelong	Tumberumba and Ouranic and Barra Creek (partly).
Undercliff (part of)	Buller	New England	Boorook and Lunatic.
Umberumberka	Yancowinna	Albert	Albert.
Ulmarrah (part of)	Wellington	Tambaroora and Turon	Wellington.
Urobodalla	Dampier	Southern	
Walcha	Parry	Peel and Uralla	Swamp Oak and Niangala.
Walla Walla	Forbes	Lachlan	Lachlan.
Wallundry	Bland	do	Gundabindyal.
Walters (part of)	Wellington	Tambaroora and Turon	Wellington.
Wangat	Gloucester	Hunter and Macleay	Gloucester.
Warragamba	Cook	Bathurst	
Warratta (part of)	Evelyn	Albert	Albert.
Warrattra (part of)	Wellington	Mudgee	Wellington.
Warre Warral	Clarendon	Tumut and Adelong	Sebastopol, Junee, and Eurongilly.
Waukaroo	Yancowinna	Albert	Albert.
Wellington North	Gough	New England	Emmaville.
Wellington Vale	do	do	do (partly).
Wells	Roxburgh	Tambaroora and Turon	
Wertago	Yungnulgra	Albert	Albert.
West Fairfield	Drake	New England	Timbarra.
Willie Ploma	Wynyard	Tumut and Adelong	Adelong Creek.
Willyama (village of)	Yancowinna	Albert	Albert.
Windeyer (part of)	Wellington	Mudgee	Wellington.
Woonona	Camden	Southern	
Wood's Reef	Darling	Peel and Uralla	Ironbark and Ti-tree.
Woraro	Yungnulgra	Albert	Albert.
Worcester	Bathurst	Bathurst	Ophir.
Worra	Gresham	Peel and Uralla	Kookarabookra.
Wyalda	Phillip	Mudgee	Gulgong.
Wylie	Buller	New England	Boorook and Lunatic (partly).
Yalwal (part of)	St. Vincent	Southern	Yalwal.
Yancowinna	Yancowinna	Albert	Albert.
Yancowinna North	do	do	do
Yarralaw	Argyle	Southern	Argyle, Camden, and King.
Young (part of)	Monteagle	Lachlan	Barrangong.
Yowaka	Auckland	Southern	Pambula.
Do (part of)	do	do	do

## INSPECTION OF MINES OTHER THAN COAL AND SHALE MINES.

The Chief Inspector of Mines (Mr. Slec, F.G.S.) reports that during the past year there have been 19 fatal and 24 non-fatal accidents in connection with the metallic mines of this Colony, being an increase of 1 fatal and a decrease of 4 non-fatal accidents as compared with 1892. The percentage of fatal accidents, it is gratifying to observe, is much lower than in 1892, being '96 as against 1'04, so is also the non-fatal accidents, which is 1'20, as compared with 1'60 during the previous year. Of the fatal accidents 3 were caused by falling down shafts, 9 from fall of earth, 3 from explosion of shot, 1 through being crushed by machinery, 1 from being run over by truck, and 2 from miscellaneous causes. The non-fatal accidents—5 were due to falling down shafts, 4 to fall of earth, 1 to explosion of shot, 7 to run-away cage (6 of them being due to the one accident), and 7 miscellaneous. During the year there was 1 fatal accident for every 1,037 miners employed as against 1 in every 963 miners employed during 1892. The number of persons employed in all classes of metallic mining was, at the end of the year, 19,709, as compared with 17,332 in 1892. The principal increase is in connection with alluvial gold-mining, no doubt due to the large number of fossickers sent from Sydney to the various gold-fields.

The undermentioned localities were visited and inspected during the year:—

*By the Chief Inspector.*

Adelong, Gundagai, Gunning, Goulburn, Temora, Barmedman, Yalgogrin, Grenfell, Forbes, Parkes, Burra Burra, Mount Hope, Mount Allen, Billigoe, Bee Mountain, Cobar, Peak Hill, Alectown, Wellington, Lucknow, Bathurst, Orange, Dubbo, Nymagee, Armidale, Uralla, Sherwood, Hillgrove, Glen Innes, Glen Elgin, and Deepwater, the Chief Inspector at the same time dealing with applications under the Prospecting Vote.

*By Inspector Milne.*

In the Northern District:—Nana Creek, Grafton, Cangi, Mann River, Glen Elgin, Dalmorton, Newton Boyd, Tenterfield, Drake, Rivertree, Deepwater, Emmaville, Torrington, Glen Innes, Bear Hill, Inverell, Tingha, Kookabookra, Bingara, Tamworth, Swamp Oak, Niangala, Armidale, Hillgrove, and Copeland.

In the Southern District:—Wagonga, Bodalla, Nerrigundah, Araluen, Nelligen, Brimbramalla, Tarago, Bungonia, Nadgingomar, Goulburn, Crookwell, and Coolamin.

In the Western District:—Kerr's Creek, Ophir, Lewis Ponds, Orango, Forest Reefs, Burnt Yard, Carcoar, Woodstock, Mandurama, Galley Swamp, and Mount McDonald.

The Inspector observes a very noticeable improvement both on the surface and underground workings, due, no doubt, to the more frequent inspection of the mines, the regulations being generally complied with. Mr. Inspector Milne, as a member of the Prospecting Board, has also reported on a large number of applications for aid during his visits of inspection.

*By Inspector Hebbard.*

Mr. Hebbard's head-quarters are at Broken Hill, and he makes frequent inspections of the very important mines in that district. He also inspected during the year the districts of Thackaringa, Umberumberka, Purnamoota, Day Dream, Tarrawingee, Euriowie, Nuntherungie, White Cliffs, Mount Browne, and Tibooburra. The Inspector reports that the regulations in his district are generally complied with.

*By Acting Inspector Godfrey.*

In the Southern District, Pambula, Cobargo, Bimbimbie, Nelligen, Yalwal, Braidwood, Major's Creek, Boro, Captain's Flat, Cooma, Kiandra, Adelong, Gundagai, Temora, Cullinga, Young, Grenfell, Junee, and Albury. In the Northern Districts, Deepwater, Emmaville, Dalmorton, Nana Creek, Cangi, Hillgrove, Nundle, Stewart's Brook, Moonan Brook, Niangala, and Swamp Oak. With very few exceptions the regulations were found to be generally complied with.

*By Acting Inspector Atherton.*

The urgent need for retrenchment was the sole occasion of dispensing with Mr. Atherton's services at the end of the year. Although only a short time in the Department, Mr. Atherton has always performed his duties very satisfactorily. During the year he visited and inspected the following districts:—Drake, Orange, Lucknow, Carcoar, Blayney, Mandurama, Woodstock, Canowindra, Wattle Flat, Sofala, Hill End, Hargraves, Windeyer, Stuart Town, Wellington, Ironbarks, Cobar, Peak Hill, Alectown, Parkes, Forbes, Newbridge, Rockley, Oberon, Gulgong, Denison Town, Trunkey, Tarana, Sunny Corner, King's Plains, and Bathurst.

## DIAMOND DRILLS.

The aggregate depth bored during 1893 was 1,903 feet 7 inches, or 2,235 feet 6 inches less than during the year 1892.

The average cost per foot for boring in 1893 was 18s. 1½d., as compared with 16s. 0½d. in 1892, the extra cost being due to larger diameter, deeper boring, and difficult nature of strata passed through.

Diamonds used in 1893 cost 3s. 3½d. per foot, as compared with 2s. 2d. in 1892.

But

But for the diamonds used in 1893 for clearing the Cremorne and Yacnaba bores of obstructions the cost per foot would have been considerably less than in 1891 or 1892.

The earnings of the diamond-drills during the year amounted to £2,189 Os. 8d., and the amount paid into the Treasury was £1,900 9s. 11d.

#### GOVERNMENT METALLURGIST.

This officer (Mr. James Taylor, B.Sc., A.R.S.M.) arrived in Sydney middle of February, 1893. On the 23rd February, visited Mt. Stewart, where several days were spent in going over the mine and works and the discussion with the managers of proposed changes in the treatment of the ores. Also visited Dynever Mine and mines at or near Pine Ridge.

On the 28th, reached Mitchell's Creek Mine, Wellington, and spent a couple of days about one of the most substantial mines in the Colony. Thence, on the 4th March, reached Peak Hill and inspected the various batteries and mines, leaving on the 8th for Orange. From here inspected the Lucknow and Lewis Ponds mines, and also the Ironclad and other mines at Cargo. On the 13th visited Mandurama, for Burnt Yards, Junction Mine, and Galley Swamp. On the 16th reached Tuena, and saw Mt. Costigan, the Abercrombie alluvial deposits, and subsequently Mt. Grey, Hidden Treasure, and other mines in the neighbourhood of Trunkey Creek. On the 18th inspected the Silver battery, at Back Creek, near Rockley, and thence proceeded to Sunny Corner.

At Sunny Corner went all over the works and through such of the mines as were accessible, also visiting at Dark Corner the Lackey Mine, Homeward Bound Mine, and Johnson's Prospecting Shaft, returning to Sydney on the 24th March.

On 12th April proceeded to Rivertree, by direction of the Minister, at the request of the directors of the Rivertree Prospecting Silver-mining Co., to inspect their works, and to meet the directors on the ground, and to advise them; and subsequently a report was made to the Under Secretary. Other mines in the district were visited, but excessively wet weather somewhat hampered one's movements.

On 17th April reached Fairfield, and inspected White Rock, Mt. Carrington, Mascotte, Long Gully, and other mines in the vicinity, returning to Sydney on the 21st.

On 26th June went to Emmaville, and from thence visited the tin deposits about that district at Y Waterholes, Tent Hill, and Butler's Reef; also the argentiferous mines at Webb's Consols, Mt. Galena, and Webb's Mine. On 3rd July, went to Deepwater, and from thence visited Castle Rag, Pearce's Hill, Nine-mile, Castle Wellington, and Trollope Swamp. On 8th July, reached Glen Innes, and thence to Glen Elgin. Here, with unlimited water power and apparently a sufficiency of ore, the field should repay attention.

On 10th July reached Hillgrove, and inspected the various mines and works, also paying a visit to the Rockvale Mine. This field affords much scope for metallurgical investigation, and well-directed effort must result in considerable economies in the treatment of the combined antimony and gold ores which abound here. Returned to Sydney on the 15th.

On 17th August started for Marulan and the south, as far as Pambula. Reports were furnished on the Carrington Mine, at Marulan, on Captain's Flat, and a general report on Boro, Major's Creek, Araluen, Moruya, Nerrigundah, Mount Dromedary, Montreal, Coolagolite, Nelson, and the Pambula Fields. Returned to Sydney on 16th September.

On 14th November went to Mitchell's Creek Mine, Wellington, to inspect the McArthur-Forrest cyanide process at work there treating old tailings. Returned on the 18th and reported.

On 5th December left for Bingera and Barraba. At the former place inspected the Top Bingera Gold-mine, a newly-opened mine at Barrack's Creek, more recently named the Perseverance, Low's Shaft, on the basalt, about 8 miles from Bingera, and an old shaft a mile from that; the Monte Christo Diamond-mine, Smith's claim, and others, also Smith's Cinnabar Mine and All Nations battery, now standing. From Barraba, visited Wood's Reef, where good gold is being found, thence to Wyeth's claim and King Solomon's Mine.

The chief object in going to Barraba, however, was to visit the copper mine and smelting works at Gulf Creek, 20 miles from Barraba. Unsuccessful attempts had been made to smelt the ore, and the directors of the Cornish Copper Company wrote to this Department for assistance in their difficulty. As a result of the visit they are now successfully smelting copper there, and sending it to Newcastle for refining, much to the satisfaction both of directors and smelters. Returned to town on 14th December.

The Peak Hill Proprietary Gold-mining Company, owing to lack of water, had to make use of the water pumped from their mine. This contained copper, sulphuric acid, and other compounds, and the amalgamation was seriously prejudiced. A sample of the water was supplied to the Department for analysis

analysis and experiment. Eventually it was recommended to add to the 12,000 gallons daily taken from the mine about 2 cwt. of quicklime. The result of this treatment is reported to be exceedingly satisfactory; much less trouble is experienced with the copper-plates, and the assay value of the smelted gold is very decidedly increased.

#### SITE FOR METALLURGICAL WORKS.

Owing to the uncertainty as to the action that would be taken by Parliament on the question of a special site for noxious trades, nothing could be done towards securing a site for the proposed works. As soon as action could be taken, possible sites were visited, and it is expected that a suitable one will shortly be secured, and it is hoped that during 1894 the necessary buildings will be erected, and the works placed in going order.

The visits of the Metallurgist to the various mining localities have served the double purpose of acquainting him with the character of our deposits, and enabling him to advise mine-owners upon the modes of treating ores, and suggesting improved methods. It is gratifying to note that some mine-owners have acknowledged that the advice given has enabled them to treat successfully ores that had previously baffled all their efforts.

#### SCHOOL OF MINES.

Provision has now been made for giving in this Colony as complete and effective a training in mining as can be obtained even in Great Britain. As the projector (if I may be permitted to apply that term to myself) of the Ballarat School of Mines, I am perhaps prejudiced in favour of that very excellent institution, but, notwithstanding that, I feel bound to say the training which is being provided in Sydney is, or will shortly be, in every respect equal to the instruction in mining obtainable there.

Indeed, when the Government metallurgical works shall be in operation, there will, thanks to the kindness of the owners of private metallurgical works, and the owners of mines who permit students to visit, inspect, and have explained to them the various processes, be nothing wanting to make the course of instruction here as complete as could be desired, unless it be (and that I trust will come in good time) that mine-owners may permit their managers to take as articulated pupils or otherwise young men who desire to become mining managers or mining engineers, for, say, one or two years practical mine work, with this addition to the course provided, we should be able to turn out mine managers and mining engineers equal to any in the world.

The course at the School of Mines recently established at the Sydney University includes chemistry, practical chemistry, geology, mineralogy, microscopical petrography, metallurgy, assaying in all its branches, mining, engineering, mechanical drawing, surveying, mathematics, &c. The students in mining and metallurgy, in addition to the instruction in the class-room, are accompanied to metalliferous mines, collieries, and ore-reducing and smelting works, where the operations are explained to them by the lecturers. The course of instruction leads up to the degree of Bachelor of Mining Engineering, but the various classes are open to occasional students, or students who do not desire to take the whole course as well as to matriculated members of the University.

The School of Mines was in operation during the whole of 1893, and though the number of students was small it is confidently expected that, as the advantages of the school become more generally known, the number will increase, and that ere long a sufficient number of trained mining engineers will be turned out to meet the requirements of mining in this Colony. A very fine building, containing lecture-rooms and class-rooms for practical instruction is nearing completion, and will very shortly be supplied with a valuable collection of models to illustrate the lectures on mining, &c., which are being obtained from Europe.

At the Technical College in Sydney, instruction (including laboratory practice) in all branches of geology, mineralogy, chemistry, metallurgy, and mining is provided, and students are taken, in charge of a teacher, at convenient times, to different localities, where they can obtain a practical insight in geological field work and mining operations.

The Technical Education Branch of the Department of Public Instruction, to meet the requirements of young people in the country, also provides instruction locally at the Branch Technical Schools, as follows:—

*Bathurst—*  
Chemistry,  
Geology,  
Mineralogy,  
Mineral Prospecting.

*Goulburn—*  
Chemistry,  
Assaying,  
Geology,  
Mineralogy.

*Newcastle—*  
Chemistry,  
Metallurgy,  
Geology,  
Mineralogy,  
Coal-mining,  
Mine Surveying.

And special facilities are offered by the Senate of the University for students at the Technical College to complete their course at the University.

While

While fully recognising the skill and great practical experience of the managers of our mines, I trust I may be pardoned for saying that the value of having thoroughly trained scientific men available as mining managers cannot fail to effect improvements in our methods of mining and treatment of ores; and it must be an advantage to the youths of this Colony to have such facilities for qualifying for these important positions.

#### MINERAL PRODUCTS.

I am pleased to be able to report that the total value of our mineral products at the end of 1893 exceeded the sum of one hundred million sterling, the exact figures being £104,280,711 4s. 7d. A large decrease is shown in the output of coal during the year, the quantity raised in the year 1893 being more than half a million tons less than in 1892, representing a loss of £290,664. The decrease in the output of shale, tin, and copper is also very serious. This loss is, however, more than made up by the large increase in the value of the gold, silver, and lead produced, bringing up the total value of the minerals won during the year to £5,438,532 3s. 2d., which exceeds the output of 1892 by £132,716 15s. 6d., and the decennial average by £1,117,809.

It is to be hoped that we shall ere long be able to recover our export trade in coal, and if some means could be devised whereby the traffic charges could be so reduced as to admit of ores being brought to coal, it might perhaps be possible to treat successfully poor ores, of which we have vast quantities which cannot be profitably treated on the mines owing to the cost of fuel. This problem is now engaging the attention of the Department, and if the difficulties which at present appear insuperable can be overcome, the home consumption of coal will be enormously increased, as will also our output of minerals. The decrease in our output of tin is no doubt mainly due to the exhaustion of the principal known shallow deposits of alluvial tin ore. There is, however, a strong belief that deep leads of alluvial tin exist, and prospecting operations have for some time past been carried on in the Northern districts, but, owing to the heavy influx of water to be contended with, these operations have not so far been successful.

In view of the financial depression of the year, and the low price of several of the metals produced in this Colony, the result shown in the following must, I venture to think, be regarded as eminently satisfactory.

The following table shows the aggregate value of minerals, the produce of New South Wales, for the years 1892 and 1893 respectively compared:—

Minerals.	Quantity.			Value.			Quantity.			Value.			Increase in Value.			Decrease in Value.		
	1892.			£ s. d.			1893.			£ s. d.			£ s. d.			£ s. d.		
Gold .....	156,870·00	oz.		569,177	17	4	179,288·02	oz.		651,285	15	8	82,107	18	4	.....	.....	.....
Silver* .....	350,661·50	„		56,884	0	0	531,972·00	„		78,131	0	0	21,247	0	0	.....	.....	.....
Coal .....	3,780,967·71	tons		1,462,388	9	4	3,278,328·36	tons		1,171,722	4	6	.....	.....	.....	290,666	4	10
Shale .....	74,197·15	„		136,079	6	0	55,660·30	„		101,220	10	0	.....	.....	.....	34,858	16	0
Coke .....	7,809·00	„		8,852	8	6	17,858·00	„		20,233	2	0	11,390	13	6	.....	.....	.....
Tin .....	3,492·10	„		314,114	0	0	2,784·90	„		229,743	0	0	.....	.....	.....	84,371	0	0
Copper .....	4,834·20	„		187,706	0	0	2,067·00	„		58,426	0	0	.....	.....	.....	129,280	0	0
Iron† .....	2,782·17	„		22,605	2	6	2,190·56	„		14,786	6	0	.....	.....	.....	7,818	16	6
Antimony .....	728·25	„		14,680	0	0	1,774·00	„		25,092	0	0	10,412	0	0	.....	.....	.....
Bismuth .....	14·25	„		1,080	0	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,080	0	0
Silver-lead and Ores.	133,354·95	„		2,420,952	0	0	214,260·20	tons		2,953,589	0	0	532,637	0	0	.....	.....	.....
Manganese .....	15·80	„		47	0	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	0	0
Oxide of Iron and Pig-iron.	453·15	„		869	0	0	1,259·95	tons		1,526	0	0	657	0	0	.....	.....	.....
Zinc Spelter .....	444·55	„		5,055	0	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,055	0	0
Lead (Pig) .....	70·90	„		726	0	0	425·80	tons		4,205	0	0	3,479	0	0	.....	.....	.....
Limestone (Flux) .....	103,368·00	„		93,031	4	0	130,635·00	„		111,041	0	0	18,009	16	0	.....	.....	.....
Alumite .....	821·00	„		3,284	0	0	821·00	„		3,284	0	0	.....	.....	.....	.....	.....	.....
The Noble Opal .....	41·67	lb.		2,000	0	0	449·35	lb.		12,315	5	0	10,315	5	0	.....	.....	.....
Cobalt .....	76·00	tons		1,110	0	0	26·00	tons		305	0	0	.....	.....	.....	805	0	0
Fireclay .....	35·00	„		80	0	0	21·00	„		46	0	0	.....	.....	.....	34	0	0
Lime .....	403·00	„		822	0	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	822	0	0
Stone (Building) .....	2,478	No.		2,838	0	0	850	No.		855	0	0	.....	.....	.....	1,983	0	0
„ (Ballast) .....	224	tons		276	0	0	132	tons		166	0	0	.....	.....	.....	110	0	0
Grindstones .....	.....	.....		.....	.....	.....	2	No.		3	0	0	3	0	0	.....	.....	.....
Sundry Minerals .....	.....	.....		1,158	0	0	66·60	tons		557	0	0	.....	.....	.....	601	0	0
				5,305,815	7	8				5,438,532	3	2	690,248	12	10	557,531	17	4
										Net increase...£			132,716	15	6			

\* The greater part of the silver produced is exported in the shape of silver lead.

† Not manufactured from the ore, but old iron.



## GOLD.

The output of gold from the opening of our gold-fields to the end of 1893 amounts to 10,709,610 oz., valued at £39,853,941 10s. 10d. The quantity won last year was 179,288 oz., valued at £651,285 15s. 8d., being the largest output of any year since 1875. No doubt this satisfactory result is due somewhat to the large number of unemployed men assisted to the gold-fields as fossickers, and to the important discoveries made from time to time by parties aided out of the Prospecting Vote. It affords me much pleasure to note that some of the discoveries made towards the end of the year appear to give promise of a moderate revival in gold-mining and to justify the belief that our output of gold for 1894 will exceed that of the past year. If my anticipations in this direction should be realised, it is possible that the trouble in regard to our own unemployed will be to some extent solved, but unfortunately our efforts to help them have, I fear, had the effect of attracting the unemployed from other colonies to this.

TABLE showing the Quantity and Value of Gold won in the Colony of New South Wales from 1851 to 1893.

Year.	Quantity in oz.	Value.	Year.	Quantity in oz.	Value.
		£ s. d.			£ s. d.
1851	144,120	468,336 0 0	1874	270,823	1,040,328 13 6
1852	818,751	2,660,946 0 0	1875	230,882	877,693 19 0
1853	548,052	1,781,172 0 0	1876	167,411	613,190 7 9
1854	237,910	773,209 0 0	1877	124,110	471,418 4 4
1855	171,367	654,594 0 0	1878	119,665	430,033 2 7
1856	184,600	689,174 0 0	1879	109,640	407,218 13 5
1857	175,949	674,477 0 0	1880	118,600	441,543 7 7
1858	286,798	1,104,174 12 2	1881	149,627	566,513 0 0
1859	329,363	1,259,127 7 10	1882	140,469	526,521 12 5
1860	384,053	1,465,372 19 9	1883	123,805	458,508 16 0
1861	465,685	1,806,171 10 8	1884	107,198	395,291 12 5
1862	640,622	2,467,779 16 1	1885	103,736	378,665 0 3
1863	466,111	1,796,170 4 0	1886	101,416	366,294 7 7
1864	340,267	1,304,926 7 11	1887	110,288	394,578 16 3
1865	320,316	1,231,242 17 7	1888	87,503	317,099 12 0
1866	290,014	1,116,403 14 5	1889	119,759	434,070 8 4
1867	271,886	1,053,578 2 11	1890	127,760	460,284 16 2
1868	255,662	994,665 0 5	1891	153,336	558,305 12 3
1869	251,491	974,148 13 4	1892	156,870	569,177 17 4
1870	240,858	931,016 8 6	1893	179,288	651,285 15 8
1871	323,609	1,250,484 15 11			
1872	425,129	1,643,581 16 11		10,709,610	39,853,941 10 10
1873	361,784	1,395,175 8 7			

The following extracts taken from the reports, sent in by the Wardens and Mining Registrars, indicate the condition of mining in the various Mining Districts and Divisions in the Colony during last year:—

## BATHURST DISTRICT.

During the earlier part of the year mining matters were very dull in this District; but the advent of a large number of fossickers to the District helped to liven up matters considerably. Some of these men did very well, making full wages, and the winter being wet, it let the slicers get to work, who had been idle for want of water.

At Trunkey 200 men are at work on that field, and the gold won during the year was 700 oz. The majority of them, however, arrived about the end of the year. M'Vicar and party, at the Mountain Run, have spent a large sum of money during the year, in the construction of a race from Ford's Creek, about 12 miles away. They have just begun work, and are well pleased with their prospects; the largest nugget they found weighed 6 oz. Vivian and party are still hard at work on their gold lease; but the large influx of water is a great drawback. A Bathurst syndicate is, however, preparing to pump the water out of their shafts. Several parties have taken up ground on the range in front of the township, and are hard at work, with good prospects. At Scabbing Flat a Calcutta syndicate have been working for the last eighteen months some gold leases, and their representative, Mr. C. H. Clarth, is now in Calcutta on business in connection with the better working of the property. The Mount Gray Leases have only been employing half labour during the year. I understand the proprietor has succeeded in forming a syndicate in London to work the mine. The syndicate sent out a gentleman to furnish a report to them, and it is probable that something definite will be known very shortly as to their intentions.

At Burruga a good many men are fossicking in the vicinity, with some success; they can, at any rate, earn a living. Reid and party, at Golden Gully, on the Isabella River, have, after doing a considerable amount of work, been successful in striking the reef, showing good gold. Mann and party, near Mount Werong, are working the surface with some success.

In the Rockley Division 428 oz. of gold were won, valued at £1,607.

At Bunnamagoo a rich patch of alluvial was struck by Taylor and party, but it was soon worked out. A little work is being carried on at Native Dog Creek.

In Oberon Division about 50 men are at work, and produced 185 oz. of gold, valued at £670. It is difficult to trace all the gold won in this Division. As there is no battery in the vicinity the miners live by picking out the specimens and crushing them by hand. At a place called Tugalow, about 25 miles south of Oberon, there is one claim on payable gold, and as there is a lot of prospecting being done in the locality, it is expected that other claims will be paying expenses before long.

In the Lithgow Division about 60 men are engaged in gold-mining, but the quantity of gold won by them is not ascertainable.

The Sunny Corner Division has produced for the year 1,183 oz. of gold, valued at £4,437.

The Paddy Lackey Mine raised 789 tons of quartz, but only crushed 389 tons, which yielded £1,236 worth of gold, and the balance is expected to yield £1,600 at least.

The St. George Company put through 800 tons for 350 oz. of gold. About 150 men are fossicking on the Willawa, Daylight, Mitchell, and Bob's Creeks, and are apparently making a living.

In the Bathurst Division the Napoleon Reef Company, of Glamire, is the only company at work, but nearly 200 men are fossicking in the neighbourhood. The total output of gold for this Division being 461 oz., valued at £1,535. Newbridge reports that the total amount of gold won in the Division during the year was 508 oz., valued at £1,905. Two batteries have now been erected, which crushed during the year 790 tons, for a yield of 298 oz. Luck and party, working on Smith's Freehold, obtained 58 oz. in a very short time from a rotten quartz-vein. A new reef was discovered about midway between Trunkey and Newbridge, at the head of the old workings at Garibaldi Gully, by M'Kellar and party, 5 tons from which yielded 11½ oz. of smelted gold. Maybury and party, at the Sugarloaf, crushed 30 tons for 32 oz., and had a similar crushing ready at the end of the year, expected to give a better return than that.

At

At Lucknow operations are being vigorously carried on, and about 330 persons are employed in connection with the mines.

The Wentworth Proprietary Company crushed, during the year, about 10,000 tons of stone for a yield of 8,992 oz., valued at £35,262, and the Aladdin Lamp Company 2,500 for 5,636 oz., valued at £21,966.

At Forest Reefs several parties are hard at work, sinking through the basalt.

Lawler and party have succeeded in bottoming on wash-dirt yielding half an ounce to the load. There is a good future before this field, and the last discovery has caused quite a stir.

At Lewis Ponds and Ophir mining is very dull; but at Cadia a lot of work has been done at Swallow Creek, and a large sum spent in the erection of machinery, but no very great results have yet been achieved.

In the Blayney Division 1,590 oz. of gold were won, valued at £5,007 7s. 1d.; of this the Brown's Creek Gold-mining Company crushed 1,760 tons of conglomerate vein-stone, for a yield of 440 oz. A rush took place to Marsden's paddock (freehold), where 50 oz. were taken by the prospectors from a shallow trench. The land was thrown open by the owner, when a large number of claims were taken up; but in most cases the results were not up to expectation.

The Carcoar Division returned 2,640 oz. of quartz, and 119 oz. of alluvial gold during the year, valued at £10,330.

The Nil Desperandum claim, at Galley Swamp, contributed £1,280 worth of that amount, and the Duke Claim crushed 67 tons for 149 oz., valued at £522.

Jarvis's sluicing claim, at Flyor's Creek, put through 10,000 loads for an average yield of 4 dwt. per load.

The Mount McDonald Division yielded 1,271 oz., 738 oz. of which were taken from 3,470 tons of old tailings.

There is a prospect of the Hong Kong Company, who own the Balmoral leases, resuming work at an early date.

At Scrubby Rush, about 6 miles from Mount McDonald, several leases are working with very fair prospects; but the want of a battery on the field prevents the ground being properly tested, and retards progress.

At Canowindra mining operations are being carried on vigorously, the discovery made by Messrs. Mylechrane and party on the London Reef, Boney's Rocks, having caused quite an excitement. The party were receiving aid from the Prospecting Vote, and from the drive at the 250-ft. level took a parcel of 6 tons stone, which yielded 10 oz. to the ton.

The Blue Jacket Reef at Belmore, about 2 miles from Canowindra, yielded 735 oz. during the year.

At Cowra mining matters are very quiet, and only 200 oz. were won, valued at about £750, principally obtained at Tenandra, about 9 miles from Cowra, by McGuinness Brothers, from their own selections, for which they have obtained permits.

The Tuena Division yielded 1,217 oz. of alluvial gold, valued at £4,563 15s., and 345 oz. of quartz gold, valued at £1,196 10s. To the total yield the Excelsior Company contributed 100 oz. from 186 tons of stone; the Enterprise Company, 30 oz. from 40 tons; and Donnelly and Davidson, 155 oz. from 155 tons. The latter party have, however, sold out to the Harrogate Gold-mining Company, who are proceeding with the erection of a 10-head battery, and as there is a large quantity of fair quality stone to put through, the crushing plant will be kept busy for some time to come. Lawson and party's race and dams are nearly completed, and they will be in full work at an early date. Good returns are expected from this party.

#### MUDGEES DISTRICT.

A great deal of prospecting is being done in this District, a large number of the men being assisted fossickers, who are earning a living, some of them doing fairly well. In the Mudgee Division of this District 3,975 oz. of gold were won, which is a large increase on the yield for last year. Several parties are working in Crossing's paddock (private land), and all of them are on payable gold. In Cadell's paddock three parties are obtaining payable gold at a depth of 5 feet. A large number of fossickers are working at Apple-tree Flat and making good wages. About fifty men are working on Lowe's and Blackman's selection, and some on the mining reserve. A miner named Lynch got a 5-oz. nugget on the reserve at a depth of 6 feet.

In the Gulgong Division about 250 men are at work, and 1,436 oz. of gold have been won. The English Company are still at work on the Black Lead, but they have not met with the success their perseverance and the amount of capital they have expended deserves. Work is proceeding in Morrissey's paddock, and good results have been obtained. There is a large quantity of wash-dirt from this paddock awaiting treatment, which promises to turn out well. In the Hargraves Division mining matters have been rather dull during the year. The New Hargraves Gold-mining Company have with great perseverance carried on operations, but, unfortunately, without finding a payable reef. This Company have expended a very large sum of money on this property in prospecting work. About 150 men are earning a living by fossicking in the vicinity, and have produced about 750 oz. of gold, averaging 76s. per oz.

In the Windeyer Division the quantity of gold produced was 1,800 oz., principally from alluvial. One hundred and twenty Europeans and 60 Chinese are at work on the field. Since the stoppage of the Mount Stewart Silver Mine, at Denison Town, about 30 men have been prospecting for gold at Tucklan, which lies 9 miles south-westerly from Denison Town. The wash is thin and patchy, but still they have been able to earn a living, and some of them rather more than wages.

In the neighbourhood of Rylstone a few miners are at work fossicking for gold, and obtained about 60 oz.

The Peak Hill Division produced during the year 11,380 oz. of gold as compared with 10,070 oz. during 1892, 8,908 oz. of the yield being from lode-stuff, and the balance 2,472 oz. from alluvium.

The Proprietary Company crushed 10,164 tons for 4,727 oz. the Great Eastern, 1,678 tons for 1,194 oz.; the Great Western, 1,431 tons for 527 oz.; the Crown of Peak Hill, 500 tons for 200 oz.; Wythes and Mooney, 311 tons for 165 oz.; and various other mines, 1,276 tons for 2,035 oz. The return of about half an ounce per ton from such a large body of stone as that crushed is very satisfactory, and as there is an immense body of similar stone in the mines the permanency of this field is, I think, assured. Some of the companies are proceeding with the erection of further crushing machinery. A great drawback to the field is, however, the want of a permanent and sufficient water supply. The bark huts at first erected are gradually giving way to commodious and permanent structures in the township.

In the Wellington Division over 200 men are employed in gold-mining, principally by the Mitchell's Creek Freehold Gold-mining Company, under the management of Mr. Philip Davies. During the year this Company raised 5,756 tons of quartz, which yielded 3,095 oz. of gold, and treated 316 tons of pyrites for 1,379½ oz. There is every reason to believe that this Company will be in a position to give permanent employment to a large number of men for many years to come. Under an arrangement with the Company, the M'Arthur Forrest Company, have erected cyanide works for the treatment of tailings; about 20 men are employed in the work, and 70 tons are twice turned over daily. The tailings are estimated to contain 8 dwt. to the ton, and about 70 per cent. of the average is being obtained. The total quantity of gold won in this Division being 305 oz. from alluvium and 4,475 oz. from quartz valued at £16,958 6s. 7d.

#### TAMBABOORA AND TURON DISTRICT.

The Hill End Division of this District yielded 2,916 oz. of alluvial and 1,211 oz. of gold from 1,169 tons of quartz valued in all at £15,888 14s. 1d., as compared with £11,555 9s., the value of the gold produced in 1892. The principal companies in this Division are the Hill End United, on Prince Alfred Hill, the Hawkins Hill Mining Company, on Hawkins' Hill, and the Chambers' Hill Mining Company, at Chambers' Creek, and they employed the bulk of the miners in the district. Two private parties are on payable gold, viz., Carver and Davey, and Clymo and party. These parties were in receipt of aid from the Prospecting Vote, and the discoveries have given an impetus to prospecting work in the locality with very fair results. The number of men employed on the field are 153 Europeans and 47 Chinese.

The Sofala Division produced 5,326 oz. of gold during the year, being an increase of 844 oz. on the previous year. This was no doubt owing to the wet season, which allowed a large number of men to get to work in the creeks, and also to the number of "fossickers" sent to that locality from Sydney, some of whom were fairly successful. Wrench and party obtained 31 oz. in six weeks, all nuggety gold, from 10-oz. pieces down. Herriott and party also secured, in a very short time, 64 oz. at Maitland Bar, and at Golden Point, Bennett Bros. won 85 oz. from their sluicing claim: Meni and party, at the Big Oakey, crushed 725 tons for 1,480 oz. of gold, and the No. 1 Surface Hill crushed 335 tons of rubble for 46 oz. of gold. In Little Oakey Creek Campbell and party sluiced away some of the old workings, and obtained a large quantity of gold. At Redbank Gully, Johnstone and Prosper found a rich run of gold in some partially tested ground, and obtained 200 oz. of nuggety gold, one piece weighing 30 oz. As the nuggets were slightly mixed with ironstone, strict search was made for a lode, but without success. Reilly and party, at Middle Creek, have been steadily at work during the year with payable results, their last crushing being 30 tons for 42 oz. Two parties are at work in Reilly's Creek, and have struck a reef running from 2 to 4 feet thick, averaging 11 dwt. per ton. A large increase in the output of gold is expected from this Division during the present year.

The Ironbarks Division returns show that 200 gold miners are employed, principally in alluvial, and won 2,493 oz., valued at £9,450. The Golden Gully Gold-mining Company are still working, and crushed during the year 679 tons for 221 oz., and Curnow and party, on the Chump Reef, 317 tons for 270 oz. In this locality the principal quartz reefs have now been worked out to water-level, and pumping machinery is now a necessity before further operations can be carried on to any great extent. To this cause is attributed the reduction in the quantity of quartz gold won during the year, which was about one-half that produced in 1892.

#### THE LACHLAN DISTRICT.

In the Allectown Division of this district mining operations are very quiet, the alluvial ground being to a great extent worked out. A few claims are, however, still being worked in Watts Paddock and on Crown lands. The Prospector's Claim is still producing a little gold, 187 loads being washed during the year for 104 oz. 6 dwt. 10 gr. The returns from the quartz reefs being worked in the vicinity have not reached expectations, but it is expected that the returns will improve as greater depth is reached. A company erected a battery on the field, but they disposed of it fortunately to a local syndicate, so it will probably remain on the field. As the surrounding country is still being prospected it is expected that some reefs of greater richness will be struck, when the battery might be kept in full work.

In the Forbes Division about 150 men are mining for gold, but the quantity won by them is not ascertainable. The Britannia Co-operative and The Pinnacle Reef Quartz-mining Company have both been wound up. A few parties are prospecting in the vicinity of Strickland's Reef, and they are sanguine of striking something payable before long. Chesher, Sully, and party have been receiving aid during the year to sink a shaft on the South Lead. They have succeeded in bottoming their shaft at 215 feet on wash prospecting  $\frac{1}{2}$  oz. to the load.

Parkos, as regards reefing, is the most important part of the Lachlan Mining District, and work during the past year has been carried on with considerable vigour in some of the more extensive mines by tributors. The operations of the tributors of the Hazlehurst and Quayle's Mines have not been so very satisfactory during the past year, but at the Bushman's, where 30 men are employed on tribute stone was crushed for a return of gold to the value of £5,273 3s. 11d., the stone averaging 2 oz. 5 dwt. per ton. East of the Bushman's, Baxter and Saddler have sunk a main shaft 200 feet deep, and it is intended to continue it to 438 feet to cut the same run of gold as was worked by the Tributors in the Bushman's. The men working the Kohinoor are making wages, and three small crushings from the Ben Nevis line of reef at M'Guigan's Lead returned  $\frac{1}{2}$  an oz. per ton, which is considered payable. At the Nibbler's Hill, Williams and party are down 116 feet, and are stopping with good prospects. Wright and party, at Barkley's Creek, are on payable stone, their last crushing averaging 1 oz. per ton, with plenty similar stone in sight. The tributors of the Dayspring Mine crushed 137 tons for 204 $\frac{1}{2}$  oz. The returns from this mine were usually about 6 dwt. per ton, but at the 200 feet level the party were fortunate enough to strike the richer stone. This discovery is a very important one, as it is believed there is an abundant supply of the same class of stone in the mine. It is thought a quantity of gold is sent through privately, and as far as can be ascertained the quantity of gold won in the Parkes Division during the past year was 1,508 oz. from alluvial and 3,672 oz. from quartz, valued at about £17,584.

At Billy's Look-out a few miners are at work. Ryan and party bottomed on 2 feet of wash, which averaged from 2 $\frac{1}{2}$  to 3 dwt. per load. The sinking was only 8 feet, but as water is very scarce, it will not be possible to do much work during the summer months.

At Condobolin, Shepherd and party, during the year discovered a payable reef about 3 miles north of the township, but as there is no machinery within many miles of the place, the development of the reef must, I am afraid, await its erection.

Mining in the Barmedman Division has experienced a considerable revival during the year, owing to the discoveries of gold-bearing reefs at Yalgogrin and Wyalong, the former place being 30 and the latter 20 miles from Barmedman, where the nearest battery is to be found. The stone would pay well with a battery on the ground, and steps are being taken to effect that end. The shaft of Neild and party, the prospectors of Wyalong, is down 40 feet, the reef at that depth being 4 feet wide, and prospects from 1 to 1 $\frac{1}{2}$  oz. per ton. This reef, at the surface, was only 5 or 6 inches wide, but has kept widening all the way down. The Princess Edith Company have made a fresh start at the "Hard to find reef,"  $\frac{1}{4}$  mile south from Barmedman; and a local syndicate has been formed to reopen the claims on the Fiery Cross line of reefs. The prospects of this field are really better now than they have been for years back. The stone raised during the year was 341 tons for a yield of 412 oz. 8 dwt. 18 gr., valued at £1,577 11s. 6d.

In the Temora Division about 100 men are employed, who won 520 oz. of gold, valued at £2,007. Hensler and party, Gundibindyal, raised 62 tons of stone, which yielded 55 oz.; and Henry Morris puddled 303 loads of wash-dirt for 2 dwt. per load.

In the Cargo Division very little mining has been done, and only 274 oz. of gold were won, valued at £1,041. The Ironclad and Goldenclad Mines have been shut down until some decision has been come to as to the best mode of treating their ore, which is refractory. Alexander Timmock struck a rich patch during the year, about 2 feet from the surface, which yielded 80 oz. of gold, but after sinking a few feet the shoot cut clean out.

In the Young Division, about 1,958 oz. of gold have been won, valued at £7,525 14s. 2d. The South Burrangong Company were engaged during the year sinking a new shaft to properly work their ground, so their out-put of gold was nil during 1893. In 1892 this company won gold to the value of £14,000. The returns from Cullinga have not come up to expectations; but prospecting work is still being pushed forward. The Tilden Proprietary Company are still at work, with fair prospects of success.

The returns from the Grenfell Division show that 767 oz. of quartz and 187 oz. of alluvial gold have been won during the year, valued in all at £3,098 11s. 7d., the work employing 119 men. The most important event connected with gold-mining in this Division, was a discovery by the Young O'Brien Company of a completely new make of stone, 494 tons of which yielded 361 $\frac{1}{2}$  oz. of gold, valued at £1,387, and even better results are expected from the next crushing. This mine was in receipt of aid from the Prospecting Vote. The Homeward Bound Company have done a lot of prospecting during the year, and only treated 59 tons, for 72 oz. of gold. I understand the mine has now been let on tribute. Several parties are working the alluvial at Quondong, Seven-mile, and appear to be doing fairly well.

#### THE TUMUT AND ADELONG DISTRICT.

From the Albury Division the Warden reports that a marked degree of improvement has taken place in mining prospects generally throughout the Division during the past year, and considerable activity in mining upon private lands has been observable consequent upon the discovery of gold in localities hitherto untried. At Jindera, on Mr. Turner's property, 40 or 50 men are at work, and the crushings are fairly payable. With the exception of the claim in Portuguese Gully there is very little work doing on the Black Range, and the same condition of affairs exist on the Nailcan Range. The Corowa Prospecting Association are proceeding with boring operations in search of the Rutherglen Deep Lead, supposed to cross the Murray River near that place. Indications are favourable to the opinion that it does cross there, and in the Quat Quatta Reserve, near Corowa, payable gold has been discovered in a river claim. In this Division (Albury) the quantity of gold won was 450 oz., valued at £1,710.

In the Germanton Division about 7 gold miners are at work, and won 72 oz. of gold during the year.

In the Cootamundra Division about 70 gold miners are at work, and produced 245 oz. of quartz gold, valued at £923 15s. The Excelsior Company raised 125 tons of stone which returned 74 oz., valued at £281. Juliff and party at Muttama raised 186 tons for 121 oz., valued at £342 17s.

In the Tumbarumba Division the yield was 2,080 oz. principally from alluvium. The tributor of the Tumbarumba Flat Sluicing Company's claim is doing fairly well, owing to a rather better water supply there. Formerly mining was carried on with more success than usual in this Division, employing about 220 men.

The gold won in the Kiandra Division during the year amounted to 1,150 oz., valued at £4,600, all from alluvium, and the number of men employed is 114. The Township Hill is still being prospected, and Heinz Hooper and party, who were in receipt of aid to further test the hill, have been fortunate in striking the wash, which they consider payable. The tributors working the sluicing claim on the New Chum Hill have been earning full wages the year round.

In the vicinity of Nimitybelle very little mining is going on, and the few miners at work are barely making a living.

In the Queanbeyan Division there is very little work being done, about 190 oz. being the quantity of gold won during the year. A little prospecting is being done at Brindabella and Coolamon with very fair prospects.

In the Batlow Division there is a slight increase in the quantity of gold won as compared with 1892, the value being £1,947. Timmis and party are at work on a very large dyke, the whole of which carries a little fine gold. Special machinery has been erected to save it, and the results have proved very satisfactory. A

A number of miners are earning a living by fossicking along the banks of the Tumut River, and when the water is low full wages can be made.

In the Adelong Division the gold won was 1,730 oz. from alluvium and 2,920 oz. from quartz, valued in all at £17,705, employing about 260 men, or an increase of £3,676 on the year 1892.

The Gibraltar Hill Company crushed 656 tons of stone for 2,000 oz. of gold, valued at £8,140 13s. 9d. The Adelong Proprietary Company, 304 tons for 271 oz., and the Lady Mary Company, 217 tons for 168½ oz. The Lady Mary Company are on fair stone at present, and there is every prospect of this company being recouped for their many years of expense and toil. The Gibraltar mine is also looking well.

In Shepard's Alluvial Lease a mundio vein was struck carrying a fair proportion of gold. It is now being prospected, and should it turn out as well as expected, a new line of gold bearing country will be opened up.

In the Gundagai Division about 127 men are at work on the alluvium, and won 1076 oz., valued at £4,169 10s., as compared with 232 oz. in 1892, the principal part of the gold being got on Lindley's freehold property.

On Mount Parnassus, close to the town, Field and party struck a rich patch of gold on the summit. Although strict search has been made the vein from which the specimens were detached has not yet been found. A large nugget was also found on the south-eastern slope of the Mount by Vaughan and party about the same time.

At Upper Tarcutta mining generally is very dull, a few men at work on the alluvial barely making rations. The only quartz-mining is at Lower Tarcutta, where Woodbridge and Best are sinking a shaft on a promising vein. They are being aided from the Vote.

In the Junco Division there is a satisfactory increase in the gold yield, the amount being 251 oz. as compared with 78 oz. in 1892. A small rush took place during the year to McCarthy's land at Eurongilly, where a number of shafts were bottomed at from 40 to 60 feet, on wash varying from 12 to 18 inches in thickness, and carrying from 2 to 3 dwt. per load. Owing to the scarcity of water, however, the ground would hardly pay and was abandoned. Prospecting work is still going on in the vicinity of the Junco Reefs.

In the neighbourhood of Grong Grong, some good looking reefs are being sunk on, and much confidence is expressed in the future of this locality.

About forty miners are at work on the alluvial ground around Murrumburrah, and won 252½ oz., valued at £975 10s.

There is a large increase in the return from the Cooma Division, the quantity being 1,124 oz. as compared with 652 oz. in 1892, and about 130 men are employed. The bulk of the gold was obtained at the Cowra Creek Diggings, and with the advent of another battery, which is in course of construction, the output for 1894 is expected to be considerably larger.

The returns from Fiery Creek were somewhat less during the year, owing to a rush to Macanally, which however did not prove of much importance.

The St. John Sluicing Company on the Big Badja River, put through 9,060 loads for 109 oz.

#### THE SOUTHERN MINING DISTRICT.

In the Braidwood Division of this District there is very little mining going on, a few fossickers manage to win as much gold from the banks of the Shoalhaven River as keep them on the field; the total quantity won being about 60 oz. of alluvial gold.

In the Araluen Division, the returns of gold won are much the same as for 1892; there being 2,940 oz. of alluvial gold, and 260 oz. of quartz, valued at £12,217. From a quartz claim at Bell's Creek, 350 tons yielded 14 dwt. 21 gr. per ton.

In the Major's Creek Division, 106 gold miners are employed, and the gold won was 1,144½ oz. of alluvial and 50 oz. of quartz gold, valued in all at £4,315, an increase of about 80 oz. on the yield for 1892. There are about 24 men working at Snowball, where some nuggetty gold is being got. The Prospecting Board recommended a small sum in aid to drain a part of the swamp, and it is in this ground that some heavy gold has been got lately, the last piece weighing over 19 oz. A syndicate has taken up the old Snob's Reef, and they propose giving it a good trial.

The Nerriga returns give 470 oz. of alluvial gold won, valued at £1,833; and 120 men at work employed principally by the Golden Terrace Hydraulic Sluicing Company. The operations of this Company have unfortunately not been so successful as was expected.

In the Division of Little River there was 1,394 oz. of gold won nearly all alluvial, valued at £5,241. Mining operations in this Division are confined to the partly worked creeks, and as ground sluicing is the chief mode of working, the best returns are obtained during a rainy season.

The Day Dawn Mine, worked to a depth of 205 feet with good results, is likely to be sunk another 100 feet.

At Yalwal, the Homeward Bound claim crushed 13,574 tons of stone for 1,968 oz. of gold, valued at £6,224. This mine is worked open-cast, and the crushing stuff can be handled very cheaply.

In the Milton Division there is very little mining work going on, with the exception of the Phoenix Company at Currawan.

In the Wagonga Division, about 100 men are employed gold mining, and the returns were 102 oz. of alluvial and 789 oz. of quartz gold. The Mount Dromedary Company is let on tribute, and has yielded fair returns to the tributors. In the vicinity of Bermagui a good deal of fossicking is being done, and a little gold is being got.

In the Division of Nerrigundah gold to the value of nearly £3,000 was won, representing 287 oz. of quartz and 441 oz. of alluvial gold. The principal quartz mine in this Division is the Gulph Proprietary. The main shaft is down 160 feet on a reef averaging about 2 feet in width, which shows signs of improving with depth, 213 tons from which crushed 174 oz., worth £4 per oz.

At Brimbaramalla a good many gold leases have been taken up, consequent on some rich crushings being got out. Stevenson and party got 200 oz. from 116 tons of stone; Britten and party 32 oz. from 22 tons; M'Millan and party 45 oz. from 21 tons; Park Hill got 170 oz. from 50 tons; and Robinson and Thorburn from 216 tons got 250 oz. of gold.

The quantity of gold won in the Moruya division is more than double that of 1892, being 385 oz. from alluvial and 1,330 oz. from quartz, valued at £6,610. At Bimbimbic, Keating and party raised 182 tons, which yielded 196 oz. of gold. Their deepest shaft is 30 feet, and lode is 3 feet wide. To increase their output the party have just purchased a new crushing plant. At Mogo some of the mines have obtained suspension, and on the flat a few fossickers are at work, where sufficient gold can be got to obtain rations.

At the Big Hill in the vicinity of Bateman's Bay several gold leases have been taken up and a battery erected. A small crushing of 27 tons from Fullarton's claim yielded 29 oz.; 19 tons from Fitzgerald's claim gave 21 oz.; and 7 tons from Batt and Sons mine returned 10½ oz. of gold. Several other crushings from this locality have been made with payable results, and all engaged on this field express themselves as perfectly satisfied with it.

In the Pambula Division there are 13 mines at work, from which 5,433 tons of stone, yielded 3,508 oz. of gold, valued at £13,408 7s. 3d. The principal mines are the Mount Gahan, which yielded 1,223 oz. from 2,550 tons of stone; The Hidden Treasure Company, 120 tons for 621 oz. with 300 tons at grass expected to go 5 oz. per ton; Axam and party who treated 243 tons for 354 oz., and the Pambula Company, who crushed 526 tons for 274 oz. of gold. Recent rich crushings by the Mount Gahan and Hidden Treasure Companies have given a great impetus to mining on the field.

In the Bombala Division the gold won is hardly up to that of 1892, being only 320 oz., and of that quantity the Delegate River Hydraulic Sluicing Company contributed 215 oz.

#### THE HUNTER AND MACLEAY MINING DISTRICT.

In the Copeland Division of this District very little work has been done during the year. The Centennial is still at work, but the heavy water at the lower levels prevents them getting at the richer stone which is supposed to exist there; 20 tons were however raised from near the surface, which yielded 1½ oz. per ton. The Hidden Treasure has been taken up by a Newcastle syndicate, who propose continuing the main shaft another 100 feet from the 480 feet level, and for this purpose pumping machinery is being erected. The Lady Belmore Claim yielded 212 oz. from 46 tons of stone, valued at £747. The vein is thin, but it generally gives a return of about 5 oz. per ton. At Cobark, Stoddart and party, who were in receipt of aid from the Prospecting Vote, struck payable gold at a depth of 50 ft. A company has been formed to work the ground, and a battery is being erected to be worked by a water-wheel. A few fossickers are at work in this locality, and they just manage to earn a living.

In the Dungog Division there were 344 oz. of quartz gold won during the year, as compared with 96 oz. in 1892, a large increase, due principally to the Wonga Wonga mine, at Lower Wangat. This mine has been steadily worked during the

the year, and 225 tons raised yielded 310 oz. of gold, valued at £1,038. The results of a trial crushing from a reef on the Cherry-tree Hill, 4 miles from Dungog towards Stroud, has, I understand, proved satisfactory, but the figures are not yet available. It will be a good thing for the locality should it come up to expectation, and will lead to the re-starting of a battery situated right at the foot of the hill. Some attention has been drawn of late to the reefs to be found on the Ballie Mountains in the Tarco Division, where about twenty men are prospecting. A parcel of 3 tons of stone from this locality was treated in Sydney and yielded 15 dwt. to the ton. A small rush set in to Port Macquarie, and proved to be of no permanency. In the Kempsey Division the Deep Creek Gold-mining Company are still at work, and is the only reef being worked in the locality for gold at present.

#### THE PEEL AND URALLA DISTRICT.

In the Glen Innes Division of this district the quantity of gold won was 1,598 oz., valued at £5,344. The mines at Glen Elgin turned out 967 oz. of gold during the year, and as machinery for the treatment of pyritous tailings is on its way to the mine from England, it is expected that the product of gold for the ensuing year will greatly exceed these figures. There is very little doing in alluvial mining in the district of Glen Innes, the only discovery of any importance being that made by a party of prospectors at the Round Mountain, about 28 miles from Glen Innes on the Kookabookra Road. A tunnel was put in, and they were successful in striking the old river bed under the basalt which yielded at the rate of 9 dwt. of gold to the load. The wash lies on a granite floor, and is thin and narrow, but it is thought, were it followed, it might yet give better results. A few mines are still at work in the Kookabookra Division, the total value of the gold won not exceeding £1,500, a big reduction on 1892, which was £5,648, but those mines yet working return a fair profit. If the available water power were utilised in reduction of the expenses of a crushing plant, no doubt some of the claims now idle might be worked at a profit.

The Hillgrove Division is the centre of the gold-mining industry in the Northern Districts. The principal mine is that owned by the Baker's Creek Gold-mining Company, has been continuously at work during the year, and employs about 200 men. The gold won by this company during the year was 21,027 oz., valued at £74,645, from 9,757 tons of stone, exceeding the quantity won in 1892 by 2,100 oz. I understand that £35,000 was paid in dividends by this company during the year.

The Eleanora Company has made excellent progress in the work of development during the year, the chief work being confined to the 400-ft. level. Two furnaces have been employed, and the stone treated was 6,101 tons, yielding 3,163 oz., valued at £11,274.

The Baker's Creek No. 1 Extended Company, which adjoins the Baker's Creek Mine on its southern side, has done a large amount of prospecting during the year, and has been rewarded by striking Smith's Reef, and the Big Reef in the Baker's Creek Mine, both carrying gold. This mine received aid from the Prospecting Vote, and will probably turn out a valuable property.

The Garibaldi Gold-mining Company has been worked on tribute during the year, and fair returns have been got—865 tons yielding 710½ oz. of gold, and 93 tons of antimony. The New Baker's Creek Consolidated Company treated 1,165 tons from the mullock tip for 391 oz., and 393 tons of mine stone for 507 oz. The number of miners employed in the Division is about 450, and the total quantity of gold won was 25,798 oz. valued at £91,522.

*Hillgrove West Division.*—Mining in this Division has been somewhat dull during the year owing to the closing down of the Earl of Hopetoun Mine. The West Sunlight Gold-mining Company have been crushing all the year, and put through 5,715 tons for 3,162 oz., valued at £11,070, the Sunlight Company crushing 3,227 tons for 1,454 oz. Very little alluvial prospecting was done in this locality. A few shafts were put from 50 to 100 feet without bottoming. In the Armidale Division about eighty men are at work mining for gold, and won about 1,017 oz. A rush set in to Herbert Park where a little alluvial gold had been got at a shallow depth, but the area was small and was soon worked out. In the vicinity of Uralla, a large number of assisted fossickers are at work on the Rocky River Diggings, and have been doing fairly well. Some of them have sent for their families and have settled on the field permanently. The quantity of gold won was 2,900 oz. as compared with 1,620 oz. in 1892. In the vicinity of Bendemeer, a few men are at work ground sluicing with moderate success.

The returns from the Nundle Division show a substantial increase in the quantity of gold won during the year, being 3,873 oz. as compared with 2,709 oz. in 1892.

The Mount Sheba Hydraulic Sluicing Company were unfortunately compelled to discontinue operations not being able to cover expenses, but I believe an attempt is being made to reform the company. Isaacson's and Thompson's claim is still yielding well, with no sign of the good shoot of gold giving out.

The Peel River Proprietary Company's Mine, at Bowling Alley Point, is still at work, and has done fairly well during the year. A new gully has been opened at Quacka Nacka, and gives promise to provide employment to a number of men by sluicing.

In the Niangala Division, the output of gold has been much less than the previous year, machinery now being required to cope with the water. The Starlight Mine changed hands during the year, and new machinery has been erected, which treated 75 tons for 247 oz. of retorted gold. The Jersey Mine, which is let on tribute, raised 55 tons for 222 oz. Preparations are being made to thoroughly prospect this mine. The Just-in-Time Claim has been idle during the greater part of the year, but put through 114 tons for 139 oz. The Golden Spur Mine has been sadly neglected during the year, and only crushed 66 tons for 72 oz. retorted gold; the Morning Star Claim, 83 tons for 96 oz.; the Surprise Claim, 32 tons for 27 oz.; and the Joker Claim, 44 tons for 32 oz. At Paradise Creek, which is about 10 miles from Niangala, has an area of about 2½ square miles of auriferous country. Two batteries have been erected during the year, and fair progress has resulted. Howlett and Party crushed 114 tons for 114 oz. of gold, and Dark and Party, 48 tons for 52 oz. A small rush set in early in November to Terrible Billy Creek, where six parties are at work on a reef about 3 feet wide, easily worked, and yielding about 15 dwt. per ton.

The Swamp Oak Field has been very dull during the year, the output of gold being only 1,397 oz., about half that of 1892. The practical miners on the field are inclined to think that a second shoot of gold will come in, richer than the first, but they have no capital to prove it. The Highland Mary Company crushed 155 tons for 396½ oz.; the Rainbow Company, 264 tons for 159½ oz.; the Routine Flush, 130 tons for 103½ oz.; the Rising Moon Company, 120 tons for 78 oz.; the Great Britain Mine, 67½ tons for 111 oz.; Cleghorn and Party, 58 tons for 61 oz.; and the Storm King, 35½ tons for 75 oz. The last-named mine is idle, although aid was offered them to continue the shaft another 100 feet.

In the Walcha Division, the quantity of gold won during the year was 789 oz., worth, on an average, 70s. per oz. Watt and Party, at the Tia, are now down 150 feet. They raised 300 tons of stone during the year, which yielded 100 oz. of gold. The Mount Carrington claim is being worked by Mr. H. Whitton, who has a tunnel in about 300 feet, and expects to cut the wash-dirt during this year. The Boggy Creek Hydraulic Sluicing Company put through 20,000 loads for 300 oz. In the neighbourhood of Barraba a few gold-miners are at work, principally in the alluvial ground, and the quantity of gold won was about 300 oz.

In the Bingara Division very little progress has been made in the discovery of new leads or reefs, although prospecting is being carried on in every direction with much energy. A large number of men are fossicking in the district, and manage to earn a living, one man securing an 18 oz. nugget quite close to the surface. The King Solomon Claim, near Ironbarks, is putting out good stone. The Stewart's Brook Division shows a marked decrease in the quantity of gold won, being 1,686 oz., as compared with 2184 oz., in 1892. The United Bluey Company raised and crushed 1,425 tons for 687½ oz.; the Mutual Gold-mining Company, 486 tons for 163 oz.; the New Royal Standard, 57 tons for 68 oz.; and the Ethel May Gold-mining Company, 486 tons for 163 oz. At Denison, about 6 miles over the mountains from Stewart's Brook, a few reefs are being worked with varying success. Baker and Party, on Collet's Reef, crushed 42 tons, which yielded 1 oz. 6 dwt. per ton; and from a reef on Spencer's Flat, 4 tons yielded 5 oz. per ton, and 6 tons at the rate of 2½ oz. per ton.

#### THE NEW ENGLAND DISTRICT.

The Fairfield Division shows a large increase in the yield of gold during last year, being 584 oz. of alluvial and 3,912 oz. of quartz gold, valued in all at £15,606, an increase of £5,121 on 1892, which is very gratifying. In this Division there is a very large tract of auriferous land where the industrious miner may find profitable employment for years to come; in fact, the township of Drake, with its 600 inhabitants, is entirely supported by the mining industry carried on in the vicinity. The principal mine in the Division is the "Lady Jersey," situated in Long Gully, 8 miles south of Drake, where thirty-five men are regularly employed, producing 2,109 oz. of gold during the year. This mine was originally discovered through aid granted from the Prospecting Vote some years ago.

The Nil Desperandum comes next with 588 oz., the All Nations with 320 oz., and the Golden Bluff with 150 oz. The All Nations were in receipt of aid from the Prospecting Vote, and when their grant became exhausted and they were about to abandon the mine they luckily struck a rich patch of gold near to the surface, from which they took in a very short time gold to the value of £1,180. The vein in which the gold is got is 2 feet wide and has been proved to a depth of 60 feet. At Poverty Point, Mr. Horton is at work testing a large body of auriferous granite, which is said to yield from 3 to 5 dwt. of gold per ton. Machinery has been erected to crush 100 tons per week.

At Pretty Gully, about 15 miles from Drake, about 100 men are working on the alluvial ground and doing fairly well. Mining in the neighbourhood of Lionsville is in a very languishing state, a few parties are sluicing on the Naggregah Creek, and others are earning a living by fossicking on Cedar Creek. A little gold-mining is going on in the neighbourhood of Boonoo-Boonoo, there are about fifty men employed and the gold won was 120 oz. of alluvial, and 100 oz. of quartz gold.

#### THE CLARENCE AND RICHMOND DISTRICT.

In the Dalmorton Division of this District, the value of the gold won was £5,247, as compared with £8,764 in 1892. A number of unemployed took the Mount Poole Marvel on tribute, but were compelled to leave after the first crushing. A. Cadell's Black Slate Mine employs from twenty to thirty men, and 241 tons of stone were raised which yielded very well. There are seven different reefs in this mine all carrying gold, and the quartz is conveyed from the top of the hill to the battery by means of an aerial tramway.

The Golden Hill Mine is doing good work, 100 tons crushed yielded 238 oz. This is a flat reef running into a hill and easily worked. The tributors of the Excelsior claim are doing very well, the 113 tons of quartz raised yielding 185 oz. This is another flat reef, and the stone can be raised cheaply.

The Chandler's Creek Gold-mining Company have sold the machinery and cleared it off the ground. Some of their leases were forfeited, but were readily taken up again by some miners who think they can make a living working them. M'Annulty and Wolfe struck a rich vein, a trial crushing from which of 8 tons yielded 26 oz. Downey, Lonsdale, and party were also successful in striking a reef which crushed 17½ oz. from 3½ tons. The Tower Hill Gold-mining Company have driven their tunnel about 1,000 feet, following a large reef. They have been granted suspension of labour to enable them to raise funds to continue the development. The New Era Mine is considered a payable property, 326 oz. of gold being taken from 400 tons of stone. Cosgrove and Brennan are about to start work on Mount Rea, on the Mann River, where the indications are said to be promising, 57 tons being crushed for a return of 100 oz. of gold.

The Nana Creek Division shows a slight increase in the gold won during the year, the quantity being 301 oz. The Mount Orara Gold-mining Company have done a good deal of prospecting work during the year. A bulk sample of 2½ tons taken from the 70-ft. level yielded at the rate of 10 dwt. per ton. With the introduction of suitable machinery it is thought this property would pay. The claim known as "Nana's Daughter," on the Lady Bella line of reefs, had only one crushing during the year of 42 tons, which returned fully 1 oz. of gold per ton. The Lady Bella Mine, during the latter part of the year, crushed 71½ tons for 8 oz. 12 dwt. This is not considered the fair average value of the stone. The Jubilee Claim is still working, and in the northern tunnel a 5-ft. reef was cut, which yields 7 dwt. per ton. It is believed that this return will improve. The party working the Surprise Reef crushed 84 tons for a return of 93 oz. The total quantity of stone crushed from this field during the year was 313 tons for a return of 271 oz., employing about forty-five men. A good deal of prospecting is going on along the beach at Woogoolga, and as far down as Corindi, where some very promising returns have been got. To Chambigne, in the Grafton Division, a small rush took place during the year, owing to Elliott and Party striking an 18-inch reef at a depth of 60 feet which assayed from 10 to 13 oz. of gold per ton. This mine was aided from the last year's Prospecting Vote. H. J. Cook and Party have taken up some gold leases in the neighbourhood of Horton's Creek on the Grafton to Annidale Road, about 12 miles from the Nymboi Punt. From a depth of 20 feet they raised 9 tons of stone which yielded 37 oz. of gold which was sold for £126 7s. 7d. The Sir Walter Scott Mine at Cangai are driving a tunnel, and when it is completed it is expected some good returns will be the result. During the last six months of the year they crushed 87 tons of stone for 132 oz. of gold. The company are using the *Hyperphoric* treatment, which I understand has proved a success.

In the Ballina Division the gold-mining is confined to working the black sand along the sea beaches, running north from Clarence Heads to Byron Bay. The quantity of gold won could not have been less than 1,220 oz., chiefly got during the last six months of the year. About 250 men are employed in the work, and the wages earned run from 15s. to as high as £6 per week per man. A new find of gold was discovered near Ghostly Creek in a beach terrace about three-quarters of a mile inland. This discovery is of great importance inasmuch as it should lead to further prospecting from the main beaches to which it has hitherto been confined. M'Geary and Party were the prospectors of this terrace, the auriferous sand in their claim being 3 feet thick and 100 feet wide, the stripping being from 18 to 20 feet thick.

#### THE COBAR DISTRICT.

In the Cobar Division of this district a very large increase in the product of gold has taken place, the value being £15,271 as compared with £5,883 in 1892, due principally to the rich find at Mount Drysdale. This is the name of a new township recently laid out, about 2 miles north of the old Billygoe Diggings. The prospectors of this field, R. McPherson and Party, were originally in receipt of aid from the Prospecting Vote, and when gold was struck, the Mount Drysdale Gold-mining Syndicate was formed, and the ground is now being worked by them with much success. The gold won by them during the year was valued at £5,920.

The Occidental Company, on the United Hill, crushed 4,400 tons of stone for 1,090 oz., and thirty-seven men are employed in the mine. There are several claims at work along the Cobar line of reef, who raised during the year 1,747 tons of quartz, which, treated at the Chesney Battery, returned 784 oz. of smelted gold. A good deal of prospecting is being carried on in the neighbourhood of the Peak, but up to the present nothing of a payable nature has been struck, although the indications are promising. In the Hillston Division, the Mount Allan Gold-mining Company is turning out well, the return being 988½ oz. of gold from 872 tons of stone. This mine is situated about 10 miles from Mount Hope and is considered a valuable property. The great drawback is the want of water, the carrying on of work depending entirely on the rainfall which is not plentiful in that part of the Colony. Suspension has been granted to the Company while a shaft is being sunk near the mine in search of water. The Errebendery Gold-mining Company, near Euabalong, are now in a position to crush and put through 120 tons for 49 oz. The prospectors of this field had 9 tons crushed at Parkes for 49½ oz., but much better returns are expected. In the Nymagee Division the only discovery during the year was that made at Burra Burra. About the month of May, a great rush set in and at one time there were as many as 800 men on the field. The prospectors of the field were Fifield, Rand, and Party, who bottomed at 31 feet on 12 inches of wash 3½ loads of which yielded 2½ oz. of gold. The lead was very narrow, only measuring about 15 feet. A very large amount of work was done on the field, but the greater number of the claims were not payable. About 100 men are still on the field and doing fairly well, but the scarcity of water retards the progress of the place considerably. The value of the gold won during the year was a little over £2,500. Of that amount the prospectors contributed 310½ oz., valued at £1,164, got from 514 loads of wash-dirt, and from the No. 1 South claim, 48 oz. from 189 loads.

#### THE ALBERT DISTRICT.

The Milparinka Division shows a substantial increase on the previous year, being 798 oz., an increase of 505 oz., about 100 men being now employed on the field. Owing to the scarcity of employment, more men than usual tried gold-mining, but there were none of them successful in striking anything very rich. The rainfall during the last twelve months was under the average, preventing washing from going on as briskly as usual. During the year several new dams have been made, and others deepened, and with a good rainfall mining will revive. The owner of a dam can make more than good wages while the water lasts. At Stringer's Hill a number of men can still make a living working the old ground. At the Six-mile payable gold has again been discovered, and fair results obtained. In the early days of the diggings good returns were got at this place; but the dry state of the country drove the miners from the place, although only 4 miles from Milparinka. The recent discovery may encourage further search in that locality. At Tibooburra the miners appear to have done fairly well, ninety men having won 1,450 oz. of gold, or on an average about £64 per man.

From the only gold-producing mine on the Barrier (the Broken Hill Proprietary), 3,279 oz. of gold has been saved from their silver lead bullion at the company's refinery at Port Pirie, valued at a little over £13,000.

I am indebted to J. MacDonald Cameron, Esq., the Deputy Master of the Royal Mint, for the following information:—

QUANTITIES of Gold, the produce of New South Wales, received into the Royal Mint, Sydney, during 1892 and 1893 compared.

District.	Division.	1892.	1893.	Increase.	Decrease.
		oz.	oz.	oz.	oz.
Bathurst.....	Bathurst.....	805.13	1,363.65	558.52	.....
	Carcoar.....	2,063.64	5,021.31	2,957.67	.....
	Orange.....	12,708.00	10,844.00	.....	1,864.00
	Trunkey Creek.....	74.25	137.81	63.56	.....
	Tuena.....	324.39	144.91	.....	179.48
Tambaroora and Turon.....	Mount M'Donald.....	314.18	679.96	365.78	.....
	Hill End.....	1,624.34	972.81	.....	651.53
	Tambaroora.....	277.23	284.27	7.04	.....
	Sofala.....	396.19	5,490.18	5,102.99	.....
Mudgee.....	Stony Creek.....	216.85	57.91	.....	158.94
	Mudgee.....	2,761.79	1,422.82	.....	1,338.97
	Gulgong.....	694.23	155.13	.....	539.10
	Hargraves.....	73.28	3.98	.....	69.30
Lachlan.....	Wellington.....	341.74	1,164.49	822.75	.....
	Parkes.....	7,303.21	7,228.39	.....	74.82
	Forbes.....	51.01	63.58	12.57	.....
	Grenfell.....	667.50	634.43	.....	33.07
Albert.....	Young.....	344.44	121.58	.....	222.86
	Temora.....	136.40	312.69	176.29	.....
	Wilcannia.....	775.35	975.41	200.06	.....
	Goulburn.....	41.46	178.88	137.42	.....
Southern.....	Braidwood.....	1,607.73	3,951.80	2,344.07	.....
	Bermagui.....	206.76	.....	.....	206.76
	Araluen.....	.....	900.38	900.38	.....
	Shoalhaven.....	3,264.30	220.44	.....	3,043.86
Tumut and Adelong.....	Nerrigundah.....	739.38	187.26	.....	552.12
	Adelong.....	3,675.70	4,920.64	1,244.94	.....
	Tumut.....	173.60	205.50	31.90	.....
	Cootamundra.....	149.24	415.56	266.32	.....
Peel and Uralla.....	Tumbarumba.....	1,094.44	2,363.07	1,268.63	.....
	Gundagai.....	192.48	1,179.50	987.02	.....
	Cooma.....	356.98	848.38	491.40	.....
	Kiandra.....	24.23	288.38	264.15	.....
Hunter and Macleay.....	Wagga Wagga.....	.....	4.91	4.91	.....
	Armidale.....	30,065.17	30,582.11	516.94	.....
	Rocky River.....	124.28	12.77	.....	111.51
	Nundle.....	22.70	.....	.....	22.70
Clarence and Richmond.....	Tamworth.....	1,434.79	1,187.90	.....	246.89
	Bingers.....	385.69	714.05	328.36	.....
	Copeland.....	204.95	58.37	.....	146.58
	Grafton.....	918.48	716.68	.....	201.80
New England.....	Tenterfield.....	575.75	657.55	81.80	.....
Mixed.....	Western, Northern, and Southern.....	31,513.88	35,511.58	3,997.70	.....
	Localities unknown.....	35,534.34	48,903.05	13,368.71	.....
Total.....		144,259.48	171,097.07	36,501.88	9,664.29

## SUMMARY.

District.	1892.	1893.
	oz.	oz.
Bathurst.....	10,289.59	18,191.64
Tambaroora and Turon.....	2,514.61	6,814.17
Mudgee.....	3,871.04	2,746.42
Lachlan.....	8,502.56	8,360.67
Albert.....	775.35	975.41
Southern.....	5,859.63	5,438.76
Tumut and Adelong.....	5,668.67	10,225.94
Peel and Uralla.....	32,032.63	32,496.83
Hunter and Macleay.....	204.95	58.37
Clarence and Richmond.....	918.48	716.68
New England.....	575.75	657.55
Mixed—Western, Northern, and Southern.....	31,513.88	35,511.58
Localities unknown.....	35,534.34	48,903.05
	144,259.48	171,097.07

From the foregoing table it will be seen that the quantity of gold sent to the Mint in 1893 exceeds that sent in 1892 by 26,838 oz. The principal increase was from the Western District, which produced 4,142 oz. over 1892, and the Northern District 1,102 oz. over the previous year. The largest increases came from the Sofala, Carcoar, Braidwood, Adelong, and Tumbarumba Divisions. The Mudgee, Lachlan, Southern, Hunter and Macleay, Clarence and Richmond, show decreases.

The following table is compiled from information kindly furnished by the Collector of Customs:—

EXPORT OF GOLD, 1893.

Gold.		Quartz Tailings and Pyrites.		Total.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
oz.	£		£	oz.	£
6,817	25,885	3,826 packages .....	15,742	11,015	41,627

The quantity of gold sent to the Royal Mint, *plus* the quantity exported in 1893, equals 182,112 oz., but of the 11,015 oz. exported, we are informed that 2,824 oz. passed through the Mint, and is included in the return furnished by the Master. The out-put of gold for 1893 may, therefore, be set down as 179,288 oz., an increase of 22,418 oz. as compared with 1892. Last year the Broken Hill Proprietary Company won from their silver-mine 3,279 oz. of gold, valued at £13,000, but saved no gold in 1892.

RETURNS OF GOLD for 1893, from Mint and Mining Registrars compared.

District.	Mint.	Mining Registrars.	Excess.	Deficiency.
	oz.	oz.	oz.	oz.
Bathurst .....	18,191.64	28,313.20	.....	10,121.56
Tambaroora and Turon .....	6,814.17	11,946.51	.....	5,132.34
Mudgee .....	2,746.42	23,941.00	.....	21,194.58
Lachlan .....	8,360.67	11,853.40	.....	3,492.73
Albert .....	975.41	5,512.55	.....	4,537.14
Southern .....	5,438.76	15,419.36	.....	10,010.60
Tumut and Adelong .....	10,225.94	12,025.80	.....	1,799.86
Peel and Uralla .....	32,496.83	46,322.28	.....	13,825.45
Hunter and Macleay .....	58.37	1,906.85	.....	1,848.48
Clarence and Richmond .....	716.68	4,982.29	.....	4,265.61
New England .....	657.55	4,711.00	.....	4,053.45
Cobar .....	.....	6,376.86	.....	6,376.86
Mixed—North, South, and West .....	35,511.58	.....	35,511.58	.....
Localities unknown .....	48,903.05	.....	48,903.05	.....
	171,097.07	173,341.10	84,414.63	86,658.66
				84,414.63
The returns from Mining Registrars exceed returns from Mint by .....				2,244.03 oz.

The returns furnished by the Mining Registrars of the gold won in their respective divisions exceeds the quantity passed through the Mint by 2,244 oz., but is less than the total out-put, viz., the quantity passed through the Mint, *plus* the export, by 5,947 oz.

MINING Registrars Returns of Gold for 1892 and 1893 compared.

District.	1892.	1893.	Increase.	Decrease.
	oz.	oz.	oz.	oz.
Bathurst .....	23,704	28,313	4,609	.....
Tambaroora and Turon .....	11,269	11,947	687	.....
Mudgee .....	17,078	23,941	6,863	.....
Lachlan .....	12,474	11,853	.....	621
Albert .....	920	5,513	4,593	.....
Southern .....	16,755	15,449	.....	1,306
Tumut and Adelong.....	7,837	12,026	4,189	.....
Peel and Uralla .....	48,807	46,322	.....	2,485
Hunter and Macleay .....	1,685	1,907	222	.....
Clarence and Richmond .....	5,198	4,982	.....	216
New England .....	4,032	4,711	679	.....
Cobar .....	2,362	6,377	4,015	.....
	152,112	173,341	25,857	4,628
Less Decrease .....	.....	.....	4,628	.....
Increase in yield for 1893.....	.....	.....	21,229	.....

The Mining Registrars returns of gold for 1893 show an increased yield of 21,229 oz. The total increase for the year, as shown by the Mint and Customs return is 22,418 oz.—a difference of only 1,189 oz. This is very satisfactory, and shows that the Mining Registrars have taken greater care than usual in collecting correct information. In some cases these officers experience great difficulty in procuring correct returns.

## COMPARATIVE Statement of Average Yields from Alluvial Mines for 1892-93.

1892.				1893.			
District.	Quantity.	Average per ton.	Yield of Gold.	District.	Quantity.	Average per ton.	Yield of Gold.
	Loads.	oz. dwt. gr.	oz. dwt. gr.		Loads.	oz. dwt. gr.	oz. dwt. gr.
Lachlan .....	5,004	0 3 2	969 2 12	Bathurst .....	10,000	0 0 6	119 0 0
Southern .....	60,000	0 0 1	170 0 0	Cobar .....	983	0 13 13	665 0 0
Hunter and Macleay .....	50	0 12 0	30 0 0	Lachlan .....	1,624	0 16 3	1,311 0 0
Tumut and Adelong .....	5,541	0 0 1	133 17 1	Tumut and Adelong .....	9,800	0 0 6	124 0 0
Peel and Uralla .....	126,517	0 0 2	504 15 0	Southern .....	15,000	0 0 2	68 10 0
	197,112	0 0 4	1,807 14 13		37,407	0 1 5	2,287 10 0

The foregoing table shows the results obtained from working alluvial ground in the several districts named. It is a difficult matter to obtain correct information on this subject, the miners very seldom keeping a record of the quantity of wash-dirt put through, and in many cases are reluctant to disclose the result of their work. The table would be a valuable one were it complete, but it is given as full as possible under the circumstances.

## COMPARATIVE Statement of Average Yields from Quartz-mines for 1892-93.

1892.			1893.				
District.	Quantity.	Average per ton.	Yield of Gold.	District.	Quantity.	Average per ton.	Yield of Gold.
	Tons.	oz. dwt. gr.	oz. dwt. gr.		Tons.	oz. dwt. gr.	oz. dwt. gr.
Bathurst .....	9,980	1 17 8	18,637 11 0	Bathurst .....	14,249	0 15 2	10,739 0 0
Tambaroora and Turon .....	6,466	0 17 0	5,492 1 19	Tambaroora and Turon .....	2,702	1 2 3	2,901 10 0
Lachlan .....	10,292	0 14 14	7,513 6 2	Lachlan .....	2,453	0 13 11	1,648 10 0
Southern .....	4,829	1 7 18	6,009 3 17	Southern .....	20,405	0 6 16	6,801 10 0
Tumut and Adelong .....	2,409	1 0 7	2,445 16 12	Tumut and Adelong .....	2,906	1 4 19	3,000 10 0
Peel and Uralla .....	39,778	0 19 17	39,247 1 11	Peel and Uralla .....	31,662	1 1 19	34,671 0 0
Hunter and Macleay .....	240	1 13 7	309 16 0	Hunter and Macleay .....	861	1 14 14	674 0 0
Clarence and Richmond .....	1,420	1 13 13	2,024 6 3	Clarence and Richmond .....	1,609	1 0 16	1,880 10 0
New England .....	2,078	1 4 9	2,632 10 0	Mudgee .....	21,476	0 12 10	13,267 0 0
Mudgee .....	17,804	0 13 2	11,848 16 0	Cobar .....	7,875	1 2 30	8,902 0 0
Cobar .....	8,927	0 8 18	1,722 4 4				
	99,223	0 19 19	98,309 13 20		105,886	0 16 11	85,085 10 0

The foregoing table shows the average yield of sundry parcels of stone treated in the various mining districts. There is much less difficulty in procuring this information relating to quartz than alluvial mining. This table is more complete than usual, and shows the result of crushing 105,886 tons of stone, as compared with 99,223 tons in 1892. The average yield per ton is, however, less by 3 dwt. 8 gr. than in 1892, but the average yield of 16 dwt. 11 gr. from such a large quantity of stone as 105,886 tons is considered fairly satisfactory.

The number of miners employed in gold-mining during 1893 was 5,684 Europeans, and 717 Chinese in alluvial, and 5,556 Europeans in quartz-mining, a total of 11,957, an increase of 2,038 on the previous year.

Dividing the quantity of gold won by the number of miners, the result obtained is that each miner appears to have won 14.99 oz., or equal to £54 9s. 4d. during the year, as compared with 17.33 oz., or £62 18s. per man during 1892.

This is evidently a rough mode of computing the earnings of each man during the year, as it is understood that a large number of the men stated were only engaged in prospecting, and others in comparatively new fields, from which little returns have yet been obtained.

During the year 2,634 samples were assayed for gold in the laboratory of this Department.

1,713 yielded nil.

612 „ under 10 dwt. per ton.

309 „ as follows:—

Official Number.	Locality.	Description.	Per ton.	
			Gold.	Silver.
			oz. dwt. gr.	oz. dwt. gr.
21	Adelong .....	Massive pyrites, with a little quartz .....	36 13 21	9 11 14
1031	„ 8 miles S. of (Nackie Creek).	Greyish quartz .....	1 6 2	0 6 12
905	Albury (17 miles from)...	Siliceous brown iron ore .....	5 19 15	1 10 11
1330	„ ( „ )...	Ferruginous quartz .....	2 14 10	0 12 22
2169	„ .....	Quartz with micaceous and felspathic material .....	0 15 2	1 14 20
2170	„ .....	Quartz with ferruginous clay .....	1 9 8	0 14 0
2171	„ .....	Quartz with felspathic material .....	3 12 22	0 18 8
1292	Avisford (near Queen of Sheba mine).	Burnt pyrites—blanketing .....	14 7 10	1 1 18
2071	Abercrombie Ranges(near)	Pyritous gossan .....	1 17 0	7 12 10



Official Number.	Locality.	Description.	Per ton.	
			Gold.	Silver.
			oz. dwt. gr.	oz. dwt. gr.
1067	Carcoar District .....	Mispickel .....	7 8 0	1 3 22
1962	" (Flyer's Creek) .....	Pyrites .....	0 10 21	7 12 10
2480	" District .....	Slaty rock, with mispickel .....	0 12 22	0 8 17
2776	" " .....	Crushed pyritous quartz .....	3 3 3	3 3 3
1074	Casino .....	Fragments, consisting of pyrites, jasper, &c. ....	0 10 21	4 7 2
280	Cell's Creek (left hand branch) Walcha.	Quartz .....	0 17 8	0 4 8
967	Cell's Creek .....	Crushed pyrites, with pieces of pyritous shale .....	18 15 15	2 8 23
1806	Chambigne, near Grafton (Star of Hope G.M.)	Crushed sample, consisting largely of arsenical pyrites, with some slate.	2 19 20	0 9 18
2626	Clarence River (adjoining Star of Hope G.M., reef 3 ft. wide).	Quartz, with arsenical and iron pyrites and hematite .....	0 17 9	0 8 16
221	Clarence River (Star of Hope G.M.)	Quartz, with carbonaceous veins .....	1 6 2	0 6 12
819	Cobar (Occidental shaft) ..	Impure kaolin, with disseminated hematite .....	5 13 5	0 4 8
888	" ..	Earthy hematite, with a little magnetite, showing free gold	8 9 19	0 8 17
1427	" (Fort Bourke Hill) ..	Felsite .....	6 6 3	480 16 22
1428	" " " ..	Felspathic rock .....	6 3 23	641 13 14
2625	" ..	Kaolinised felspathic stone .....	3 5 8	0 6 12
2739	" ..	Kaolinised schist .....	2 13 8	0 3 6
904	Cobark River (14 miles W. of Copeland).	Pyritous quartz, showing free gold .....	5 8 21	1 3 22
1568	Condobolin .....	Ferruginous cellular quartz .....	1 8 6	0 10 21
1764	" (3 miles N.W.)	Quartz, amethystine in part .....	1 12 16	0 10 12
2780	" (40 miles from).	Felspathic quartz agglomerate (from surface) .....	0 18 8	0 3 6
2278	Con's River .....	Gossan .....	3 10 18	1 18 2
1972	Coolamon .....	Lode quartz .....	16 6 16	7 8 1
1973	" ..	Ferruginous quartz .....	8 12 0	2 16 14
1663	Cootamundra (near) .....	Ferruginous, micaceous, felspathic stone .....	14 3 2	3 14 1
1858	" (12 miles from).	Micaceous felspathic rock .....	7 18 22	1 17 0
2044	Cootamundra (12 miles from).	Felspathic stone .....	5 8 21	2 3 13
2456	Cootamundra District ..	Felspathic lodestuff, with some quartz and pyrites .....	1 7 4	0 10 21
735	Cooma, near (Mt. Wilson)	Chlorite schist, showing gold .....	9 2 22	0 5 10
780	" ..	Apparently partially-crushed lodestuff .....	11 17 5	0 7 14
1028	" District .....	Gossan (apparently) .....	2 14 10	0 10 21
1278	" (near) .....	Quartz, with arsenical and iron pyrites .....	0 15 2	0 4 8
1531	" " (Cowra King)	Siliceous iron and arsenical pyrites .....	7 16 18	0 12 22
1617	" " " ..	Contorted slate, with excessively fine gold .....	10 4 17	0 5 10
1849	" " " ..	Siliceous arsenical pyrites .....	0 15 2	0 4 8
2133	" 25 miles from (Cowra Creek).	Pyritous slate .....	1 19 4	0 4 8
2376	" " " ..	Blue slate, with much quartz .....	1 8 6	0 4 8
2449	Cooma, 25 miles from (Cowra Creek) (W. Monaro).	Crushed samples .....	5 8 21	2 12 6
2450	" " " ..	" .....	1 13 18	0 3 6
2451	Cooma, 25 miles from (Cowra Creek).	" .....	1 18 2	0 5 10
197	" " " ..	Quartz, with secondary iron pyrites .....	7 12 10	0 12 22
1310	" " " ..	Ferruginous felspathic stone .....	1 19 4	0 4 8
1311	" " " ..	Very ferruginous felspathic stone .....	0 11 20	0 3 6
1312	" " " ..	Cellular ferruginous felspathic stone .....	1 8 6	0 4 8
2431	" " " ..	Cellular white quartz .....	2 3 13	2 14 10
2470	" " " ..	Siliceous mispickel .....	1 15 22	0 11 20
2511	Cooma, 25 miles from (near Cowra Creek, Bredbo).	Quartz, somewhat cellular ferruginous (surface) .....	1 6 2	0 6 12
2512	" " " ..	Slightly pyritous ferruginous quartz (depth 7 feet) .....	2 3 13	0 8 17
2661	Cooma, 25 miles from (Cowra Creek).	Felspathic gossan .....	2 3 13	0 5 10
2662	" " " ..	Gossan, with clay slate .....	0 10 21	0 5 10
2663	" " " ..	Felspathic gossan .....	1 17 0	0 6 12
2664	" " " ..	" (40 feet deep) .....	0 10 21	0 4 8
2665	" " " ..	Cellular quartz .....	6 6 3	0 6 12
2667	" " " ..	Gossan, with slate .....	1 12 16	0 6 12
2668	" " " ..	Siliceous pyrites .....	0 11 20	0 5 10
2670	Cooma (Fiery Creek) .....	Felspathic stone, containing carbonate of copper .....	0 16 4	0 5 10
859	Cow Flat .....	Pyritous quartz felsite .....	0 16 4	0 5 10
1611	Crookwell, near (Markdale, Wheel of Fortune, Crooked Corner).	Pyritous quartz .....	16 6 16	58 11 14
587	Cullinga .....	Crushed sample, with pyromorphite .....	2 19 20	0 16 14
588	" ..	" ..	0 15 2	0 6 12
589	" ..	" with pyromorphite .....	2 14 10	0 18 8
906	" (Johnston's Prospecting Claim).	Probably a much decomposed felsite .....	1 3 22	0 15 2
958	Cullinga (depth 7 feet) ..	Ferruginous pyromorphite .....	5 8 21	2 3 13
1054	" (Johnston's Prospecting Claim).	Ferruginous felspathic rock .....	1 12 16	0 6 12
1928	Cullinga .....	Felsite .....	1 3 22	0 6 12
1929	" ..	Mortarings .....	4 18 0	1 19 4
2343	" (95-foot level) ..	Felspathic lodestuff, with pyromorphite .....	4 0 13	0 15 2
2344	" ..	Micaceous felspathic stone associated with pyromorphite ..	18 10 5	6 8 8
2513	Curra Creek (18 miles from Wellington).	Quartz—jasperoid in part—with much hematite ..	4 11 10	0 17 9

Official Number.	Locality.	Description.	Per ton.	
			Gold.	Silver.
			oz. dwt. gr.	oz. dwt. gr.
1100	Dalmorton .....	Quartz, with blende, &c. ....	0 14 2	0 7 14
2402	Damondrillo .....	Ferruginous white quartz. ....	0 17 9	0 8 17
248	Deepwater (near) .....	Decomposing rock, probably granite (quartz, mica, kaolin). ..	2 4 15	0 9 19
1255	Deep Creek .....	Mispickel. ....	8 5 11	0 15 2
14	Dilga River (Goumba Mine).	Quartz and talc, with copper pyrites .....	3 11 20	30 14 2
869	Drake (Lady Charlotte Reef).	Coarsely crushed lodestuff—principally quartz .....	0 15 2	7.56 p. cent. 0 4 8
918	" " " " .....	Homatite and quartz, and crushed material, showing free gold ..	12 14 18	1 8 6
1378	Drake (Gladstone G.M.) ..	Ferruginous cellular quartz. ....	3 9 16	0 12 22
1380	" " " " .....	Cellular quartz, somewhat ferruginous. ....	1 14 20	0 8 16
1381	" " " " .....	Ferruginous cellular quartz. ....	1 1 18	0 6 12
1383	" " " " .....	" " " " .....	5 19 15	0 10 21
2483	Dubbo (20 miles from) ..	Crushed material .....	0 16 4	0 3 6
2553	Dungog (Church & School Lands).	Lode quartz. ....	2 19 20	0 5 10
1325	Eldorado (near Drysdale)	Decomposing felspathic rock .....	10 11 5	256 19 11
956	Flyer's Creek .....	Sand, containing ilmenite, magnetite, and probably wolfram ..	9 18 16	1 4 13
2275	Gladstone Ranges, Drake	Friable ferruginous quartz .....	3 14 1	0 15 2
2313	Glen Elgin District (?) ..	Crystallised quartz .....	0 17 9	0 6 12
1040	Goulburn District .....	Ferruginous quartz, with iron pyrites .....	1 15 22	3 4 5
1820	Goulburn District (to- wards Crookwell).	Pyritous quartz (8 or 10 feet deep) .....	55 10 15	11 12 20
1821	" " " " .....	Quartz, with arsenical pyrites .....	6 10 15	0 10 21
753	Gough's Gully (8 miles S. of Drake).	Cavernous quartz, with iron pyrites, zincblende, and a little galena. ....	10 12 17	4 12 12
2599	Gough's Gully (Kelly's Claim).	Pyritous quartz .....	6 3 23	5 4 12
341	Grenfell (?) (Dane & party)	Quartz, with free gold .....	25 0 21	0 8 16
957	" (J. Ackroyd) ..	Quartz sand, containing much quartz, magnetite, pyrites, &c. ..	1 19 4	0 3 6
2233	Grafton (19 miles from) ..	Compact white lode quartz traversed by black vein, with a little arsenical pyrites. ....	11 15 0	1 1 18
2367	Green Swamps .....	Ferruginous siliceous stone, with a little slaty-country rock. ..	1 14 20	1 17 0
296	Gundagai .....	Ferruginous quartz, with slate casing .....	1 1 18	0 3 6
297	" " " " .....	Quartz, with specks of mispickel .....	0 19 11	0 4 8
1424	" (near) .....	" " pyrites. ....	3 7 12	0 8 16
1107	Guyra and Tingha (between).	Ferruginous clay, apparently a decomposed basalt .....	0 11 20	0 3 6
728	Hawkesbury District ..	Quartz, with copper pyrites .....	0 17 9	0 15 2
1020	Hindmarsh (Parish of) ..	Ferruginous stone containing quartz, mica, and felspathic material. ....	1 0 13	0 5 10
1641	" " " " .....	Crumbling felspathic rock .....	1 1 18	0 4 8
1545	Inverell (near) .....	Dark coloured crystalline rock .....	0 18 8	0 16 4
1546	" " " " .....	" " " " .....	0 16 4	0 14 0
1421	Isabella River (14 miles from Burraga).	Highly ferruginous felspathic quartz—breccia .....	2 7 20	0 4 8
1631	Junee Reefs (Rosedale ?)	White quartz .....	1 19 4	0 19 12
690	Junee Reefs (Dust-Hole Reef).	Quartz and felspathic material .....	1 13 18	0 16 4
2474	Junee Reefs .....	Pyritous white quartz .....	1 8 6	0 6 12
2325	Jerrawa (Hyphalia Gold- mine).	Ferruginous pyritous quartz .....	8 18 13	7 8 1
358	Kerr's Creek (near Orange)	Ferruginous cavernous quartz. ....	1 6 2	2 5 17
471	Larras Lake .....	Fine-grained magnetite .....	0 10 21	0 4 8
3	Lewis Ponds (4 miles east of).	Quartz and clay veinstone, with sulphides of iron and lead. ..	2 7 21	1 6 2
158	Little River .....	Quartz with a little arsenical and iron pyrites, and a speck of free gold. ....	1 9 8	0 3 0
2581	Liddleton .....	Ironstone. ....	0 12 22	0 6 12
2582	" " " " .....	" " " " .....	5 2 8	2 7 2
2122	Long Swamp (Orange) ..	Mercury, supposed to contain gold .....		
		Total weight of amalgam, 7 oz. 16 dwt. 11 gr. troy		
		Weight of mercury obtained after distillation, 7 oz. 11 dwt. 4 gr. troy.		
		Gold and silver in amalgam .....	5.200 gr.	
		Fine gold .....	5.116 "	
		Fine silver .....	0.084 "	
2156	Mitchell's Creek (near) ..	Siliceous pyrites—copper and iron. ....	10 6 21	30 7 13
2401	" " " " .....	" " " " .....	1 8 6	5 8 21
1293	" (6 miles from)	Quartz, with a little pyrites and calcite .....	1 17 0	1 1 18
1918	Michelago .....	Quartz rubble. ....	2 3 13	1 1 18
1919	" " " " .....	Pyrites. ....	1 18 2	1 18 2
1920	" " " " .....	" " " " .....	1 19 4	2 10 1
2038	" " " " .....	Siliceous mispickel. ....	2 18 18	2 10 1
2252	" " " " .....	Gossan .....	0 16 4	7 15 16
1215	Major's Creek (Braidwood)	Quartz felsite .....	0 16 4	0 3 6
1216	" " " " .....	Pyritous quartz felsite .....	1 12 16	0 6 12
1217	" " " " .....	Quartz felsite .....	2 11 3	0 7 14
1218	" " " " .....	" " " " .....	0 11 20	0 3 6
1649	" Araluen (be- tween).	" " with secondary quartz .....	0 11 20	0 3 0
1157	Milburn Creek .....	Pyritous felspathic lodestuff .....	10 17 18	3 11 20
328	Mount Allen Gold-mine ..	Iron ore .....	1 4 12	0 3 19
329	" " " " .....	Slate, showing free gold in fine scales .....	1 1 17	1 17 0
497	" " " " .....	Highly ferruginous claystone .....	1 17 0	0 4 8
377	Mount Billagoe .....	Schistose siliceous aluminous rock. ....	1 17 0	0 8 17
378	" " " " .....	" " " " .....	4 7 2	1 8 6

Official Number.	Locality.	Description.	Per ton.	
			Gold.	Silver.
			oz. dwt. gr.	oz. dwt. gr.
379	Mount Billagoe .....	Schistose siliceous aluminous rock .....	2 14 10	1 3 22
1043	Mount Carrington (Drake)	Slimes .....	1 14 20	0 14 3
408	Mount Dromedary .....	Ferruginous felspathic material, with quartz .....	4 11 10	0 17 9
1473	Mount Drysdale .....	Decomposing felspathic rock, with minute scales of mica .....	6 17 3	49 8 17
50	Mount Mulloou .....	Sulphides of zinc, lead, and copper .....	0 15 2	10 2 11
404	Mulloou .....	Quartz and slate, with copper pyrites .....	0 17 9	5 2 8
406	" .....	Sulphides of copper and zinc in quartz and slate .....	0 10 21	1 12 16
666	" .....	Copper pyrites, with blende and galena .....	Copper, 7.80 per cent 1 3 22	8 18 3
1652	Mount McDonald (near)	Crushed lodestuff .....	Copper, 11.00 p. cent 3 13 10	1 15 9
2341	Mount Morton .....	Highly ferruginous quartz .....	0 14 6	0 3 6
672	Mount Parnassus (Battye A. Sullivan's Claim).	Talc schist, with crystals of oxide of iron (formerly iron pyrites).	1 1 18	0 4 8
454	Mogo .....	Average sample from tons of tailings averaged at Clyde .....	2 7 21	0 6 12
1080	" (Blackfellows' Moun- tain).	Quartz .....	1 1 18	0 4 8
1081	Mogo (West Blackfellows' Mountain Line).	Ferruginous quartz .....	9 10 12	0 5 10
1406	Mogo .....	Ore .....	1 5 10	0 2 6
1408	" .....	Blanketings .....	1 2 20	0 3 6
1474	" .....	Ore .....	1 3 22	0 5 10
1476	" .....	Blanketings .....	0 11 20	0 3 6
1728	" District (Victory Mine line of reef).	" .....	0 18 8	0 3 6
1466	Mogo District (Victory Mine).	Pyritous quartz, with a little galena .....	1 1 18	0 12 22
1468	Mogo District (South of Victory Mine).	White quartz, with a few specks of pyrites and a little micaceous felspathic material.	1 1 18	0 6 11
1730	Mogo District (N.W. of Victory Mine).	White quartz, with a little pyrites .....	2 10 1	0 4 8
1731	Mogo District (Victory Mine).	Siliceous pyrites .....	10 2 11	0 15 2
1469	Mogo District (N. of Victory Mine).	Rubble .....	0 19 11	0 6 11
1012	Molong District .....	Quartz, with copper pyrites .....	2 5 17	5 2 8
736	Mooney Mooney parish (County of Harden).	Siliceous oxide of iron .....	1 19 4	0 19 11
199	Moruya .....	Quartz, showing free gold .....	10 17 8	2 14 10
200	" .....	" " " .....	9 11 14	1 14 20
1075	" (near) .....	Blanketings .....	0 16 4	0 3 6
1155	Mosquito Creek (near Tooloom).	Crushed pyrites .....	4 10 17	6 19 9
2491	" " " .....	Friable white quartz, with much clay .....	5 8 21	90 7 13
1361	Mundi Mundi (Barrier Range).	Granite .....	7 16 8	0 12 22
1045	Muttama .....	Apparently gossan .....	1 5 0	0 5 10
2704	" (3 miles S. of P.O.)	Felspathic lodestuff, stained with blue and green carbonates of copper.	0 12 22	2 16 14
2194	Nana Creek District .....	Quartz, with pyrites, galena, and blende .....	2 14 10	4 12 12
953	Nerriga District .....	Scoriaceous volcanic rock, with veins of quartz and a little pyrites.	6 14 23	0 8 17
2222	" " .....	Siliceous sintery stone, with a few specks of pyrites .....	4 15 9	1 6 2
2224	" " .....	Ferruginous sintery stone .....	1 6 3	0 9 19
1432	Nerrigundah (1½ mile from)	Quartz in felspathic matrix .....	3 0 22	0 10 21
1433	" (4 miles from)	Quartz, somewhat ferruginous .....	4 7 2	0 15 2
366	Newbridge (near) .....	Ferruginous cavernous quartz, with a few specks of pyrites .....	0 17 9	86 14 17
718	" " .....	Ferruginous quartz .....	0 19 11	1 19 4
1226	" " .....	Highly cellular quartz, somewhat stained by yellowish clay .....	4 19 0	9 13 9
1520	" " .....	Ferruginous cellular quartz, with a little pyrites and galena .....	2 14 10	13 18 16
1563	" " .....	Quartz, slightly pyritous; cellular and ferruginous in part .....	1 19 4	7 5 21
1651	" " .....	Ferruginous cellular quartz .....	0 15 2	9 0 17
337	New Hargraves .....	Pyritous stuff .....	1 13 18	1 3 22
1491	" Mine .....	Quartz, with a little slaty country rock, slickensided in part .....	0 10 21	0 4 8
2	Niangala (Morning Star Battery).	Blanketings .....	2 17 3	0 9 22
1414	Niangala .....	Dark-coloured quartz, with iron and arsenical pyrites .....	3 5 8	0 17 9
564	Norway parish (county of Westmoreland).	Arsenical pyrites, with quartz and micaceous clay .....	14 6 8	8 7 16
2601	Nuntherungie (Nil Des- perandum Claim).	Quartz .....	1 1 18	29 7 23
629	Nymagee .....	Ferruginous cellular quartz .....	0 11 20	0 3 6
360	Oberon District .....	Quartz, with mispickel, pyrites, galena, and blende .....	0 19 11	6 8 8
2339	O. B. X. Creek .....	Compact white quartz, with black pyritous clayey veins .....	13 3 10	1 12 16
1666	Paupong .....	Ferruginous cellular quartz .....	0 17 9	0 8 17
323	Pambula (the Bell G.-m.)	Crushed sample .....	1 16 11	0 1 15
2145	" .....	Slimes .....	2 18 18	0 8 16
78	Peak Hill (Walker and party).	Ferruginous quartz, cavernous in places, containing chloride of silver.	28 1 20	524 19 1
301	Peak Hill (West Battery)	Pyritous blanketings .....	1 2 20	0 3 6
522	" (Crown of Peak Hill Mine).	Crushed samples (pyritous) .....	0 18 8	0 4 8
1802	Peelwood (near) .....	White quartz .....	0 10 21	28 8 8
940	Penrith (8 miles N. from)	Highly silicified felsite, showing a little free gold .....	3 14 1	0 6 12
2490	Pretty Gully (near Too- loom).	Friable white quartz, with much clay .....	8 19 15	129 16 22
795	Scrubby Rush (near Mil- burn Creek).	Felspathic rock, with quartz .....	1 6 2	1 3 22
1579	Solferino .....	Pyritous quartz, in part cellular and ferruginous .....	0 12 22	0 8 16

Official Number.	Locality.	Description.	Per ton.	
			Gold.	Silver.
			oz. dwt. gr.	oz. dwt. gr.
242	Sunny Corner (4 or 5 miles N.E. from).	Quartz, with a few specks of galena; pyrites, and blonde	4 11 10	17 10 14
1017	Sunny Corner	Ferruginous pyritous quartz	0 14 0	0 7 14
1083	Sunny Corner (5 miles W. from).	Ferruginous quartz with mispickel; also piece of country rock.	16 11 0	9 9 10
202	Tenterfield (?)	Ferruginous quartz	1 6 2	31 7 3
2316	The Bluff (Ophir)	Pyritous quartz	0 10 21	0 4 8
1320	Tindary	Highly siliceous talcose schist	21 0 6	464 10 6
1417	Trunkey	Ferruginous cellular quartz	0 18 8	0 5 10
1708	" (near)	Quartz	0 10 21	8 12 0
208	Tucna (2 miles from)	Cavernous ferruginous quartz, a little gold showing	19 5 10	25 7 9
342	Tucna	Cavernous quartz, showing free gold	20 15 22	15 10 7
1350	"	Ferruginous cellular quartz	7 12 10	26 11 8
479	Tumut	Ferruginous quartz	3 11 20	0 4 8
1289	Tumbarumba District	Siliceous felspathic lodestuff	10 9 1	3 12 22
2796	Tumbarumba (Head of Paddy's River).	Quartz, with much ferruginous felspathic material	5 15 9	1 6 2
2611	Tunell's Swamp	Ferruginous sandstone	2 7 21	2 10 1
1845	Umaralla Siding (near)	Gossan	1 12 16	0 6 12
1846	" ( " )	Slate	1 6 2	0 4 8
1847	" ( " )	Gossan	0 11 20	0 3 6
1848	" ( " )	"	2 18 18	0 8 17
1932	Uralla (15 miles W. from Armidale).	Ferruginous manganese quartz breccia	7 10 6	0 4 8
1792	Wagonga North Heads	Quartz, with copper pyrites and carbonaceous shale; free gold showing.	6 17 3	1 8 6
397	Walcha, near (Cell's Ck.)	Powdered material	1 12 16	0 6 12
1290	Walcha, (Jersey Mine, Niangala).	Gray quartz	22 6 7	3 11 20
319	Wallendbene	Crushed pyromorphite	13 5 21	2 5 17
1465	Wattle Flat (Sofala)	Loosely crushed quartz	2 10 20	0 8 16
2237	Wellington (near Gladstone reef.)	Quartz borings	1 1 18	0 8 17
2238	" "	Quartz	1 17 0	0 10 21
1496	Woolgoolga	Quartz	1 3 22	0 6 12
1497	"	"	11 12 20	1 17 0
1101	Yalwal	Ferruginous cellular quartz	84 13 3	20 10 11
1102	"	Decomposing felspathic rock	42 9 7	11 19 12
1585	"	Quartzose and slaty fragments	1 18 2	0 5 10
2773	"	Veins of white quartz, cellular in part, traversing slate	2 3 13	3 14 0
962	Yalgolgin (near Lake Cargellico.)	Cellular pyritous vein-quartz	6 4 2	2 10 1

## COAL.

THE output of coal, I regret to say, for 1893 shows a decrease of 502,640 tons, and in value £290,666, as compared with 1892. The value of the output for last year is the lowest for eleven years past, and the average rate per ton, which was 7s. 1.78d., is the lowest for the past thirteen years. The lowest averages since the opening of our coal-fields were 7s. 0.47d., in 1871, and 6s. 9.40d. in 1881. The decrease in the home consumption is comparatively small, but the falling off in the exports to intercolonial and foreign ports has been very serious.

The decrease in the home consumption is, no doubt, due to the depression in the various trades, and to the need for retrenchment in various directions. The decrease in the intercolonial trade is probably due to the discovery of workable coal-seams in Victoria; and while we may be pardoned feeling regret at the loss of so good a customer, we cannot fail to congratulate our neighbour on a discovery which adds so materially to the wealth of the Colonies as a whole.

## QUANTITY and Value of Coal raised from the opening of the Coal-seams to 1857, inclusive :—

Year.	Quantity.	Average per ton.	Value.	Year.	Quantity.	Average per ton.	Value.
Prior to		£ s. d.	£			£ s. d.	£
1829	50,000	0 10 0.00	25,000	1844	23,118	0 10 8.34	12,363
1829	780	0 10 1.23	394	1845	22,324	0 7 10.27	8,769
1830	4,000	0 9 0.00	1,800	1846	38,965	0 7 0.46	13,714
1831	5,000	0 8 0.00	2,000	1847	40,732	0 6 9.01	13,750
1832	7,143	0 7 0.00	2,502	1848	45,447	0 8 3.38	14,275
1833	6,812	0 7 6.73	2,575	1849	48,516	0 6 0.45	14,647
1834	8,490	0 8 10.00	3,750	1850	71,216	0 6 6.77	23,375
1835	12,392	0 8 10.19	5,483	1851	67,610	0 7 6.51	25,546
1836	12,646	0 9 1.06	5,747	1852	67,404	0 10 11.33	36,885
1837	16,083	0 9 8.81	5,828	1853	96,809	0 16 1.51	78,059
1838	17,220	0 9 9.05	8,399	1854	116,642	1 0 5.63	119,380
1839	21,283	0 9 9.73	10,441	1855	137,076	0 12 11.96	89,082
1840	30,256	0 10 10.88	16,498	1856	189,960	0 12 4.06	117,906
1841	34,841	0 12 0.00	20,905	1857	210,434	0 14 0.97	148,158
1842	39,900	0 12 0.00	23,940				
1843	25,862	0 12 6.54	16,222		1,468,961	0 11 10.72	869,391

TABLE showing the Quantities and Average Value per ton of Coal exported to Intercolonial and Foreign Ports respectively, the Quantity of Coal consumed in this Colony, and the Average Price per ton of the total output of the Collieries, from 1858 to 1893 inclusive.

Year.	Exports to Intercolonial Ports.			Exports to Foreign Ports.			Total Exports.			Home consumption.	Total Output and Value.		
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.		Quantity.	Average per ton.	Value.
1858	Tons. 101,488	£ s. d. 0 16 1-07	£ 76,824	Tons. 12,039	£ s. d. 1 0 1-85	£ 12,132	Tons. 113,527	£ s. d. 0 15 8-05	£ 88,956	Tons. 102,870	Tons. 216,397	£ s. d. 0 14 11-84	£ 182,162 0 0
1859	129,536	0 14 6-07	94,312	44,349	0 17 5-27	38,672	178,935	0 15 3-49	137,984	134,278	309,213	0 13 2-14	304,371 0 0
1860	140,183	0 14 10-85	104,471	93,694	0 16 11-10	79,290	233,877	0 15 8-57	182,761	134,965	368,842	0 12 2-26	236,498 0 0
1861	157,278	0 15 2-25	119,433	50,502	0 16 5-37	41,532	207,780	0 15 5-92	180,965	134,237	342,067	0 12 9-52	218,330 0 0
1862	195,427	0 15 0-55	147,019	113,355	0 17 4-34	98,403	308,782	0 15 10-75	245,422	167,740	476,522	0 12 9-73	305,234 0 0
1863	213,909	0 13 8-40	146,532	84,129	0 17 6-10	73,649	296,038	0 14 9-29	220,181	135,551	428,889	0 10 10-06	226,239 0 0
1864	283,539	0 10 3-74	146,199	88,927	0 14 10-90	66,289	372,466	0 11 4-91	212,498	176,546	549,012	0 9 10-10	279,171 0 0
1865	202,004	0 9 11-83	146,129	90,804½	0 15 0-79	68,029	362,968½	0 11 2-20	214,158	202,556½	585,525	0 9 4-43	274,308 0 0
1866	344,194	0 9 2-98	159,175	196,711	0 14 4-53	141,413	540,905	0 11 1-37	300,588	233,333	774,238	0 8 4-44	324,949 0 0
1867	312,101	0 9 4-35	146,111	161,256	0 13 2-47	107,148	473,357	0 10 8-40	253,259	208,656	770,012	0 8 10-79	347,865 0 0
1868	320,052	0 9 5-76	155,975	218,994	0 12 5-29	136,226	545,036	0 10 7-96	292,201	409,186	954,221	0 8 9-08	417,809 0 0
1869	340,400	0 8 9-07	149,059	255,087	0 11 8-31	149,136	505,563	0 10 0-16	298,196	324,221	919,774	0 7 6-22	346,146 0 0
1870	335,564	0 8 6-02	142,056	242,825	0 10 3-57	125,025	578,389	0 9 2-07	267,081	290,176	808,564	0 7 3-54	316,838 0 0
1871	378,891	0 8 6-91	162,470	186,538	0 10 1-22	94,220	565,429	0 9 0-25	256,690	233,355	808,784	0 7 0-47	316,240 0 0
1872	394,052	0 8 8-11	170,947	275,058	0 9 11-46	136,914	609,110	0 9 2-42	307,851	343,316	1,012,496	0 7 9-92	296,199 0 0
1873	425,937	0 12 9-32	272,110	347,142	0 14 7-59	253,079	773,079	0 13 7-32	526,069	419,783	1,192,862	0 11 1-94	605,747 0 0
1874	407,583	0 13 8-30	320,119	405,442	0 15 4-76	312,128	873,025	0 14 5-61	632,247	421,567	1,304,612	0 12 1-37	790,224 0 0
1875	518,853	0 13 7-77	354,074	408,154	0 15 6-64	317,400	927,007	0 14 5-84	671,483	402,722	1,329,729	0 12 3-26	819,429 17 2
1876	542,952	0 13 8-45	372,045	325,865	0 15 6-45	253,166	868,817	0 14 4-70	625,211	451,101	1,319,918	0 12 2-06	808,300 5 8
1877	563,757	0 13 8-64	386,740	351,970	0 14 10-81	262,237	915,727	0 14 2-08	648,977	523,544	1,444,271	0 11 10-74	858,908 8 2
1878	623,323	0 13 8-77	427,954	383,097	0 14 7-69	290,452	1,006,420	0 14 0-23	708,406	569,977	1,575,497	0 11 8-28	920,336 7 4
1879	621,067	0 13 6-75	421,198	376,962	0 14 6-13	273,509	998,049	0 13 11-05	694,707	586,332	1,583,381	0 12 0-12	959,878 18 3
1880	550,672	0 11 2-67	309,004	202,684	0 11 5-70	116,295	753,356	0 11 2-48	425,299	712,824	1,469,180	0 8 6-26	615,338 11 7
1881	657,135	0 7 9-34	265,572	372,709	0 8 8-29	161,958	1,029,844	0 8 1-30	417,530	739,753	1,769,597	0 6 9-55	698,248 5 8
1882	760,226	0 9 9-54	372,334	501,319	0 10 11-50	274,699	1,351,545	0 10 3-09	647,083	547,737	2,109,282	0 8 11-97	942,965 0 0
1883	855,704	0 10 5-75	448,356	658,741	0 11 7-34	381,306	1,512,445	0 10 11-65	829,662	1,000,012	2,521,457	0 9 8-40	1,291,941 12 11
1884	994,087	0 10 8-66	532,938	696,676	0 11 5-14	396,107	1,690,763	0 11 0-15	981,045	1,056,346	2,749,109	0 9 5-71	1,308,978 19 11
1885	991,924	0 10 7-13	525,443	764,432	0 11 6-52	441,220	1,756,356	0 11 0-00	966,663	1,122,507	2,878,863	0 9 2-72	1,340,212 13 7
1886	1,027,775	0 10 7-22	544,824	708,090	0 11 4-31	402,178	1,735,866	0 10 10-93	947,002	1,094,310	2,830,175	0 9 2-53	1,308,164 4 1
1887	1,077,270	0 10 5-89	565,084	713,172	0 11 1-08	395,455	1,790,442	0 10 8-75	960,539	1,132,055	2,922,497	0 9 2-57	1,245,449 2 7
1888	1,039,764	0 10 10-25	564,293	884,108	0 11 3-77	500,179	1,923,873	0 11 0-78	1,064,472	1,279,572	3,203,444	0 9 1-62	1,455,198 4 1
1889	1,310,228	0 10 4-24	678,200	1,077,474	0 11 1-88	601,071	2,387,702	0 10 8-58	1,279,271	1,267,930	3,665,632	0 8 11-29	1,632,948 15 6
1890	1,149,544	0 10 6-96	608,108	672,330	0 11 3-31	379,065	1,821,874	0 10 10-04	967,173	1,239,002	3,060,876	0 8 4-29	1,279,698 19 5
1891	1,397,256	0 10 0-30	700,380	847,473	0 10 10-43	460,595	2,244,729	0 10 4-12	1,160,965	1,793,300	4,037,929	0 8 7-58	1,742,795 12 6
1892	1,318,008	0 8 10-89	587,016	873,697	0 10 1-24	441,379	2,191,705	0 9 4-61	1,023,395	1,589,263	3,780,968	0 7 8-92	1,462,365 9 4
1893	1,160,233	0 8 6-05	493,372	674,852	0 9 6-35	321,557	1,835,090	0 8 10-57	614,929	1,443,238	3,278,328	0 7 1-79	1,171,722 4 6
	22,001,717	0 10 8-79	11,806,476	14,358,147½	0 11 11-68	8,596,022	36,369,864½	0 11 2-57	20,392,489	23,133,258½	59,493,113	0 9 3-23	27,573,769 12 1

A very valuable discovery of coal was made during the year at Cremorne, Sydney Harbour, by means of the Government diamond drill, at a depth of 2,929 feet. At that depth a seam of good steam coal was struck, 10 feet 3 inches in thickness, 9 feet 2 inches of which is workable, and money is now being raised in London to develop it.

One important effect of this discovery is that it may now be regarded as proved that the seam in question extends from the Newcastle to the Illawarra district.

The opening of a colliery on the shores of Port Jackson will probably prove an additional attraction to large ocean-going steamers, as it may afford special facilities for obtaining their coal supply.

The number of collieries under inspection at the 31st December, 1893, was 97 coal and 4 shale, as compared with 101 coal and 5 shale on the same date of the previous year.

The following statement shows that the output of the Northern collieries in 1893 was less in quantity by 408,251 tons, and in value by £222,476 10s. 2d. than the output for 1892. In the Western District the decrease in quantity was 45,985 tons, and in value by £14,172 19s. 3d., and in the Southern District it was less in quantity by 48,403 tons, and in value by £34,016 15s. 5d. than the previous year. There was a decrease in the average price per ton on the total output, the largest decrease being in the Southern and South-western Districts, which was 10.24d. per ton.

COMPARATIVE

## COMPARATIVE Statement of Output of Coal in the Northern, Western, and Southern Districts.

	1885.		1886.		1887.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		£ s. d.		£ s. d.		£ s. d.
Output, Northern District .....	2,113,372 13 0	1,032,904 13 4	2,178,116 0 0	1,081,554 17 1	2,243,792 0 0	1,096,720 0 7
Increase as compared with previous year .....	58,030 2 1	20,970 19 9	61,713 7 0	51,650 3 9	65,876 0 0	12,165 3 6
Decrease do do .....						
Output, Western District .....	311,762 16 0	76,836 13 3	281,229 0 0	68,615 15 0	302,137 0 0	79,036 0 2
Increase as compared with previous year .....	37,939 2 0	2,675 3 8			20,908 0 0	10,420 5 2
Decrease do do .....			30,533 16 0	8,220 18 3		
Output, Southern District .....	453,727 15 8	230,471 7 0	370,830 0 0	149,993 12 0	376,568 0 0	170,684 1 10
Increase as compared with previous year .....	33,785 6 3	13,489 10 8			5,738 0 0	20,690 9 10
Decrease do do .....			82,897 15 3	80,477 15 0		

	1888.		1889.		1890.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		£ s. d.		£ s. d.		£ s. d.
Output, Northern District .....	2,067,042 4 3	1,022,022 8 10	2,624,347 3 0	1,261,224 16 6	2,120,043 6 1	995,931 2 6
Increase as compared with previous year .....			557,304 18 1	239,202 7 7		
Decrease do do .....	176,749 15 1	74,697 11 9			504,300 16 3	265,293 13 11
Output, Western District .....	339,594 9 0	95,136 3 0	329,713 3 0	81,459 1 1	343,232 3 2	65,995 3 0
Increase as compared with previous year .....	37,457 9 0	16,100 2 10			13,519 0 2	
Decrease do do .....			9,881 6 0	13,677 1 11		15,463 18 1
Output, Southern District .....	796,806 10 0	338,039 12 3	701,572 0 0	290,164 18 0	597,598 0 0	217,162 13 11
Increase as compared with previous year .....	420,238 10 0	167,355 10 5				
Decrease do do .....			95,231 10 0	47,874 14 3	103,974 0 0	73,002 4 1

	1891.		1892.		1893.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		£ s. d.		£ s. d.		£ s. d.
Output, Northern District .....	2,853,251 13 1	1,354,028 12 8	2,611,731 13 0	1,102,694 14 5	2,203,480 10 0	880,218 4 3
Increase as compared with previous year .....	733,205 7 0	359,097 10 2				
Decrease do do .....			241,520 0 1	251,333 18 3	408,251 3 0	222,476 10 2
Output, Western District .....	346,804 13 0	74,104 17 10	236,363 1 0	57,414 13 8	190,377 19 1	43,241 14 5
Increase as compared with previous year .....	3,572 9 2	8,109 14 10				
Decrease do do .....			110,441 12 0	16,689 4 2	45,985 1 3	14,172 19 3
Output, Southern and South-western Districts .....	837,873 0 0	314,662 2 0	932,873 0 1	302,279 1 3	894,469 18 0	248,262 5 10
Increase as compared with previous year .....	240,275 0 0	97,499 8 1	95,000 0 1			
Decrease do do .....				12,383 0 9	48,403 2 1	54,016 15 5

The average price of Coal in the several districts was as follows:—

	1892.		1893.		
	s.	d.	s.	d.	
Northern .....	8	5.32	7	11.19	a decrease of 0 6.13 per ton.
Western .....	4	10.30	4	6.10	a decrease of 0 4.20 "
Southern and South-western .....	6	5.60	5	7.36	a decrease of 0 10.24 "

TABLE compiled from Reports furnished by Owners of Collieries, showing the quantity and value of Coal and Shale won during the year 1893, and the number of men employed in the Collieries.

Company.	Locality.	Men employed.			Quantity.	Value.
		Above ground.	Under ground.	Total.		
<i>Northern District.</i>						
					Tons cwt. qr.	£ s. d.
<b>COAL.</b>						
Australian Agricultural Company..	Newcastle .....	138	574	710	253,530 0 0	104,830 3 0
Abram .....	Farley .....	3	4	7	550 0 0	127 10 0
Behside .....	Waratah .....	1	2	3	80 0 0	22 5 0
Burwood .....	Burwood .....	65	317	382	31,321 1 2	15,096 15 9
„ Extended .....	Redhead .....	2	2	4	2,028 0 0	811 4 0
Brown's .....	Minmi .....	70	340	410	102,969 0 0	44,498 0 0
Bloomfield .....	Four-mile Creek, East Maitland.	3	8	11	3,000 0 0	1,200 0 0
Co-operative .....	Plattaburg .....	53	282	335	109,283 0 0	37,296 12 0
Centenary .....	Curlewis .....	5	10	15	4,600 0 0	2,000 0 0
Dulwich .....	Singleton .....	2	14	16	4,684 12 3	1,990 14 0
Durham .....	Redhead .....	30	9	48		
Dudley .....	Near Charlestown	46	210	256	51,449 0 0	19,300 0 0
Denton Park .....	West Maitland ..	4	6	10	800 0 0	240 0 0
Duckenfield .....	Minmi .....	80	360	440	142,901 0 0	59,376 0 0
East Lambton .....	New Lambton .....	4	12	16	7,260 0 0	3,252 7 0
Ebbw Vale .....	Adamstown .....	3	40	43	17,995 0 0	6,343 1 0
East Greta .....	West Maitland .....	20	6	26	4,365 0 0	1,450 0 0
Elliott's .....	Rix's Creek .....	4	8	12	3,500 0 0	1,750 0 0
Ellesmere .....	Singleton .....	13	27	40	12,118 0 0	5,018 10 0
Elemore Vale .....	Wallsend .....	2	14	16	9,011 0 0	2,252 17 6
Electric .....	North Lambton ..	2	4	6	550 0 0	132 10 0
Ferndale .....	Wickham .....	10	59	69	9,642 0 0	4,296 0 0
Gladstone .....	Gunnedah .....	4	4	8	40 0 0	13 10 0
Greta .....	Greta .....	60	350	410	58,469 0 0	24,785 1 0
Gartlee .....	Teralba .....	4	25	29	16,000 0 0	5,500 0 0
Hetton .....	Carrington .....	44	315	359	156,640 0 0	62,416 14 0
Hillside .....	Burwood, Merewether.	3	14	17	8,443 0 0	2,638 9 0
Inganee .....	East Maitland .....	1	2	3	75 0 0	22 10 0
Kyuga .....	Muswellbrook .....	1	1	2	607 0 0	265 0 0
Lambton .....	Lambton .....	53	382	435	159,100 0 0	69,540 11 2
Liddle's .....	Waratah .....	1	3	4	274 0 0	104 12 0
Maryland .....	Wallsend .....	4	14	18	17,000 0 0	7,500 0 0
Marshall's .....	Four-mile Creek ..		1	1	250 0 0	75 0 0
Morley .....	Gunnedah .....	1	2	3	16 0 0	9 12 0
Morrisett .....	Swansea .....	1	1	2	261 0 0	90 0 0
New South Wales Coal Company..	Teralba .....	3	3	6		
Newcastle-Wallsend .....	Wallsend .....	138	780	924	235,189 0 0	98,762 3 6
Newcastle Coal Company .....	Newcastle .....	106	441	547	113,635 0 0	21,144 7 1
New Lambton C Pit .....	Adamstown .....	21	75	96	12,189 0 0	5,026 17 0
New Anvil Creek .....	Greta .....	4	32	36	9,345 0 0	2,363 0 0
„ Park .....	Singleton .....	13	27	40	11,529 0 3	4,569 0 0
Northumberland .....	Fassifern .....	4	4	8	1,894 0 0	414 0 0
North Co-operative .....	Wallsend .....	7	10	17	2,579 0 0	594 6 8
Pacific .....	Teralba .....	25	155	180	50,340 0 0	20,136 0 0
Pioneer .....	West Maitland .....	3	3	6	271 17 0	73 19 0
Rotunda .....	Waratah .....		4	4	32 0 0	11 4 0
Ray's .....	Lambton .....		1	1	80 0 0	26 0 0
Rosedale .....	Singleton .....	5	17	22	5,889 0 0	2,711 11 0
Rose Hill .....	„ .....		2	2	210 0 0	73 10 0
Sunlight .....	„ .....	1	1	2	74 0 0	18 11 9
Stockton .....	Stockton .....	60	290	350	116,057 18 0	63,831 16 6
South Waratah .....	Charlestown .....	58	193	251	44,438 0 0	19,253 0 0
„ Wallsend .....	Cardiff .....	9	60	69	17,002 0 0	5,525 13 0
Summer Hill .....	Plattsburgh .....	5	11	16	9,000 0 0	4,000 0 0
Sunderland .....	East Maitland .....	1	2	3	249 0 0	54 18 0
Seaham .....	Minmi .....	35	230	265	89,501 10 0	34,912 12 1
South Rathluba .....	East Maitland .....	2	2	4	60 0 0	32 0 0
„ Stockton .....	Teralba .....	1	4	5	175 0 0	61 5 0
Thornley .....	East Maitland .....	3	10	13	5,514 10 0	1,240 15 3
Thornton .....	Thornton .....	6	20	26	6,250 0 0	2,083 0 0
Toronto .....	Lake Macquarie ..	1	3	4	564 0 0	155 2 0
Wickham and Bullock Island .....	Carrington .....	43	299	342	162,504 0 0	65,001 12 0
West Burwood .....	Merewether .....	5	27	32	9,000 0 0	2,925 0 0
„ Wallsend .....	West Wallsend .....	30	240	270	38,069 0 0	15,763 0 0
Wallarrah .....	Catherine Hill Bay	36	125	161	73,411 0 0	24,868 2 0
		1,369	6,503	7,872	2,203,480 10 0	890,218 4 3
<i>Southern District.</i>						
					Tons cwt. qr.	£ s. d.
Metropolitan .....	Hellensburg .....	46	285	331	194,512 0 0	58,900 8 0
Coal Cliff .....	Clifton .....	14	32	46	17,632 0 0	4,552 6 0
Auftermore .....	North Bulli .....	31	60	91	9,794 0 0	3,917 12 0
Bulli .....	Bulli .....		3	3		
South Bulli .....	„ .....	45	209	254	147,559 0 0	38,164 5 6
Bullambi .....	South Bulli .....	18	74	92	42,716 0 0	11,450 0 0
Corrimal .....	Wollongong .....	40	154	194	94,820 0 0	22,499 16 0
Mount Pleasant .....	„ .....	38	120	158	70,547 0 0	23,389 10 0
Osborn Wallsend .....	„ .....	50	167	217	83,788 0 0	29,695 6 0
Mount Kembla .....	„ .....	37	235	272	150,992 0 0	45,722 5 0
South Clifton .....	„ .....	16	117	133	50,000 0 0	12,500 0 0
Bulli Pass .....	Bulli .....	7	23	30	6,052 0 0	1,647 18 0
		340	1,479	1,819	874,412 0 0	243,439 6 6

Company.	Locality.	Men employed.			Quantity.	Value.	
		Above ground.	Under ground.	Total.		£	s. d.
<i>South-Western District.</i>							
Great Southern .....	Moss Vale .....	3	7	10	Tons cwt. qr.	£	s. d.
Box Vale .....	Mittagong .....	1	3	4	1,609 0 0	668	9 4
Australian Kerosene Company .....	Joadja Creek .....	4	14	18	5 18 0	3	0 0
					8,383 0 0	4,151	10 0
		8	24	32	10,057 18 0	4,822	19 4
<i>Western District.</i>							
Irondale .....	Piper's Flat .....	1	6	7	Tons cwt. qr.	£	s. d.
Cullen Bullen .....	Wallerawang .....	4	13	17	6,006 0 0	1,299	0 0
Lithgow Valley .....	Lithgow .....	2	26	28	9,100 0 0	2,167	0 0
Hermitage .....	" .....	2	26	28	23,296 0 0	4,659	4 10
Eskbank .....	" .....	6	32	38	23,349 10 0	4,623	7 0
Eskbank Old Tunnel .....	" .....	1	7	8	22,229 5 0	4,131	18 10
Vale of Clwydd .....	" .....	6	29	35	5,121 0 0	1,001	6 6
Vale .....	" .....	7	36	43	25,400 0 0	6,587	0 0
Zigzag .....	" .....	4	25	29	16,495 0 0	4,611	0 0
Oakey Park .....	" .....	4	30	34	19,884 0 0	5,000	0 0
Coerwull .....	" .....	1	1	2	25,457 0 0	6,018	0 0
Australian Kerosene Company .....	Katoomba .....	2	8	10	400 0 0	100	0 0
New South Wales Shale Company .....	Hartley .....	2	10	12	4,263 0 0	1,005	18 0
Rawdon .....	Rylstone .....	2	5	7	6,118 0 0	1,223	12 0
Lidsdale .....	Mudgee Road .....	1	1	2	584 4 1	189	17 3
Piper's Flat .....	Piper's Flat .....	2	6	8	60 0 0	22	10 0
					2,015 0 0	302	0 0
		44	261	305	190,377 19 1	43,241	14 5
<i>SHALE.</i>							
New South Wales Shale and Oil Company .....	Hartley .....	15	116	131	Tons cwt. qr.	£	s. d.
Australian Kerosene Oil and Mineral Company .....	Katoomba .....	39	129	168	13,462 0 0	26,924	0 0
Australian Kerosene Oil and Mineral Company .....	Joadja Creek .....	8	60	68	26,599 6 0	46,548	5 0
Genowlan .....	Capertee .....	6	12	18	13,799 0 0	24,143	5 0
		68	317	385	1,800 0 0	3,600	0 0
					55,660 6 0	101,220	10 0

The number of men actually employed in and about the coal and shale mines during 1893 was 10,413, as compared with 10,910 in 1892. The total number of fatal accidents was 13, and non-fatal 45. Of that number, 10 of the fatal and 31 of the non-fatal accidents occurred in the Northern District, 2 of the fatal and 14 non-fatal accidents in the South-western District, while in the Western District there was only one accident which proved fatal. The death-rate in this Colony for 1892 compares very favourably with the death-rate for the same year in the United Kingdom.

SUMMARY of persons employed, number of fatal accidents (deaths), and ratios of the number of persons employed, and the number of fatal accidents in and about the "United Kingdom" and "New South Wales" Coal Mines, since 1874:—

Year.	United Kingdom.				New South Wales.			
	Persons employed.	Lives lost by accident.	Persons employed per life lost.	Death rate from accidents per 1,000 persons employed.	Persons employed.	Lives lost by accident.	Persons employed per life lost.	Death rate from accidents per 1,000 persons employed.
1874	538,829	1,056	510	1.959	.....	5	.....	.....
1875	535,845	1,244	430	2.321	3,308	8	413	2.418
1876	514,532	933	551	1.813	4,084	4	1,021	0.979
1877	494,391	1,208	409	2.443	4,657	7	665	1.503
1878	475,329	1,413	336	2.972	4,792	8	599	1.669
1879	476,810	973	490	2.040	5,035	5	1,007	0.993
1880	481,933	1,318	368	2.718	4,676	8	584	1.710
1881	495,477	954	519	1.925	4,098	2	2,049	0.488
1882	503,987	1,126	447	2.234	4,487	12	373	2.674
1883	514,933	1,054	488	2.046	5,481	15	365	2.736
1884	520,376	942	552	1.810	6,227	14	414	2.248
1885	520,632	1,150	453	2.207	7,097	11	645	1.549
1886	519,970	953	545	1.833	7,847	29	270	3.694*
1887	526,277	995	529	1.890	7,998	94	85	11.752†
1888	534,945	888	601	1.666	9,301	15	620	1.612
1889	563,735	1,064	530	1.887	10,277	41	250	3.989‡
1890	613,233	1,160	529	1.891	10,315	13	793	1.260
1891	648,450	979	662	1.509	10,820	21	515	1.940
1892	664,300	982	676	1.478	10,910	8	1,364	0.733

\* Excessive number of falls of coal and Lithgow disaster caused this high death-rate.

† Hulli catastrophe and excessive falls of coal caused this high death-rate.

‡ Hamilton pit crush, excessive falls of coal, and over winding of four men at South Burwood sinking pit, caused this high death-rate.

During

During the year 42 Analyses were made of Coal, 29 of which are published:—

Official number.	Locality.	Description of Mineral.	Analysis in 100·00 parts				Sulphur.	Specific Gravity.	Remarks.
			Hygroscopic Moisture.	Volatile Hydrocarbons.	Fixed Carbon.	Ash.			
781	Awaba (3 miles north of) 8 foot seam.	Coal Block, about 4 feet square.	3·55	33·85	53·90	8·70	·549	1·382	Coke, 62·6 per cent., well swollen, firm, and lustrous. Ash, white and flocculent. 1 lb. of this coal will convert 10·9 lb. of water into steam.
782	Awaba (3 miles north of) 15 foot seam.	Coal... ..	2·85	33·30	53·80	10·05	·576	1·354	Coke, 63·85 per cent., well swollen, firm, and lustrous. Ash, white and flocculent. 1 lb. of this coal will convert 10·54 lb. of water into steam.
941	Awaba (3 miles north of) seam A.	Splint coal with bright streaks.	3·35	25·35	49·85	21·45	·466	1·497	Coke, 71·3 per cent., dull and dense. Ash, white and flocculent. 1 lb. of this coal will convert 10·23 lb. of water into steam.
942	Awaba (3 miles north of) seam B.	Very dull coal .....	3·60	28·20	55·70	12·50	·521	1·418	Coke, 68·2 per cent., fairly well swollen, dull. Ash, white and flocculent. 1 lb. of this coal will convert 11·88 lb. of water into steam.
943	Awaba (3 miles north of) seam C.	Coal.....	3·50	30·95	49·70	15·85	·466	1·399	Coke, 65·55 per cent., well swollen, firm, and lustrous. Ash, grey and flocculent. 1 lb. of this coal will convert 12·32 lb. of water into steam.
944	Awaba (3 miles north of) seam A.	„ .....	3·25	27·45	56·60	12·70	·466	1·433	Coke, 69·30 per cent., dull and dense. Ash, white and flocculent. 1 lb. of this coal will convert 11·99 lb. of water into steam.
945	Awaba (3 miles north of) seam B.	„ .....	2·50	29·15	51·20	17·15	·439	1·438	Coke, 68·35 per cent., dull and dense. Ash, white and flocculent. 1 lb. of this coal will convert 11·66 lb. of water into steam.
946	Awaba (3 miles north of) seam C.	„ .....	3·20	28·60	53·70	14·50	·576	1·422	Coke, 68·20 per cent., fairly well swollen, dull. Ash, white and flocculent. 1 lb. of this coal will convert 11·88 lb. of water into steam.
947	Awaba (3 miles north of) seam D.	„ .....	3·20	33·25	55·25	8·30	·795	1·377	Coke, 63·55 per cent., well swollen, firm, and lustrous. Ash, white and flocculent. 1 lb. of this coal will convert 12·76 lb. of water into steam.
1751	Branxton (Leconfield).	„ .....	2·80	31·70	54·20	11·30	1·68	1·261	Coke, 65·5 per cent., fairly well swollen, firm and dull. Ash, reddish tinge, granular. Vanadium was detected in the ash, which on an estimation being made, yielded 0·07 per cent. of vanadic anhydride.
75	Bulli (near) .....	Bituminous coal .....	·85	16·62	61·96	20·57	...	...	Coke, 82·53 per cent., very little swollen, fairly firm, dull lustre. Ash, grey in colour, flocculent.
2318	Cendelo (near) .....	Brown coal.....	14·75	44·45	28·55	12·25	·412	1·386	No coke formed. Ash, grey and flocculent.
505	Casino District .....	Bituminous coal .....	3·95	30·50	40·75	24·80	...	...	Coke, 65·55 per cent., fairly well swollen, firm and dull. Ash, grey and flocculent.
	Cremerne No. 2 Bore	Mean analysis of six samples of coal (2,572 to 2,577).	·66	17·57	71·09	10·68	mean ·724	mean 1·346	Calorimetric, value 13·0. The samples are good description of coals for household purposes. The percentage of ash being low as compared with the average ash present in the Bulli and Wollongong coals. They may be described as excellent steaming coals, as proved by the high calorimetric values found by experiment in a Thompson's calorimeter. Coke— They yield an excellent coke, having all the physical properties of the Southern coals, i.e., Bulli and Wollongong, and are well suited for all metallurgical purposes.
1268	Cundletown .....	Brown coal.....	21·65	37·75	36·20	4·40	·494	1·351	No coke formed. Ash, reddish tinge, flocculent.
168	Greta seam, E. Greta	Bituminous coal .....	1·90	36·45	53·70	7·95	1·016	1·308	Coke, 61·65 per cent., well swollen, firm and lustrous. Ash, grey and flocculent. 1 lb. of this coal will convert 12·87 lb. of water into steam.
169	Greta seam, E. Greta (portion of upper or thick seam).	Bituminous coal, with pyrites.	2·10	42·10	50·95	4·85	1·290	1·247	Coke, 55·80 per cent., fairly well swollen, firm and lustrous. Ash, reddish tinge, flocculent. 1 lb. of this coal will convert 13·26 lb. of water into steam.
170	Greta seam, Anvil Creek.	„ .....	1·85	45·00	46·20	6·95	2·993	1·295	Coke, 53·15 per cent., fairly well swollen, firm and lustrous. Ash, grey and flocculent. 1 lb. of this coal will convert 13·26 lb. of water into steam.
171	Greta seam, Greta .....	„ .....	2·20	40·80	52·30	4·70	1·016	1·279	Coke, 57·00 per cent., well swollen, firm and lustrous. Ash, reddish tinge. 1 lb. of this coal will convert 13·46 lb. of water into steam.

Official number.	Locality.	Description of Mineral.	Analysis in 100.00 parts.				Sulphur.	Specific Gravity.	Remarks.
			Hygroscopic Moisture.	Volatile Hydrocarbons.	Fixed Carbon.	Ash.			
1450	Greta (Leconfield) ...	Coal.....	2.60	42.50	50.25	4.85	.658	1.291	Coke, 54.00 per cent., well swollen, lustrous and fairly firm. Ash, reddish tinge, flocculent. Ash in coke, 8.46 per cent. 1 lb. of this coal will convert 14.0 lb. of water into steam.
29	Maitland West (Richmond Vale shaft).	Semi-bituminous coal ...	1.43	42.98	51.59	4.00	0.64	1.263	Coke, 55.59, well swollen, fairly lustrous, firm. Ash, reddish tinge, dense. 1 lb. of this coal will convert 13.7 lb. of water into steam.
30	" " ...	" " ...	1.59	40.58	53.09	4.74	0.49	1.273	Coke, 57.83 per cent., well swollen, fairly lustrous, firm. Ash, dark grey, dense. 1 lb. of this coal will convert 13.5 lb. of water into steam.
31	Maitland West (Hedden Greta shaft).	" " ...	1.77	41.49	51.47	5.27	0.809	1.276	Coke, 56.74 per cent., well swollen, fairly firm, lustrous. Ash, dark grey, dense. 1 lb. of this coal will convert 13.5 lb. of water into steam.
1109	Maitland District (Thornley Colliery)	Coal.....	2.90	34.80	54.00	8.30	1.648	1.388	Coke, 62.3 per cent., well swollen, firm and lustrous. Ash, reddish tinge, flocculent. 1 lb. of this coal will convert 12.5 lb. of water into steam.
1110	" " ...	" .....	2.77	33.11	54.62	9.50	.906	1.302	Coke, 64.12 per cent., well swollen, firm and lustrous. Ash, red and flocculent. 1 lb. of this coal will convert 12.3 lb. of water into steam.
1483	Newcastle, Hetton Colliery (unwashed)	" .....	2.05	34.8	56.85	6.5	.494	1.340	Coke, 63.15 per cent., well swollen, firm and lustrous. Ash in coke, 10.29 per cent. Ash, red and flocculent. 1 lb. of this coal will convert 13.3 lb. of water into steam.
1485	Newcastle, Dudley Colliery (unwashed)	" .....	2.30	35.60	54.15	7.95	.535	1.329	Coke, 62.1 per cent., well swollen, firm and lustrous. Ash in coke, 12.80 per cent. Ash, reddish tinge and flocculent. 1 lb. of this coal will convert 12.9 lb. of water into steam.
1539	Newcastle (near Cardiff Colliery).	" .....	2.90	36.20	52.35	8.55	.508	1.307	Coke, 60.9 per cent., well swollen, firm, and lustrous. Ash in coke, 14.03 per cent. Ash, grey and flocculent. 1 lb. of this coal will convert 12.6 lb. of water into steam.
1606	Taralga.....	" .....	3.10	32.80	55.00	9.10	0.686	1.396	Coke, 64.1 per cent., fairly well swollen, firm and lustrous. Ash, grey and flocculent. 1 lb. of this coal will convert 11.7 lb. of water into steam.

## COKE.

TABLE showing the quantity and value of Coke made in the Colony of New South Wales.

Year.	Quantity.				Total Value.
	Northern District.		Southern and Western Districts.		
	tons	cwt.	tons	cwt.	£ s. d.
1890	15,886	2	15,211	0	41,147 3 7
1891	9,474	2	20,836	5	34,473 5 10
1892	5,245	0	2,654	0	8,852 8 6
1893	12,262	0	5,596	0	20,233 2 0
Totals.....	42,867	4	44,297	5	104,705 19 11

From the foregoing table it will be seen that the quantity of coke manufactured during 1893 is more than double that of the previous year. The works of the Purified Coal and Coke Company, situated at Wallsend in the Northern District, made during the year 11,500 tons, and the Australian Coke Company, at Unandera, manufactured 4,351 tons. The report furnished by the Government Geologist in 1892, shows that the coke made in this Colony is capable of great improvement, and it is probable that the demand would be largely increased if the quality were improved.

## SHALE.

The out-put of bog-head mineral, or petroleum oil cannel coal, commonly called shale, during 1893 was less by 18,537 tons than during the previous year, but the average price per ton was only about 4d per ton lower.

The following table shows the quantity and value of kerosene shale produced during the years 1865 to 1893:—

Year.	Quantity.	Average price per ton.	Total value.	Year.	Quantity.	Average price per ton.	Total value.
	tons.	£ s. d.	£ s. d.		tons.	£ s. d.	£ s. d.
1865	570	4 2 5.47	2,350 0 0	1881	27,894	1 9 2.59	40,748 0 0
1866	2,770	2 18 10.48	8,150 0 0	1882	48,065	1 15 0.00	84,114 0 0
1867	4,079	3 14 9.21	15,249 0 0	1883	49,250	1 16 10.77	90,861 10 0
1868	16,952	2 17 7.11	48,816 0 0	1884	31,618	2 5 7.86	72,176 0 0
1869	7,500	2 10 0.00	18,750 0 0	1885	27,462	2 8 11.62	67,239 0 0
1870	8,580	3 4 3.18	27,570 0 0	1886	43,563	2 5 10.79	99,976 0 0
1871	14,700	2 6 3.91	34,050 0 0	1887	40,010	2 3 10.43	87,761 0 0
1872	11,040	2 11 11.91	28,700 0 0	1888	34,869	2 2 2.66	73,612 0 0
1873	17,850	2 16 6.55	50,475 0 0	1889	40,561	1 18 3.55	77,666 15 0
1874	12,100	2 5 1.48	27,300 0 0	1890	56,010	1 17 2.07	104,103 7 6
1875	6,197	2 10 2.22	15,500 0 0	1891	40,349	1 18 8.77	78,160 0 0
1876	15,998	3 0 0.00	47,994 0 0	1892	74,197	1 16 8.16	136,079 6 0
1877	18,963	2 9 0.81	46,524 0 0	1893	55,660	1 16 4.44	101,220 10 0
1878	24,371	2 6 11.40	57,211 0 0				
1879	32,519	2 1 1.96	66,930 10 0		782,898	2 2 3.04	1,654,011 13 6
1880	19,201	2 6 7.03	44,724 15 0				

During the year, 48 analyses were made of kerosene shale, 16 of which are as follows:—

Official number.	Locality.	Analysis in 100.00 parts.				Sulphur.	Specific Gravity.	Remarks.
		Hygroscopic Moisture.	Volatile Hydrocarbons.	Fixed Carbon.	Ash.			
1265	Ben Bullen (near)	0.75	69.90	13.75	15.60	...	...	Ash, reddish tinge, granular.
268	Blackheath (near)	0.30	67.80	16.25	21.65	.672	1.178	" " " " "
619	Capertee (11 miles N.E. from)	0.40	69.55	11.40	18.65	...	...	Ash, grey and flocculent.
620	" "	0.400	68.475	12.700	18.425	...	...	" " " " "
653	Capertee (near)	0.20	69.30	11.15	19.35	...	...	" " " " "
654	" "	0.00	67.75	13.85	17.50	...	...	" " " " "
655	" "	0.30	68.90	12.60	18.20	...	...	" " " " "
738	" "	0.15	70.95	14.70	14.20	.672	1.131	Ash, grey and granular.
2213	" "	0.25	69.20	12.35	18.20	...	...	" " " " "
2423	" (17 miles from, on the Colo River).	0.45	68.95	12.00	18.60	.370	1.131	" " " " "
2716	Capertee	0.33	69.50	12.05	18.10	.59	1.135	Ash, light gray and granular.
2810	Capertee Valley (Umbrella Ck.)	0.60	74.30	14.75	10.35	.508	1.093	Ash, reddish tinge, granular.
1593	Hartley (near)	0.65	69.65	10.30	19.40	...	...	Ash, reddish, granular.
1260	Lithgow, near (Marrangaroo)	0.10	67.80	5.35	26.75	...	...	Ash, reddish tinge, granular.
954	Manning River (Macdonald)	20.65	43.45	31.10	4.80	.315	1.342	Ash, red, granular; no coke formed; a slightly coherent mass after ignition.
1131	Wallerawang (near)	0.28	71.35	9.94	18.43	0.412	...	Ash, grey, granular; no coke formed.

#### SILVER AND LEAD.

There has been a very satisfactory increase in the quantity and value of silver and lead produced in the Colony during the year, the amount of increase being £553,884. The total value of the output during the year was £3,031,720, which was only exceeded in 1891 since the opening of the silver-mines. Our great silver-mines at Broken Hill on the Barrier Ranges contributed nearly the whole of the output, and approximately the quantity of silver in ounces produced from these mines during 1893, was little short of 16,000,000. This will probably be increased should the companies be successful in devising a mode of treating their low-grade sulphide ores at a profit.

#### QUANTITY and Value of Silver, and Silver-lead, and Ore exported.

Year.	Silver.		Silver-lead, and Ore.				Total Value.
	Quantity.	Value.	Quantity.		Value.		
			Ore.	Metal.			
Up to	oz.	£ s. d.	tons cwt. qr. lb.	tons cwt.	£ s. d.	£	
1881	728,779.14	178,405 0 0	191 13 0 0	.....	5,625 0 0	183,430	
1882	38,618.00	9,024 0 0	11 19 0 0	.....	360 0 0	9,384	
1883	77,065.18	16,488 0 0	136 4 0 0	.....	2,073 0 0	18,563	
1884	93,660.25	19,780 0 0	9,167 11 1 7	.....	241,940 0 0	261,720	
1885	794,173.80	159,187 0 0	2,095 16 0 0	190 8	107,626 0 0	264,813	
1886	1,015,433.10	197,544 0 0	4,802 2 0 0	.....	294,485 0 0	492,029	
1887	177,307.75	32,458 0 0	12,529 3 2 0	.....	541,952 0 0	574,410	
1888	375,063.70	66,668 0 0	11,739 7 0 0	18,102 5	1,075,777 0 0	1,142,405	
1889	416,895.35	72,001 0 0	46,965 9 0 0	34,579 17	1,899,197 0 0	1,971,198	
1890	406,552.80	95,410 0 0	89,719 15 0 0	41,319 18	2,667,144 0 0	2,762,554	
1891	729,590.05	134,850 0 0	92,383 11 0 0	55,396 3	3,434,739 0 0	3,619,589	
1892	350,661.50	56,884 0 0	87,504 15 0 0	45,850 4	2,420,952 0 0	2,477,836	
1893	531,972.00	78,131 0 0	135,859 1 0 0	58,401 3	2,953,589 0 0	3,031,720	
	5,823,772.62	1,116,930 0 0	513,106 6 3 7	253,839 18	15,694,821 0 0	16,811,651	

\* NOTE.—In the Annual Report for 1888, 11,739 tons 7 cwt. of silver ore, valued at £164,680, was omitted from the table. The bulk of the silver is exported in the form of silver-lead.

The following information relating to the silver-mining industry is taken from reports sent in by the Wardens and Mining Registrars:—

#### THE ALBERT MINING DISTRICT.

At Broken Hill operations are now almost entirely confined to the Broken Hill lode, the principal mines at work thereon being the Broken Hill Proprietary Company, the Block 14 Company, the Block 10 Company, the British Block Company, the Junction Company, the North Company, the Central Company, and the Broken Hill South Company.

Some of the mines are still experimenting with the object of discovering the best mode of treating the immense bodies of sulphide ores existing in their mines, and there is every probability of the experiments proving successful.

The great depreciation during the year in the value of silver has led to the closing of some of the smaller mines and the restriction of the output in others. Work has gone on smoothly during the year, and the absence of labour troubles has been the means of greatly increasing the quantity of ore raised as compared with 1892, during which year the mines were closed for about four months.

The quantity and value of the minerals exported from this field during the year was:—Silver ore, 155,099 tons, valued at £924,290; silver bullion, 38,058 tons, valued at £2,003,562; and 345,770 oz. of pure silver, valued at £51,457.

A very great difficulty is experienced in arriving at the exact quantity of pure silver won on this field, as it is nearly all exported in the form of silver lead, but approximately the quantity was 15,677,345 oz., as compared with 12,909,195 oz. in 1892.

The New Broken Hill Extended Company, which is contiguous to the main lode, is in receipt of aid from the Prospecting Vote to crosscut the course of the main lode at the 1,330 feet level. The mines at Nuntherungie are now almost abandoned. The water supply, which used to be a source of trouble to the companies, causing vexatious stoppages in their smelting operations, has now been happily overcome, a plentiful supply being available from Stephen's Creek and the Acacia Dam. The number of miners employed on the Barrier is given at 4,300, a few hundred less than during 1892, and the population of the Broken Hill District is 22,000.

#### THE BATHURST MINING DISTRICT.

In the Mitchell Division the Sunny Corner Company's mine has been let on tribute to Mr. Charleston for a period of three years. He appears to be running it with some success, having smelted 5,102 tons for 37 tons of matte, valued at £2,200, and that during seven months' work. The Phoenix and the Silver King mines are both idle.

In the Rockley Division there is still a little silver being got at Back Creek, the quantity during the year being about 4,680 oz., worth £600. The mine has, however, changed hands, and furnaces are being brought from Sunny Corner for the better treatment of the silver ore.

At Tuena the Mount Costigan lead and silver mine was worked for a short time in the beginning of the year, the output being about £5,000 worth of matte. There is a probability of the mine being re-started at an early date. The Cordillera mine, which has been shut down for some considerable time, has been taken up by Mr. Samuel Fuge, who has four men employed in cleaning up the old workings and effecting repairs. At Lewis Ponds all the silver-mines are idle.

#### MCDGEE MINING DISTRICT.

At Denison Town the Mount Stewart Company has, unfortunately, been compelled to stop operations, owing to the low price of silver. In the meantime suspension of the labour conditions has been granted the company.

#### THE SOUTHERN MINING DISTRICT.

At Captain's Flat the Lake George Copper-mining and Smelting Company employ 130 men, and smelted during the year 7,710 tons of ore, from which was extracted over 60,000 oz. of silver found associated with gold and copper in considerable quantities. The new Koh-i-noor Company are busily engaged continuing their main shaft with assistance from the Prospecting Vote. The company smelted during the year 4,264 tons of ore, which returned 58,092 oz. of silver, 784 oz. of gold, 137 tons of copper, and 2½ tons of lead, valued in all about £15,739. This company employs about seventy men, and as the treatment of the silver ore has not been paying they have during the last two months of the year been working for gold.

#### THE NEW ENGLAND MINING DISTRICT.

In the Fairfield Division the White Rock Silver-mining Co. are about to make another start after being idle about a year, but it is feared that if the present low price of silver continues, it will prevent the mine being worked at a profit. The company have erected new works on the cyanide principle, which is said to be very suitable for the class of ore to be treated. At Rivertree the silver-mining companies have practically shut down in the meantime, or until they have decided on the best system of treating the ore, which abounds in the locality. The returns from several parcels of ore sent to the Aldershot Works in Queensland were very satisfactory. The companies jointly erected a very extensive leaching plant, costing over £3,000, but it did not work up to expectation, and is now idle.

#### THE PEEL AND URALLA MINING DISTRICT.

There is still a little silver-mining going on in the Emmaville Division of this district. The amount of ore concentrates of this mineral forwarded from the Deepwater Station for treatment elsewhere was 285 tons, valued at £5,848 14s. Of that amount Webb's mine contributed 194 tons; the balance came from the Webb's Consols mine near Strathbogie. It is considered that a slight rise in the price of silver would make these mines payable concerns. The concentrates from the Webb's mine yielded 155 oz. of silver to the ton.

During the year 2,622 samples were assayed for silver in the laboratory of this Department, 1,477 yielded nil; 1,062 yielded under 20 oz. per ton; 83 yielded as follows:—

Official number.	Locality.	Description.	Per ton.	
			Silver.	Gold.
			oz. dwt. gr.	oz. dwt. gr.
1	Bathurst (near)	Cavernous ferruginous quartz	42 15 19	1 6 2
830	Back Creek	Felsite, with veins of quartz	124 2 14	0 5 10
641	Berrima District	Pyritous quartz, with galena	40 10 2	Nil.
1473	Billago (near)	Decomposing felspathic rock, with minute scales of mica	49 8 17	6 17 3
1747	"	Decomposing felsite	241 8 2	41 14 1
2128	"	Light-coloured felsite	194 18 3	13 1 7
1956	Bingara	Pyritous quartz	207 13 0	119 0 3
1976	Bolderogery	Galena, with a little pyrites	25 0 21	1 17 0
1683	Bolivia	Copper pyrites, with blende, &c.	33 4 2	Trace.
844	Boro (4 miles from)	Crushed sample	45 5 22	Nil.
149	Broken Hill (near)	Siliceous brown iron ore	31 11 12	Trace.
353	" (Junction Mine)	Vesicular zinc and lead, also yellow copper sulphides	30 5 8	Nil.
354	"	Blende and galena, with quartz and garnets	26 6 23	"
355	" (Junction N. Mine)	Vesicular zinc and lead sulphides, with garnets	24 16 11	"
658	"	Galena (mainly)	23 19 2	"
43	Burraborang	Galena, with a little quartz	74 7 9	"
487	"	Quartz, with galena and pyrites	23 0 21	Trace.
488	"	Quartz, with galena	25 11 18	"
1322	"	Galena in pyritous siliceous gangue	143 8 2	"
2273	"	Siliceous felspathic stone, with a few specks of galena and pyrites	52 17 18	"
2274	"	Pyritous quartz, with galena	108 17 18	"



Official number.	Locality.	Description.	Per cent. Metallic Lead.	Per ton.	
				Silver.	Gold.
				oz. dwt. gr.	oz. dwt. gr.
355	Broken Hill (Junction North Mine).	Vesicular zinc and lead sulphides, with garnets .....	32.04	Nil.	24 16 11
858	Broken Hill .....	Galena (mainly) .....	76.69	"	23 19 2
2334	Burraborang .....	Pyritous quartz, with galena .....	22.57	Trace.	124 13 12
2335	" .....	Siliceous crystalline galena .....	73.00	"	45 14 15
2843	" .....	Galena in quartz .....	16.46	"	8 14 5
1822	Canbarra .....	Siliceous galena .....	22.23	"	1 10 4
233	Cobar (near).....	Brown iron ore, with carbonate and oxide of lead ..	14.17	Nil.	Nil.
2379	Colinton .....	Fine-grained siliceous galena .....	35.11	"	6 10 16
1996	Cullulla .....	Granular galena in argillaceous matrix .....	69.00	"	2 14 10
1997	" .....	Galena, with a little cerussite .....	46.73	Trace.	2 14 10
435	Curragh Ck. (Windellama)	" felspathic material.....	69.68	0 3 6	2 13 8
13	Dilga River (Goumbia Mine).	Quartz and talc, with galena .....	25.31	Nil.	2 7 21
2578	Emmaville (8 miles from)	Galena, with mispickel .....	60.73	"	21 15 13
295	Gundaroo (near).....	Quartz, with galena and a few specks of copper pyrites	23.73	"	1 18 2
2681	Jinglemoney .....	Siliceous fine-grained galena, with pyrites.....	15.91	Trace.	3 0 22
1859	Lachlan River (30 miles below Forbes).	Galena .....	74.46	"	7 18 22
1316	Moonaba Silver-mine).....	Felspathic stone .....	13.35	Nil.	3 5 8
1518	" .....	" " with galena.....	12.00	"	20 2 21
1813	Murrumbidgee and Molonglo Rivers (near junction of).	Siliceous galena, with a little copper pyrites .....	27.46	Trace.	1 19 4
1814	" .....	" " " .....	37.71	"	1 8 6
1815	" .....	" " " .....	10.65	"	1 8 0
1816	" .....	" " " .....	15.33	"	1 8 0
2812	Pye's Creek.....	Galena, with pyrites .....	46.08	"	61 5 0
2813	" .....	Oxide of lead, &c. .....	15.81	Nil.	40 12 6
646	Queanbeyan .....	Fine-grained galena, with quartz and pyrites .....	36.96	"	2 14 10
597	Sunny Corner Mine .....	Old sulphide ore .....	23.78	Trace.	14 9 15
598	" .....	New ore, now using .....	17.25	"	8 3 8
599	" .....	Roasted ore .....	13.56	"	15 3 18
602	" .....	New matte .....	10.20	"	20 19 4
415	Tarago .....	Crushed sample, chiefly galena.....	54.78	Nil.	5 15 9
580	" (12 miles E. from)	Average sample of a silver-lead lode .....	95.45	Trace.	2 9 0
926	Thackeringa .....	Galena .....	17.93	Nil.	4 1 15
1252	Thirlmere (Cunco and Party's claim).	Crushed ore .....	18.29	6 3 15	25 19 1
1253	" .....	Galena .....	80.00	0 2 4	33 12 9

## TIN.

THE following table shows that during the year there has been a reduction of £84,371 in the value of the tin won as compared with 1892, during which year a revival in this industry was manifested. The Vegetable Creek tin-field, near Emmaville, is still the chief seat of tin-mining in this Colony, and produced during the year 1,035 tons, valued at £46,833 15s., about 250 tons of this being lode tin. This is a reduction of £9,504 on the yield for 1892, but considering the low price ruling for tin during 1893—the average price being £45 5s., as compared with £53 10s. in 1892—the output may be looked upon as fairly satisfactory. One promising feature on the Vegetable Creek field is the steady, although slow, growth of lode-mining. The division of Glen Innes produced 80½ tons of stream tin, valued at £4,351 14s. 3d. The bulk of this tin was got in the valley of the Mann River, about 8 miles from Glen Innes, where tin of good quality is very generally found as a surface deposit on the granite slopes from the basaltic tableland, which locality is attracting some considerable attention of late. A decrease of about £4,000 in the value of the output for the year has also taken place in the Wilson's Downfall Division, the total output being 176 tons, valued at £8,335 10s.

In the Tingha Division of the Peel and Uralla Mining District the output for the year was 700 tons, valued at £32,900. The alluvial tin deposits in this division are, to a great extent, worked out, and more attention is being paid to reefing. Numerous leaders are found on this field, many of which have been profitably worked, but they usually pinch out at a shallow level, when capital is required to follow them down. A good deal of fossicking is going on in this Division, and the men can generally make a living. In the neighbourhood of Deepwater, 350 tons, valued at £14,000, were won, as compared with 420 tons in 1892. At Bendemeer a little tin-mining is going on, the quantity won during the year being 6 tons 16 cwt., valued at £330 17s. 4d. On the Gundle Tin-field, in the Kempsey district, there are only two leases at work, and what tin is got is of good quality. It is thought that deeper sinking on this field would lead to much better results. The most important mineral discovery made of late in the Albury district was the tin deposit at Dora Dora, on the Upper Murray. The company so named have erected a large dam for sluicing, and have carried on steady work during the past winter. The output of the company is about 2 tons of tin per month, which allows of a dividend being paid. At Basin Creek, some miles distant from the Dora Dora Company's ground, but on the same line of country, an Albury syndicate

is carrying on boring operations, with indications of success. At Euriowie, in the Broken Hill district, there are still a few companies at work prospecting for payable tin, but up to the present with only indifferent results.

TABLE showing the quantity and value of Tin exported from, and the product of, the Colony of New South Wales, since the opening of the Tin-fields in 1872.

Year.	Ingots.			Ore.			Total.			
	Quantity.		Value.	Quantity.		Value.	Quantity.		Value.	
	tons	cwt.	£	s.	d.	tons	cwt.	£	s.	d.
1872	47	0	6,482	0	0	849	0	41,337	0	0
1873	911	0	107,795	0	0	3,660	0	226,641	0	0
1874	4,101	0	366,189	0	0	2,118	0	118,133	0	0
1875	6,058	0	475,168	0	0	2,022	0	86,143	0	0
1876	5,449	0	379,318	0	0	1,509	0	60,329	0	0
1877	7,230	0	477,952	0	0	824	0	30,588	0	0
1878	6,085	0	362,072	0	0	1,125	0	33,750	0	0
1879	5,107	2	343,075	0	0	813	15	29,274	0	0
1880	5,476	6	440,615	0	0	682	6	30,722	0	0
1881	7,590	17½	680,511	0	0	609	6	37,492	0	0
1882	8,059	0	800,571	0	0	611	0	32,890	0	0
1883	8,680	1	802,867	0	0	445	4	21,685	0	0
1884	6,315	16	506,726	0	0	349	13	14,861	0	0
1885	4,057	18	390,458	0	0	534	18	25,168	0	0
1886	4,640	18	449,303	0	0	326	18	18,350	0	0
1887	4,069	8	509,009	0	0	291	13	16,411	0	0
1888	4,562	2	569,182	0	0	247	8	13,314	0	0
1889	4,408	13	403,111	0	0	241	15	12,060	0	0
1890	3,400	11	317,117	0	0	259	4	12,724	0	0
1891	2,941	5½	261,769	0	0	203	5	9,643	0	0
1892	3,253	0	301,541	0	0	239	2	12,573	0	0
1893	2,636	17	223,139	0	0	148	1	6,604	0	0
	106,289	7	9,179,970	0	0	18,110	8	890,683	9	0
								124,697	3	10,070,653 9 0

During the year seventy-five assays were made for Tin in the Laboratory of the Department, the following giving the best results:—

Official number.	Locality.	Description.	Per cent. Metallic Tin.
187	Bald Hill (Pullitop Station)	Stream tin and wolfram (tungstic acid, 47·70 per cent.)	20·60
1138	Burra Burra	Tin drift	71·4
1139	" "	"	74·8
1140	" "	"	72·8
1141	" "	"	72·4
249	Burrowa River (Anthony's Hill Sluicing Claim).	Sand, chiefly ilmenite, zircons, &c. (gold, 6 dwt. 12 gr. per ton; silver, 2 dwt. 4 gr.).	7·96
1429	Bukkulla (2½ miles N. from)	Sand, consisting of garnet, zircon, &c., with tin-stone	19·20
59	Carcoar (near)	Sand, containing stream tin	58·16
2543	Clarence District	Sand, consisting of zircons, &c. (platinum, 16 oz. 6 dwt. 16 gr. per ton; gold, a trace; osmiridium, 6 oz. 17 dwt. 4 gr. per ton).	16·60
2899	Cooma District	Stream tin	74·3
1489	Deepwater (Nine-mile)	Lode-tin ore	36·6
1510	Dundee	Sand, consisting of garnet, magnetite, oxide of iron, and a little tin-stone.	34·60
1021	Evan's River	Wash dirt (platinum, 23 oz. 0 dwt. 14 gr. per ton; iridosmine, 25 oz. 4 gr. 22 dwt. per ton; contains other platinoid metals).	8·24
1022	" "	Blanketings (platinum, 38 oz. 10 dwt. per ton; iridosmine, 22 oz. 5 dwt. per ton; contains other platinoid metals).	16·85
298	Kempsey, near (Cogo)	Elvan, with tin oxide	26·17
1004	Manning River District	Rotten granite (silver, 1 oz. 6 dwt. 2 gr. per ton; gold, a trace)	6·29
2419	Molong, near (Red Hill)	Copper gossan, green and blue carbonates (silver, 4 oz. 8 dwt. 4 gr. per ton; gold, 3 dwt. 6 gr. per ton).	25·98
709	Richmond River (Evan's Beach).	Blanketings (platinum, 3 oz. 19 dwt. 1 gr. per ton; gold, 1 oz. 10 dwt. 10 gr.; iridosmine, 15 oz. 19 dwt. 1 gr.)	92·94
2846	Richmond River	Beach sand, slightly concentrated (platinum, 13 oz. 7 dwt. 20 gr. per ton; gold, 18 dwt. 12 gr.; iridosmine, 5 oz. 11 dwt.)	7·00
476	Tumbarumba, near (Coppabella).	Ferruginous quartz, with wolfram, mica, and a little tin-stone (silver, 1 oz. 19 dwt. 4 gr.; gold, a trace).	2·68
2061	Wagga Wagga (20 miles from)	Stream tin	53·26

#### COPPER.

During the year copper to the value of £7,360 was extracted from the silver ore raised from the mines at Broken Hill. The Great Cobar Mine, at Cobar, which has been shut down since August, 1889, has been re-started on tribute, and will probably give employment to about 200 men. At Nymagee, the Nymagee Copper-mining Company, as also the New Burra Burra Company, closed during the year, owing to the low price of copper, but arrangements are being made, I understand, to restart the Nymagee Company's Mine on the tribute system. At Nyngan, the Girilambone Copper Mine is let on tribute to the

the Messrs. Richardson, who put out during the year copper to the value of £957 7s. 4d. In the Hillston Division the New Mount Hope Copper-mining Company produced copper to the value of £6,501 8s. This Company have a good plant, and employ over 40 men.

At Captain's Flat, the Lake George Copper-mining and Smelting Co. saved from the ore treated by them 238 tons of copper, besides gold and silver, and the New Koh-i-noor Co., 137 tons, besides gold, silver, and lead. The Burruga Copper Mine, situated in the Abercrombie Mountains, near Burruga, which has been shut down for two years, was re-started in November last by the owner, Mr. Lewis Lloyd, and 150 men are now employed, but this number will probably be doubled when the mines get into full working order. This mine is being worked at the 750-foot level; the lode is 9 feet thick, and appears to improve with sinking. The value of copper put out during the time the mine was at work was about 40 tons, valued at £1,800.

The Mount Costigan Mine, at Tuean, is now on tribute, and steps are being taken to re-open the Cordillera Lead and Silver Mine, with the intention of working it for copper. The Burley Jackey Mine, near Cowra, put out something like 200 tons of copper during the year, and parties are at work in the locality prospecting for that mineral.

The Belara Copper Mine, at Goolma, near Wellington, which had been idle for some time, started work in October last, and employs 20 men. A little copper is being got in the Fairfield Division of the New England Mining District, the quantity last year being valued at £251 5s.

TABLE showing the quantity and value of Copper, the produce of the Colony, exported from the Colony of New South Wales, from 1858 to 1893.

Year.	Ingots.		Ore and Regulus.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	tons cwt.	£	tons cwt.	£	tons cwt.	£
1858	.....	.....	58 0	1,400	58 0	1,400
1859	30 0	578	.....	.....	30 0	578
1860	.....	.....	43 0	1,535	43 0	1,535
1861	.....	.....	144 0	3,390	144 0	3,390
1862	.....	.....	213 0	5,742	213 0	5,742
1863	23 0	1,680	114 0	420	137 0	2,100
1864	54 0	5,230	.....	.....	54 0	5,230
1865	247 0	15,820	22 0	545	269 0	16,365
1866	255 0	18,905	23 0	1,885	278 0	20,790
1867	393 0	30,189	0 2	5	393 0	30,194
1868	644 0	23,297	172 10	4,000	816 0	27,297
1869	1,980 0	74,605	104 0	2,070	2,084 0	76,675
1870	994 0	65,671	6 0	60	1,000 0	65,731
1871	1,350 0	87,579	94 0	1,297	1,444 0	88,876
1872	1,035 0	92,736	417 0	13,152	1,452 0	105,888
1873	2,795 0	237,412	51 0	1,690	2,846 0	239,102
1874	3,638 0	311,519	522 0	13,621	4,160 0	325,140
1875	3,520 0	297,334	157 0	4,356	3,677 0	301,690
1876	3,106 0	243,142	169 0	6,836	3,275 0	249,978
1877	4,153 0	307,181	360 0	17,045	4,513 0	324,226
1878	4,983 0	337,409	236 0	7,749	5,219 0	345,158
1879	4,106 15	256,437	36 7	915	4,143 2	257,352
1880	5,262 10	359,260	131 18½	4,799	5,394 8½	364,059
1881	5,361 0	350,087	132 16	4,975	5,493 16	355,062
1882	4,865 3	321,887	93 1	2,840	4,958 4	324,727
1883	8,872 17	574,497	84 10	2,704	8,957 7	577,201
1884	7,286 6	415,601	18 18	578	7,305 4	416,179
1885	5,745 5	261,905	0 15	15	5,746 0	264,920
1886	3,968 18	166,429	57 18	1,230	4,026 8	167,665
1887	4,463 19	195,752	299 8	3,350	4,763 7	199,102
1888	3,786 1	272,110	113 6	2,924	3,899 7	275,034
1889	3,983 16	203,319	198 4	3,322	4,182 0	206,641
1890	3,165 9	163,537	580 9	9,774	3,755 18	173,311
1891	3,860 3	191,678	665 8	13,215	4,525 11	205,093
1892	3,535 0	160,473	1,299 4	27,233	4,834 4	187,706
1893	1,051 0	44,235	1,016 0	14,191	2,067 0	58,426
	98,514 2	6,090,694	7,642 14½	178,869	106,156 16½	6,269,563

As will be seen from the foregoing table, the value of the copper exported from the Colony last year was less than in any year since 1868, no doubt due to the great drop in the price of copper, which led to the shutting down of some of the largest of our copper-mines. A slight rise in the value of this metal has taken place, which, if maintained, will undoubtedly lead to the output being greatly increased in 1894.

During

During the year 100 assays were made for Copper in the Laboratory of this Department, the following yielding over 10 per cent. —

Official number.	Locality.	Description.	Per cent. Metallic Copper.	Per ton.	
				Gold.	Silver.
				oz. dwt. gr.	oz. dwt. gr.
218	Blayney (near)	Crushed copper ore	11.35		
219	" "	" "	19.29		
375	" (?)	Brown iron ore, with sulphide and carbonate of copper	46.15		
376	"	Crushed copper ore	11.98		
1875	"	Crushed sample	13.16		
1683	Bolivia (New England)	Copper pyrites, with blende, &c.	32.1	Trace.	33 4 2
2167	Braidwood (near)	Cupriferous shaly stone	16.65	"	4 7 2
978	Broken Hill (Little Stephen's Creek).	Ferruginous ore, with a little malachite, &c. (See under "Platinum.")	15.1	"	10 6 21
845	Bulga Mountain	Gander's matte	32.85	"	8 16 0
2121	Captain's Flat	Crushed copper pyrites	40.23	"	Trace.
1389	Carcoar	Copper gossan, containing some cuprite	25.55	0 3 6	2 8 23
800	Cargo	Cuprite, with a little carbonate and sulphide of copper	36.0	1 6 2	2 14 10
1567	" (Dolcoath Mine)	Copper glance, coated with green and blue carbonates of copper.	45.15	0 6 12	1 17 0
313	Cobar (?)	Green and blue carbonates of copper and oxide of iron in quartz.	42.45	Trace.	Trace.
857	"	Felspathic copper ore, red oxide, blue and green carbonates.	11.45	"	0 10 21
1419	Cooma (near)	Copper gossan	41.15	Nil.	10 17 15
398	Cowra (14 miles from)	Crushed sample	19.28	Trace.	0 10 21
747	" (?)	Cuprite, with a little malachite, &c.	30.15	"	0 10 21
828	" (?)	Copper glance, with copper pyrites and carbonates of copper.	26.65	"	1 1 18
1367	" (4 miles from)	Copper pyrites	13.6		
1832	Deepwater Creek, near (Copmanhurst).	"	17.80		
2670	Fiery Creek	Felspathic stone, containing carbonate of copper	12.08	0 16 4	0 5 10
2303	Macleay River (Hickey's Creek)	Copper gossan	29.3	Trace.	35 8 20
2603	Mount Carrington	Oxides of copper, with blende, &c.	22.18	"	3 5 8
348	Mudgee District	Copper gossan	15.5	Nil.	0 12 22
840	" (5 miles from)	Copper pyrites, &c.	36.35	Trace.	Trace.
2711	" District	Copper matte	39.10	0 7 14	27 4 10
666	Mulloon (near Bungendore)	Copper pyrites, with blende and galena	11.00	1 3 22	8 18 3
811	Mulloon	Average sample of a copper pyrites lode	14.00	0 1 2	3 10 18
455	New Burra Burra	Felspathic material, with black copper oxide	32.50		
456	"	Crushed felspathic material	10.29		
612	"	Copper glance	71.00		
613	"	Oxide and carbonate of copper	16.05		
615	"	Carbonate of copper	46.90		
2527	Orange (near)	Igneous rock, impregnated with grey sulphide and blue and green carbonates of copper.	18.84		
2605	"	Copper ore, containing blue and green carbonate	16.43		
2591	Saw-pit Gully	Ironstone, with copper pyrites, &c.	39.92	Nil.	Nil.
2660	Shoalhaven River (Callen)	Cupriferous quartz, with much clay	11.81	Trace.	Trace.
1863	Tenterfield (near)	Siliceous, arsenical, and copper pyrites	25.61	"	9 7 6
382	Wilcannia District	Hematite, with carbonate of copper	19.45		
383	"	" " "	13.95		

### IRON.

Nothing tangible has yet resulted from the efforts made during late years to establish the iron-making industry in this Colony, although attention has from time to time been directed to many natural advantages possessed by several districts of the Colony, namely, deposits of iron ore, with coal and flux in close proximity. The iron made in the Colony at the present time is not from ore, but from scrap, and the quantity so manufactured during the year was 2,190 tons 11 cwt. 1 qr. 4 lb., valued at £14,756 Gs. The Eskbank Iron-works, where this industry is carried on, are situated at Lithgow, and employ about 150 men. The owner is Mr. W. Sandford.

In the Broken Hill District there were raised during the year 1,051 tons of iron ore, valued at £1,198. The bulk of this comes from Balaclava, about 8 miles from Broken Hill, the rest of it being taken by the Proprietary Co. from the outcrop of the lode. It is solely used as flux.

During the year the following assays and analyses were made for iron in the Laboratory of this Department:—

Official number.	Locality.	Description of ore.	Assay or analysis.	Iron.
1135	Austimere	Ironstone		19.02
1014	Albury (?)	Hematite (neither gold nor silver).		68.70
1907	Bombala (near Quedong River).	Highly ferruginous earth	Moisture .....	14.69 %
			Ferric oxide .....	24.00 "
			Protoxide of iron .....	26.03 "
			Phosphoric acid .....	43.60 "
885	Broken Hill (near Razorback)	Phosphate of iron	A considerable quantity of magnesia is present.	
2150	Cookariudgera Parish (County Ashburnham)	Compact ironstone		20.69
1027	Dubbo (about 7 miles from)	Brown iron ore (limonite)		35.94

Official number.	Locality.	Description of ore.	Assay or analysis.	Iron %
977 1549	Gulgong (3 miles S. from)	Brown iron ore Red ochre	Moisture at 100° C. ... 3.68 % Combined water ... 7.73 ,, Silica ... 9.92 ,, Alumina ... 9.72 ,, Ferric oxide ... 67.05 ,, Ferrous oxide ... nil. Manganese oxide ... .84 ,, Lime ... trace. Barium oxide ... nil. Magnesia ... .81 ,, Phosphoric acid ... .25 ,, Sulphuric acid ... nil. Titanic acid ... trace.	48.12
1550	"	Yellow ochre	Moisture at 100° C. ... 1.76 % Combined water ... 11.55 ,, Silica ... 28.76 ,, Alumina ... 30.97 ,, Ferric oxide ... 24.60 ,, Ferrous oxide ... .61 ,, Manganous oxide ... trace. Lime ... .72 % Barium oxide ... nil. Magnesia ... .49 % Phosphoric acid ... trace. Sulphuric acid ... .. Titanic acid ... nil.	99.46 %
2503	Gundagai district	Hematite		24.48
2006	Illawarra	Ferruginous alluvial deposit		27.82
1279	Lane Cove River (Burns Valley)	Silicious ironstone		34.27
1605	Lucknow	Ferruginous decomposed rock	Ferric oxide, 71.20 %; ferrous oxide, nil.	
2302	Macleay River (Willie Willie)	Limonite		55.41
325	Mount Allen Gold-mine (N.E. corner of E quarry).	Iron ore—bulk sample	Bismuth, .12 %; copper, a trace; silica, 12.39 %.	48.59
326	Mount Allen Gold-mine (N.W. corner of E quarry).	" "	Bismuth, .03 %; copper, a trace; silica, 10.07 %.	52.63
327	Mount Allen Gold-mine (S.W. corner of E. quarry).	" "	Bismuth, trace; copper, a trace; silica, 7.39 %.	56.35
328	Mount Allen Gold-mine (now vein E side of quarry).	" "	Bismuth, .72 %; copper, a trace; silica, 7.47 %.	55.86
329	Mount Allen Gold-mine	Slate from shaft at level, showing free gold in fine scales.	Gold, 1 oz. 1 dwt. 17 gr. per ton; silver, 1 oz. 17 dwt. per ton; gangue, 69.72 %.	14.68
331	Mount Allen Gold-mine (E quarry).	Picked samples of best ironstone.	Bismuth, .04 %; copper, nil; silica, 6.15 %.	58.78
441	Mount Allen	Proportional weights of 325, 326, 327, and 328, thoroughly mixed.	Moisture, at 100° c. ... .87 % Combined water ... 4.15 ,, Ferric oxide ... 74.11 ,, Ferrous oxide ... .54 ,, Manganous oxide ... .28 ,, Alumina ... 9.68 ,, Silica ... 9.60 ,, Lime ... .14 ,, Magnesia ... .10 ,, Phosphoric anhydride ... .26 ,, Sulphuric anhydride ... .03 ,, Bismuth oxide ... .25 ,, Copper ... trace.	52.3
332	Mount Dromedary (bluestone quarry near shaft).	Iron ore	Bismuth, trace; copper, nil Silica ... 12.47 %	57.42
333	Mount Dromedary (bluestone quarry north of shaft).	"	Bismuth, .02 %; copper, nil Silica ... 1.24 ,,	67.20
334	Mount Hope Copper-mine	Flux as used at mine	Moisture, at 100° C. ... .27 ,, Combined water ... 1.57 ,, Ferric oxide ... 85.53 ,, Ferrous oxide ... 1.50 ,, Manganous oxide ... trace. Alumina ... 3.10 ,, Silica ... 9.13 ,, Lime ... .24 ,, Magnesia ... trace. Phosphoric anhydride ... .05 ,, Sulphuric anhydride ... .83 ,, Bismuth oxide ... .03 ,,	59.64
1000	Mudgee	Earthy hematite		54.6
78	Picton	Earthy magnetite	Ferric oxide ... 35.91 %	
3008	Port Macquarie	Highly ferruginous rock; in part pure hematite.	This sample contains a large amount of insoluble siliceous matter.	29.84
2986	Trunkey Creek, near Hobby's Yards.	Red ochre	Sand ... 1.5 %	17.74
302	Tumut	Micaceous hematite and magnetite schist.		62.59

## ANTIMONY.

The antimony veins at Taylor's Arm, Bowraville, and Deep Creek have been worked vigorously during the year, and a fair quantity of ore is shipped at regular intervals. The ore is of good quality, varying from 63 to 67 per cent. Smelters are being put up on a new process, which will treat the ore, it is said, at a cost of about 5s. per ton. Should they prove as great a success as anticipated, it will admit of the second class ore being worked at a profit. The output from the Kempsey District may be put down as 866 tons, valued at £7,466 10s. At Hillgrove, in the New England District, the yield of antimony is more than in 1892, although the value is less, owing to the low price ruling for that metal during the past year, the quantity being 1,376 tons, valued at £15,270, as compared with 1,135 tons, valued at £25,658 during 1892. In consequence of the fall in price there are very few men employed independently in working the numerous veins abounding in the district, and the principal producer of antimony on the field is the Hillgrove Antimony Mining and Smelting Co. In the Hillgrove West Division the total amount of antimony sold during the year was about 400 tons, the whole of which was raised by miners for themselves, and sold in its crude state at an average rate of about £6 5s. per ton.

During the year 38 assays were made for antimony in the laboratory of this Department, the following giving the best results:—

Official number.	Locality.	Description.	Per cent. metallic antimony.	Per ton.	
				Gold.	Silver.
				oz. dwt. gr.	oz. dwt. gr.
2389	Bellinger River, head of	Antimonite, with a little oxide of antimony	63.55	Trace.	Trace.
2390	" " "	Oxide of antimony	69.94	Nil.	Nil.
2471	" " "	Oxide and sulphide of antimony	36.94	"	"
2717	" " "	Very fine-grained antimonite, with oxide crust	79.45	"	"
2718	" " "	Antimonite, with oxide	38.30	"	"
2719	" " "	Oxide of antimony	41.85	"	"
2844	" " "	Siliceous antimonite—average sample of 5 cwt.	51.41	Trace.	Trace.
2003	Clarence River District	Sulphide and oxide of antimony	61.98		
2004	" " "	Antimonite, with some oxide of antimony	54.23		
2005	" " "	Antimonite	68.58		
2364	" " "	"	61.14	Nil.	Nil.
986	Cooloongolook	"	57.61	"	"
2448	" Wang Wank	Stibnite	46.78	"	"
1741	Cudgegong River	Siliceous antimony ore	41.21	"	"
1947	Hillgrove (West Sunlight G.-M. Co., 100 ft. deep)	Antimonite	50.67		
521	Lionsville (Washpool Ck.)	"	56.10	Nil.	0 14 0
2594	Lunatic Reef	Oxide and sulphide of antimony	50.84	Nil.	Nil.
1396	Macksville ("Mountain Maid" Mine).	Antimonite	66.31	"	"
1857	Macksville	Felspathic antimony ore	27.57	"	"
2348	" District	Antimonite, with felspathic matter	52.30	Trace.	Trace.
2349	" " "	" " "	56.21	"	"
1967	Nana Creek	Antimonite	30.0	"	1 12 16
129	Nundle (near)	Stibnite, with a little cervantite and quartz	59.87	Nil.	Nil.
71	Yulgilbar (Co. Drake)	Stibnite, with a little quartz	51.85	"	"
73	" "	Stibnite, with quartz	54.07	"	"

## BISMUTH.

Mining for bismuth is nearly a dead letter. The Great Jingera Company at Pambula sent away a few tons during the year, but the mine is now shut down. On the Red Range, about 15 miles from Glen Innes, a party are opening up some old workings that were worked for bismuth some years ago. When ready for work, the mine will be let on tribute.

During the year 33 assays were made for bismuth in the laboratory of this Department, the following giving the best results:—

Official number.	Locality.	Description.	Per cent. metallic bismuth.	Per ton.	
				Gold.	Silver.
				oz. dwt. gr.	oz. dwt. gr.
1783	Hillgrove (near)	Felspathic lode-stuff, with galena	4.74	Trace.	6 17 3
1723	Nimitybelle	Quartz containing sulphide of bismuth, &c.	6.45	Nil.	Nil.

## ZINC.

During the year twenty assays were made for zinc in the laboratory of this Department, the following giving the best results:—

Official Number.	Locality.	Description.	Per cent. metallic zinc.	Per ton.	
				Gold.	Silver.
				oz. dwt. gr.	oz. dwt. gr.
2352	Bore .....	Galena, with blende, &c., with a felspathic gangue.....	17·97	Trace.	2 14 10
353	Broken Hill (Junction Mine).	Vesicular zinc and lead, also yellow copper sulphides...	22·83	Nil.	30 5 8
354	Broken Hill (Junction Mine).	Blende and galena, with quartz and garnets.....	27·92	„	26 6 23
355	Broken Hill (Junction North Mine).	Vesicular zinc and lead sulphides, with garnets .....	30·49	„	24 16 11
2792	Burrage .....	Average sample of siliceous pyrites, with galena and blende.	10·07	.....	.....
2749	Goulburn (near) .....	Zinc blende, with iron pyrites.....	42·65	Trace.	6 1 19
2750	„ .....	Siliceous zinc blende .....	28·60	Nil.	4 7 2
2111	Jinglemoney .....	Siliceous pyrites, with zinc blende and calcite .....	9·63	0 6 12	0 10 21
2681	„ .....	Siliceous fine-grained galena, with pyrites.....	26·04	Trace.	3 0 22
597	Sunny Corner Mine .....	Old sulphide ore .....	21·19	„	14 9 15
598	„ .....	New ore (now using) .....	24·20	„	8 3 8
599	„ .....	Roasted ore .....	20·73	„	15 3 18
601	„ .....	Old matte .....	25·51	„	12 15 18
602	„ .....	New matte .....	26·45	„	20 19 4
603	„ .....	Old slag.....	31·20	Nil.	0 15 2
604	„ .....	New slag .....	29·90	„	0 16 4

## PLATINUM.

In the northern sea beaches bordering the Clarence and Richmond Mining District in this Colony, platinum is to be found in payable quantities, but up to the present time little attention has been paid to its production. Several leases have been granted to mine for this metal, but only Martin Anderson, near Baliina, has got to work, and he has already a considerable quantity of concentrates on hand. Many of the men who are working the beach sand for gold are paying more attention to the saving of the concentrates, in the hope that some effective mode of saving the platinum will yet be found. The extreme fineness of this metal, as found on these beaches, and the want of knowledge how to separate it from its associated minerals, renders it of little commercial value at present to the miners of the district. Prospecting has shown that there are on the Northern Coast inner beaches which it is thought contain both gold and platinum. Prospecting is still going on in the neighbourhood of Mulga Creek, about 12 miles north-east from Broken Hill, where the indications are favourable to the existence of platinum in payable quantities. About 3 tons were raised during the year from this locality, which realised £5 per ton.

During the year twenty-two assays were made for platinum, the following giving the most favourable results:—

Official Number.	Locality.	Description.	Per ton platinum.	Per ton gold.	Per cent. tin.
978	Broken Hill (Little Stephen's Creek).	Ferruginous ore, with a little malachite, &c.; metallic copper, 15·1 per cent.; nickel, 0·848 per cent.; cobalt, 0·89 per cent.	0 19 12 Iridosmine, 2 dwt. Silver, 10 oz. 6 dwt. 21 gr.	Trace.	.....
147	Clarence and Richmond Rivers (between).	Concentrated beach sand .....	34 9 2 Iridosmine, 6 oz. 13 dwt. 22 gr. 29 15 12 Iridosmine, 23 oz. 18 dwt. 13 gr.	0 16 6	16·26
1525	Clarence and Richmond Rivers (between) (Richmond Beach).	Concentrated beach sand.....	Iridium, palladium, rhodium, &c., 6 oz. 15 dwt. 2 gr. 16 6 16 Osmiridium, 6 oz. 17 dwt. 4 gr.	1 2 18	5·02
2543	Clarence River District...	Sand, consisting of zircons, &c. (said to be unconcentrated).	13 7 20 Iridosmine, 5 oz. 11 dwt. 30 19 1	Trace.	16·80
2846	Richmond River.....	Beach sand, slightly concentrated .....	Iridosmine, 15 oz. 19 dwt. 1 gr. 23 0 14	0 18 12	7·0
709	Richmond River (Evan's Beach).	Blanketings .....	Iridosmine, 25 oz. 4 dwt. 22 gr. 88 10 0	1 10 10	12·94
1021	Evan's River .....	Wash dirt .....	Iridosmine, 22 oz. 5 dwt.	Nil.	8·24
1022	„ .....	Blanketings .....	„	„	16·85

## CHROMIUM.

There was some excitement in the neighbourhood of Gundagai during the year owing to the discovery of large deposits of chrome ore in that locality. The principal deposit is on private land, but as capital will be required to open up the mines, no practical results have followed the discovery.

During

During the year twenty-eight assays were made for chrome in the laboratory of this Department, the following giving the best results:—

Official Number.	Locality.	Description	Chrome per cent.
2103	Armidale	Chrome-iron ore	44.71
1281	Bowling Alley Point	"	42.81
1983	Coolac	Average of bulk sample of chrome-iron ore	46.05
611	Cootamundra	Concentrated chrome-iron	53.70
1833	(Gordonbrook (Oakey Creek))	Chromite	39.13
1834	"	"	39.70
1835	"	"	41.60
1836	"	"	37.63
2509	"	Chrome-iron ore	36.53
2510	"	"	37.99
340	Gundagai	Chromite	56.61
2203	" (10 miles east of)	Chrome-iron ore	31.98
2955	"	Chrome-iron ore, with coating of oxide	34.26
186	Juneo District	Chromite	39.18
79	Mooney Mooney, parish of, county of Harden.	"	52.08
1508	Muttama (3 miles east of)	Chrome-iron ore	30.26
178	Nundle (near)	Chromite	46.04
1993	Tamworth	"	38.95
2409	Tenterfield District	"	44.18
592	Wagara, parish of, county of Buccleugh	"	44.64

#### MANGANESE, NICKEL, AND COBALT.

A large lode of ironstone, carrying manganese, is about to be worked at Darbalara, about 12 miles from Gundagai. Should this deposit prove payable it may be the means of employing a large number of men.

The only actual mining for cobalt going on at the present time in the Colony is on M'Killop's selection, at Carcoar. A few tons of ore were raised during the year.

Five tons of cobalt ore were shipped from Port Macquarie to test its value. There is no lode discovered there yet, the ore shipped being taken from bunches, but it is thought that by sinking, a true lode may be discovered.

DURING the year the following assays were made for manganese, cobalt, and nickel in the laboratory of this Department:—

Official Number.	Locality	Description.	Per cent. Binoxide of Manganese.	Per cent. Metallic Manganese.
1404	Camden Haven Heads (near)	Psilomelane (cobalt and nickel under 0.5 per cent.)	58.03	36.69
1807	Cobar, near (Boppy Mount.)	Ferruginous pyrolusite	55.18	34.89
3003	Coolac	Wad	66.05	41.76
2850	Cooma District	Ferruginous wad	54.62	34.69
2820	Cootamundra	Psilomelane	67.58	42.92
1682	Condobolin (60 miles N.W.)	"	40.96	25.89
1245	Dubbo	Quartz stained with felspathic and manganic substance (silver, 1 oz. 12 dwt. 16 gr. per ton).	29.18	.....
1654	" (near)	Pyrolusite	89.70	56.52
172	Grafton	Manganese oxide, containing clayey iron ore	57.77	36.52
2218	" District	Black oxide of manganese	72.82	46.04
2219	"	" " carthy in part	64.37	40.69
2220	"	" " "	37.06	23.43
1756	Gundagai (7 miles from)	Gossau, containing a little manganese	39.58	25.02
1860	"	Psilomelane	86.64	54.77
1642	Hastings River (Doyle River)	Ferruginous pyrolusite	54.28	34.32
2259	Kerr's Creek	"	82.09	51.89
807	Michelago (near Margaret Creek.)	Psilomelane	66.00	41.73
808	"	"	45.10	28.45
809	"	"	58.68	37.06
2359	Moonbi	"	71.52	45.21
839	Mudgee (5 miles from)	Ferruginous psilomelane	47.50	30.03
1233	Nadgigomar	Siliceous psilomelane (protoxide of nickel, 0.51 per cent.; sesquioxide of cobalt, 2.71 per cent.)	44.31	.....
2488	Nambucca River (Taylor's Arm).	Wad	36.57	23.12
225	Orange (near)	Manganese oxide	80.67	51.00
1824	Queanbeyan	Psilomelane	52.67	33.29
2261	Rockley	" and rhodonite	65.02	41.01
1865	Tabulum (Clarence River).	"	78.92	49.89
1655	Tamworth	Pyrolusite	80.78	51.07
1893	Tenterfield	"	89.93	56.85
99	Tumut District	Manganese oxide	79.88	50.50
2903	Woodstock (1 mile N. from)	Manganese ore (cobalt sesquioxide under ½ per cent.)	66.92	42.31
1498	Woolgoolga	Psilomelane	49.16	31.06

#### WOLFENAM.

The quantity of this mineral won in the Colony during the year was 1 ton 2 qr. from the Emma-ville Division of the New England Mining District, and 7 cwt. from the Broken Hill District. The value of it could not be ascertained. Prospecting operations are still going on at Berridale in the Cooma District for this mineral, and the indications are considered very satisfactory.

TUNGSTEN.

## TUNGSTEN.

A little prospecting work is going on in the vicinity of Frogmore, in the Burrowa District for tungsten. It is said fair prospects have been found in that locality. During the year eighteen assays were made for tungstic acid in the laboratory of this Department, the following giving the best results:—

Official Number.	Locality.	Description.	Tungstic Acid per cent.
187	Bald Hill (Pullitop Station).....	Stream tin and wolfram (tin 20·60 per cent.) .....	47·70
2754	Berridale .....	Wolfram in quartz.....	54·35
1507	Bingara District.....	Almost pure wolfram .....	72·46
878	Cowra District .....	Wolfram .....	67·80
137	Deepwater, 20 miles from (Bald Rock)	Wolfram in felapar and quartz veinstone, stained with arseniate of iron.	45·50
453	" .....	Wolfram .....	73·10
238	Hillgrove .....	Scheelite with stibnite .....	51·23
1855	" .....	Crushed scheelite (antimony, 1·43 per cent.) .....	71·65
542	Tenterfield District .....	Granular wolfram in clayey matrix .....	57·25

## ALUM.

The Australian Alum Company, Bulladelah, have not manufactured any alum at their works there, but have shipped a large quantity of alumite to their works in England.

## DIAMONDS.

Bingara is the principal seat of the diamond-mining industry in the Colony, and is carried on at the now famous Monte Christo Mine, owned by Captain Rogers. This mine is situated about 4 miles from Bingara township, and on a hill about 800 feet above the Gwydir River.

The diamond-bearing gravels have been covered by lava, which still forms the summit of the main range, but has been removed by denudation from the Monte Christo Mine and the other low parts, whence most of the diamonds have hitherto been extracted. The mine has been steadily worked during the year, and as much as 10½ carats of diamonds have been obtained from 80 lb. of wash-dirt, which also yields a little gold. Capital is, however, required to develop the property, and an attempt is being made to raise money on the London market. A large area of diamondiferous ground has been taken up adjoining the Monte Christo, but little work has been done owing to the scarcity of water. The output of the Bingara District is said to have been 15,000 carats, valued at £15,375, or an average of 20s. 6d. per carat, which shows that the majority of the stones are not very large in size. A few men are still prospecting in the Inverell and Berrima Districts for gem stones, but no really payable wash carrying these stones has yet been discovered in these localities.

## OPAL.

The White Cliff opal-field, situated in the Wilcannia Division of the Albert Mining District, has assumed some considerable importance during the year. A township has sprung up, and the population is estimated to be about 700, with a line of coaches running frequently between the field and Wilcannia, 60 miles distant. An immense amount of work has been done on the field, but only a few of the claims are worked on wages, the majority of them being worked on tribute, and whilst some of the tributors are doing remarkably well, a large number are not making anything. The real good opal is found in patches, and a large percentage of the opal raised is of little or no value. The opal-bearing country at present being worked covers an area of 12 miles in length by 2 miles in width, and is found at an average depth of from 10 to 12 feet from the surface, although, in a few instances, it has been found at depths varying from 20 to 50 feet, which may indicate that the opal may be distributed at great depths, and, if so, the field may become one of a permanent character for many years to come. It is seldom that any surface indication shows the presence of the noble opal. A shaft is started, which generally passes through 12 to 14 feet of red clay, then a layer of about 6 feet of gypsum, and then about 2 feet of hard sandstone, when the opal-bearing country is struck, but it has been found in drives at a depth of about 50 feet, although in some cases it has been found on the top of a claystone band at from 12 to 15 inches from the surface. The ground is, however, generally worked by open-cuttings, a face being opened out 30 or 40 feet wide and 10 feet deep. Some magnificent stones have been found on this field, valued as high as £60 each, and the green stones or green stones with fire in them, being the most valuable, although they are found in all colours. The scarcity of water is a great drawback to the field, the nearest supply being a private tank on the Momba Pastoral Company's Holding, 4 miles from the township. A Government tank is, however, being excavated, which will, it is hoped, overcome the difficulty. The sum realised from the sale of opal raised during the year is given approximately as £17,000.

## LIMESTONE FLUX.

The Tarrawingie Flux Company's limestone quarries are situated at Tarrawingie about 30 miles north of Broken Hill, and are connected with Broken Hill by means of a tramway. The output of flux during the year was 130,635 tons, valued at £111,041, a very large increase over the previous year, which was only 74,057 tons representing £65,357. This is a very important mining industry in the Barrier District, about 200 men being employed in the work.

MISCELLANEOUS

MISCELLANEOUS ANALYSES.

LOCALITY—BEARBONG.  
(2192) Rock consisting largely of felspar, yielding :—

	Per cent.
Moisture at 100° C.	2.22
Combined water	2.17
Silica	74.12
Alumina	12.39
Ferrous oxide	.21
Ferric "	.31
Manganous oxide	trace.
Lime	.30
Magnesia	.32
Potash	5.07
Soda	3.22
Sulphuric anhydride	trace.
Phosphoric "	"
	100.33

LOCALITY—BOURKE.  
(1522) Celostine, yielding :—

	Per cent.
Moisture	.70
Sulphate of strontium	93.57
" lime	.99
" baryta	trace.
Silica	3.22
Oxide of iron and trace of alumina	1.52
Magnesia	.33
Chloride of sodium	trace.
	100.33

LOCALITY—BOURKE DISTRICT.  
(270) Soil from Native Dog Artesian Bore. Analysis made of the soluble matter contained in the soil, i.e., soluble in distilled water :—  
Soluble matter in soil 1.0328 per cent. (dried at 220° F.)

	Per cent.
Consisting of Soda	0.2950
" Potash	.0439
" Lime	.0628
" Magnesia	.0279
Sulphuric anhydride	.1130
Chlorine	.4340
Clayey matter	.0168
Carbonic acid, organic matter, &c.	.0394
	1.0328

LOCALITY—BOURKE DISTRICT.  
(271) Soil from Native Dog Artesian Bore. Analysis made of the soluble matter contained in the soil, i.e., soluble in distilled water :—  
Soluble matter in soil 0.9416 per cent. (dried at 220° F.)

	Per cent.
Soda	0.2131
Potash	.0934
Lime	.0748
Magnesia	.0229
Sulphuric anhydride	.0910
Chlorine	.3830
Clayey matter	.0172
Carbonic acid, organic matter, &c.	.0402
	0.9416

LOCALITY—BROKEN HILL (THE PINSACLES).  
(1711) Felspar, yielding :—

	Per cent.
Moisture at 100° C.	nil.
Combined water	.35
Silica	61.75
Alumina	20.74
Ferric oxide	.66
Manganous oxide	trace.
Lime	.80
Magnesia	.17
Potash	14.84
Soda	1.07
Sulphuric anhydride	trace.
	100.38

LOCALITY—BROKEN HILL.  
(2025) New mineral (Willyamite) yielding :—  
Weight of mineral, 5.1222 grains.

	(I.) Per cent.	(II.) Per cent.
Metallic antimony	56.85	56.71
" cobalt	13.92	13.84
" nickel	13.38	13.44
" iron	trace.	trace.
" copper	minute traces	min. traces.
" lead	"	"
Sulphur	15.64	15.92
	99.79	99.91

NOTE.—Mineral decomposes in hydrochloric and nitric acid, bearing no residue, and giving a green solution.

LOCALITY—BROKEN HILL.  
(2915) Supposed new mineral (lead, sulphur, &c.), yielding :—

	Per cent.
Moisture at 100° C.	.08
Silver sulphide	77.99
Copper "	.62
Iron "	1.42
Lead sulphate	19.36
Insoluble siliceous matter	.30
	99.77

No gold detected. Sp. gr. of mineral, 6.710.

LOCALITY—BROKEN HILL.  
(2916) Supposed new mineral (lead, sulphur, &c.), yielding :—

	Per cent.
Moisture at 100° C.	.14
Silver sulphide	13.25
Lead "	2.20
Copper "	1.82
Iron "	.42
Lead sulphate	77.60
Insoluble siliceous matter	4.30
	99.93

Traces of arsenic, antimony, and zinc.  
No gold detected. Sp. gr. of mineral, 6.011.

LOCALITY—BULLADELAH.  
(1801) Alumstone, yielding :—

	Per cent.
Moisture at 100° C.	.20
Combined water	13.40
Silica	5.51
Alumina	36.16
Ferric oxide	nil.
Ferrous oxide	.22
Lime	trace.
Magnesia	.07
Potash	10.30
Soda	nil.
Sulphuric anhydride	24.10
	99.98

Sp. gr., 2.816.

LOCALITY—BULLADELAH.  
(2395) Mineral from reef running parallel to the alumstone deposit :—This mineral consists mainly of silica and alumina, combined water ; also traces of lime, ferric oxide, sulphuric acid, &c. It is very probable that this is an altering felspar rock.

LOCALITY—BULLI.  
(1644) Supposed fireclay, yielding :—

	Per cent.
Moisture at 100° C.	2.21
Combined water	6.06
Silica	55.90
Alumina	17.17
Ferric oxide	5.73
Manganous oxide	trace.
Lime	1.80
Magnesia	2.12
Potash	1.91
Soda	.57
Phosphoric acid	trace.
Sulphuric "	nil.
Titanic "	trace.
Organic matter	6.23
	100.35

NOTE.—Some of the iron exists as ferrous oxide, which cannot be satisfactorily determined on account of the presence of so much organic matter.

LOCALITY—CAMPRELLTOWN.  
(2007) Highly ferruginous sand, yielding :—

	Per cent.	
Moisture at 100° C.	1.36	
Combined water	7.34	
Alumina	12.85	Soluble in acids.
Ferric oxide	8.74	
Ferrous oxide	trace.	
Manganous oxide	"	
Lime	nil.	
Magnesia	.12	
Phosphoric acid	nil.	
Sulphuric acid	trace.	
Silica	68.23	Insoluble in acids.
Alumina	1.32	
Ferrous oxide	trace.	
Manganous oxide	"	
Organic matter	"	
	100.16	

## LOCALITY—CASINO DISTRICT.

(506) Whitish clay—fireclay (?), yielding :—	Per cent.
Moisture, at 100° C.	7.74
Combined water	7.41
Silica	49.72
Alumina	27.62
Ferric oxide	1.80
Manganous oxide	trace.
Lime	2.46
Magnesia	1.65
Potash	1.30
Soda	.60
Phosphoric anhydride	trace.
Sulphuric	nil.
	<hr/> 100.30

## LOCALITY—HEATHCOTE.

(749) Supposed fireclay, yielding :—	Per cent.
Moisture at 100° C	4.57
Combined water	
Silica	74.48
Alumina	18.83
Ferric oxide	.39
Manganous oxide	trace.
Lime	do
Magnesia	.72
Potash	1.58
Soda	nil.
Phosphoric anhydride	trace.
Sulphuric	do
Titanic acid	do
	<hr/> 100.57

## LOCALITY—HEATHCOTE.

(750) Supposed fireclay, yielding :—	Per cent.
Moisture at 100° C.	1.04
Combined water	3.33
Silica	78.31
Alumina	15.29
Ferric oxide	.74
Manganous oxide	trace.
Lime	do
Magnesia	do
Potash	1.29
Soda	
Phosphoric anhydride	trace.
Sulphuric	nil.
Titanic acid	nil.
	<hr/> 100.00

## LOCALITY—HEATHCOTE.

(751) Supposed fireclay, yielding :—	Per cent.
Moisture at 100° C.	1.70
Combined water	5.56
Silica	72.44
Alumina	16.70
Ferric oxide	.28
Ferrous „	1.00
Manganous oxide	trace
Lime	.45
Magnesia	.36
Potash	1.45
Soda	
Phosphoric anhydride	trace
Sulphuric	do
	<hr/> 100.00

## LOCALITY—LARRIS LAKE.

(473) Impure kaolin, yielding :—	Per cent.
Moisture at 100° C.	71.
Combined water	3.89
Silica	71.16
Alumina	17.47
Ferric oxide	1.55
Manganous oxide	trace.
Lime	1.65
Magnesia	.23
Potash	3.28
Soda	trace.
Phosphoric anhydride	„
Sulphuric anhydride	„
	<hr/> 99.94

## LOCALITY—LITHGOW.

(1819) Pure white clay, yielding :—	Per cent.
Moisture at 100° C.	1.88
Combined water	11.27
Silica	46.41
Alumina	30.08
Ferric oxide	.40
Ferrous „	nil.
Manganous oxide	trace.
Lime	do
Magnesia	do
Potash	.68
Soda	nil.
Phosphoric anhydride	do
Sulphuric	trace
	<hr/> 90.72

## LOCALITY—MANNING RIVER (DIAMOND HEADS).

(610) White clay, yielding :—	Per cent.
Moisture at 100° C	4.27
Combined water	
Silica	70.23
Alumina	19.27
Ferric oxide	1.54
Manganous oxide	trace.
Lime	„
Magnesia	.23
Potash	4.50
Soda	trace.
Phosphoric anhydride	„
Sulphuric	„
Titanic acid	strong trace
	<hr/> 100.04

## LOCALITY—MICHELAGO (near).

(2977) Manganese oxide.

Consists largely of manganese binoxide, with lesser amounts of ferric oxide and alumina, lime, barium oxide, and magnesia, with traces of strontia, nickel, cobalt, and zinc. Some carbonic and phosphoric acids present; also a small amount of insoluble matter (in acids), which consists of clay and sand.

Contains neither gold nor silver.

## LOCALITY—MICHELAGO (near).

(2956) Manganese wad, yielding :—	Per cent.
Moisture at 100° C.	.91
Combined water	3.67
Silica	4.40
Alumina	3.78
Ferric oxide	16.37
Manganous oxide	62.68
Lime	2.50
Magnesia	2.04
Baryta	.64
Strontia	trace.
Soda	.31
Carbonic acid	2.11
Phosphoric acid	.31
	<hr/> 99.72

Contains also traces of zinc, cobalt, and nickel.  
Yielded neither gold nor silver.

## LOCALITY—MILTON.

(2467) White clay, yielding :—	Per cent.
Moisture at 100° C.	6.85
Combined water	11.35
Silica	45.79
Alumina	34.54
Ferric oxide	.90
Manganous oxide	nil.
Lime	.31
Magnesia	trace.
Potash	.65
Soda	trace.
Phosphoric acid	„
Sulphuric acid	nil.
Organic matter	trace.
	<hr/> 100.39

A brick made of this clay, dried and burnt at a high temperature, showed no sign of fusion having taken place, the sharp edges being retained.

## LOCALITY—MITCHELL'S CREEK (WELLINGTON).

(2398) Calcareous stone—the cap of gold lodes, yielding :—	Per cent.
Moisture at 100° C.	.27
Combined water	.83
Carbonate of lime	50.48
Alumina	1.19
Carbonate of magnesia	.81
Ferric oxide	2.30
Phosphoric anhydride	trace.
Sulphuric	nil.
Silica	36.52
Alumina	5.32
Ferrous oxide	trace.
Magnesia	1.83
	<hr/> 99.55

Soluble in acid.

Insoluble in acid.

## LOCALITY—MUDGEK.

(660) Kaolin, yielding:—

	Per cent.
Moisture at 100° C.	·96
Combined water	6·20
Silica	52·00
Alumina	31·20
Ferric oxide	1·70
Manganous oxide	trace.
Lime	·50
Magnesia	2·34
Potash	5·33
Soda	trace.
Phosphoric anhydride	"
Sulphuric	"
Titanic acid	"
	100·29

## LOCALITY—NINE-MILE CREEK, NEAR STROUD.

(2565) Granular magnetite, closely resembling the Port Stephens' ore, yielding:—

	Per cent.
Moisture at 100° C.	·90
Combined water	1·23
Silica	19·50
Ferric oxide	60·85
Ferrous oxide	3·85
Manganous oxide	·29
Lime	·50
Magnesia	·85
Alumina	11·59
Phosphoric anhydride	·29
Sulphuric	nil.
Titanic oxide	trace.
	99·85

## LOCALITY—PARKES, ABOUT 6 MILES EAST FROM FLAGSTONE CREEK.

(1796) Soapy clay, yielding:—

Moisture	7·65
Combined water	4·62
Silica	50·68
Alumina	18·71
Ferric oxide	12·51
Ferrous oxide	nil.
Manganous oxide	trace.
Lime	·52
Magnesia	2·28
Potash	1·34
Soda	1·89
Sulphuric anhydride	trace.
Phosphoric	trace.
	100·00

## LOCALITY—PORT STEPHENS.

(1288) Gritty, white clay, yielding:—

Moisture at 100° C.	1·84
Combined water	4·36
Silica	74·57
Alumina	16·47
Lime	·17
Magnesia	trace.
Ferric oxide	1·18
Manganous oxide	trace.
Potash	1·03
Soda	nil.
Phosphoric anhydride	"
Sulphuric	trace.
Titanic acid	nil.
	99·32

## LOCALITY—STOCKTON COLLIERY.

(1551) Inflow water:—

The sample was contained in a small spirit flask, holding about 8 oz. Gave an alkaline reaction. The bottle on being opened emitted a foul odour—due to sulphuretted hydrogen, and at the bottom of the bottle was a black sediment, which was found to be sulphide of iron. The water consists largely of chloride of sodium, magnesium, and calcium; with lesser amounts of sulphide of iron (sediment), ferrous oxide (in solution), silica, and a small amount of alkaline, carbonates, &c.

No sulphates, phosphates, or nitrates detected.

## LOCALITY—VICTORIA FALLS (100 FEET ABOVE THE).

(1935) Calcareous shale, yielding:—

	Per cent.
Carbonate of lime	47·0

## LOCALITY—WELLINGTON CAVES.

(995) Well water:—

Results expressed in.	Grains per gallon.	Parts per 100 000
Free ammonia	nil.	nil.
Albuminoid ammonia	101	102
Nitrogen as nitrates	present.	present.
" nitrites	nil.	nil.
Oxygen absorbed in 15 minutes	nil.	nil.
" " 4 hours	0046	0067
Appearance in 2 foot tube	Pale green colour.	
Odour when heated to 100 F°	nil.	nil.
Total solid matter	28 352	40 493
Chlorine as chlorides	1 900	2 714
Poisonous metals	nil.	nil.

The total solid matter consists mainly of lime and magnesia, with lesser quantities of chloride of sodium, silica, and traces of alumina, sulphuric acid, &c. A spring water of excellent purity, and suitable for all domestic purposes.

## LOCALITY—WHITE ROCK.

(1671) Sample of ore, yielding:—

	Per cent.
Moisture and combined water	1·75
Silica	70·31
Alumina	1·27
Manganous oxide	trace.
Lime	1·15
Magnesia	trace.
Sulphide of iron	6·64
" zinc	14·40
" lead	3·70
" copper	·25
" cadmium	trace.
" arsenic	minute trace.
" silver	*304
	99·64

\* Fine silver at the rate of 86 oz. 11 dwts. 8 gr. per ton. No gold.

## LOCALITY—WINGEN.

(2394).—Greenish unctuous clay (Fuller's Earth), yielding:—

Moisture	13·73
Combined water	6·45
Silica	50·61
Alumina	19·35
Ferric oxide	3·55
Ferrous "	nil.
Manganous oxide	"
Lime	1·37
Magnesia	3·24
Potash	·92
Soda	·47
Phosphoric anhydride	trace.
Sulphuric	nil.
	99·69

## LOCALITY—WOLLONGONG.

(1249) White clay, very pure, yielding:—

Moisture at 100° C.	1·87
Combined water	8·13
Silica	53·90
Alumina	21·77
Ferric oxide	·37
Ferrous oxide	·14
Manganous oxide	trace.
Lime	1·17
Magnesia	12·89
Potash	·40
Soda	trace.
Phosphoric acid	nil.
Sulphuric	"
Titanic	"
	100·54

The sample contained some lumps, which when broken, were of a reddish-brown colour.

## LOCALITY—WOONONA.

(2321).—Supposed fireclay, yielding:—

Moisture at 100° C.	2·05
Combined water	7·39
Silica	58·80
Alumina	23·33
Ferric oxide	1·10
Ferrous "	"
Manganous oxide	trace.
Lime	1·06
Magnesia	·65
Potash	2·09
Soda	·15
Phosphoric anhydride	·07
Sulphuric	·11
Organic matter	3·71
	100·51

Bricks made of this clay in heating at a severe temperature show no sign of fusion, their sharp edges being retained.

## SUMMARY.

## SUMMARY.

The total value of the mineral products of this Colony to the end of 1893 is £104,280,711 4s. 7d., details of which are given in the following table:—

	Quantity.	Value.	Total Values.		
Quantity and value of coal raised prior to 1st January, 1893 .....	57,631,711.59 tons	£ 27,271,429 0 3	£ s. d.		
Quantity and value of coal raised in 1893 .....	3,278,328.36 „	1,171,722 4 6			
Totals .....	60,910,039.95 tons	28,443,151 4 9	28,443,151 4 9		
Quantity and value of shale raised prior to 1st January, 1893 .....	727,238.15 tons	1,552,795 13 6			
Quantity and value of shale raised in 1893 .....	55,660.30 „	101,220 10 0			
Totals .....	782,898.45 tons	1,654,016 3 6	1,654,016 3 6		
Quantity and value of coke made prior to 1st January, 1893 .....	69,306.85 tons	84,472 17 11			
Quantity and value of coke made in 1893 .....	17,858.10 „	20,233 2 0			
Totals .....	87,164.95 tons	104,705 19 11	104,705 19 11		
Quantity and value of gold won prior to 1st January, 1893 .....	10,530,322.19 oz.	39,202,655 15 2			
Quantity and value of gold won in 1893 .....	179,288.02 „	651,285 15 8			
Totals .....	10,709,610.21 oz.	39,853,941 10 10	39,853,941 10 10		
Quantity and value of silver, silver lead, and ore raised prior to 1st January, 1893 .....	Ingots ..... 5,291,800.02 oz. Silver lead..... 245,466.52 tons Ore ..... 307,220.65 „	13,779,331 0 0			
Quantity and value of silver, silver lead, and ore exported in 1893 .....	*Ingots ..... 531,972.00 oz. Silver lead..... 58,401.15 tons Ore..... 155,859.05 „			3,031,720 0 0	
Totals .....					
Quantity and value of copper exported prior to 1st January, 1893 .....	Ingots ..... 97,460.95 tons Ore and regulus ... 6,616.55 „	6,211,137 0 0			
Quantity and value of copper exported in 1893 .....	Ingots ..... 1,051.00 „ Ore and regulus ... 1,016.00 „			58,426 0 0	
Totals .....		6,269,563 0 0	6,269,563 0 0		
Quantity and value of tin exported prior to 1st January, 1893 .....	Ingots ..... 103,652.76 tons Ore and regulus ... 17,961.80 „	9,840,910 0 0			
Quantity and value of tin exported in 1893 .....	Ingots ..... 2,636.85 „ Ore and regulus ... 148.05 „			229,743 0 0	
Totals .....		10,070,653 0 0	10,070,653 0 0		
Quantity and value of iron made prior to 1st January, 1893 .....	52,433.59 tons	406,170 16 2			
Quantity and value of iron made during 1893 .....	* 2,190.56 „	14,786 6 0			
Totals .....	54,624.15 tons	420,957 2 2	420,957 2 2		
Quantity and value of antimony exported prior to 1st January, 1893 .....	6,775.25 tons	130,478 8 6			
Quantity and value of antimony raised in 1893 .....	1,774.00 „	25,092 0 0			
Totals .....	8,549.25 tons	155,570 8 6	155,570 8 6		
Quantity and value of lead (pig) exported prior to 1st January, 1893 .....	910.15 tons	11,049 0 0			
Quantity and value of lead (pig) exported during 1893 .....	425.80 „	4,205 0 0			
Totals .....	1,335.95 tons	15,254 0 0	15,254 0 0		
Quantity and value of bismuth exported prior to 1st January, 1893 .....	182.65 tons	37,721 14 0			
Quantity and value of bismuth exported in 1893 .....	.....	.....			
Totals .....	182.65 tons	37,721 14 0	37,721 14 0		
Quantity and value of oxide of iron and pig-iron exported prior to 1st January, 1893 .....	1,626.80 tons	3,516 0 0			
Quantity and value of oxide of iron and pig-iron exported in 1893 .....	1,259.95 „	1,526 0 0			
Totals .....	2,886.75 tons	5,042 0 0	5,042 0 0		

\* The bulk of the silver is exported in the form of silver-lead and ore.

	Quantity.	Value.	Total Value.
Quantity and value of zinc-spelter exported prior to 1st January, 1893	970.45 tons	£ 11,043 0 0	£ a. d.
Quantity and value of zinc-spelter exported in 1893	.....	.....	.....
Totals	970.45 tons	11,043 0 0	11,043 0 0
Quantity and value of limestone flux raised prior to 1st January, 1893	218,861.80 tons	200,877 15 11	
Quantity and value of limestone flux raised in 1893	180,635.00 "	111,041 0 0	
Totals	349,426.80 tons	311,418 15 11	311,418 15 11
Quantity and value of alumite exported prior to 1st January, 1893	1,745.00 tons	8,172 0 0	
Quantity and value of alumite exported in 1893	821.00 "	3,244 0 0	
Totals	2,566.00 tons	11,456 0 0	11,456 0 0
Quantity and value of manganese ore exported prior to 1st January, 1893	254.00 tons	712 0 0	
Quantity and value of manganese ore exported in 1893	.....	.....	
Totals	254.00 tons	712 0 0	712 0 0
Quantity and value of opals raised prior to 1st January, 1893	236.67 lb.	17,600 0 0	
Quantity and value of opals raised in 1893	449.35 "	12,315 5 0	
Totals	686.02 lb.	29,915 5 0	29,915 0 0
Quantity and value of cobalt exported prior to 1st January, 1893	77.15 tons	1,580 0 0	
Quantity and value of cobalt exported in 1893	26.00 "	305 0 0	
Totals	103.15 tons	1,885 0 0	1,885 0 0
Quantity and value of fire-clay exported prior to 1st January, 1893	51.80 tons	135 0 0	
Quantity and value of fire-clay exported in 1893	21.00 "	46 0 0	
Totals	72.80 tons	181 0 0	181 0 0
Quantity and value of lime exported prior to 1st January, 1893	813.00 tons	1,780 0 0	
Quantity and value of lime exported in 1893	.....	.....	
Totals	813.00 tons	1,780 0 0	1,780 0 0
Quantity and value of marble exported prior to 1st January, 1893	635 pkgs.	2,577 0 0	
Quantity and value of marble exported in 1893	.....	.....	
Totals	635 pkgs.	2,577 0 0	2,577 0 0
Quantity and value of building stone exported prior to 1st January, 1893	7,213 No.	8,043 0 0	
Quantity and value of building stone exported in 1893	850 "	855 0 0	
Totals	8,063 No.	8,898 0 0	8,898 0 0
Quantity and value of ballast stone exported prior to 1st January, 1893	843 tons	989 0 0	
Quantity and value of ballast stone exported in 1893	132 "	166 0 0	
Totals	975 tons	1,155 0 0	1,155 0 0
Quantity and value of grindstones exported prior to 1st January, 1893	471 No.	311 0 0	
Quantity and value of grindstones exported in 1893	2 "	3 0 0	
Totals	473 No.	314 0 0	314 0 0
Quantity and value of slates exported prior to 1st January, 1893	81,234 No.	351 0 0	
Quantity and value of slates exported in 1893	.....	.....	
Totals	81,234 No.	351 0 0	351 0 0
Value of sundry minerals exported prior to 1st January, 1893	.....	56,841 0 0	
Value of sundry minerals exported in 1893	.....	557 0 0	
Totals	.....	57,398 0 0	57,398 0 0
General Total	.....	.....	£104,280,711 4 7



District and Division.	Alluvial Miners.		Quartz Miners.		Total Miners.	Quantity of Gold.			Price of Gold per oz.		Value of Gold won.	Auriferous ground worked.	Quartz reefs proved to be Auriferous.	Value of Machinery.
	Europeans.	Chinese.	Europeans.	Chinese.		Alluvial.	Quartz.	Total.	From	To				
<b>TUMUT AND ADELONG—</b>	No.	No.	No.	No.	No.	oz. dwt. gr.	oz. dwt. gr.	oz. dwt. gr.	s.	s.	£ s. d.	sq. miles	No.	£
Albury	3		48		50		450 0 0	460 0 0	72/6	80/	1,710 0 0	40		1,000
Adelong	102	30	70		202	1,738 14 21	2,920 10 8	4,658 5 8	65/	76/	17,705 3 4	40	54	21,000
Cooma	20		110		130	214 0 0	910 0 0	1,124 0 0	78/	77/	4,080 16 0	1	7	4,000
Captain's Flat	6	3			9	40 0 0		40 0 0	75/	75/	150 0 0			
Gundagai	115		12		127	1,076 0 0		1,076 0 0	74/	80/	4,169 10 0			2,350
Junee	16		16		31	14 8 9	226 10 10	250 18 19	78/	77/6	928 7 11		3	500
Germanton	6		2		7	0 2 0	12 0 0	73 2 0	75/	77/6	271 17 6	12	1	2,750
Nimitybelle	6		1		7	8 0 0		8 0 0	75/	77/6	30 0 0	30	3	300
Queanbeyan	6		14		20	180 0 0	7 10 0	187 10 0	78/		713 1 3	1	4	625
Reedy Flat	6				99	650 0 0	8 0 0	658 0 0	70/	77/6	1,946 15 0			500
Tumbarumba	214	4	2		220	2,066 0 0	50 0 0	2,106 0 0	40/	77/6	8,132 10 0	3	10	2,000
Tarutta			2		2			245 0 0	56/6	75/	923 15 0			600
Cootamundra			70		70			245 0 0			923 15 0			1,000
Kiandra	96	19			114	1,150 0 0		1,150 0 0		80/	4,600 0 0			
	783	69	346		1,148	7,186 5 6	4,829 10 16	12,025 15 22	40/	80/	45,361 16 6	127	82	53,922
<b>SOUTHERN—</b>	No.	No.	No.	No.	No.	oz. dwt. gr.	oz. dwt. gr.	oz. dwt. gr.	s.	s.	£ s. d.	sq. miles	No.	£
Araluen	210	29	10		249	2,940 0 0	260 6 0	3,200 6 0	68/	78/	12,217 4 0			19,635
Bombala	58	13	1		52	520 12 0		520 12 0	76 10	77 3	1,223 14 3	10	1	30,300
Braidwood	45	4			49	59 4 17		59 4 17	78/	78/6	228 1 1	15		100
Candelo			3		3									
Pambula			120		120		3,608 0 0	3,608 0 0	77/6	80/	13,406 7 2			12,508
Cobargo	4		4		8									
Little River	98	35	10		143	1,350 0 0	44 0 0	1,394 0 0	78/		5,241 12 0			3,000
Major's Creek	96	12	10		118	1,144 11 6	50 0 0	1,194 11 6	69/	78/	4,314 15 1		17	20,300
Moruya	50		90		140	385 0 0	1,330 0 0	1,715 0 0	70/	82/6	6,610 8 6	5	15	3,600
Nerrigundah	60	50	50		160	286 12 6	441 17 6	728 9 12	80/	83/	2,923 13 0	12	20	
Yalwal			50		50		1,908 0 0	1,908 0 0	75/	77/6	6,224 0 0			12,000
Nerriga	110		10		120	470 0 0		470 0 0	78/		1,423 0 0			22,500
Wagonga	15	16	74		105	102 2 19	789 1 1	891 3 20	70/	77/6	3,156 14 0			1,200
	726	159	432		1,317	7,058 3 0	8,391 4 7	15,449 7 7	68/	82/6	57,891 7 8	42	73	146,538

Summary.

Compiled from Mining Registrars' Reports.

TABLE showing approximately the number of Miners employed in Gold-mining, the quantity and value of Gold won, the area of ground worked, and the value of machinery, in the Colony of New South Wales during 1893.

District.	Alluvial Miners.		Quartz Miners.		Total Miners.	Quantity of Gold.			Price of Gold per oz.		Value of Gold won.	Auriferous ground worked.	Quartz reefs proved to be Auriferous.	Value of Machinery.
	Europeans.	Chinese.	Europeans.	Chinese.		Alluvial.	Quartz.	Total.	From	To				
Albert	157	15	17		189	793 11 14	4,713 19 12	5,512 11 2	77/6	81/3	21,934 18 6	112	17	1,907
Bathurst	642	83	986		1,711	4,195 2 0	24,148 2 16	28,313 4 16	50/-	85/-	107,137 11 3	251	34	50,000
Clarence and Richmond	815	39	135		489	737 1 11	4,245 2 8	4,982 3 19	72/6	77/10	18,436 12 0	1,150	96	
Cobar	112		236		348	715 0 0	5,661 17 0	6,376 17 0	70/-	83/4	24,634 6 1	8	19	7,135
Hunter and Macleay	31		106		136	40 7 0	1,868 10 0	1,908 17 0	69/-	80/-	7,041 5 11	5	24	2,574
Lachlan	858	23	1,045		1,928	5,328 5 16	6,527 2 8	11,853 8 0	65/-	80/-	43,225 7 6	133	117	34,797
Mudgee	895	87	635		1,617	10,468 0 0	13,473 0 0	23,941 0 0	56/-	78/-	89,940 9 7	40	1	41,300
New England	110	26	122		258	684 0 0	4,027 0 0	4,711 0 0	55/-	74/-	16,306 0 9			4,600
Peel and Uralla	602	99	1,154		1,945	8,359 17 15	37,962 7 21	46,322 5 12	67/-	77/10 1/2	168,063 5 4	9	65	104,136
Tambaroora and Turon	413	117	343		873	7,962 0 20	3,984 10 22	11,946 11 19	74/6	80/-	45,312 11 6	72	85	24,700
Tumut and Adelong	783	69	346		1,148	7,186 5 6	4,839 10 16	12,025 15 22	40/-	80/-	45,361 16 0	127	82	53,922
Southern	726	159	432		1,317	7,058 3 0	8,391 4 7	15,449 7 7	68/-	82/6	57,891 7 8	42	73	146,538
	5,684	717	5,556		11,957	53,500 14 10	119,840 7 14	173,341 2 0	40/-	86/-	642,115 12 4	1,991	608	475,465

TABLE showing approximately the number of Miners employed in mining for minerals other than Gold, Coal, or Shale, at some of the principal mines, the quantity of minerals won during the year 1893, and the value of same, and the value of Plant.

Locality.	Miners employed.	Quantities.							Value.		Value of Machinery.	
		Copper.	Tin.	Antimony.	Alumina.	Iron ore.	Silver.	Silver lead and ore.	Other.	£		s. d.
Broken Hill and Silverton	4,300	184	12			9,101 0	15,677,345	38,059	130,646	3,013,830	10 2	784,420
Rockley	18						4,680			600	0 0	1,300
Burriga	34	40								2,000	0 0	10,000
Mitchell	140							37		2,200	0 0	30,246
Cowra	66	36						1,000		3,000	0 0	200
Bendemeer	4		6 1/2							330	17 4	
Deepwater	250		350							14,000	0 0	7,000
Hillgrove	50					1,376				15,270	0 0	4,200
West						400				2,500	0 0	
Kookabookra	22		10							400	0 0	
Fairfield	19	6								251	5 0	31,000
Emmaville	910		1,035					286		52,681	9 0	20,000
Wilson's Downfall	267		176 1/2					900		9,235	10 6	7,640
Glen Innes	116		80 1/2							4,351	14 3	
Tingha	550		700							32,900	0 0	900
Germanton	5		8 1/2							420	0 0	
Captain's Flat	236											2,675
Rye Park	16						2,279	32 1/2		610	0 0	
Pambula	10						750			96	15 0	
Kempsey	113		80		866					8,162	0 0	1,300
Mount Hope	50	200								6,000	0 0	
Nyngau	16	23								957	7 4	750
Bulladelah	10				800					800	0 0	300
Wellington	20	9								378	0 0	7,640

TABLE showing approximately the Machinery employed in Gold and Tin Mining during 1893.

District and Division.	Quartz.										Alluvial.												
	Steam-engines employed in winding, crushing, &c.		Crushing machines.	Stamp-heads.	Concentrators.	Whims and pulleys.	Water-wheels.	Pumps.	Huntington mills.	Whips.	Fruse rammers.	Chilian mills.	Steam-engines employed in winding, pumping, &c.		Water-wheels.	Whims and pulleys.	Whips.	Pumps.	Puddling-machines.	Hydraulic hoses.	Sluice boxes.	Other machinery.	
	No.	Aggregate horse-power.											No.	Aggregate horse-power.									
ALBERT DISTRICT—																							
Milparinka	...	...	...	...	...	...	...	...	...	...	...	...	2	34	...	...	...	12	14	...	...	...	...
BATHURST DISTRICT—																							
Blayney	5	117	3	69	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bathurst	1	9	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Newbridge	2	28	2	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rockley	2	24	2	18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cowra	1	24	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mitchell	4	64	6	25	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	2	1	...	...
Mount McDonald	3	125	3	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Oberon	2	20	2	15	...	...	...	...	...	...	...	...	1	15	...	...	...	...	...	...	...	...	...
Trunkey	3	50	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tuena	4	44	4	36	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Orange	9	280	2	30	...	...	...	1	12	...	...	...	1	10	...	...	1	...	...	...	...	...	...
CLARENCE AND RICHMOND DISTRICT—																							
Dalmorton	5	68	6	27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grafton	1	25	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nana Creek	3	16	3	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
COBAR DISTRICT—																							
Cobar	7	69	4	25	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mount Hope	2	25	2	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burra Burra	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
HUNTER AND MACLEAY DISTRICT—																							
Kempsey	3	65	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bulladelah	1	25	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Copeland	4	66	5	48	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dungog	1	20	1	20	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
MUDGRE DISTRICT—																							
Hargraves	1	50	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peak Hill	5	98	5	61	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Windeyer	3	23	1	10	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington	7	105	2	15	...	...	...	3	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...
LACHLAN DISTRICT—																							
Temora and Barmedman	2	85	1	25	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Alectown	1	12	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Forbes	1	14	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenfell	6	32	4	30	...	...	3	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canowindra	2	8	2	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Parkes	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cargo	6	85	6	35	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
NEW ENGLAND DISTRICT—																							
Fairfield	6	88	6	48	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tenterfield	2	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Emmaville	9	87	2	20	...	...	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
PEEL AND URALLA DISTRICT—																							
Stewart's Brook	3	36	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Barraba	4	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hillgrove West	4	85	2	60	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hillgrove	10	215	4	59	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kookabookra	2	12	2	11	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Niangala	2	16	2	10	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nundle	3	55	4	28	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Walcha	1	12	...	...	...	...	...	...	...	...	...	...	2	23	...	...	...	...	...	...	...	...	...
Swamp Oak	3	40	3	23	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tingha	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TUMUT AND ADELONG DISTRICT—																							
Albury	3	24	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Adelong	12	254	2	35	...	...	2	...	...	...	...	7	118	2	3	...	...	...	...	...	...	...	...
Cooma	5	45	5	27	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Captain's Flat	3	36	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Junee	1	10	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cootamundra	1	20	1	5	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nimitybelle	1	8	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Reedy Flat	1	8	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tumbarumba	1	25	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tumbarumba	3	64	3	32	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Queanbeyan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gundagai	3	30	3	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TAMBAROOBA AND TURON DISTRICT—																							
Hill End	14	215	9	99	...	...	1	1	...	...	...	1	20	...	...	...	...	...	...	...	...	...	...
Ironbarks	5	98	5	37	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sofala	7	143	7	63	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
SOUTHERN DISTRICT—																							
Araluen	1	12	3	10	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cobargo	1	8	1	5	...	...	...	...	...	...	...	8	139	7	14	...	...	4	20	...	...	...	...
Little River	2	20	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Major's Creek	6	70	8	...	...	...	1	3	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Moruya	6	58	6	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nerrigundah	3	32	4	28	...	...	1	...	...	...	...	1	5	...	...	...	...	...	...	...	...	...	...
Pambula	3	120	3	35	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nerriga	1	8	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wagonga	2	18	6	31	...	...	3	...	...	...	...	1	80	...	...	...	...	...	...	...	...	...	...
Yalwal	3	45	6	65	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	233	3,757	182	1,425	4	4	15	22	11	3	20	1	27	509	13	5	4	34	42	10	...	...	...

Department of Mines and Agriculture,  
12th March, 1894.

HARRIE WOOD,  
Under Secretary for Mines and Agriculture.

CHIEF

## CHIEF INSPECTOR OF MINES' REPORT.

Sir,  
In submitting my annual report for the year 1893, I do myself the honor to inform you that the following is a list of accidents reported on by Wardens, Coroners, Inspectors of Mines, and Mining Registrars as having occurred during the year 1893 in the metalliferous mines of New South Wales.

TABLE A.  
Fatal and Serious Accidents, 1893.

No. of Accidents	Date.	Name of Mine or Company.	Locality.	Persons killed.	Persons seriously injured.	Occupation.	Cause of death or injury.	Fatal.		Non-fatal.								
								Fall down shaft.	Fall of earth.	Explosion.	Killed by machinery.	Run over by truck.	Miscellaneous.	Fall down shaft.	Fall of earth.	Explosion.	Collapse of timber.	Runaway cage.
1	1893.																	
1	18 Jan.	Proprietary Mine	Broken Hill	W. M'Farlane		Miner	Fall down shaft	1										
2	19 "	"	Nerrigundah	G. Treachaler		"	Fall of earth	1										
3	1 Feb.	"	Broken Hill		John Hill	"	Fall through floor				1							
4	3 "	British Mine	"		H. Hutchins	Laborer	Caught in running rope				1							
5	4 "	Tarrawingee	"		J. Farr	Quarryman	Explosion of rack a-rock				1							
6	10 "	Proprietary Mine	Nerrigundah		G. Malmyren	Miner	Fall of pole down shaft				1							
7	21 "	North Baker's Creek	Hillgrove		W. Perryman	"	Runaway bucket				1							
8	22 "	Gough's Gully	Drake	W. Ballantyne		"	Fall of earth	1										
9	2 Mar.	Ironbarks Mine	Mount Adrah	T. Barry		"	Collapse of timber		1									
10	20 "	Mount Stewart	Leadville	- Carr		"	Fall of earth	1										
11	20 "	"	"	- Stapleton		"	"	1										
12	23 "	Wentworth Proprietary	Lucknow	S. Rule		"	Fall of rock	1										
13	27 "	Proprietary	Broken Hill		J. Smith	"	"				1							
14	29 "	Pine Ridge	Trunkey		M. Casey	"	"				1							
15	1 Apr.	Wentworth Proprietary	Lucknow		T. Nicholls	"	Explosion of dynamite drilling in old hole.	1										
16	1 "	"	"	F. Dobson		"	"	1			1							
17	4 "	Proprietary	Broken Hill		H. Smith	Quarryman	Hit with stone from blast				1							
18	24 "	"	"	W. Williams		Miner	Fall of plumb-bob down shaft			1								
19	10 May	South Welshman	Sofala	J. Thomas		"	Fall of rock	1										
20	11 "	Nine-mile	Emmaville	John Ross		"	Fall of earth	1										
21	8 June	Proprietary	Broken Hill		R. Turner	Quarryman	Explosion of shot				1							
22	10 "	British	"	M. Burns		Engine-driver	Caught by shaft coupling		1									
23	14 "	Proprietary	"		D. Lewis	Laborer	Caught by running belt				1							
24	2 Aug.	Bushman's	Parker		W. Seymore	Miner	Explosion of rack-a-rock				1							
25	5 "	Block 11	Broken Hill		J. Thompson	"	Skull fractured by cage				1							
26	22 "	Proprietary	"		W. Cargenven	Ore-picker	Fall off plank				1							
27	5 Sep.	"	"	E. Humphrey		Trucker	Run over by truck			1								
28	7 Oct.	"	"		F. Bannigan	Miner	Fall of earth				1							
29	8 "	"	"		C. Burns	Quarryman	"				1							
30	9 "	King's Lead	Forbes	J. O'Hare		Miner	Fall down shaft	1										
31	23 Nov.	Hard-to-find	Mount Drysdale	J. Belcher, sen.		"	Explosion		1									
32	24 "	Eleanora	Hillgrove		A. G. Page	Trucker	Collapse of timber				1							
33	27 "	"	Sofala	R. Gransell		Miner	Fall of earth	1										
34	4 Dec.	Wentworth Proprietary	Lucknow	A. Mallin		"	Fall down shaft	1										
35	7 "	Proprietary	Broken Hill		H. Gray	"	"				1							
36	7 "	"	"		W. Bright	"	"				1							
37	7 "	"	"		F. Dalbridge	"	Runaway cage.				1							
38	7 "	"	"		A. T. Dalbridge	"	"				1							
39	7 "	"	"		J. Rodgers	"	"				1							
40	7 "	"	"		J. Bowden	"	"				1							
41	10 "	"	"		F. Henning	Laborer	Fall in crushing mill				1							
42	15 "	"	"	S. Moyle		Miner	Fall of earth	1										
43	27 "	Gracian Bend	Temora		T. Shipp	"	"				1							
								3	9	3	1	1	2	5	4	1	7	7
								19		24								
								43										

ABSTRACT.

Killed:—9 Auriferous, quartz.  
2 " " alluvial.  
7 Silver  
1 Tin.

Injured: 4 Gold, quartz.  
2 " " alluvial.  
18 silver.

19

24

Total..... 43

TABLE B.

NUMBER of Men employed in the Metalliferous Mines of New South Wales, and value of Machinery, at 31st December, 1893, and percentage of persons killed or injured:—

Mining District.	Alluvial Gold.		Quartz Gold.	Silver.	Copper.	Tin.		Other.	Total.	Value of Machinery.	
	Euro-peans.	Chinese.				Euro-pean.	Chinese.			£	s. d.
Albert .....	157	15	17	4,300	...	...	...	452	4,941	786,417	0 0
Bathurst .....	642	83	986	188	56	...	...	24	1,979	51,826	0 0
Clarence and Richmond .....	315	39	135	...	...	...	...	...	489	7,875	0 0
Cobar .....	112	...	236	...	74	...	...	...	422	3,574	0 0
Hunter and Macleay .....	31	...	105	...	...	...	...	146	282	34,797	0 0
Lachlan .....	858	23	1,045	...	...	...	...	2	1,928	41,390	0 0
Mudgee .....	895	87	635	...	20	...	...	...	1,637	51,347	0 0
New England .....	110	26	122	122	3	520	557	4	1,464	104,136	0 0
Peel and Uralla .....	692	99	1,154	...	...	494	448	75	2,962	24,700	0 0
Tambaroora and Turon .....	413	117	343	...	...	...	...	...	873	56,607	0 0
Tumut and Adelong .....	733	69	346	81	130	5	...	33	1,397	191,538	0 0
Southern .....	726	159	432	18	...	...	...	...	1,335		
<b>Total .....</b>	<b>5,684</b>	<b>717</b>	<b>5,556</b>	<b>4,709</b>	<b>283</b>	<b>1,019</b>	<b>1,005</b>	<b>730</b>	<b>19,709</b>	<b>1,354,207</b>	<b>0 0</b>
Persons killed per 1,000 persons employed.		·31	1·62	1·49	...	·05	...	...	·96	.....	.....
Persons injured per 1,000 persons employed.		·31	·72	·38	...	.....	...	...	1·20	.....	.....

TABLE C.

## MINOR Accident List, 1893.

Date.	Name of Company.	Name of injured person.	Nature of injury.	Cause.
1893.				
21 Jan. ...	Proprietary Mine, Broken Hill .....	A. Thornton .....	Dislocated shoulder ...	Fall of rock.
22 Feb. ...	British Mine .....	E. Smith .....	Broken rib .....	Fall down ladder.
24 " ...	Proprietary Mine .....	E. Snell .....	Bruises .....	Run over by truck.
4 April ...	" .....	T. Gordon .....	" .....	" .....
3 May ...	" .....	W. Penno .....	Injury to lung .....	Pierced by candle spider.
26 " ...	Bushmans, Parkes .....	W. Mullens .....	Dislocated shoulder ...	Fall of rock.
13 June ...	Proprietary Mine, Broken Hill .....	J. Saville .....	" .....	" .....
23 " ...	" .....	T. Humpheries .....	Bruises .....	Explosion.
23 " ...	" .....	T. O'Rourke .....	" .....	" .....
19 July ...	Nelbothery, Bombala .....	— Hawkins .....	" .....	" .....
19 " ...	" .....	— Rowe .....	" .....	" .....
18 Sept. ...	Proprietary Mine, Broken Hill .....	H. Holland .....	Injuries to head .....	Fall from stage.
2 Oct. ...	Hidden Treasure, Pambula .....	T. Crane .....	Lacerated hand .....	Explosion.
4 Dec. ...	Australian Broken Hill Consols, Broken Hill.	F. Wulf .....	Bruises to back .....	" .....

Table A gives the number of accidents, date, name of mine or company, locality, persons killed or seriously injured, occupation, and cause of death or injury.

Table B gives, in addition to the percentage of persons killed or injured, the number of persons employed, and the value of machinery in, on, or in connection with, the metalliferous mines of New South Wales.

Out of the total of nineteen persons killed during the year, nine lost their lives in auriferous quartz-mining, two in alluvial gold-mining, seven in silver-mining, and one in tin-mining, being an increase of accidents as compared with 1892 of three in auriferous quartz-mining, and one in silver-mining, but a decrease of two in alluvial gold-mining, and one in cobalt-mining, making a total increase of one of the fatal accidents during the year.

Table C gives a list of the minor accidents, of which there were fourteen, or ten less than during the year 1892. Some of these accidents were so slight that the persons injured were able to keep to their work, but as they were reported on by the local officers, they were thought of sufficient importance to be noted here.

The total number of persons employed on the metalliferous mines, or on the machinery in connection with said mines, during the year 1893 was 19,709, or 2,317 persons more than were employed on said mines in 1892. The value of machinery in connection with metalliferous mining has increased during the year to the extent of £114,183, which may be considered very satisfactory in the face of the ordeal of financial depression New South Wales passed during the year 1893. The reports of Inspectors Milne, Hebbard and Godfrey, are also attached herewith. These Inspectors have carried on their work of inspection energetically and satisfactorily, ever ready and willing to assist me when their services were required. As will be seen by their reports, Messrs. Milne and Godfrey have travelled all over the various mining districts with the exception of Broken Hill, in which mining district Inspector Hebbard is at present stationed.

The following districts were visited by me during the year, in the capacities of Chief Inspector of Mines or Mining Warden, on various official duties:—Adelong, Gundagai, Gunning, Goulburn, Temora, Barmedman, Yalgogrin, Grenfell, Forbes, Parkes, Burra Burra, Mount Hope, Mount Allen, Billigoe, Bee Mountain, Cobar, Peak Hill, Alectown, Wellington, Lucknow, Bathurst, Orange, Dubbo, Nymagee, Armidale, Uralla, Sherwood, Hillgrove, Glen Innes, Glen Elgin, Deepwater (Nine Mile).

The clerical work of my branch has considerably increased during the year, owing to the assistance afforded to certain of the unemployed to proceed to the gold-fields for the purpose of fossicking out a living. No less than 2,630 persons were so assisted during the year through my recommendation as a member of the Fossicking Board and an officer of the Mines Department. This, no doubt, greatly accounts for the increase of 2,317 persons employed in the metalliferous mines of New South Wales during the year 1893 as compared with 1892.

The

The following is the important minute written by the Under Secretary for the purpose of providing an outlet to certain of the unemployed on the gold-fields of New South Wales, the action of which has proved very beneficial to many deserving persons.

The minute referred to of Mr. H. Wood, the Under Secretary, reads as follows:—

*“Providing an outlet for the Unemployed.*—In view of the distress existing amongst the unemployed in the centres of population, it is a question whether an outlet might not be found on some of our gold-fields. I raise this question with considerable hesitation, because at best it cannot be regarded as other than a *pisaller*, but I am inclined to think that on many of our deserted or partially deserted gold-fields a few shillings per week can be earned without special skill and with moderate industry, and there is always the off-chance of finding a stray patch or nugget. Then, as to the cost of living. A miner's right (cost, 10s. for the year, or 5s. from July to December) entitles the holder to occupy one-quarter acre of land, and to take from any Crown lands any timber and bark that he may require for building a hut and fencing in his land. Upon his quarter-acre he can grow as much vegetables as will supply a moderate family. He can, free of cost, keep a few goats to supply milk and food, and his earnings, small though they may be, would probably suffice to provide the other absolute necessaries of life. In this way many poor families might be saved from starvation or pauperism until more prosperous times may enable them to find some more congenial and profitable outlet for their energies. If approved, the matter might be referred to the officer in charge of the Labour Bureau, and if he thinks any number of the unemployed would be willing to avail themselves of this opening, I would endeavour to ascertain through the officers of this Department which fields offer the best prospects.”

The above minute of the Under Secretary received the Minister's approval, the outcome of which was that a Board, consisting of H. Wood, Esq., J.P. (Under Secretary for Mines and Agriculture), Mr. Dowel, M.P., Mr. Creer (Superintendent of the Labour Bureau) and myself (Chief Inspector of Mines), were appointed.

The Board decided, amongst other important matters, that all applicants for assistance to proceed to our gold-fields should, in the first instance, make application to me, and if found eligible a letter should be given them to Mr. Creer, for the issue of free railway passes, a miner's right, and in some cases, where really needed, rations, in the shape of flour, tea, and sugar, sufficient for about a fortnight. As stated above, no less than 2,630 persons were assisted to proceed to the gold-fields, which, in the majority of cases, has given beneficial results. By these means, not only was the labour market relieved in and about the centres of populations, but many were able to make happy, comfortable homes who otherwise would have been a drag on the labour market.

While the clerical work in connection with the Prospecting Vote has decreased during the year, owing to the fact that only £20,000, instead of £40,000 had been voted, that of the Chief Inspector of Mines has greatly increased, owing to the action taken in assisting some of the unemployed to proceed to our gold-fields for fossicking purposes.

	Letters written in 1893.	Papers registered in 1893.
Prospecting Vote ... ..	2,649	5,282
Chief Inspector of Mines ... ..	1,875	3,002
Total ... ..	4,524	8,284
Diamond-drills .. ..	516	1,318

The total number of letters written in my branch during the year was 5,043, and papers registered 7,602. Mr. M'Culloch, with his energetic habits and ability, has, as usual, overcome this large amount of clerical work with apparent ease, which is certainly very highly creditable to him, more especially when it is considered that the whole of the Annual Report is compiled by him. Mr. Stone has ably assisted Mr. M'Culloch throughout the year.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

REPORT on the Sherwood Mine by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines.

12 January, 1893.

Sir,

I have the honor to inform you that I have inspected the Sherwood mine, which is situated about 26 miles south-east of Armidale, 22 miles from Uralla, and 1 mile north-east of Bora Creek. The present workings consist of an open cutting, about 20 feet in depth, and 10 feet in width, on a large bed of quartzite, through which very small veins of auriferous quartz occur, with which the gold is associated. These quartz-veins are too small, and cannot be “culled” from the quartzite, which in itself contains no gold, but which has to be crushed, by which the yield of gold is reduced very considerably. Some of these quartzite beds may be of very great width and extent, and it is of the greatest importance to this district that they should be tested to a greater depth than hitherto obtained as they occur through miles of country, and if the Sherwood mine should prove dividend-paying other quartzite deposits would be worked, and a large number of persons find profitable employment. The quartzite beds of the Sherwood mine are similar to those so profitably worked in the Yalwal Gold-fields, Nowra District, and, like Yalwal, richer shoots of gold may probably be discovered at the Sherwood mine after the quartzite beds have been opened up to a greater length and depth. The Company have a 10-stamp battery crushing night and day, and out of 1,054 tons obtained 259oz. 2dwt. of gold. But as quantity, rather than quality, must be looked forward to, more crushing-power will be required to ensure a larger production of gold, with lesser expenses at per ton than hitherto obtained.

I have, &c.,

W. H. J. SLEE, F.G.S.,

Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

FURTHER Report by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines on the Burra-Burra Gold and Tin Rushes.

Parkes, 30 May, 1893.

Sir,

In continuation of my previous reports, re the Burra-Burra gold and tin rushes, I have the honor to inform you that since my last report a party of miners, named Pepper and party, washed a load of dirt from their claim at the gold rush about half a mile distant from the prospecting claim, which yielded

6 dwt. of gold to the one-horse load, with a thickness of wash of about 9 inches. This find strengthens the opinion expressed by me that the gold will occur in patches. The yield obtained by Pepper and party, although small, will pay wages to industrious experienced miners. Nothing fresh has, however, been discovered at the tin-rush; but as the mineral is found in patches, and shepherding adjoining claims is of no avail, I think fresh discoveries may be looked forward to at any moment. Parties are now scattered in all directions over the Burra Burra, Murrumbogie, Melrose Plains, Carlyle, and other stations, prospecting for gold and other minerals, and as this part of the country has already been reported on by me in 1884, nine years ago, has a decided auriferous appearance, and, in addition, stanniferous and argentiferous deposits have been discovered over a large tract of country in the Burra Burra, Melrose Plains, Murrumbogie, Carlyle, and Yellow Mountain Pastoral Holdings, on to Dandaloo, the newly-formed township of Burra Burra is likely to become the permanent centre of this large area. The majority of the persons congregated at these rushes belong to the respectable industrious class; there are, however, the usual followers after the miner and business-men—the drones of our gold-fields—and some very rough characters too. Persons without money, tools, or provisions should not come to the rush, as they would necessarily have to undergo great hardship and privation, as there are already too many of these unfortunates on the rush, and the strain on the stores of the settlers is becoming too great, and cannot be expected to be kept up much longer, as on some stations some twenty to thirty persons have daily received food free of cost. Grass and water are at present in abundance in this part of the country. I leave to-morrow for Orange, and hope to be in Sydney, on Saturday, the 3rd proximo.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

COPY of a Report by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, on a Mine on the Bletchington Estate, Orange.

Sir,

Sydney, 5 June, 1893.

*Re* your instructions to report on a mine on the Bletchington Estate, near Orange, when on my return from Burra Burra to Sydney, I have the honor to inform you that I inspected said mine on the 1st instant, and found that a new shaft had been sunk to a depth of 95 feet, and a drive put in a westerly direction for 20 feet towards a shaft said to have been sunk several years ago, and out of which a few tons of quartz were taken and crushed at Lucknow, yielding about 1 oz. of gold per ton. In the drive referred to can be seen all the characteristics of the Lucknow formation—that is, the diorite and serpentine—also the quartz veins occurring in the diorite, and terminating at the points of the serpentine rock. I was informed that the quartz crushed was taken from a brown vein (decomposed pyrites), which has not, however, yet been met with in the new workings. A prospect was washed in my presence from some quartz veins lying on top of the old shaft, which yielded a very fair prospect of fine free gold. There is no doubt in my mind that at the Bletchington Estate a similar formation to that of the Lucknow deposits exists, the latter of which were so successfully developed by that energetic and able mining manager Mr. H. W. Newman, M.P. This also verifies the opinion frequently expressed to me by the late Mr. C. S. Wilkinson, Government Geologist, when on our joint official travels through the Orange District, that the joint or crack of the Lucknow formation could be traced for miles through the Hon. A. T. Kerr's; Lane's; Dalton's; and other properties, and that probably such auriferous deposits would be met with along the formation in a north-westerly direction. Therefore, although nothing payable has so far been discovered in Mr. Dalton's property, known as the Bletchington Estate, systematic prospecting may bring to light payable auriferous deposits, if even on a smaller scale than those of Lucknow, still, of sufficient importance to induce capitalists to invest their money for the development of said tract of country, or property-holders to prospect their land.

I have, &c.,

W. H. J. SLEE.

The Under Secretary for Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, on the New Rush at Yalgogrin, situated 55 miles west from Barmedman.

Sir,

Barmedman, 26 August, 1893.

Having returned to Barmedman from Yalgogrin, Nariah, and Wallandra, of which I advised you by wire this morning, I do myself the honor to furnish you with further particulars concerning the prospects of the locality as a gold-field, and other matters in connection therewith. I arrived at Yalgogrin on Monday morning, the 21st instant, which is situated about 55 miles from Barmedman in a north-westerly direction. Having been supplied by Mr. Love, Warden's Clerk at Barmedman, with a list of applications for permits to dig and search for gold on Messrs. Payne's and Waldron's conditional purchases and leases, I at once commenced in my capacity as Warden to mark off, per order of date of application, the several areas applied for. No sooner had I started to measure than disputes arose, and I found that it would require more time and consideration than I had anticipated, as several parties were claiming the same areas, irrespective of date of application and the fact that pegs had been put in in all directions, regardless of regularity, size of area applied for, or the interest and feelings of adjoining applicants. Some had specified no site in their application; hence they were ready to claim a site at or near where gold had been discovered by someone else. There were several instances where not only no site was specified, but only one name appeared as applicant, still the latter wanted to claim eight men's ground, or 480 x 400 feet. If such a system were encouraged or allowed, then eight men each applying for eight men's ground could hold 3,840 feet along the line of reef by 400 feet in width. These two systems, if allowed, would be detrimental to the best interests and development of any mining-field. To remove the muddle into which matters had drifted, and bring them to something like a satisfactory conclusion for all parties concerned, I saw no alternative but to measure the areas already held under permits, as well as those already under application, amounting in all to about 120. This took me several days, from early morn till late at night, as disputes for the same pegs, boundaries, or areas were numerous, and cropped up very frequently during the day. I have now good reason to believe that, in defining the boundaries of all the areas, things will work more smoothly at Yalgogrin in the future than they have done in the past. The localities above named, for a distance of several miles, not only in the conditional purchases and conditional leases above referred to, but also the Crown lands, have a decided auriferous appearance, and, in some parts,

stanniferous

stanniferous and argentiferous deposits are likely to be met with; and if the same energy were displayed in prospecting for gold in the Crown lands at Yalgogrin, Nariah, and Wallandra, as is displayed on this selection, the results would probably be equally as good, if not better. So far, although no payable prospects have been obtained from the alluvial, and, in fact, not much prospecting has been done for alluvial gold, nevertheless the indications are very favourable for the existence of auriferous leads. The great scarcity of water, notwithstanding the favourable season, will always prove a great obstacle against thoroughly prospecting that part of the country, there being no natural waterholes or springs to be found. Therefore, the conservation of water must be accomplished by artificial means, such as the construction of dams or tanks. Were it not for the great kindness and forbearance of the selectors in allowing permit-holders the use of water and other privileges, the latter could not have prospected the country to the extent they have already done. The report that from 7 to 8 dwt. of gold to the dish had been obtained is not correct, but about four different parties are obtaining gold in irregular masses of quartz in Payne's selection, and about the same number in Waldron's. So far, the best-defined vein, which has been sunk upon to about 30 feet from the surface, is M'Mahon's Reef, on Payne's selection. From this reef three small crushings, in the aggregate 26 tons, were taken, which yielded a total of 55 oz. 16 dwt. of gold. The quartz vein is from 6 to 16 inches in thickness, occurs in the granite, and, characteristic of that formation, is met with in short blocks. Payne, Thompson, Gibson and party, and one or two others, are also obtaining gold in quartz. In Waldron's selection, O'Brien and party, Campbell, Organ and party, and Shelley and party, are obtaining very fair gold in irregular masses of quartz and quartzite, but as (with the exception of M'Mahon's) only surface scratchings have been made, it is premature to pass a decided opinion. Present appearances are, however, against the belief that they are of a permanent nature. In some of the auriferous quartz, chloride of silver was detected by me. Owing to the fact that the resumption and throwing open to the public for mining purposes, of the 1,280 acres conditional purchases and 2,560 acres conditional leases, at present owned by Messrs. Payne and Waldron, would cost at least £7,000 or £8,000 of public money, as the whole area is surrounded by rabbit-proof fencing of first-class character, it appears to me that the land has not been sufficiently prospected, and what gold discoveries have been made are not of sufficient importance to warrant resumption at the outlay required.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, on the Burra Burra Gold and Tin Field.

Sir,

Parke, 20 October, 1893.

I do myself the honor to inform you that I returned here from a visit of inspection to the Burra Burra Gold-field. The male population of Burra Burra, in the parish of Murga, may now be put down as about 150, in addition to which there are a few families with probably a sufficient number of children to form the nucleus of a Provisional Public School. I was informed by the miners themselves that a large number of men had lately left the field owing to the scarcity of water for gold-mining purposes, and on account of it being the shearing season, many have obtained employment on stations in the immediate neighbourhood. I may, perhaps, incidentally mention that this season's wool-clip in these parts of the western back country has lightened the hearts of the settlers, having exceeded their most favourable anticipations. The crops, too, are looking wonderfully well, in consequence of which the settlers (squatters and selectors) are jubilant, and it is thought in these parts at least the wave of depression has passed, and with the lesson taught, the future is being looked forward to with the greatest of hope and confidence, which, indirectly, must also have a beneficial effect on our mining community, they being great consumers of the commodities produced by squatters and selectors.

The prospectors of the Murga or Fifield part of the Burra Burra rush are still working their claim with payable results, and though by personal inquiries made from the miners at work, I could not ascertain that any extraordinary finds had been made, nevertheless several expressed themselves satisfied with their earnings, looking hopefully for something better as soon as a more copious water supply could be obtained. Taking the gold-field as a whole, I am of opinion that its permanency is assured, and that a small population of a few hundreds will make a living for years to come, though, of course, the number of the population will always depend on the rainfall in these localities. The rush has now a Post Receiving Office, name Fifield, after one of the prospectors. A hotel is in course of erection, and there are the usual baker's, butcher's, and blacksmith's shops and stores to form the foundation of a mining township. As permanent buildings are now being erected, the business people thought it was time to have a street laid out, and interviewed me to that effect, with which request I complied, and in my capacity as Warden marked out a street, leaving it an open question whether the township be named after the parish of Murga or after one of the prospectors, Fifield, the name under which the Receiving Office is now known. The following is a list of washings which have taken place on the field, for which information I am indebted to Mr. H. Biltuft, one of the prospectors:—

								oz.	dwt.	gr.	
Prospector's claim	209	loads	yielded	...	...	...	...	158	6	8	
Newton and party	52	"	"	...	...	...	...	8	0	0	
Cole and party	64	"	"	...	...	...	...	14	0	0	
Machattie and party	40	"	"	...	...	...	...	10	0	0	
Fleming and party	55	"	"	...	...	...	...	17	15	0	
Ferguson and party	14	"	"	...	...	...	...	2	2	0	
Stamp and party	14	"	"	...	...	...	...	0	7	0	
Kennedy and party	43	"	"	...	...	...	...	6	0	0	
Harry the Puddler	52	"	"	...	...	...	...	12	0	0	
Phillip and party	17	"	"	...	...	...	...	(about)	1	10	0
Armstrong and party	51	"	"	...	...	...	...	11	10	0	
Hall and party	25	"	"	...	...	...	...	9	10	0	
Wharton and party	13	"	"	...	...	...	...	2	12	0	
Houghton and party	57	"	"	...	...	...	...	13	18	2	
And sundry others	...	...	...	...	...	...	...	(about)	10	0	0

From the above it will be seen that nothing rich has so far been obtained, the gold seemingly occurring in small, irregular patches; thus, in the prospector's claim, as high as 9 oz. of gold to the prospecting-dish

dish has been obtained; but as the ground is shallow, and sinking and driving easy, a living can be made by a few hundreds as soon as the dams and water-holes are once more filled by rain, which at present is sadly needed. Some excitement was caused through the washing up of 18 loads by Smith, Warner, and party, from W. Simmons' conditional lease No. 10, as it was thought that the ground was payable, and that the conditional lease might be resumed for mining purposes. I waited on the field till the washing was completed, which yielded 2 oz. 6 dwt. of gold and about 2 oz. platinum to the 18 loads, or about 2½ dwt. of gold per load, which, considering the shallow, easy sinking and driving, would give small wages if water were plentiful and near at hand, but the yield is not of sufficient importance to warrant the resumption of the conditional lease. The tin-field has been quite deserted by the Europeans, and a man named Litchfield is now negotiating with some Chinese to work these tin deposits. I am, however, still of opinion that gold discoveries are likely to be made in the Burra Burra, Melrose, Murrumbogie, Carlyle, and other localities similar to those workings at present carried on near the boundary of Burra Burra and Murrumbogie Runs.

I have, &c.,

W. H. J. SLEE,  
Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture, Sydney.

REPORT by Mr. W. H. J. Slee, Chief Inspector of Mines, on Gold-mining in the Parkes District.

Sir,

Parkes, 23 October, 1893.

I do myself the honor to inform you that the quartz and alluvial industry in this district is on the eve of revival, and that in the near future the Parkes district may again come to the front as a great gold-producing locality. Several of the quartz reefs worked on the tribute system have of late given excellent returns, such as the Bushman, Dayspring, and others. Extensive prospecting operations are also carried on in the Phoenix, Gladstone, and other mines. For alluvial, great hopes are entertained of Lynch Brothers prospecting works, situated about 4 miles southerly of Parkes. This party have bottomed a shaft at the depth of 93 feet on about 18 inches of wash containing gold. They intend to wash from 6 to 8 loads of dirt by the end of this week, and have great hopes of favourable results. The party have been receiving aid from the Prospecting Vote. I examined the auriferous wash below ground, which has a very promising appearance. Although so far no payable gold has been reported, the ground has been marked off for a considerable distance in all directions from the Prospector's shaft, and it is likely that one or more shafts will be bottomed by the end of this week. Ryan and party have reported gold on the Scrubby Plains, about half-way between Parkes and Forbes, and about 1½ miles from Judd's Hotel. Their prospecting-shaft is 138 feet deep, with about 15 inches of wash, yielding about 7 dwt. per load. The sinking is comparatively easy, and quite dry. The ground has been marked off for a considerable distance, and there are favourable indications of the existence of an alluvial lead. Egan, Lamb, and party are also obtaining gold at a depth of 130 feet. At Strickland, about fifteen parties are earning, from "tucker" up to small wages, but so far the favourable anticipations formed at the outset of the rush have not been realised. These new discoveries, although at present of no great extent, may yet profitably employ a large number of persons, and could not take place at a more opportune time, as, owing to the near completion of the Molong to Parkes and Forbes railway, a large number of persons are at the present time idle throughout the district.

I have, &c.,

W. H. J. SLEE,  
Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, on the mines situated in the Mount Hope and Mount Allen Districts.

Sir,

Mount Hope, 7 December, 1893.

I do myself the honor to inform you that I completed my inspection of the Mount Hope and Mount Allen mines, and will return to Cobar for the purpose of inspecting the mines in that district. At Mount Hope, the tributors of the Mount Hope Copper-mine, are just able to keep one furnace going, and are making and sending away from 17 to 18 tons of copper per month. The total number of men at present employed, including wood-carters, averages about fifty. The Great Central Mine, about 5 miles from Mount Hope, has been taken on tribute, and mining operations are to be started again at an early date. At Mount Allen, about 10 miles north-west from Mount Hope, a township has been laid out, within about ½ a mile of the Mount Allen mine, and several small buildings for residence and business purposes are being erected, the total population numbering about 200. This number would be greatly increased if the Mount Allen Gold-mining Company had sufficient water in their tank to keep their 20-stamp battery continually going. This Company, under the able management of Mr. John Hutchings, has just completed a crushing of 274 tons, yielding 343 oz. of smelted gold, making a total of 1,591 tons crushed out of the mine for a total yield, in round numbers, of 1,826 oz. of smelted gold, which is very satisfactory, but unfortunately the supply of water has again run out, and crushing operations are once more at a standstill. These stoppages, from want of water, are greatly retarding operations for the development of the mine. The greatest depth so far obtained is 70 feet, and it would be to the interest of the Company to continue the sinking of their main shaft as quickly and to as great a depth as circumstances will allow.

The workings or cuttings out of which the crushings have been taken are about 55 feet in length by several feet in width, but whether the lode occurs in lenticular blocks or the saddle formation similar to the quartz reefs at Bendigo, or the Proprietary Mine, Broken Hill (to the latter of which public attention was first drawn by Mr. Pittman, Government Geologist), cannot be determined until further development has taken place, or "horse" or mass of rock occurring at present in the lode, which makes the latter appear as a saddle formation. Personally I favour the theory that the Mount Allen auriferous and iron ore deposits originate through the agency of mineral springs. Captain Cause; Penhale, and Brentnall have, in conjunction with others, taken up a mine on the Dromedary Mountain, about 3 miles from Mount Allen, from which several tons of bulk samples were taken to a crushing-machine at Parkes, yielding from 7 to 8 dwt. of gold per ton, from a lode several feet in width. A further number of claims have been taken up on these auriferous iron deposits in the district, with a view to thorough prospecting. The great drawback to the mining industry in this part of New South Wales is the scarcity of water, although

although sufficient rain has fallen during the last two years to cause abundance of grass, which is now unfortunately destroyed by extensive bush fires all around this district, the rainfall has been so light and at such long intervals that the storage of water in the tanks and reservoirs is comparatively small; in fact, in some parts of the district almost nil.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary, Department of Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines on the new gold and tin discoveries at Burra-Burra.

Sir,

I do myself the honor to more fully report to you on the new gold and tin discoveries at Burra-Burra Rush than I was able to do by the telegrams forwarded by me. Burra-Burra is situated about 65 miles from Parkes, about the same distance from Peak Hill and Alectown, and about 55 miles from Dandaloo. It is situated on the Murrumbogie, and Burra-Burra Mining Reserve in the parish of Murga, county of Cunningham. On my arrival I found about 800 persons on the ground, and large numbers arriving hourly, I at once proceeded to the prospecting claim of Field, Rand, and party, who had reported payable gold to the Warden's Clerk at Alectown, to whom they gave the information that they had washed 2½ loads of wash-dirt, which yielded 1 oz 7½ dwt. of gold. As a large crowd of persons collected round the shaft, I selected two miners who had no interest in the prospecting or surrounding claims, and proceeded with them down the shaft, and knocked out two prospects which were washed in my presence, and yielded at the rate of about 6 dwt. of gold per load. The prospectors, in addition to the two loads (one-horse tip-dray load), had knocked out a load before my arrival, which was washed in my presence, and yielded 1 oz. 2½ dwt. per load, making a total of about 2½ oz. of gold out of 3½ loads of wash. The depth of sinking is 31 feet; thickness of wash, 12 inches; and width, 15 feet. There are strong indications that whatever gold will be obtained is likely to be very patchy without the probability of anything like a continuous load. After I had allowed about a dozen miners to go below on behalf of the miners on the field, I declared the prospectors' claim payable, and advised one and all to go to work, and not to idle away their time waiting for others to find the gold, as in patchy ground it would be useless to shepherd, and that in my capacity of Warden, I should strictly enforce the Mining Board Regulations. The consequence was that large numbers started to sink, but although fully 100 holes have now bottomed, none, so far, obtained any payable gold except the Prospectors. I settled a few mining disputes on the ground, and then posted up notices around the dam formerly belonging to the Nymagee-Cobar Gold-mining Company, reserving same for domestic purposes, and cleared away all parties camped above the dam, to prevent the water becoming polluted and unfit for human use. Numbers of persons are hourly arriving, but I feel confident that the rush will not be able to support a large number of persons. The Prospecting claim is only about 2½ miles from Cavanagh's gold workings, and the same distance from the prospecting operations, for which Connolly and party obtained aid out of the Prospecting Vote.

I then proceeded to the tin discoveries in the parish of Burra-Burra, about 10 miles westerly from the gold rush, and found about 200 persons on the ground. About six parties are on payable tin, and the sinking is from 6 feet to 20 feet in depth. I will report more fully on this discovery after I have completed my trip of inspection to Bullock Creek, and Lightning Creek the latter locality being about 40 miles from Dandaloo.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary for Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, on the Bee Mountains, Billigoe, and Cobar Districts.

Sir,

Cobar, 13 December, 1893.

I do myself the honor to inform you that I have completed my inspection of the Bee Mountains, Billigoe, and Cobar districts, and will also inspect Girilambone before returning to Sydney.

At the Bee Mountains, prospecting operations are still carried on by Thomas O'Brien and party, but so far nothing of a payable character has been discovered.

Several of the gold mines within 3 miles of Cobar, on the Fort Bourke and Occidental lines, have of late yielded highly payable results. Commencing on the southern part of the range is the Occidental Mine, under the able management of Mr. G. Fawl. This company have crushed from a large mass of country rock over 25 feet in width, over 1,746 loads since September last, yielding 325 oz. 8 dwt. of smelted gold—a payable yield, considering the large quantity of stuff taken for crushing purposes. At present, twenty-five men and three boys are employed at the mine. With a large water supply and increased crushing plant, even 4 dwt. per ton ought to give payable returns. North of the Occidental is the Albion Mine (Crow and party). This party crushed lately 180 tons, yielding 106 oz. 4 dwt. of smelted gold, the last 38 tons yielding 48 oz. of smelted gold. The crushing stuff is taken for about 4 feet in width, and the deepest level so far obtained is 40 feet. A large number of tons of stuff is now at grass ready for crushing before the end of this year.

Next, and northerly of this mine, are two leases idle, not complying with the labour conditions.

Adjoining this is the Wood Duck Mine (A. Mallott, Hunt, and party). This party has lately crushed 107 tons, yielding 88 oz. 11 dwt. of smelted gold. The width of the lode taken for crushing purposes is 4 feet, and the deepest level 34 feet. About 30 tons more are likely to be crushed before the end of this year.

North of the Wood Duck Mine is a 5-acre lease; only one man at work.

Next comes the No. 3 Chesney—Hunt, Beard, and others—a tribute party who have lately crushed from the 186-ft. level 328 tons, yielding 222 oz. 9 dwt. of smelted gold. The thickness of the lode taken averages from 3 to 5 feet in width, which gives highly remunerative returns.

The Reform North Chesney (Gellard and party) are still prospecting, so far without any payable results, although there is a great probability that payable shoots of gold will be discovered in the ground.

Cooper and party, still further northerly, have for some considerable time carried on prospecting operations, which so far have not proved successful.

By the above, will be seen that payable auriferous deposits in large quantities exist in the whole of the above-mentioned tract of country, that the gold mining industry is now the principal mining done in this district, and that by indications the auriferous deposits may perhaps be worked profitably, to the depth of 200 feet or water-level, after which depth the sulphides are almost certain to make their appearance, and, in the near future, the output of these mines will be changed from gold to copper. It is only a matter of time, and probably a short time, when Cobar will once more rank as the premier copper-producing district of Australia.

The market value of copper is now on the rise, and should it continue to do so, then the Great Cobar Copper-mine is sure to make a start again. As it is, I am still of opinion that the new find on the 60-fathom level, near Besker's shaft, would, even in the present state of the market value of copper, prove payable if opened out on higher levels. Unlike the old lode, the dreggy part is slate, instead of iron, and could, therefore, be dressed up to a higher percentage by jiggers and otherwise than the copper ore of the old lode, which was largely associated with iron.

The Billigoe field, which is distant about 25 miles from Cobar, has lately received a great impetus by the striking of very rich auriferous deposits in the Drysdale Mine. This is the result of aid out of this year's Prospecting Vote.

The vein in which the gold is obtained varies from a mere thread to, in one place, 12 inches in thickness, and has been opened for fully 100 feet in length, and although the main shaft has been sunk to 80 feet in depth, the present workings are carried on at the 40-ft. level. To give an idea of the richness of the vein, I may state that, through the courtesy of Mr MacGregor, the Company's secretary, a return, in round numbers, of the crushing and yield are appended herewith. It appears that some sixteen samples were crushed, some at Chesney local battery, at the Clyde Works, Sydney, and Wallaroo, South Australia; in all 125 tons, yielding 1,297 oz 18 dwt. of smelted gold. In addition, 40 tons, known as seconds, are now *en route* to the Clyde Works, Sydney, which are expected to yield 1 oz. per ton; and 33 tons *en route* from Wallaroo, estimated to yield about 10 oz. per ton. In addition to the above, payment for silver at the rate of about 5 oz. per ton treated has been made.

A party at the Old Billigoe, about 2½ miles north of the Drysdale Mine, are also obtaining payable gold. This mine was aided out of the last years' Prospecting Vote.

So far, no other mines have made any payable discoveries. The whole of the population at both places is about eighty. Provisions are plentiful on the field, but water is very scarce.

I have, &c.,

W. H. J. SLEE,

Chief Inspector of Mines.

The Under Secretary for Mines.

#### INSPECTOR MILNE'S ANNUAL REPORT.

Sir,

Sydney, 17 January, 1894.

I have the honor to submit my annual report of the inspection of mines in the following districts for 1893.

Naua Creek, Grafton, Cangi, Mann River, Glen Elgin, Dalmorton, Newton Boyd, Tenterfield, Drake, Rivertree, Deepwater, Ennerville, Torrington, Glen Innes, Bear Hill, Inverell, Tingha, Kookabookra, Bingera, Tamworth, Swamp Oak, Niangala, Armidale, Hillgrove, and Copeland in the north

Wagonga, Bodalla, Nerrigundah, Araluen, Braidwood, Snowball, Nerriga, Nelligen, Brimbramalla, Tarago, Bungonia, Nadgingomar, Goulburn, Crookwell, and Coolamin in the south.

Kerris Creek, Ophir, Lewis' Ponds, Orange, Forest Reefs, Burnt Yards, Carcoar, Woodstock, Mandurama, Gally Swamp, and Mount McDonald in the west.

In the different districts inspected a great improvement is noticeable both on the surface and underground workings.

This is due no doubt to the mines being more frequently inspected, and the managers generally complying with the regulations for the inspection of mines other than coal and shale mines.

In the whole of the Northern District two fatal and two serious accidents have occurred during the year.

Both fatal accidents were from falls of earth in shallow workings of prospecting claims, the men themselves being shareholders.

The constant and heavy rains during the early part of the year were to a great extent the cause of these accidents, having thoroughly saturated the ground, rendering shallow workings very treacherous, and extra precautions required in securing the ground.

In conjunction with the above, as a member of the Prospecting Board, I have inspected and reported on 187 applications for aid out of the Prospecting Vote.

I have, &c.,

DAVID MILNE,

Inspector of Mines.

The Chief Inspector of Mines, Sydney.

#### INSPECTOR HEBBARD'S ANNUAL REPORT.

Sir,

Broken Hill, 31 January, 1894.

I have the honor to present my annual report as follows:—

During the year, in addition to constantly visiting and inspecting the mines, machinery and boilers, in this immediate neighbourhood, I have visited the following out-lying districts:—

Thackaringa, Uumberumberka, Purnamoota, Day Dream and Apollyon Valley, Tarrawingee and Euriowie, Nuntherungie, White Cliffs, Mount Browne, and Tibooburra.

Work in this district is now almost entirely confined to the Broken Hill lode, and on that, all work is embraced in the operations of the following companies:—

Broken Hill North.

Junction North.

Junction.

British, Block 14.

Broken Hill Proprietary, Block 10.

Central, Broken Hill South.

Of

Of the mines contiguous to the main lode, only the A.B.H. Consols and the New B.H. Extended are in operation; the latter partly by means provided by the Prospecting Vote to crosscut the course of the main lode at the 1,330-ft. level.

In the mines on the main lode some are now confined to experiments in the treatment of the immense deposits of sulphide ore, and, judging from results obtained in concentrating, these experiments are likely to have a successful issue.

At Euriowie some of the tin mines are again at work, and I am informed that the ore-dressing plant at Mount Euriowie is to be started early in the year to dress ore for the public.

Those interested and having charge of these mines speak with confidence of a certain measure of success.

At Nuntherungie the mines are almost entirely abandoned.

The opal fields at White Cliffs have received a large access of population, and a large quantity of the precious stone has been found during the year.

Mount Browne and Tibooburra remain in practically the same condition as during last year.

Occasional patches of good ground are found, but not sufficient, I should judge, to pay wages to those employed in the industry.

There has been a total of sixty-one accidents in and about the mines and machinery of the district. Of these, five were fatal, twenty-eight serious, and twenty-eight slight. Of these the great majority were preventable.

During the year I have made numerous reports on applications for aid from the Prospecting Vote, but in cases where work has been done under the Vote no good discoveries have yet been made.

I have also reported on several applications for the suspension of the labour covenants of leases at the request of Mr. Warden Barnett.

I have, &c.,

JAMES HEBBARD,

Inspector of Mines.

The Chief Inspector of Mines, Department of Mines, Sydney.

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#### ACTING INSPECTOR GODFREY'S ANNUAL REPORT.

Sir,

Sydney.

I have the honor to submit to you my Annual Report on the mines inspected by me during the year.

The principal mining centres visited by me were:—

In the Southern District: Pambula, Cobargo, Mount Dromedary, Bimbimbie, Big Hill, Nelligen, Yalwal, Braidwood, Major's Creek, Boro, Captain's Flat, Cooma, Jindabyne, Kiandra, Adelong, Gundagai, Coolac, Muttama, Temora, Cullinga, Young, Grenfell, Junee, and Albury.

In the Northern District: Deepwater, Emmaville, Dalmorton, Nana Creek, Cangri, Hillgrove, Nundle, Stewart's Brook, Moonan Brook, Niangala, and Swamp Oak.

For the greater part of the year I was engaged in the Southern District, travelling round it systematically, and during the year a considerable improvement was noticeable in many of the mines visited.

Four accidents, other than minor accidents, occurred in the Southern District. Two of these, at Nerrigundah and Mount Adrah, were fatal; and two, at Nerrigundah and Temora, were serious.

The returns for the year prove that a systematic and regular inspection of the mines is a great safeguard, as it renders the men more careful and causes the managers to comply with the mining regulations.

The most common fault observable was a want of care in handling and keeping explosives, which was consequently a fruitful cause of accident.

I also inspected and reported on several applications for aid under the Prospecting Vote.

I have, &c.,

J. B. GODFREY,

Acting Inspector of Mines.

The Chief Inspector of Mines, Sydney.

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## SUPERINTENDENT OF DIAMOND-DRILLS' REPORT.

## The Superintendent of Diamond-drills to The Under Secretary for Mines and Agriculture.

Sir,

Department of Mines, Diamond-drill Branch, Sydney.

In submitting my Annual Report on the working of the diamond-drills for the year 1893, I do myself the honor to attach to said Report the following Appendices:—

*Appendix A.*—Return showing the locality, strata, depth bored, percentage of core extracted, and rate per foot, exclusive of office salaries, store wages, and rent; also Superintendent of Diamond-drills' travelling expenses.

*Appendix B.*—Summary of diamond-drills showing the number of feet bored, working cost to the Department, average cost at per foot, and amount receivable for the year 1893.

*Appendix C.*—Balance-sheet of diamond-drills.

*Appendix D.*—Diagrams from No. 1 to No. 3 sections of borings during the year 1893.

*Appendix E.*—Summary showing total cost to the Department for reaming, clearing, and repairing at Cremorne and Yacaaba bores.

The total depth bored with the diamond-drills during the year 1893 was 1,903 feet 7 inches, or 2,235 feet 6 inches less than in 1892. The average cost per foot for boring, exclusive of office salaries, store wages, rent, and Superintendent of Diamond-drills' travelling expenses, also of clearing bores, reaming, and repairing, was 12s. 4½d., or 5½d. less than during the year 1892.

The cost to the Department for boring, exclusive of clearing from obstruction and reaming the bores at Cremorne and Yacaaba, near Port Stephens, was £1,724 6s. 11d., equal to 18s. 1½d., or 2s. 0½d. more than the year 1892. But the total cost to the Department, including boring, clearing bores of obstructions, reaming, and repairing, also office salaries, store wages, rent, and Superintendent's travelling expenses, was £2,930 4s. 2d., equal to 30s. 9½d. per foot for the total depth bored.

The above average rate per foot may at first sight appear to be high, but it must be remembered that the Cremorne bore has reached the total depth of 2,929 feet, the diameter of the bore from surface to the 2,356-ft. level being 5½ inches, and from that depth to the bottom of bore, 4 inches in diameter.

By the balance-sheet it will be observed that there is a debit balance of £914 4s. 11d., which amount was expended in clearing the bores of obstruction and also reaming, or otherwise a balance on the right side would have been the case.

The core saved during the year was very satisfactory, that saved at Cremorne being 97·88, at Bulli 86·94, and at Yacaaba 82·62, or a total percentage of 92·81. The smaller percentage of the Bulli and Yacaaba bores is due, the former to very soft shales, and the latter to the great thickness of sand—no less than 163 feet of sand and clay had to be passed through, before actual boring could be proceeded with.

The cost of wear and tear of diamonds during the year is 3s. 3½d., or 1s. 1½d. per foot more than during the year 1892.

The principal cause of the extra cost per foot for wear and tear of diamonds during the year is due to the strata at Yacaaba and the large diameter of the Cremorne bore.

The decrease in the number of feet bored during the year is solely due to the great financial depression under which the Colony is now suffering, as the Government drills are only worked at the expense of those who use them.

No. 7 drill completed a bore at Bulli to the depth of 1,010 feet 7 inches, of which 261 feet 7 inches were bored during the year. No. 11 drill completed the important bore at Cremorne at a depth of 2,929 feet, of which 1,054 feet were bored during the year. No. 13 completed a bore at Yacaaba to the depth of 675 feet, of which 588 feet were bored during the year.

The most important bore during the year is No. 2 bore at Cremorne, which was brought to a successful termination on the 9th November last. It has solved the problem as to the existence of good coal under the harbour and the city of Sydney. As the difficulties of the boring operations were very great, owing to the great weight of rods and the frequent breaking of same, the raising and lowering of the rods took on an average six hours—that is, three hours each way; and, while on this subject, I may mention that a letter received from the M. C. Bullock Manufacturing Company, Chicago, U.S., introducing an invention, by which the core-barrel could be brought to the surface without raising the rods, stating that the advantage was very considerable, as by the so-called "come along attachments" the core could be raised to the surface in from twenty minutes to one hour, instead of as now, over ten hours from a 2,000-foot bore. In reply to this the Bullock Manufacturing Company was informed that, with every due respect to the new invention, which, if used with our diamond-drills would require expensive alteration, the lowering and raising of rods to the depth of 2,750 feet had never occupied a longer time than six hours, to which the following characteristic reply was received from the President of the Bullock Manufacturing Company:—"Your record of handling 2,750 feet of rods in six hours is certainly very remarkable. American workmen claim to be about as expert as any in that line, and the best record that we have been able to make is 2,000 feet in ten hours for regular work. Of course it might be done probably in five or six hours for once, but for regular every-day work ten hours is the best general average we could get."

The regular work at the Cremorne bore to the bottom of bore, 2,929 feet, has never been more than six hours from the time of raising the rods and have them ready again for boring, which, even by such authority as the President of the Bullock Manufacturing Company, Chicago, is very remarkable.

It is, however, only fair to state that the raising and lowering of the rods on the drill used at Cremorne was done by a steam-winch, and not by the regular winding gear attached to the drill. As the

Cremorne

Cremorne coal discovery is of such great importance, I have attached to my report all the reports in connection with said discovery, made by Professor David, B.A., F.G.S., of the Sydney University, the report by Mr. Mingaye, F.C.S., on the analysis of the coal, and my report.

The clerks of the Diamond-drill Branch, Messrs. M'Neill and Leigh, have done everything possible to assist me in the drill work, the latter, in addition of being the storeman, has also helped me in connection with assisting the unemployed to our gold-fields.

I have, &c.,

W. H. J. SLEE,

Superintendent of Diamond-drills.

REPORT by Professor David, B.A., F.G.S., on Cremorne Bore, No. 2.

Sir,

University of Sydney, 9 November, 1893.

In the absence of Mr. E. F. Pittman, the Government Geologist, I have the honor to report that I was present with Mr. W. H. J. Slee, the Chief Inspector of Mines, at the site of the No. 2 bore at Cremorne yesterday and to-day, and witnessed the boring through of the Bulli coal-seam. I examined the core from the coal-seam, and have the honor to submit a brief report. The detailed report will, of course, be furnished later by the Government Geologist.

The seam was struck at a depth of 2,917 feet from the surface.

The drill had penetrated the seam to a depth of 8 inches before our arrival, and during yesterday and to-day a further depth of 9 feet 7 inches was bored before the floor of the coal-seam was reached. The bore was continued 1 foot 9 inches below the floor of the seam. The total thickness of the seam was proved to be 10 feet 3 inches. The floor of the seam lies at a depth of 2,927 feet 3 inches, and the total depth of the bore is 2,929 feet.

Altogether about 8 feet of coal-core was recovered, besides a large quantity of coal-dust, resulting partly from the coal pulverised by the sawing action of the diamond-drill, and partly from the waste of the coal-core through friction of the loose fragments of coal-core upon one another in the core-barrel. In view of the great depth of the bore the proportion of core obtained is unusually large.

With the exception of a thickness of about 1 foot 1 inch, the whole of the coal in the seam appears to be of good quality, and is a useful splint and bituminous coal. The total thickness of workable coal in the seam is thus about 9 feet 2 inches. During the boring yesterday evening a large quantity of coal-dust was floated up rather suddenly by the hydraulic feed-water at the top of the bore-hole, and formed a thick seam, from which coal-gas was given off in such quantities that it could readily be ignited, burning with a bluish flame, 6 to 8 inches long.

The so-called natural gas at Narrabeen may have had a similar origin, being derived in all probability from a fissure in the rocks, communicating with the Bulli coal-seam at a depth.

The following is a generalised descending section of the coal-seam:—

Depth to roof, 2,917 feet. Roof, clay shale.

ft. in.

0	1	Coaly clay shale.
0	8	Splint coal, somewhat inferior, with minute veins of calcite (?).
3	0	Coal, splint and bituminous, of good quality.
0	0½	Band, dark brown clay shale, adhering firmly to coal.
6	2½	Coal, splint and bituminous, of good quality, the last 3 inches rather soft and bituminous.
0	3½	Coal, soft bituminous, a trifle clayey.

Total ... 10 3

Floor, black carbonaceous clay shale, containing impressions of the fossil plant *Vertebraria*.

The site for this bore was chosen by Mr. E. F. Pittman, after a careful geological examination of the neighbourhood, and was located in a position calculated to be as far as possible removed from the damaging influence of volcanic dykes, such as the one encountered in the first Cremorne bore. With the exception of the minute veins of calcite in the uppermost few inches of the section, the coal in this seam shows no evidence of its having been in any way altered or damaged by the influence of dykes, a result which may be considered very satisfactory, especially in view of the fact that the bore is distant only about quarter of a mile from one of these dykes, as it proves that the damaged portions of coal under Port Jackson will be found to be only quite local and of small proportion in relation to the area of good coal.

I have, &c.,

T. W. E. DAVID.

The Under Secretary for Mines and Agriculture.

REPORT by Mr. W. H. J. Slee, F.G.S., Superintendent of Diamond-drills, Cremorne Bore No. 2.

Sir,

Department of Mines, Diamond-drill Branch, Sydney, 10 November, 1893.

I do myself the honor to report that No. 2 bore, Cremorne Point, between Mossman's and Neutral Bays, has been brought to a successful issue, and has demonstrated the soundness of the frequent predictions made by the late Mr. C. S. Wilkinson, Government Geologist, that payable coal deposits existed under and in the vicinity of Sydney.

It will be remembered that No. 1 bore reached the total depth of 3,095 feet, and that at a depth of 2,801 feet a burnt seam of coal, about 8 feet in thickness, was pierced through, but as there are few, if any, of our known coal-seams which have not been disturbed by volcanic action in some portion or other, it was thought by the scientific staff of the Mines Department that as No. 1 bore at Cremorne had proved the existence of a thick seam of coal, it would only require further search to prove that valuable deposits of coal existed in the immediate vicinity. The Sydney and Port Hacking Company holding the same opinion, requested that a report might be obtained from Mr. T. W. E. David, B.A., F.G.S., then a geological surveyor of the Mines Department, now a Professor of the University of Sydney.

Mr. David's report pointed out that, although burnt coal had been obtained in No. 1 bore, he saw no reason why valuable coal should not be discovered in close proximity of same. In fact, it may be reasonably expected that such would be the case. Thus, encouraged by perhaps the highest opinion which could possibly be obtained on the extensive coal-measures of New South Wales, the Company were induced to make fresh arrangements for a second bore.

In the meantime Professor David discovered the existence of one volcanic dyke which caused the disturbance in No. 1 bore, and Mr. Pittman discovered another, both dykes crossing or intersecting each other in No. 1 bore-hole, which site had been selected by the Company without the aid of the scientific staff of the Mines Department.

To

To avoid further disappointments, if possible, Mr. Pittman, the present Government Geologist, was requested and selected the site of No. 2 bore just completed, and the most important and successful diamond-drill bore ever put down in the Colony of New South Wales.

The bore was started in July, 1892, but through circumstances over which I had no control, several months were lost without any actual boring. It had been my intention to carry down a 5-inch diameter bore to the full depth required, but finding that the soft shales at the depth of about 2,400 feet commenced to cave in, I had 5-inch tubing inserted to that depth, and started a 4-inch diameter bore, which was carried down to the present depth. At the depth of 2,917 feet the top of the coal seam was struck, and Mr. Pittman, Government Geologist, being unavoidably absent from Sydney on official duty, I obtained the valuable services of Professor David to see the coal bored through and measure thickness of same.

We started boring through the coal at 10.10 a.m. on the 8th instant, and boring 6 feet 6 inches the core barrel jammed, which compelled me to have the rods raised to the surface—an operation which takes fully three hours' smart work to accomplish. Four feet ten inches of coal out of the 6 feet 6 inches bored were brought to the surface. For the second and third time the same operation had to be performed before the whole coal-seam was pierced through, and at 10 a.m. on the 9th instant, after twenty-four hours' continuous boring, lowering and raising of rods and core-barrel, the seam of coal, with an additional 1 foot 9 inches of rock, was bored through, giving the total depth of bore from surface, 2,929 feet, and a total thickness of 10 feet 3 inches of coal-seam, of which 8 feet coal-core was saved, 2 feet 3 inches having been ground away and flowed with the water to the surface. Sufficient of this ground-coal was saved to fill fully 5 feet of a 4-inch tube rammed down to the exact diameter and almost same density of the coal-core, one-third of which may, perhaps, be credited to the coal ground up by the thickness of the boring-bit (Crown head), one-third as belonging to the coal-core saved, and one-third to the actual thickness of the coal-seam. It may, therefore, be granted that about 9 feet of coal-core, out of a possible 10 feet 3 inches, has actually been saved—a result highly satisfactory from such a great depth. Outside of a scientific point of view, which must alone be given a high place, the discovery made at Cremorne through the agency of a Government diamond drill, is, in a broad, national point of view, incalculable, as it has increased the known wealth and national assets of this favoured land by many million pounds sterling. The company received for their No. 2 bore aid out of the Prospecting Vote at per foot on the actual rate of boring, they having to defray direct the full cost of all carriage, fuel, and water required for boring operations.

Mr. Pittman has carefully taken the whole core section from surface down to the depth of 2,898 feet, and Professor David has noted the remainder to the full depth of 2,929 feet, including the coal-seam; and further, although no analysis of the coal could at this juncture be made, Professor David expresses the opinion that the quality will be good.

In conclusion, I beg to add that my thanks are due to the foremen, Messrs. Ayles and Fryer, also to Mr. Leigh, and the men employed at the drill, for having, one and all, done their duty faithfully and well to bring this important boring operation to such gratifying results.

I have, &c.,

W. H. J. SLEE,

Superintendent of Diamond Drills, &c.

The Under Secretary for Mines and Agriculture.

REPORT by J. C. H. Mingaye, F.C.S., M.A.I.M.E., on Analysis of Coal from the Cremorne Bore.

Geological Survey, New South Wales,

Sir,

Department of Mines and Agriculture, Sydney, 27 November, 1893.

I have the honor to inform you that the samples of coal from the Cremorne Bore have been analysed with the following results:—

2572—No. 1. Average sample from the first 18 inches below the 8 inches of coal with calcite veins:—

Hygroscopic moisture .....	·65	
Volatile hydro-carbons .....	17·30	
Fixed carbon .....	71·75	} =Coke, 82·05 per cent.
Ash .....	10·30	
	100·00	

Sulphur in coal .....	·795 per cent.
Specific gravity .....	1·207

One pound of this coal, by experiment in a Thompson's calorimeter, will convert 12·7 lb. of water into steam.

2573—No. 2. Average sample from the next 18 inches:—

Hygroscopic moisture .....	·70	
Volatile hydro-carbons .....	17·80	
Fixed carbon .....	71·60	} =Coke, 81·50 per cent.
Ash .....	9·90	
	100·00	

Sulphur in coal .....	·562 per cent.
Specific gravity .....	1·365

One pound of this coal will convert 13·3 lb. of water into steam.

2574—No. 3. Average sample from the next 14 inches:—

Hygroscopic moisture .....	·80	
Volatile hydro-carbons .....	16·90	
Fixed carbon .....	71·05	} =Coke, 82·30 per cent.
Ash .....	11·25	
	100·00	

Sulphur in coal .....	·617 per cent.
Specific gravity .....	1·398

One pound of this coal will convert 12·9 lb. of water into steam.

## 1575—No. 4. Average sample from the next 14 inches :—

Hygroscopic moisture .....	70	
Volatile hydro-carbons .....	17.06	
Fixed carbon .....	71.25	} = Coke, 82.25 per cent.
Ash .....	11.00	
	100.00	

Sulphur in coal .....	.809 per cent.
Specific gravity .....	1.374

Ash, reddish tinge, flocculent.  
One pound of this coal will convert 12.9 lb. of water into steam.

## 2576—No. 5. Average sample from the next 14 inches :—

Hypogroscopic moisture .....	.85	
Volatile hydro-carbons .....	17.95	
Fixed carbon .....	70.15	} = Coke, 81.40 per cent.
Ash .....	11.25	
	100.00	

Sulphur in coal .....	.878 per cent.
Specific gravity .....	1.373

Ash, reddish tinge, flocculent.  
One pound of this coal will convert 13.1 lb. of water into steam.

## 2577—No. 6. Average sample of the last 14 inches :—

Hygroscopic moisture .....	.45	
Volatile hydro-carbons .....	18.45	
Fixed carbon .....	71.75	} = Coke, 81.10 per cent.
Ash .....	9.35	
	100.00	

Sulphur in coal .....	.696 per cent.
Specific gravity .....	1.362

Ash, reddish tinge, flocculent.  
One pound of this coal will convert 13.2 lb. of water into steam.

## Mean analysis of the six samples :—

Hygroscopic moisture .....	.66	
Volatile hydro-carbons .....	17.57	
Fixed carbon .....	71.09	} = Coke, 81.77 per cent.
Ash .....	10.68	
	100.00	

Mean sulphur .....	.724 per cent.
„ specific gravity .....	1.346
„ calorimetric value .....	13.0

*Remarks.*—The samples are good descriptions of coals for household purposes, the percentage of ash being low as compared with the average ash present in the Balli and Wollongong coals. They may be described as excellent steaming coals, as proved by the high calorimetric values found by experiment in a Thompson's calorimeter.

*Coke.*—They yield an excellent coke, having all the physical properties of the southern coals—i.e., Balli and Wollongong—and are well suited for all metallurgical purposes.

I have, &c.,  
JOHN C. H. MINGAYE, F.C.S., M.A.I.M.E.,  
Analyst and Assayer.

The Under Secretary for Mines and Agriculture.

## REPORT by Professor David, B.A., F.G.S., &amp;c., on taking the temperature in No. 2 Borehole, Cremorne Point.

Sir,

University of Sydney, 27 November, 1893.

I have the honor to report that, in the absence of Mr. E. F. Pittman, the Government Geologist, I have, with the assistance of Mr. W. H. J. Sles, the Chief Inspector of Mines, made some determinations of the temperature of the Cremorne Bore.

The bore being filled with the water pumped into it during the process of boring to within about 300 feet of the surface, it was necessary to take special precautions to protect the bulbs of the thermometers against the great pressure to which they would be subjected at the bottom of the bore. The bore is 2,929 feet deep, but the last 29 feet (about) is silted up with the powdered rock produced by the cutting action of the diamond drill. From 2,900 feet, therefore, to within 300 feet of the surface, the bore was filled with water, the column being 2,600 feet high, and giving a maximum pressure of, approximately, a trifle over half a ton per square inch.

By the advice of Professor Threlfall and Mr. H. C. Russell, the Government Astronomer, the thermometers were enclosed in a strong wrought-iron tube, 2 ft. 3 in. long, and 1½ inch inside diameter, with two strong cap pieces screwed on at either end, the threads of the screws being heated and dipped in molten solder immediately before they were screwed on. This work was executed by Mr. Gilchrist, of 174 Pitt-street, in a thoroughly satisfactory manner, not a drop of water finding its way into the hermetically-sealed tube, although it was left down the bore on one occasion for twenty-seven hours consecutively, and the pressure on the whole tube being equal to about 60 tons.

Two of the thermometers were lent by Mr. Russell, and were maximum thermometers of the overflow type, and two were supplied by Mr. Wiesener, one being a maximum overflow and the other a maximum and minimum thermometer, with two small piston-shaped indexes inside the glass tube.

The thermometers were packed in brass filings and brass turnings. On Wednesday last the two thermometers provided by Mr. Russell were used alone. The bulbs were protected by a few folds of soft paper, and, after being placed in the iron tube and hermetically sealed, were lowered down the bore to a depth of 2,780 feet, it being found impossible to lower them deeper on account of some obstruction in the bore at that depth—probably a small piece of shale fallen in from the side of the bore.

After

After having been left down the bore for three quarters of an hour the thermometers were drawn up and the tube unsealed, but neither of the two thermometers had altered as compared with their reading at the surface, the paper round the bulbs probably having prevented the conduction of heat from the water in the bore-hole.

On the following day the four thermometers above described were sealed up in the tube, with brass filings and shot packed round their bulbs. Owing to a break in the steel wire by which they were lowered, it was found impossible to draw them up until the following day, when Mr. Slee succeeded in grappling the broken end of the wire, and the tube was drawn to the surface, after having remained continuously for twenty-seven hours at a depth of 2,730 feet.

The tube being unsealed at once on the spot by melting the solder with an oxygen blow-pipe, the thermometers were found to read as follows:—

1. No. 1,590 (H. C. Russell)...	...	...	...	97.38° Fahr.
2. Wiesener's maximum	...	...	...	98.00° "
3. No. 1,591 (H. C. Russell)...	...	...	...	94.00° "
4. Wiesener's maximum and minimum—maximum...	...	...	...	95.00° "
The minimum temperature recorded was about	...	...	...	63.00° "

On Saturday last the same four thermometers were again lowered, in order to verify the results, and, after being down the bore for one hour, were hauled up to the surface, and now read as follows:—

1. 95.5° Fahr.
2. 96.0° "
3. 96.0° "

The bulb of the fourth was found to have been broken, so that the reading was unreliable.

The lower readings afforded by the second series of observations were doubtless due partly to the local chilling of the water column on the previous day by the lowering of the large iron coupling for grappling the wire, and partly to the chilling of the water by the tube in which the thermometers were cased. The first set of readings of the thermometers 1 and 2 may be considered the most reliable, and, provisionally, it may be concluded that the rock temperature at a depth of 2,730 feet is about 97½° Fahr. at Cremorne.

The mean surface temperature at Sydney being about 63° Fahr., the temperature was therefore increased by about 34½° Fahr. at a depth of 2,730 feet—that is, an increase at the rate of 1° Fahr. for about every 78 feet 10 inches.

At the bottom of the bore, therefore, at 2,929 feet (nearly 200 feet deeper than the point at which the measurements of the temperature were taken), the temperature would be about 2½° Fahr. in excess of the temperature at 2,730 feet—that is, 97½° + 2½° = 100° Fahr. This temperature is less by 3° Fahr. than was anticipated, and should not occasion any apprehension as to the possibility of successfully ventilating the mine. A fuller report on this aspect of the question will no doubt be furnished by M. Pittman on his return to Sydney.

I have, &c.,

T. W. E. DAVID.

The Under Secretary for Mines and Agriculture.

APPENDIX A.

DIAMOND-DRILL work, showing average cost per foot, exclusive of office salaries, store wages, rent, and Superintendent's travelling expenses, for year 1893.

120-K

No. of Machine.	No. of Bores.	Locality.	Diameter of Bore.	Strata.	Depths			Days occupied.						Rate bored per hour.	Per-centage of core obtained.	Cost.		Remarks.
					At 31 Dec., 1892.	Bored During 1893.	Total.	Moving.	Erecting.	Boring.	Repairing & reaming.	Delays.	Holidays.			Total.	Amount.	
			in.		ft. in.	ft. in.	ft. in.								£ s. d.	£ s. d.		
7	1	Bull	3	.....	749 0	261 7	1,010 7	..	..	43	11	4	2	60	9-13	86-94	178 8 1	0 18 7½
11	1	Cremorne	•	.....	1,875 0	1,064 0	2,929 0	..	..	114	26	6	2	148	13-87	97-88	624 18 11	0 11 10½
13	1	Yacaaba	.....	.....	87 0	588 0	675 0	..	..	79	29	13	5	126	11-17	82-62	377 11 5	0 12 10½
					.....	1,903 7	.....	..	..	236	66	23	9	334	12-10	92-81	1,180 18 5	0 12 4½

\* 5½ and 4 inches.

J. S. McNEIL.  
J. S. LEIGH.

W. H. J. SLEE,  
Superintendent of Diamond Drills.

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APPENDIX B.

SUMMARY of Diamond-drill work, showing number of feet bored, total working cost to Department, average cost per foot, and amounts receivable for 1893.

No. of machine.	Locality.	Bored.	Wages.	Carriage.		Travelling expenses.	Repairs.	Diamonds used.	Stores issued.	Sundries.	Proportion of balance of general account.	Proportion of balance of general stores issued.	Office salaries.	Store wages.	Rent.	Superintendent's travelling expenses.	Total.	Cost per foot.	Amounts receivable in full.		Amount receivable per foot.
				Railway.	Other.														£ s. d.	£ s. d.	
		ft. in.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
7	Bull	261 7	83 0 0	1 18 8	0 9 9	0 6 6	12 2 9	18 4 7	11 3 1	1 2 0	49 18 3	0 2 6	67 19 7	23 1 0	17 8 6	0 4 7	237 1 9	.....	164 7 5	.....	.....
11	Cremorne	1,064 0	384 5 0	.....	4 2 9	0 14 4	9 19 3	44 15 7	81 0 3	.....	99 16 6	0 4 11	135 19 4	46 2 2	34 16 10	0 9 1	842 6 4	.....	1,913 17 10	.....	.....
13	Yacaaba (Port Stephens.)	588 0	164 5 4	1 18 1	14 0 6	.....	.....	91 15 5	5 0 8	0 10 0	99 16 6	0 4 11	135 19 4	46 2 2	34 16 10	0 9 1	594 18 10	.....	410 15 5	.....	.....
		1,903 7	651 10 8	3 16 9	18 13 0	1 0 10	22 2 0	154 15 7	97 4 0	1 12 0	249 11 3	0 12 4	339 18 3	115 5 4	87 2 2	1 2 9	1,724 6 11	0 18 1½	2,489 0 8	1 6 1½	.....

J. S. McNEIL.  
J. S. LEIGH.

Comparative statement of diamonds used per foot:—  
 1883 = 3/8                      1887 = 1/6½  
 1884 = 2 0½                    1888 = 1/0½  
 1885 = 1/5½                    1889 = 1/3½  
 1886 = -8½                      1890 = -7½  
 1891 = 1/9½  
 1892 = 2/2  
 1893 = 3-2½

W. H. J. SLEE,  
Superintendent of Diamond Drills.

APPENDIX C.

APPENDIX C.  
BALANCE SHEET, 1893.—Diamond-drills.

Dr.	£	s.	d.	£	s.	d.	Cr.
To value of field machinery and plant other than diamonds at 1st January.....	12,631	14	8				
Value of new stock in store at 1st January.....							
£ s. d.							
846 7 4							
Value of stores purchased ..	173	0	0				
	1,019	7	4				
Value of new diamonds at 1st January .....	1,412	13	0				
Value of diamonds at drills at 1st January .....	365	18	4				
Value of suspense diamonds, &c., at 1st January.....	218	17	6	1,097	3	10	
Working expenses for boring (exclusive of office salaries, store wages, rent, and Superintendent's travelling expenses).....	1,180	18	5	16,648	10	10	
£ s. d.							
Office salaries .....	516	13	4				
Less, charged as under ..	176	15	1				
	339	18	3				
Store wages .....	175	4	0				
Less, charged as under.....	59	18	3				
	115	5	4				
Rent .....	152	8	1				
Less, charged as under.....	45	5	11				
	87	2	2				
Superintendent's travelling expenses .....	1	14	6				
Less charged as under .....	0	11	9				
	1	2	9				
	1,734	6	11				
Clearing, &c., No. 2 Bore at On inorne Point .....	810	16	1				
Clearing bore at Yacaba ..	112	9	9				
	923	5	10				
(Exclusive of the following), vis :—							
Office salaries .....	176	13	1				
Store wages .....	59	18	3				
Rent .....	45	5	11				
Superintendent's travelling expenses.....	11	9					
	1,205	17	3				
				2,930	4	2	
				£	18,578	15	0
By amount receivable for boring during the year .....	2,452	0	8				
Amount receivable for tubing .....	37	0	0				
							2,489 0 8
Diamonds sold .....	71	2	9				
Diamond fractures sold .....	26	8	0				
Bit and spring sold .....	1	2	6				
							98 13 3
Value of field machinery and plant other than diamonds .....	12,631	14	8				2,587 13 11
Plant issued and not used ..	237	8	10				
	12,869	3	6				
Less 5 per cent depreciation ..	642	19	2				
							12,216 4 4
Value of new stock in store at 31st December .....							593 5 3
Value of new stock of diamonds at 31st December ..	1,111	19	11				
Value of suspense diamonds at 31st December .....	485	10	2				
Value of fractures of diamonds and dust at 31st December .....	21	17	4				
							1,619 7 5
Depreciation as above.....							14,438 17 0
Balance .....							642 19 2
							914 4 11
							£18,578 15 0

J. S. McNEIL.  
J. S. LEIGH.

W. H. J. SLEE,  
Superintendent of Diamond Drills.

## Section of Bore N° 3 N° 7 Diamond Drill at Bulli

Borehole 4" Diam.	Nature of Strata	Thickness of Strata		Depth from Surface	
		ft	in	ft	in
	Depth bored to 31 <sup>st</sup> Decr. 1892.....			749	0
	Conglomerate.....	8	0		
	Rough jointy conglomerate.....	13	0		
	Shale affected by basalt Rough jointy conglomerate.....	2	10	772	11
	Shale and sandstone.....		6		
	Rough jointy conglomerate.....	9	1		
	Basalt.....	3	11		
	Fine & coarse conglomerate.....	15	11	802	4
	Blue shale.....		9		
	Grey shale.....	2	11		
	Blue shale.....	16	0	822	0
	Very soft shale.....	1	5		
	Blue shale.....	13	7	837	0
	Grey shale.....	1	0		
	Basalt.....	5	10		
	Blue shale.....	3	3		
	Shale affected by basalt Basalt.....	1	0	846	7
	Blue shale.....	11	5		
	Sandstone & grey shale.....	7	1		
	Blue shale.....	5	8	870	9
	Basalt.....		6		
	Grey shale.....		11		
	Basalt.....	12	11	885	9
	Blue shale & sandstone.....		3		
	Basalt.....	3	10		
	Blue shale and streaks of sandstone.....	3	9	895	7
	Grey shale.....	4	6		
	Sandstone.....	1	9		
	Grey shale.....	3	10		
	Basalt.....	3	7	908	9
	Grey shale.....		10		
	Shale affected by basalt Grey shale & streaks of sandstone.....	6	4		
	Grey shale.....	3	2		
	Shale affected by basalt.....	1	0	919	5
	Basalt.....	1	6		
Blue shale & spots of basalt.....		4			
Sandstone.....	17	0	939	3	
Fine conglomerate and dark shale.....	8	4			
Fine conglomerate with traces of basalt.....	3	0			
Fine conglomerate.....	1	10	953	10	
Grey shale.....		10			
Shale and sandstone.....		10			
Light basalt.....		10			
Sandstone.....		10			
Dark shale.....		10			
Decomposed basalt.....		10	956	4	
Burnt coal.....	4	6	960	10	
Dark shale.....	1	9			
Burnt coal.....	4	4			
Dark shale & sandstone.....	2	10			
Basalt.....	2	1	971	6	
Hard grey shale.....	1	1			
Basalt.....	2	0			
Hard grey rock.....		0			
Sandstone & dark shale.....	2	0			
Sandstone, shale & fine conglomerate.....	1	10	984	7	
Basalt.....		10			
Fine conglomerate with streaks of shale.....	1	10			
Fine conglomerate.....		10			
Basalt.....		10	1003	0	
Burnt coal.....	4	1			
Burnt coal with one spot of basalt.....	1	1			
Dark shale & streaks of burnt coal.....		1			
Dark shale.....		1			
Total depth.....			1010	7	

Compiled from the Foreman's Weekly Returns

Section of Bore N° 2  
N° 11 Diamond Drill  
at Cremorne

Borehole 5" Diam	Nature of Strata	Thickness of Strata		Depth from Surface		
		ft	in	ft	in	
	Depth bored to 31 <sup>st</sup> Decr. 1892			1875	0	
	Shale	3	6	1878	6	
	Sandstone	4	4			
	Shaly sand and sandstone	22	4	1945	6	
	Shale	5	4			
	Sandstone	20	2	1971	0	
	Shaly sandstone	7	6	1978	6	
	Shale	4	0			
	Shaly sandstone & shale	28	6	2011	0	
	Shale, sandstone & sand	18	7			
	Fine conglomerate	4	0			
	Shale and sandstone	5	4			
	Fine conglomerate	4	5	2043	4	
	Sandstone	9	0			
	Conglomerate	1	6			
	Sandstone	4	4			
	Conglomerate	2	0			
	Sandstone	10	2	2070	4	
	Shale, sand & conglomerate	16	1			
	Fine conglomerate	16	2			
	Sandstone	4	9	2107	4	
	Shale and sandstone	4	8	2112	0	
	Shaly sandstone & shale	15	0	2127	0	
	Conglomerate, shale & sandstone	1	0	2128	0	
	Mudstone with chocolate intermixed	6	0	2134	0	
	Shale	5	6	2139	6	
	Sandstone	7	6	2147	0	
	Sandstone with bands of coarse grit	12	0	2159	0	
	Shale, sandstone & fine conglomerate	29	6	2188	6	
	Shaly sand	2	6			
	Sandstone with bands of coarse grit	23	6	2214	6	
	Shale	1	6	2216	0	
	Sandstone with bands of conglomerate or coarse grit	43	0	2259	0	
	Fine conglomerate & shaly sandstone	53	0	2312	0	
	Clay shale	25	6			
	Green shaly sandstone	3	6			
	Clay shale	10	8			
	Shaly sandstone	5	4	2357	0	
	Conglomerate and sandstone	14	1	2498	0	
	Shale and claystone & sandstone	33	0	2531	0	
	Sandstone & conglomerate	22	0	2553	0	
	Shale and claystones	8	0	2561	0	
	Conglomerate & coarse grit	27	0	2588	0	
	Shale	25	0	2613	0	
	Sandstone	10	9	2623	9	
	Shale	8	3	2632	0	
	Sandstone with shale & conglomerate	23	0	2655	0	
	Shaly sandstone and shale	91	0	2746	0	
	Conglomerate	1	6	2747	6	
	Sandstone	11	0	2758	6	
	Conglomerate	51	6	2810	0	
	Shale	10	9	2820	9	
	Shale & shaly sandstone	41	9	2862	6	
	Sandstone and conglomerate	27	7	2890	1	
	Sandstone & clay ironstone	1	7	2891	8	
	Shale	7	5	2899	1	
	Clay ironstone	0	1	2899	2	
	Shale	10	7	2909	9	
	Mudstone	0	7	2910	4	
	Sandstone	0	8	2911	0	
	Mudstone	0	6	2911	7	
	Shale	5	5	2917	0	
	Coal Seam (section enlarged)					
	Coaly clay shale	0	1			
	Splint coal somewhat inferior with minute veins of calcite	0	8			
	Coal splint & bituminous, of good quality	2	10			
	Band, dark brown clay shale adhering firmly to coal	0	0			
	Coal splint & bituminous, of good quality, the last 3 inches rather soft and bituminous	6	4			
	Coal, soft bituminous, a trifle clayey	0	3			
	Black carbonaceous clay shale containing impressions of the fossil plant <i>Pectocaria</i>	1	9			
	Total depth			2929	0	
	The Section was originally to have been taken from the Foreman's Weekly Report Sheets which however clashed with the section taken by Mr Pittman A.R.S.M. Government Geologist, the latter has therefore kindly revised the Foreman's Section.					

*Section of Bore N° 1*  
*N° 13 Diamond Drill*  
*at Yacaba*

Borehole 4" Diam.	Nature of Strata	Thickness of Strata		Depth from Surface	
		ft	in	ft	in
	Depth bored to 31 <sup>st</sup> Decr. 1892.....			87	0
	Boulders and sand drift.....	13	0		
	Sand.....	1	0		
	Clay.....	62	0	163	0
	Fine conglomerate.....	39	0		
	Sandstone & clay.....	22	0		
	Coarse sandstone.....	10	3	234	3
	Shale and sandstone.....	3	9		
	Fine conglomerate.....	19	3		
	Sandstone.....	3	9		
	Fine conglomerate.....	39	0	300	0
	Shale.....				
	Fine conglomerate.....	17	3		
	Shale.....				
	Conglomerate.....	9	0	326	8
	Shale.....				
	Conglomerate.....	1	6		
	Sandstone & shale.....	1	3		
	Conglomerate.....				
	Sandstone & shale.....	1	4	342	0
	Sandstone shale & quartzite.....				
	Conglomerate.....	8	0		
	Sandstone and shale.....				
	Conglomerate.....				
	Sandstone & shale.....				
	Sandstone.....			370	0
	Shale.....				
	Sandstone and quartzite.....				
Quartzite.....					
Black shaly rock & sandstone.....	21	0	427	0	
Black shaly rock.....					
Black shaly rock & sandstone.....	37	0			
Dark and grey shaly rock.....	21	6			
Conglomerate.....	2	0			
Black shale.....	2	6	490	0	
Dark shaly rock.....	3	0			
Sandstone.....	17	4			
Brown shale.....	1	8	512	0	
Fine & coarse sandstone.....	14	6			
Sandstone and brown & grey shale.....	11	6			
Sandstone.....	11	0	549	0	
Hard conglomerate.....	83	0			
Basalt.....	43	0			
	Total depth.....			675	0

Compiled from the Foreman's Weekly Returns

## APPENDIX E.

SUMMARY showing total cost to Department for reaming, clearing, and repairing at Cremorne and Yacaaba, during 1893.

Locality.	Wages.	Carriage.		Travel- ling Ex- penses.	Repairs.	Diamonds Used.	Stores Issued.	Sun- dries.	Propor- tion of Balance of General Account.	Propor- tion of Balance of General Stores Issued.	Office Salaries.	Store Wages.	Rent.	Superin- tendent's Travelling Expenses.	Total.	
		Rail- way.	Other.													
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Cremorne .....	401 17 4	.....	9 17 6	2 17 5	65 8 11	159 8 5	70 19 7	0 5 6	99 16 6	0 4 11	135 19 4	46 2 2	34 16 10	0 9 1	1,028 8 6	
Yacaaba (Port Stephens).	55 14 8	7 9 4	2 11 6	.....	13 6 1	.....	3 7 9	.....	29 19 0	0 1 5	40 15 9	13 16 6	10 9 1	0 2 8	177 13 9	
	457 12 0	7 9 4	12 9 0	2 17 5	78 15 0	159 8 5	74 7 4	0 5 0	129 15 6	0 6 4	175 15 1	59 18 8	45 5 11	0 11 9	1,206 17 3	

J. S. McNEIL.  
J. S. LEIGH.

W. H. J. SLEE,  
Superintendent of Diamond Drills.

## EXAMINER OF COAL-FIELDS REPORT.

Report of the Examiner of Coal-fields for the Colony of New South Wales for the year 1893.

IN accordance with the provisions contained in the 26th section of the Coal Mines Regulation Act, 39 Vic. No. 31, I have the honor to submit reports from Messrs. Dixon, Bates, and Humble, Inspectors of Collieries, for coal-mines at work and opening out in the counties of Northumberland, Durham, Gloucester, Buckland, and Pottinger, called the Northern District; and Mr. Rowan, Inspector of Collieries, for coal and shale mines at work and opening out in the counties of Cumberland, Camden, Cook, and Roxburgh, called the Southern and Western Districts, with this my general report for the year ending 31st December, 1893.

The information I have the honor to submit with respect to the condition and progress, &c., of the coal and boghead mineral (yielding large quantities of gas and oil per ton) mines during the year 1893 is as follows:—

In 1893, the year under notice, there have been 13 fatal and 45 non-fatal accidents. Ten of the fatal accidents happened from falls of coal, 1 from fall of stone, 1 by loaded waggon on surface, and 1 by descending cage at bottom of shaft.

Four of the non-fatal accidents occurred from the explosion of gas, 22 from falls of coal, 5 by skips, 5 by falls of stone, 2 by ignition of loose powder, 1 by waggon on surface, 1 on railway-line, 1 falling down shaft on to cradle, 1 by an explosion of a shot, 1 by crank-shaft of engine in motion, 1 by a piece of coal falling down shaft, and 1 by falling-prop.

In 1892 the fatal accidents were 8, and the non-fatal accidents 77. Four of the fatal accidents happened from falls of coal, 3 from falls of stone roof, and one from skips in motion.

Thirty-eight of the non-fatal accidents occurred from falls of coal, 10 from falls of stone roof, 12 from skips, 6 from explosion of blasting-powder, 1 kick from a horse, 5 from ignition of fire-damp, 1 bursting of a steam-pipe, 1 from pit-cage in shaft, 1 from explosion of a shot, 1 from haulage-rope, and 1 from a block on jetty.

In 1891 the fatal accidents were 21, and the non-fatal accidents 54. Seven of the fatal ones happened from falls of coal, 1 by fall of roof-stone, 4 from falls of stone in sinking-shafts, 2 by skips, 1 by a pit inundation, 1 by being suffocated in a coal-hopper, 1 by being injured at screens, 1 by fire-damp, and 3 by waggons.

Twenty-six of the non-fatal accidents occurred from falls of coal, 8 from falls of stone roof, 8 injuries from skips, 1 by a descending cage, 4 by blasting-powder, 1 by a horse-whim, 1 blow from a sprag, 1 by winch handle, 1 by a horse, 1 by a prop, 1 by a waggon, and 1 by a trolley.



RETURN showing the number of fatal and non-fatal accidents; those caused by "falls of coal," stone "roof"; and Lithgow, Ferndale, Bulli, A. A. Co.'s Hamilton Pit, and South Burwood Sinking Pit disasters, 1873 to 1893 inclusive.

Year.	Fatal accidents.	Remarks on fatal accidents.	Non-fatal accidents.	Remarks on non-fatal accidents.	Men above and below ground.	Tons of coal raised.	Tons of coal raised per life lost.
1873...	18	9 by falls of coal .....	10	4 by falls of coal, 1 by stone roof * .....	.....	1,192,862	91,758
1874...	5	3 by falls of coal, 2 by stone roof .....	18	6 by falls of coal, 4 by stone roof * .....	.....	1,304,612	260,922
1875...	8	4 by falls of coal, 3 by stone roof .....	10	6 by falls of coal .....	3,308	1,329,729	166,216
1876...	4	2 by falls of coal, 1 by stone roof .....	8	4 by falls of coal .....	4,084	1,819,918	329,979
1877...	7	4 by falls of coal, 1 by stone roof .....	21	16 by falls of coal .....	4,657	1,444,271	206,324
1878...	8	2 by falls of coal, 1 by stone roof .....	15	12 by falls of coal, 1 by stone roof	4,792	1,575,497	196,937
1879...	5	2 by falls of coal, 2 by stone roof .....	19	10 by falls of coal .....	5,035	1,583,381	316,676
1880...	8	4 by falls of coal, 1 by stone roof .....	19	8 by falls of coal .....	4,676	1,466,180	183,272
1881...	2	2 by falls of coal .....	33	25 by falls of coal .....	4,008	1,769,597	884,798
1882...	12	10 by falls of coal .....	33	23 by falls of coal .....	4,487	2,109,282	175,773
1883...	15	8 by falls of coal, 1 by stone roof .....	34	15 by falls of coal, 4 by stone roof	5,491	2,521,457	168,096
1884...	14	6 by falls of coal, 2 by stone roof .....	34	14 by falls of coal, 6 by stone roof	6,227	2,749,109	196,364
1885...	11	7 by falls of coal, 2 by stone roof .....	40	13 by falls of coal .....	7,097	2,878,863	261,714
1886...	29	10 by falls of coal, 1 by stone roof, 8 by Lithgow disaster, 1 by Ferndale flooding.	43	15 by falls of coal, 2 by fall of roof	7,847	2,830,175	97,592
1887...	94	81 killed by Bulli catastrophe, 5 by falls of coal, 2 by falls of stone roof.	45	22 by falls of coal, 5 by fall of stone roof.	7,998	2,922,497	31,090
1888...	15	5 by falls of roof .....	43	12 by falls of coal, 4 by stone roof	9,301	3,203,443	213,562
1889...	41	11 by crush at Hamilton Pit, 11 by falls of coal, 4 by over-winding at South Burwood.	57	24 by falls of coal .....	10,277	3,655,832	89,161
1890...	13	4 by falls of coal, 1 by fall of roof .....	36	17 by falls of coal, 3 by stone roof	10,315	3,060,876	236,145
1891...	21	7 by falls of coal, 3 by fall of roof .....	54	27 by falls of coal, 6 by stone roof	10,820	4,037,929	192,282
1892...	8	4 by falls of coal, 3 by fall of roof .....	77	38 by falls of coal, 10 by stone roof	10,514	3,780,967	472,620
1893...	13	10 by falls of coal, 1 by fall of stone ...	45	22 by falls of coal, 5 by fall stone	9,971	3,278,327	252,179

\* Figures not available.

The returns of the collieries raising coal and shale (boghead mineral) which have been collected and forwarded to me by the Mining Department show the following figures for the year 1893 :—

#### COAL RETURN.

	Northern District.	Southern and South-western Districts.	Western District.	Total.
Tons of round and small coal raised .....	tons cwt. qr. 2,203,480 10 0	tons cwt. qr. 884,469 0 0	tons cwt. qr. 190,377 19 1	tons cwt. qr. 3,278,327 9 1
Value of round and small coal raised ...	£ s. d. 880,218 4 3	£ s. d. 248,262 5 10	£ s. d. 43,241 14 5	£ s. d. 1,171,723 4 6
Persons employed above ground .....	Number. 1,327	Number. 348	Number. 44	Number. 1,719
Persons employed under ground .....	Number. 6,491	Number. 1,500	Number. 261	Number. 8,252

#### PETROLEUM OIL CANNEL COAL OR BOGHEAD MINERAL RETURNS.

##### Western and Southern Districts

Tons of boghead mineral or petroleum oil cannel coal .....	55,660 tons 6 cwt.
Value of boghead mineral or petroleum oil cannel coal raised .....	£101,220 10s.
Persons employed above ground .....	68
Persons employed under ground .....	317

#### COKE RETURN.

Northern District .....	Tons. 12,262	} Value, 20,233 2 0
Southern and Western Districts .....	5,596	

COMPARATIVE

## COMPARATIVE statement of Returns for 1892-93.

	Men above ground.	Men below ground.	Tons of round and small coal.		Value.		
			tons.	cwt. qr.	£	s.	d.
<b>NORTHERN DISTRICT.</b>							
Australian Agricultural, Newcastle, Wallsend, Newcastle Coal, Lambton, Co-operative, Brown's, Duckenfield, South Waratah, Ferndale, Wickham and Bullock Island, Hetton, Burwood, Stockton, West Burwood, West Wallsend, New Lambton, C Pit, Bloomfield, Thornley, Greta, New Anvil Creek, Rix's Creek, Ellesmere, New Park, Rosedale, Dulwich, Centenary, East Lambton, Ebbw Vale, South Wallsend, Summerhill, East Greta, Gartlee, Morriset, Burwood Extended, Wallarah, Elemore Vale, Rotunda, Dudley, Denton Park, Maryland, Hillside, Marshall's, Morley, Pioneer, Seaham, Toronto, Pacific, Rays, South Rathluba, South Stockton, Thornton, Rose Hill, Bebside, Electric, Sunlight, Inganea, Liddles, Kyuga.	1,327	6,491	2,203,480	10 0	880,218	4	3
Total in 1893 (exclusive of the men engaged in sinking) .....	1,327	6,491	2,203,480	10 0	880,218	4	3
Total in 1892 .....	1,421	6,783	2,611,731	13 0	1,102,694	14	5
Decrease in 1893 .....	94	292	408,251	3 0	222,476	10	2
<b>SOUTH AND SOUTH-WESTERN DISTRICTS.</b>							
Metropolitan, Coal Cliff, South Bulli, Osborne, Wallsend, Mount Kembla, Australian Kerosene Oil and Mineral Co., Bellambi, Corrimal, Mount Pleasant, Great Southern, Bulli Pass, South Clifton, Box Vale, North Bulli .....	348	1,500	884,469	0 0	248,262	5	10
Total in 1893 .....	348	1,500	884,469	0 0	248,262	5	10
„ 1892 .....	391	1,469	932,873	0 1	302,279	1	3
Decrease in 1893 .....	43	.....	48,404	0 1	54,016	15	5
Increase „ .....	.....	31	.....	.....	.....	.....	.....
<b>WESTERN DISTRICT.</b>							
Katoomba, Main Camp, New South Wales Shale and Oil Co., Oakley Park, Vale, Zig Zag, Vale of Clwydd, Lithgow Valley, Eskbank, Eskbank Old Tunnel, Hermitage, Coorwull, Rawdon, Irondale, Cullen Bullen, Australian Kerosene Oil Company, Lidsdale, Piper's Flat .....	44	261	190,377	19 1	43,241	14	5
Total in 1893 .....	44	261	190,377	19 1	43,241	14	5
„ 1892 .....	78	372	236,368	1 0	57,414	13	8
Decrease in 1893 .....	34	111	45,985	1 3	14,172	19	3

From these returns we find that in the Northern District, in the year under notice, there has been a decrease of 408,251 tons in the quantity of coal raised, and £222,476 in value.

In the South and Western Districts there has been a decrease of 48,404 tons, and £54,016 in the value.

In the Western District there has been a decrease of 45,985 tons, and £14,172 in the value.

Years.	Exports to Intercolonial Ports.			Exports to Foreign Ports and United Kingdom and other British Possessions.			Total Exports.			Home consumption.
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	
1891 .....	Tons	£ s. d.	£	Tons.	£ s. d.	£	Tons.	£ s. d.	£	Tons.
1892 .....	1,397,256	0 10 0 30	700,380	847,473	0 10 10 43	460,585	2,244,729	0 10 4 12	1,160,065	1,783,200
1893 .....	1,319,008	0 8 10 89	587,016	873,697	0 10 10 20	441,379	2,191,705	0 9 4 81	1,023,395	1,589,202
1894 .....	1,160,238	0 8 6 05	493,372	674,652	0 9 6 35	321,557	1,835,090	0 8 10 57	814,929	1,443,238
	3,876,502	0 9 2 27	1,780,768	2,396,022	0 10 2 55	1,223,521	6,271,524	0 9 6 96	3,004,289	4,825,700

Years.	Total output and value.			Coal raised per each person employed in and about the mines.			Value of coal raised per each person employed in and about the mines.			Tons of coal raised per each life lost.		
	Quantity.	Average per ton.	Value.	Quantity.	Average tons per each person employed.	Persons employed.	Value.	Average value per each person employed.	Persons employed.	Quantity.	Average tons per each life lost.	Lives lost.
1891 .....	Tons.	£ s. d.	£	Tons.	Tons.	Number.	£	£ s. d.	Number.	Tons.	Tons.	Number.
1892 .....	4,037,929	0 8 7 58	1,742,795	4,037,929	373	10,820	1,742,795	161 1 5	10,820	4,037,929	192,232	21
1893 .....	3,780,967	0 7 8 35	1,462,328	3,780,967	359	10,514	1,462,328	139 1 9	10,514	3,780,967	472,620	3
1894 .....	3,278,328	0 7 1 78	1,171,722	3,278,328	329	9,971	1,171,722	117 10 3	9,971*	3,278,328	262,179	13
	11,097,224	0 7 10 65	4,376,905	11,097,224	354	31,305	4,376,905	139 16 3	31,305	11,097,224	264,219	42

\* Exclusive of the men engaged in sinking for coal.

## OUR COAL TRADE—THE CALIFORNIAN MARKET.

(From the *Newcastle Herald and Advocate*, 8 February, 1894.)

ADVICES from California received last mail are more encouraging, and the outlook for our coal trade with that country is brighter than it has been for some time. The firm of Mr. R. B. Wallace has received Mr. J. W. Harrison's annual report of the coal trade of California for 1893. The report says:—"The coal trade for 1893 has been very steady, the highest and lowest values not varying over 50 cents per ton. Importers have profited by last year's experience, and at no time has the market

market been overloaded by the arrival of hmoold cargoes. Business for the moment has come to a standstill, and will show no vitality until we shall ascertain whether bituminous coal shall remain dutiable or not. It really appears a travesty on common intelligence to justify the maintenance of 75 cents per ton duty on an article which costs only 10 cents per ton more to produce in Pennsylvania, of which 46,000,000 tons were produced last year. Coal should never have appeared on the tariff, as outside California the revenue collected from it is merely nominal. There will be less than one million dollars collected for duties on coal in the United States in 1893, and we in California will contribute at least 690,000 dollars." The report then goes on to show the prices of the various coals during each month of the year in San Francisco. The lowest prices during the year were in January, when Newcastle coal sold at 6 dollars 37 cents per ton; English steam, 6 dollars 50 cents; Scotch splint, 7 dollars; West Hartley, 7 dollars 50 cents. The highest prices ruled from April to September, when Newcastle coal sold at 6 dollars 75 cents, English steam coal at the same figure, while Scotch splint was quoted at 7 dollars 25 cents, and West Hartley at 7 dollars 50 cents.

The figures showing the imports of coal into California in 1893 are interesting. The total quantity imported was 1,479,785 tons, as compared with 1,593,850 tons in 1892, 1,702,833 tons in 1891, and 1,204,555 in 1890. Last year Australia sent to San Francisco 202,017 tons, against 314,280 tons in 1892, 321,197 tons in 1891, and 194,725 tons in 1890. British Columbia heads the list as usual, having sent 588,527 tons to the State, as compared with 554,600 tons in 1892, 652,657 tons in 1891, and 441,759 tons in 1890. The quantity of English and Welsh coal received in 1893 was 151,269 tons, while in 1892 the imports of this coal amounted to 210,660 tons; in 1891, 169,586 tons; and in 1890, 35,662 tons. The coast mines of California continue to be developed rapidly, and last year Carlen Hill and South Prairie sent to Frisco 261,435 tons, as against 218,390 tons in 1892, and 196,750 tons in 1891. The importation of the much-advertised Japanese coal into California is very small, and in 1893 this source of supply sent only 7,758 tons, as against 4,220 tons in 1892, 20,679 tons in 1891, and 13,170 tons in 1890.

NORTHERN DISTRICT.

Number of persons employed in and about the mines .....	7,818
Number of persons employed under ground.....	6,491
Quantity of coal raised in tons.....	2,203,480 10 0
Number of non-fatal accidents.....	31
Number of lives lost by accidents .....	10
Persons employed per each non-fatal accident.....	252
Persons employed per each life lost .....	781
Tons of round and small coal raised per each non-fatal accident .....	77,090
Tons of round and small coal raised per each life lost .....	220,348
Tons of coal raised per each person employed in and about the mines .....	281
Tons of coal raised per each person employed under ground.....	339
Value of coal raised .....	£880,218 4 3
Value of coal raised per each person employed in and about the mines .....	112 11 9
Value of coal raised per each person employed under ground .....	135 12 1

SOUTHERN AND SOUTH-WESTERN DISTRICT.

Number of persons employed in and about the mines .....	1,848
Number of persons employed under ground .....	1,500
Quantity of coal raised in tons .....	884,469
Number of non-fatal accidents.....	14
Number of lives lost by accidents .....	2
Persons employed per each non-fatal accident .....	132
Persons employed per each life lost .....	924
Tons of round and small coal raised per each non-fatal accident.....	63,176
Tons of round and small coal raised per each life lost.....	442,234
Tons of coal raised per each person employed in and about the mines .....	478
Tons of coal raised per each person employed under ground.....	588
Value of coal raised .....	£248,262 5 10
Value of coal raised per each person employed in and about the mines.....	134 6 9
Value of coal raised per each person employed under ground .....	165 10 1

WESTERN DISTRICT.

Number of persons employed in and about the mines.....	305
Number of persons employed under ground.....	261
Quantity of coal raised in tons.....	190,377 19 1
Number of non-fatal accidents.....	Nil.
Number of lives lost by accidents .....	1
Persons employed per each non-fatal accident.....	No non-fatal accident.
Persons employed per each life lost.....	305
Tons of round and small coal raised per each non-fatal accident.....	No non-fatal accident.
Tons of round and small coal raised per each life lost .....	190,377 19 1
Tons of coal raised per each person employed in and about the mines .....	624
Tons of coal raised per each person employed under ground.....	729
Value of coal raised .....	£43,241 14 5
Value of coal raised per each person employed in and about the mines.....	141 15 6
Value of coal raised per each person employed under ground .....	165 13 6

The following table shows comparisons between the year under notice and the preceding year, as regards the proportion the accidents and deaths bear to the persons employed, and the quantity and value of the coal for each person employed in and about the mines and under ground in the Northern, Southern, and Western Districts.

	Northern District.		Southern and South-western Districts.		Western District.	
	1892.	1893.	1892.	1893.	1892.	1893.
Number of persons employed in and about the mines	8,204	7,818	1,860	1,848	450	305
Number of persons employed under ground.....	6,783	6,491	1,400	1,500	372	261
Quantity of coal raised in tons .....	2,611,731	2,203,480	932,878	884,469	296,363	190,377
Number of non-fatal accidents .....	59	31	16	14	3	Nil
Number of lives lost by accident .....	6	10	Nil	2	2	Nil
Persons employed per each non-fatal accident .....	131	252	116	123	226	Nil
Persons employed per each life lost .....	1,807	781	Nil	924	225	305
Tons of round and small coal raised per each non-fatal accident.....	44,266	77,090	58,304	63,176	118,121	Nil
Tons of round and small coal raised per each life lost .....	435,288	220,348	Nil	442,234	112,181	190,377
Tons of coal raised per each person employed in and about the mines.....	218	281	502	478	125	624
Tons of coal raised per each person employed under ground.....	386	339	635	588	64	729
Value of coal raised .....	£ 1,102,694 14 5	£ 880,218 4 3	£ 302,279 1 3	£ 248,262 5 10	£ 57,414 13 8	£ 43,241 14 5
Value of coal raised per each person employed in and about the mines.....	134 8 2	112 11 9	162 10 4	134 6 9	127 11 9	141 15 6
Value of coal raised per each person employed under ground.....	162 11 4	135 12 1	205 15 5	165 10 1	154 6 9	165 13 6

The following statistical return, furnished by Mr. Logan, the Collector of Customs, Newcastle, shows that the greatest increase in the export of coal from that port has been:—Java, 9,567 tons; Hong Kong, 4,414; United Kingdom, 1,438; Madagascar, 760; and the greatest decreases are to Victoria, 147,481; Chili, 50,794; Singapore, 21,933; Peru, 1,934; United States, 14,826; Philippine Islands, 12,639; South Australia, 10,963; New Caledonia, 9,859; Queensland, 7,078; and Tasmania, 7,037.

NEWCASTLE.—New South Wales export of Coal during the years 1892 and 1893.

Countries	1892.	1893.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.
Victoria.....	791,960	644,479	.....	147,481
New Zealand .....	154,276	154,294	18	.....
South Australia .....	138,186	127,223	.....	10,963
Queensland .....	20,089	13,611	.....	7,078
Tasmania .....	69,042	62,005	.....	7,037
Western Australia .....	24,652	19,980	.....	4,672
Hong Kong .....	15,696	20,110	4,414	.....
United States .....	224,095	209,269	.....	14,826
Java .....	20,966	30,533	9,567	.....
Ecuador.....	1,060	1,318	258	.....
New Caledonia.....	20,296	10,437	.....	9,859
Celebes Islands.....	1,323	.....	.....	1,323
Mauritius .....	8,440	5,841	.....	2,599
Fiji.....	11,614	6,265	.....	5,349
India .....	29,424	28,283	.....	1,141
Philippine Islands .....	45,878	33,239	.....	12,639
Peru .....	32,055	12,711	.....	19,344
Chili .....	192,734	141,940	.....	50,794
Sandwich Islands .....	35,779	32,139	.....	3,640
Mexico .....	8,191	3,643	.....	4,548
South Sea Islands .....	3,113	386	.....	2,727
Singapore .....	31,833	9,900	.....	21,933
United Kingdom.....	3,668	5,106	1,438	.....
Ceylon .....	6,171	2,700	.....	3,471
Madagascar .....	1,302	2,062	760	.....
Annam .....	692	.....	.....	692
Kamschatka.....	1,600	.....	.....	1,600
Other Countries .....	.....	4,062	4,062	.....
Panama .....	.....	2,346	2,346	.....
<b>Total .....</b>	<b>1,894,735</b>	<b>1,583,882</b>	<b>22,863</b>	<b>333,716</b>

COKE.				
	1892.	1893.	Increase.	Decrease.
Victoria.....	470	49	.....	421
Tasmania .....	189	.....	.....	189
New Zealand .....	65	81	16	.....
New Caledonia.....	250	747	497	.....
South Australia .....	.....	750	750	.....
<b>Total .....</b>	<b>974</b>	<b>1,627</b>	<b>1,263</b>	<b>610</b>

DECENNIAL RETURN.—Port of Newcastle.—Foreign and Intercolonial Ports.

Year.	Vessels cleared outwards for Foreign and Intercolonial Ports.		Total value of Imports from Foreign and Intercolonial Ports.	Quantity and value of Coal exported to Foreign and Intercolonial Ports.		Total value of Exports (inclusive of Coal) to Foreign and Intercolonial Ports.	Total amount of Revenue collected.
	No. of Vessels.	Tonnage.		Tons.	Value.		
1884	1,433	1,066,462	£ 788,653 0 0	1,505,395	£ 835,070 0 0	1,699,047 0 0	£ 108,720 0 0
1885	1,388	1,076,346	930,200 0 0	1,552,136	832,495 0 0	1,927,626 0 0	108,834 18 6
1886	1,335	1,097,382	843,474 0 0	1,544,694	828,189 0 0	1,398,728 0 0	119,131 15 0
1887	1,334	1,154,439	781,796 0 0	1,658,386	886,921 0 0	1,788,664 0 0	117,543 7 10
1888	949	815,516	758,586 0 0	1,580,337	852,083 0 0	2,067,460 0 0	126,036 7 9
1889	1,277	1,126,892	924,150 0 0	2,091,557	1,102,722 0 0	1,894,321 0 0	132,018 0 7
1890	916	842,180	816,694 0 0	1,628,038	875,197 0 0	1,768,379 0 0	124,782 14 10
1891	1,425	1,476,097	877,063 0 0	2,244,729	1,160,965 0 0	2,032,522 0 0	166,048 2 9
1892	1,307	1,381,318	765,083 0 0	1,894,735	879,482 0 0	1,846,953 0 0	191,394 12 10
1893	1,108	1,209,467	451,253 0 0	1,583,882	702,190 0 0	1,700,813 0 0	151,286 8 1

RETURN showing the quantity raised, price per ton, and value of the boghead mineral or petroleum oil (cannel coal), commonly called kerosene shale, from 1865 to 1893 inclusive.

Year.	Tons.	Average price per ton.	Value.	Year.	Tons.	Average price per ton.	Value.
1865	570	£ 4 2 5-47	£ 2,350 0 0	1880	19,201	2 6 7-03	44,724 15 0
1866	2,770	2 18 10-48	8,154 0 0	1881	27,894	1 9 2-59	40,748 0 0
1867	4,079	3 14 9-21	15,249 0 0	1882	48,065	1 15 0-00	84,114 0 0
1868	16,952	2 17 7-11	48,816 0 0	1883	40,250	1 16 10-77	90,861 10 0
1869	7,500	2 10 0-10	18,750 0 0	1884	31,618	2 5 7-85	72,176 0 0
1870	8,580	3 4 3-18	27,570 0 0	1885	27,462	2 8 11-62	67,239 0 0
1871	14,700	2 6 3-91	34,050 0 0	1886	43,563	2 5 10-79	99,976 0 0
1872	11,040	2 11 11-91	28,700 0 0	1887	40,010	2 3 10-43	87,761 0 0
1873	17,850	2 16 6-55	50,475 0 0	1888	34,896	2 2 2-26	73,612 0 0
1874	12,100	2 5 1-48	27,300 0 0	1889	40,561	1 18 3-55	77,666 15 0
1875	6,197	2 10 2-22	15,500 0 0	1890	56,010	1 17 2-07	104,103 7 6
1876	15,998	3 0 0-00	47,994 0 0	1891	40,349	1 18 8-90	78,160 0 0
1877	18,963	2 9 0-82	46,524 10 0	1892	74,197	1 16 8-16	130,079 6 0
1878	24,371	2 6 11-49	57,211 0 0	1893	55,660	1 16 4-44	101,220 10 0
1879	32,519	2 1 10-96	66,930 10 0				

The following notices were received during the year of new mines opening out or in course of development, mines re-opened, sinking of shafts, changing name of colliery, and colliery manager:—

*North Co-operative Colliery.*

Thomas Hill notified on 17th January having commenced mining operations on a portion of the Co-operative Estate.

*Wallarah Colliery.*

Mr. Thomas Parton, on 16th January, notified having appointed Joseph Sperrings colliery manager for the Wallarah Mine from date hereof.

*South Stockton.*

C. Faul and Son, on 9th February, notified that they were preparing to commence mining for coal at the South Stockton Colliery, Fennell's Bay.

*Abram Colliery.*

Mr. R. Tilden-Smith, on 10th March, notified having commenced to work the lower seam of the Abram Colliery.

*Cullen Bullen Colliery.*

Mr. Louis B. Blackwell, on 24th March, notified having appointed Mr. M. H. Costes his representative during his absence from the Colony.

*Denton Park Colliery.*

Mr. James H. Paul, on 8th April, notified having commenced to dig coal at the above colliery, lately worked by Messrs. Horsfield and Russell.

*Old Dog and Rat Colliery.*

David Hughes notified, on 17th April, his intention of opening out a portion of the Old Dog and Rat Colliery, on the east side of Lambton line.

*Lidsdale, Mudgee Road.*

Mr. John Maddox, on 4th May, notified having opened out a seam of coal at Lidsdale, near the Mudgee Road, for the purpose of supplying the inhabitants of Wallerawang and Lidsdale.

*Northumberland Colliery.*

Messrs. A. L. and J. Donaldson, jun., on 5th of May, notified their intention of working the Northumberland Land and Coal Company's mine, Fassifern.

*Rawden Colliery.*

Messrs. Cox Brothers notified, on 17th May, having leased the Rawden Colliery to miners on tribute, and that they will shortly be getting coal out.

*South Rathluba.*

Mr. William Shelton notified, on 6th June, having sunk a new pit on property adjoining Rathluba, within 2 miles of East Maitland. Size of pit, 8 ft. x 6 ft.; depth of pit, 80 feet; thickness of coal, 7 feet, including bands.

*Pioneer Colliery.*

Mr. James H. Paul notified, on 8th June, that he had started to get the water out of the Pioneer Colliery, and would start hewing coal as soon as possible.

*Dunkirk Colliery.*

Walter Hayes notified, on 11th July, having started a small colliery at New Lambton, formerly known as Dunkirk, near East Waratah tunnel.

*Gowrie Estate, Singleton.*

Mr. F. W. D. Parkes notified, on 24th July, of having taken a mineral lease of a piece of land from the Rev. Dr. White, of Singleton, to sink for coal, &c.

*Waratah Land-sale Colliery.*

Messrs. Tonks and Key notified, on the 5th September, that they were driving a tunnel to work a portion of the Waratah Company's land for coal to sell land-sale.

*Piper's Flat.*

Mr. G. Raffin notified, on 14th of September, having opened a coal-mine at Piper's Flat, on the Mudgee line.

*Tulip's New Colliery.*

Mr. Matthew Tulip gave notice (not dated), of his intention to open a coal-mine on Mr. F. Reynolds' Rathluba Estate, East Maitland.

*Electric Land-sale Colliery.*

Mr. William Metcalfe, on 13th October, notified having commenced coal-mining and working a shaft for land-sale purposes, better known as Charltons.

*Morrissett Colliery.*

Messrs. G. and D. Murray notified, on 16th October, of their intention to start working a little at the Morrissett Colliery, Lake Macquarie.

*Oakvale Colliery.*

Mr. F. W. D. Parkes notified, on 30th October, having commenced a tunnel near the Dulwich Colliery known as the Oakvale Colliery, on the east side of Dulwich Colliery, on Mr. Cunneen's ground, south side of the railway line.

*Beaside Colliery, Grovetown.*

On 18th December, Sarah Robson notified having a seam of coal underlying her allotment at Grovetown; had the same opened out.

*Sunlight Colliery.*

Mr. Hugh Sneddon, on 18th December, notified that he had sunk a shaft on his allotment and found coal.

*Grovetown, North Lambton.*

On 27th December Mr. Thomas Green gave notice that he had opened a coal pit on his allotment at Grovetown, North Lambton.

*Changing name of Colliery.*

Mr. Morgan Jones notified, on 3rd August, that the colliery formerly known as the "Northern Colliery" is now the "Pacific Colliery," owned by the Pacific Co-operative Steam Company.

## COAL-MINES ABANDONED OR WORK SUSPENDED DURING THE YEAR 1893.

*Denton Park Colliery.*

Mr. C. Horsfield notified, on 28th January, that Denton Park Colliery had stopped; failed to get the coal seam.

*Richmond Hill.*

Mr. F. Robbins, of Illawarra, on 8th March, sent the following notice:—"I beg to inform you that work is for the present suspended at Richmond Hill—that is, the Richmond Hill and Coraki Coal and Fire-clay Company, situated at Swan Bay, Richmond River. The suspension is indefinite."

*Pioneer Colliery.*

Mr. James H. Paul notified, on 8th April, having suspended work at the Pioneer Colliery for the present. Rutherford Estate, at the Pioneer Colliery, is flooded.

*Morrissett Colliery.*

Mr. P. Murray, on 24th April, notified, that, as there is no trade for their colliery at Lake Macquarie, they have decided to close the same for a time.

*Denton Park Colliery.*

On 8th June Mr. James H. Paul, managing proprietor, notified having resigned the management of Denton Park Colliery, and would not be in any way connected with it in future.

*Dog and Rat, Waratah.*

On 8th August David Hughes gave notice that he had ceased all work at the Old Dog and Rat, and filled up all shafts.

*Inganee Colliery.*

On 25th September Mr. Matthew Tulip notified his intention to suspend operations for a time at his coal-mine, Inganee, Four-mile Creek.

*Coal property, Awaba.*

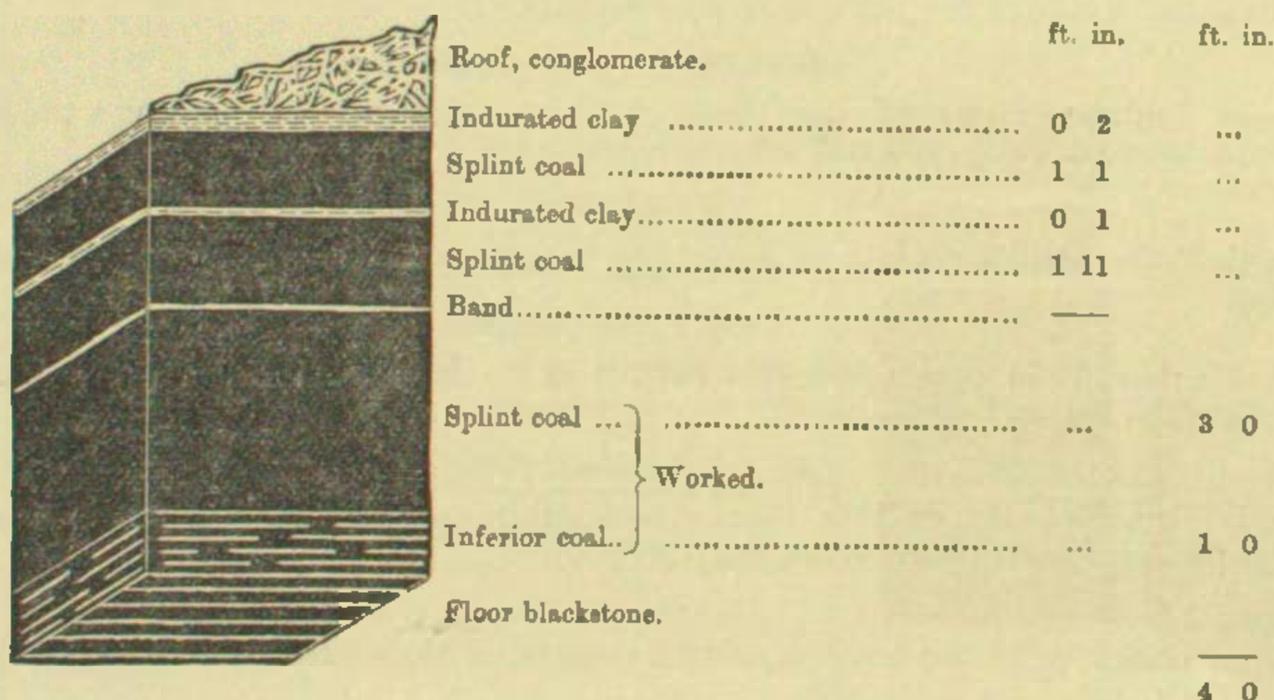
On 10th October Mr. W. D. Bedlington gave notice that operations upon the property of the New South Wales Coal Company, at Awaba, have been temporarily suspended.

*Dunkirk, New Lambton.*

On 18th November Richard Lathlean notified having abandoned Dunkirk Colliery.

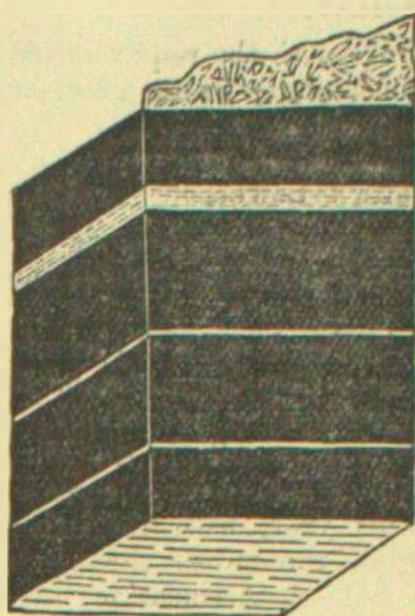
*Sunderland Colliery.*

On 3rd December Mr. Matthew Tulip notified that, owing to the quantity of water and inferiority of the coal at Rathluba, he had abandoned the same finally.



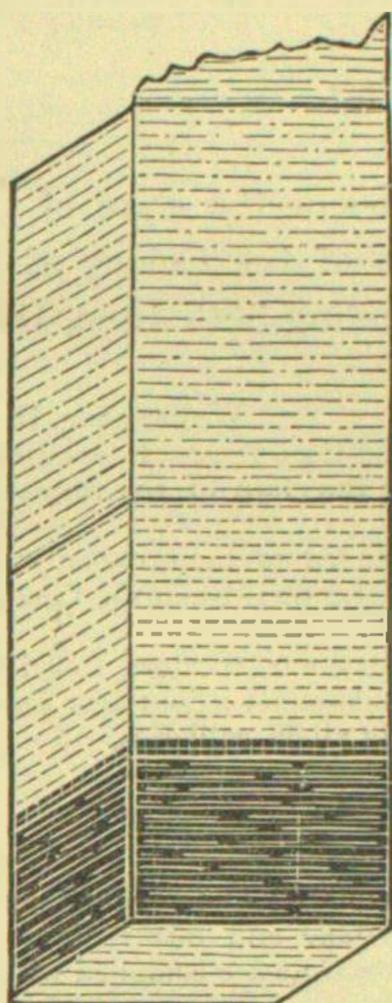
This is a section of the Lithgow coal seam, worked on Maddox's 21½ acres, adjacent to Cox's River, in the parish of Lidsdale, county of Cook.

The coal seam has a slight dip to the north-east.



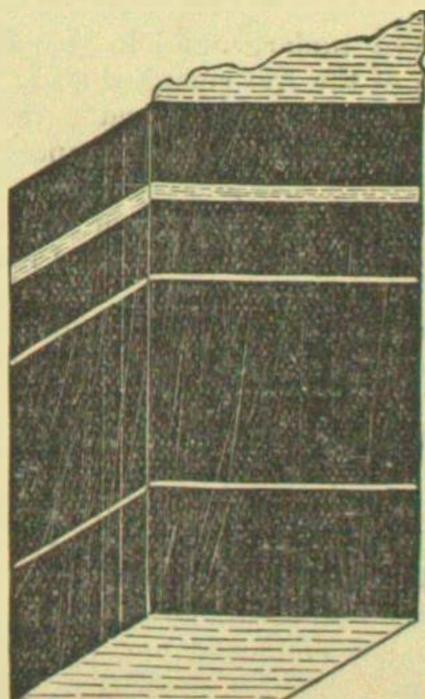
	ft. in.
Conglomerate roof.....	
Splint coal.....	1 3
Indurated clay .....	0 2½
Splint coal.....	1 9
Band .....	0 0½
Splint coal.....	1 9
Band .....	0 0½
Splint coal.....	1 0
	6 0

The above is a section of the Lithgow coal-seam, now being worked at the Ivanhoe Colliery by Mr. George Raffan on his 1,280 acres (Lawson's grant) at Piper's Flat, opposite railway station, in the parish of Falnash, county of Cook.



	ft. in.	ft. in.
Blue shale .....	5 ft. to	6 0
Indurated clay .....	3 0	
Boghead mineral.....	...	0 4
„ best quality .....	...	2 6
		2 10

The above is a section of the boghead mineral (petroleum oil cannel coal) opened out by Messrs. Corbett and others on mineral lease 20, adjacent to Capertee River, near Glen Alice, in the parish of Gindantharie, county of Cook, at a height of about 1,608 feet above sea level.



	ft. in.	ft. in.
Coal and bands .....	10 6	
Splint coal .....	...	1 3
Band.....	...	0 2½
Splint coal, &c. ....	...	1 2
Band .....	...	0 1
Splint coal, with thin layers of bituminous coal .....	...	3 1
Band.....	0 1	...
Coal and bands .....	3 1	
		5 8½

The above is a section of the coal worked at the Box Vale Colliery at the Nattai River, near Mittagong, in the parish of Jellore, county of Camden.

## COMPLAINTS MADE OF DEFICIENT VENTILATION, &amp;c.

Sundry complaints of deficient ventilation and non-compliance with the requirements of the "Coal Mines Regulations Act, 1876," have been inquired into, and proceedings, where necessary, have been taken to enforce the provisions of the Act, and reports furnished thereon.

## COAL UNLAWFULLY TAKEN FROM CROWN LANDS.

Reports and surveys have been made on coal unlawfully taken from Crown lands by the Stockton, Wickham and Bullock Island, Hetton, and Burwood Coal Companies, and large sums of money have been paid to the Department for coal so taken.

In conclusion, I have only to add there were 97 coal and 4 boghead mineral (petroleum oil cannel coal) mines under inspection, and that notices have been received of 23 new mines opening out, or in course of development, reopening, sinking, &c., and of 10 having suspended operations. Also, that the year's returns show a large falling off in the coal trade of the Colony, especially in the Northern District, of 408,251 tons of round and small coal raised, and £222,476 in value. This year's decrease in the output of coal in the Newcastle District is greater than that of any previous year, with the exception of 1890, when there was a decrease of 504,301 tons, owing to the closing of the mines through a struggle for mastery between labour and capital commenced by the Maritime Labour Association, which lasted ten weeks, viz., from 28th August to 7th November, on which day most of the collieries resumed operations.

In the South and South-western Districts there has been a decrease of 48,404 tons and of £54,016 in value, and in the Western a decrease of 45,985 tons and £14,172 in value.

I have, &c.,

JOHN MACKENZIE, F.G.S.,  
Examiner of Coal-fields.

THE Half-yearly Report of the Inspector of Collieries on the state of the various Collieries in the Southern and Western Districts of the Colony of New South Wales, and Accidents therein for the half-year ending 30th June, 1893.

The Examiner of Coal-fields,—  
Sir,

Wollongong, 13 July, 1893.

In compliance with the requirements of clause 26 in the Coal Mines Regulation Act, 1876, I have the honor to transmit to you this, my six-monthly report, on the state of the various collieries for the half-year ending 30th June, 1893.

During the last six months two new collieries have been added to the number, viz., Piper's Flat Coal-seam, about half a mile north-east from Piper's Flat railway-station; Maddix's Coal-mine, about 2 miles north from Wallerawang.

The total number of collieries under inspection in the Southern and Western Districts during the last six months is 36. Western District, 17 coal-mines and 4 shale-mines; Southern District, 12 coal-mines; Berrima District, 2 coal-mines and 1 shale-mine; making in all 36 collieries.

## PRESENT STATE OF MINES.

## WESTERN DISTRICT.

*Lithgow Valley Colliery.*—About 46 men and horses are employed underground, and served with 22,500 cubic feet of air per minute in two separate splits. The intake and return airways and second ways to the day, in good order. The provisions of the Act in all respects are complied with.

*Hermitage Colliery.*—About 43 men and horses are employed underground, and supplied with 20,000 cubic feet of air per minute in one current. The travelling-road, intake and return airways are in good order. The Act in every respect complied with.

*The Vale Colliery.*—About 40 men are employed underground, and served with 20,000 cubic feet of air per minute in one current. The air-current is well sustained, and the Act in all matters complied with.

*Zig-Zag Colliery.*—About 40 men and horses are employed underground in this mine, and are supplied with 15,000 cubic feet of air per minute. The provisions of the Act complied with.

*Oakey Park Colliery.*—There are about 38 men, &c., employed underground, and served with 18,000 cubic feet of air per minute in one current. The airways and all other matters in connection with the Act complied with.

*Eskbank and Old Tunnel.*—About 50 men and horses are employed underground and served with 23,000 cubic feet of air per minute in two separate currents. Travelling road intake and return airways in good order. The Act in all matters complied with.

*Vale of Clwydd Colliery.*—There are about 36 men employed and served with 16,000 cubic feet of air per minute. The ventilation is satisfactory and the provisions of the Act in other matters also is complied with.

*Cullen Bullen Colliery.*—About 20 men are employed underground and supplied with 15,000 cubic feet of air per minute. The Act in every respect complied with.

*New South Wales Shale Mines (Hartley).*—About 80 men are employed underground and supplied with 12,000 cubic feet of air per minute. Shaft division of workings, 40 men are employed and served with 6,000 cubic feet of air per minute. Brick-yard tunnel 40 men employed and served with about 6,000 cubic feet of air per minute. The shaft and tunnel are worked on the Longwall system, and every care taken by the manager to ensure safety. Coal tunnel, 6 men are employed and served with 4,000 cubic feet of air per minute. The Act in all respects complied with.

*The Australian Kerosene Oil Company's Shale Mines (Karoomba), Mort's Shale Mine.*—About 95 men and horses are employed underground and served with 12,000 cubic feet of air per minute in three separate currents. The colliery is worked on the Longwall system. The pack walls and propping are well carried out in every bord.

Ruined

*Ruined Castle Shale Mines.*—About 23 men are employed and served with 3,500 cubic feet of air per minute. The Act in all matters complied with.

*Irondale Colliery.*—About 12 men are employed underground, and served with 6,000 cubic feet of air per minute. The Act in other matters complied with.

*Genowlan Shale Mine.*—About 20 men employed underground and supplied with 6,000 cubic feet of air per minute. This colliery is worked on the Longwall system and substantial pack-walls built in every bord. The Act in all other matters complied with.

*Cooerwull Mine.*—Only one man employed getting a few tons of coal weekly for the tweed factory. The Act complied with.

*Rawden Colliery.*—During the last half year little work has been done. Only two men getting coal. The Act complied with.

*Piper's Flat Coal Seam.*—The main heading has been driven in a distance of 40 yards. An air shaft has been sunk. No men are working underground at present, but several men are employed on the surface making a tram-railway to connect the colliery with Cullen Bullen lime works.

*Maddix's Coal Mine.*—Only one man driving a heading to prove the thickness of coal.

#### SOUTHERN COLLIERIES.

*Metropolitan Colliery.*—The main north intake, 277,200 cubic feet of air per minute; main south intake, 88,000; total intake for the colliery, 365,200 cubic feet of air in circulation per minute. Nos. 5 and 6, 19 men and horses are employed, and supplied with 28,560 cubic feet of air per minute. No. 2 west, 30 men, and supplied with 18,000 cubic feet of air per minute. No. 4 left, 48 men and horses, and served with 36,495 cubic feet of air per minute. No. 4 right, 40 men and horses, and served with 23,625 cubic feet of air per minute. South jig, right hand, 28 men, and served with 44,550 cubic feet of air per minute. South jig, left hand, 21 men and horses are employed and served with about 2,000 cubic feet of air per minute for each man and horse. North jig, 11 men and horses, and served with 43,200 cubic feet of air per minute. All the miners in this colliery work with locked safety-lamps, and every care exercised by the management to ensure safety. The Act in every respect complied with.

*Coal Cliff Colliery.*—An average of 15 men during the last half year have been employed, and served with 10,000 cubic feet of air per minute. The Act in all respects complied with.

*South Clifton Colliery.*—About 74 men employed underground, and served with about 30,000 cubic feet of air per minute in two separate currents. The colliery is well ventilated throughout, and the Act in every other respect complied with.

*North Illawarra Colliery.*—About 70 men and horses are employed underground, and served with about 20,000 cubic feet of air per minute. The Act in all other matters complied with.

*Bulli Pass Colliery.*—About 20 men employed underground, and served with 12,000 cubic feet of air per minute. The intake and return air-ways and second way to the day in good order.

*Bulli Colliery.*—No miners have been at work during the last half year, only a few day men keeping the airways in repair.

*Bellambi Colliery.*—About 70 men employed underground, and served with about 18,000 cubic feet of air per minute. The Act in all matters complied with.

*South Bulli Colliery.*—About 200 men and horses employed underground, and served with about 45,000 cubic feet of air per minute. During the half year, several of the main returns have been repaired and brick stoppings have been put in the main intakes. The colliery is well ventilated throughout, and the Act in all other matters complied with.

*Corrimal Colliery.*—About 60 men employed underground, and served with 18,000 cubic feet of air per minute in two separate splits. The Act in all matters complied with.

*Mount Pleasant Colliery.*—About 120 men employed underground, and served with about 30,000 cubic feet of air per minute in two separate splits. The ventilating currents are well directed round the workings, and the bords are exceptionally well timbered. The Act in all other matters complied with.

*Osborne Wallsend Colliery.*—About 95 men and horses employed underground, and served with about 30,000 cubic feet of air per minute in 3 separate splits. The bords are well timbered, and the Act in all other matters complied with.

*Mount Kembla Colliery.*—An average of about 200 men and horses are employed underground, and served with about 45,000 cubic feet of air per minute in 4 separate splits. None of the districts are overcrowded with men, and the provisions of the Act in all matters complied with.

#### BERRIMA DISTRICT.

*The Australian Kerosene Shale Mines (Joadja).*—About 80 men are employed underground. Incline tunnel, about 30 men employed, and served with 5,000 cubic feet of air per minute. No. 2 tunnel, about 20 men employed, and served with 4,000 cubic feet of air per minute. No. 5 tunnel, 12 men employed, and served with 5,000 cubic feet of air per minute. About 18 men are employed in various portions of the mountain side driving adits in order to prove the thickness and quality of shale. The Act in all matters complied with.

*Box Vale Colliery (Mittagong).*—Only 2 men employed getting a few tons of coal weekly for local consumption.

*The Great Southern Colliery (Berrima).*—About 5 men employed underground, and supplied with 6,000 cubic feet of air per minute. The Act in other places complied with.

#### ACCIDENTS IN MINES.

During the last six months, I have investigated 9 separate accidents which have been fully reported upon. I have also investigated several other slight accidents which are not embraced in this report.

The first was a fatal accident to a deputy named George Patterson, at the Metropolitan Colliery, on 21st January, who was severely crushed by a fall of stone from the roof while drawing props in the pillar work, from the effects of which he died the same day. An inquest was held by the City Coroner, which I attended and fully agreed with the verdict of accidental death, as returned by the jury.

The second was a non-fatal to an onsetter named A. McGeachie, at the Metropolitan Colliery, on 13th February, who had his skull fractured by coal falling down the shaft.

The third to a wheeler named William Thomson at Corrimal Colliery, on 22nd February—leg broken, jammed by a skip on the road side.

The fourth non-fatal to a miner named W. Broadhead, at South Clifton Colliery, leg broken by a fall of stone.

The fifth non-fatal to C. Chesterton, at the Metropolitan Colliery, 15th April; thigh fractured by a fall of coal.

The sixth non-fatal to a miner named James Grills at the Metropolitan Colliery; skull fractured by a fall of coal.

The seventh non-fatal to a miner named James Mathieson, on 10th May, Metropolitan Colliery; leg broken by a fall of coal.

The eighth was a fatal accident which happened to a miner named O. A. Welch, who received fatal injuries by a fall of coal on 11th May, at the Metropolitan Colliery. He lived a few days, and died from the effects. An inquest was held by the District Coroner, at the Paragon Hotel, Helensburgh, which inquest I attended, and fully agree with the verdict of accidental death, as returned by the jury.

The ninth non-fatal to a miner named John Ripon, on 8th June, at the Metropolitan Colliery; ankle bruised by a fall of coal.

I have, &c.,

JAMES ROWAN,  
Inspector of Collieries.

TABULATED LIST of fatal and non-fatal accidents in the Southern and Western Districts of New South Wales Collieries investigated by the Inspector of Collieries during the half-year ending 30th June, 1893:—

No.	Date.	Colliery.	Sufferer.	Occupation.	Remarks, &c., on the nature and extent of injuries.	Killed while drawing props.	By coal falling down the shaft.	By a horse bolting.	By a stone at working face.	By a fall of coal at working face.	By a fall of coal at working face.	Fatal.	Non-fatal.
1	Jan. 21	Metropolitan	George Paterson	Deputy	Fatal injury by a fall of stone	1							
2	Feb. 12	"	A. M'Geachie	Onsetter	Skull fractured by a fall of coal		1						
3	" 22	Corrimal	William Thomson	Wheeler	Leg broken, jammed by a skip			1					
4	" 23	South Clifton	William Broadhead	Miner	Leg broken by a fall of stone				1				
5	Apl. 15	Metropolitan	C. Chesterton	"	Fracture of thigh by a fall of coal					1			
6	May 5	"	James Grills	"	Skull fractured by a fall of coal		1						
7	" 10	"	Jas. Mathieson	"	Leg broken by a fall of coal					1			
8	" 11	"	O. A. Welch	"	Fatal injury by a fall of coal						1		
9	June 8	"	John Ripon	"	Ankle bruised by a fall of coal							1	
						1	2	1	1	2	1	2	7

The Half-yearly Report of the Inspector of Collieries on the state of the various Collieries in the Southern and Western Districts of the Colony of New South Wales, and Accidents therein, for the half-year ending 31st December, 1893.

The Examiner of Coal-fields,—

Sir,

Wollongong, 25 January, 1894.

In compliance with the requirements of clause 26 in the Coal Mines Regulation Act, 1876, I have the honor to transmit to you this, my six-monthly report, on the state of the various collieries for the half-year ending 31st December, 1893.

The total number of collieries under inspection in the Southern and Western Districts during the last six months is thirty-two:—

Western District	...	...	...	14 coal-mines, and 3 shale-mines.
Southern	"	...	...	12 "
Berrima	"	...	...	2 " 1 "
				—
				28 " 4 "
				= 32 collieries.

#### PRESENT STATE OF MINES.

##### WESTERN DISTRICT.

*Australian Kerosene Oil Company (Katoomba) Shale Mines, Ruined Castle.*—About 80 men are employed underground, and served with 10,000 cubic feet of air per minute, in six separate currents. *Mort's Tunnels.*—Eighty-five men are employed and supplied with 12,000 cubic feet of air per minute in three separate splits. The shale mines are worked on the Longwall system. *Coal-mine.*—Six men employed, and served with 6,000 cubic feet of air per minute. The Act in all respects complied with.

*New South Wales Shale Mines (Hartley).*—About 140 men are employed underground, and served with 18,000 cubic feet of air per minute in four separate splits. During the last half-year several adits have been driven, to further test the extent of the shale deposits. The Act in all respects complied with. *Coal Mine.*—Five men are employed.

*Oakey Park Colliery.*—About 30 men are employed underground, and served with 15,000 cubic feet of air per minute, and the Act in all matters complied with.

*The Vale Colliery.*—About 30 men are employed underground, and served with 36,000 cubic feet of air per minute. The ventilation is good throughout the mine, and the Act in all other matters complied with.

*Zig-Zag Colliery.*—About 33 men are employed underground, and served with 15,000 cubic feet of air per minute. The Act in all respects complied with.

*The Vale of Clwydd Colliery.*—About 30 men are employed underground, and served with 18,000 cubic feet of air per minute. The Act in all other respects complied with.

*Eskbank*

*Enkbank Pit.*—About 26 men are employed underground, and supplied with 20,000 cubic feet of air per minute. The Act in all respects complied with. *Old Tunnel.*—Six men employed, and served with 6,000 cubic feet of air per minute.

*Lithgow Valley Colliery.*—Thirty-six men employed, and served with 22,000 cubic feet of air per minute. The ventilation is good, and the Act in every respect complied with.

*Hermitage Colliery.*—About 30 men are employed underground, and served with 18,000 cubic feet of air per minute. Intake and return airways in good order. The Act in all other matters complied with.

*Coerwill Mine.*—One man employed getting a few tons of coal weekly. The Act complied with.

*Piper's Flat Colliery.*—About 12 men are employed underground and served with 8,000 cubic feet of air per minute. The ventilation good, and the Act in all matters complied with.

*Ivanhoe Colliery.*—About 12 men employed, and served with 9,000 cubic feet of air per minute. Intake and return airways and second way to the day in good order. The Act in all matters complied with.

*Cullen Bullen.*—About 18 men are employed, and served with 18,000 cubic feet of air per minute. The Act in every other respect complied with.

*Genowlan Shale Mine.*—About 20 men are employed underground, and served with 2,500 cubic feet of air per minute. The mine is worked on the Longwall system, with good pack walls on each working place. The Act in all respects complied with.

*Rawden Colliery.*—Very little work has been done during the last half year, on account of no sale for the coal.

#### SOUTHERN DISTRICT.

*Metropolitan Colliery.*—About 280 men are employed underground, and served with about 330,000 cubic feet of air per minute in eight separate splits. All the miners and wheelers in this colliery work with locked safety lamps. The colliery is examined twice every twenty-four hours, and the condition of the mine recorded in a book and signed by the persons who make the examination. The Act in every matter complied with.

*Coal Cliff Colliery.*—About 26 men are employed underground, and served with 20,000 cubic feet of air per minute. The Act in all other respects complied with.

*South Clifton Colliery.*—About 140 men are employed underground, and served with 51,000 cubic feet of air per minute in two separate currents. The colliery is well-ventilated, and the Act in all matters complied with.

*North Bulli Colliery.*—About 80 men are employed underground, and served with 16,000 cubic feet of air per minute in two separate splits. The Act in all matters complied with.

*Bulli Pass Colliery.*—About 25 men are employed underground, and served with 10,000 cubic feet of air per minute. The Act in all matters complied with.

*Bellambi Colliery.*—About 60 men are employed, and supplied with 26,000 cubic feet of air per minute in two separate splits. Throughout the mine the roof at the working faces is very bad, but great care is taken by the management and miners to ensure safety. The Act in all respects complied with.

*South Bulli Colliery.*—About 200 men and horses are employed underground, and served with about 40,000 cubic feet of air in four separate splits. The ventilation is good throughout the mine. The Act in all respects complied with.

*Corrimal Colliery.*—About 130 men employed underground, and served with 24,000 cubic feet of air per minute in three separate splits. The roof, as a rule, is very bad, but every care is taken to ensure safety. The Act in all respects complied with.

*Mount Pleasant Colliery.*—About 130 men are employed underground, and served with 30,000 cubic feet of air per minute in two separate splits. The Act in all respects complied with.

*Osborne Wallsend.*—About 130 men and horses are employed underground, and served with 30,000 cubic feet of air per minute in two separate currents. The ventilating currents were well conducted round the workings, and the Act in all other matters complied with.

*Mount Kembla.*—About 200 men are employed underground, and served with 68,000 cubic feet of air per minute in six separate splits, each split being supplied with a separate and distinct current of fresh air. None of the splits are overcrowded. The requirements of the Act are also complied with in other respects.

#### BERRIMA.

*Australian Kerosene Oil Company (Joadja Creek).*—About 90 men are employed and served with about 20,000 cubic feet of air per minute in three separate currents. The above shale tunnels are worked on the Longwall system, and every care is taken to ensure safety. The Act in all respects complied with.

*Box Vale (Mit'agong).*—Three men at work, and served with 6,000 cubic feet of air per minute. The Act in other matters complied with.

*Great Southern (Berrima).*—Six men are employed and served with 10,000 cubic feet of air per minute. The intake and return airways and second way to the day in good order. The Act in other matters complied with.

#### ACCIDENTS IN MINES.

The accidents investigated by me in the southern and western districts during the half-year ending 31st December, 1893, are eight in number, one of which was fatal.

The first non-fatal happened a miner named James Craddick, on 12th August, who had his leg bruised while tipping a full skip at the screens at Corrimal Colliery. The second was a fatal accident, and happened at the Vale Colliery, on 23rd August, to an onsetter named Alex. Hogg. At the time of the accident he was lifting a piece of coal out of the bottom of the shaft, when the descending cage struck him, from the effects of which he died. An inquest was held on the following day by the district Coroner (near the Vale Colliery).

Inspector Dixon attended the inquest, and fully agreed with "Accidental" death as returned by the jury. The second non-fatal accident happened a miner named Thomas Evans, at Corrimal Colliery, on 3rd October, who had his leg broken by an empty skip on the surface incline. The third non-fatal accident happened a miner named John Edwards, at the Metropolitan Colliery on 6th October, who received injuries while drawing a prop in the pillar work.

The fourth non-fatal accident happened a miner named Peter Owen, at North Illawarra Colliery on 8th November, who had three of his toes chopped off by a fall of stone. The fifth non-fatal accident happened

happened to a lad named John Riddley, greaser, at the Metropolitan Colliery, on 27th November, who had his leg severely crushed by a full skip at the bottom of the shaft; afterwards the leg was amputated. The sixth non-fatal happened a lad named Albert Askew, who had his shoulder dislocated by an empty skip at Osborne Wallsend Colliery on 27th November. The seventh non-fatal happened to an onsetter named John McGeachie, at the Metropolitan Colliery, on 29th November, who had his leg broken by a piece of coal falling down the shaft.

The usual tabulated list of accidents is hereto appended.

I have, &c.,

JAMES ROWAN,

Inspector of Collieries.

TABULATED LIST of Fatal and Non-fatal Accidents in the Southern and Western Districts of New South Wales Collieries, investigated by the Inspector of Collieries during the half-year ending 31 December, 1893.

No.	Date.	Colliery.	Sufferer.	Occupation.	Remarks, &c., on nature and extent of injuries.	By a skip.	Killed by cage.	By a skip.	By fall of stone.	By fall of stone.	By a skip.	By a skip.	Coal falling down shaft.	Fatal.	Non-fatal.
						1	1	1	1	1	1	1	1	1	1
1	1893.														
1	Aug. 12	Corrimal	James Craddock	Surfman	Leg bruised by a skip at the screens	1									
2	" 23	Vale Colliery	Alex. Hoop	Onsetter	Fatal injuries by the cage at bottom of shaft.		1								
3	Oct. 3	Corrimal	Thos. Evans	Miner	Leg broken by a skip in the incline			1							
4	" 6	Metropolitan	John Edwards	"	Internally injured by a fall of stone				1						
5	Nov. 8	North Hawarra	Peter Owen	"	Foot bruised by a fall of stone					1					
6	" 27	Metropolitan	John Riddley	Greaser	Leg crushed by a full skip at bottom of shaft						1				
7	" 27	Osborne Wallsend	Albert Askew	Screen-boy	Shoulder dislocated by a skip							1			
8	" 29	Metropolitan	John McGeachie	Onsetter	Leg broken by a piece of coal falling down the shaft.								1		1
						1	1	1	1	1	1	1	1	1	7

THE Half-yearly Report on the Collieries in the Northern District of New South Wales and accidents investigated by the Inspector of Collieries during the six months ending 30th June, 1893:—

The Examiner of Coal-fields, Sydney,—  
Sir,

Newcastle, 15 July, 1893.

Pursuant to the provisions of section 26 in the Coal Mines Regulation Act, 1876, we have the honor to transmit to you this, our six-monthly report, on the state of the various collieries in the Northern District for the half-year ending 30th June, 1893.

The total number of collieries in the Northern District is 75, of which 60 have been under inspection during the half-year.

Fifteen collieries have not been under inspection during the half-year, as no work has been done, viz., Killingworth, North Stockton, Teralba, Shamrock Hill, North Borehole, Young Wallsend, Swansea, Richmond Vale, Stanford Greta, Maitland, Leconfield, Oakvale, Fern Valley, Richmond Hill, and Nicholais' Tunnel.

The following collieries have been added, viz., Inganee, North Co-operative, Dog and Rat, and South Rathluba.

Two collieries have been abandoned, viz., Enterprise and Tulip Sinking Shaft, and are not included in this report.

#### PRESENT STATE OF MINES.

*A. A. Co's No. 2 Colliery.*—There are about 210 men, &c., employed in this mine during the day, and the quantity of air circulating in the mine is about 100,000 cubic feet per minute. The face workings are divided into five separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with.

*A. A. Co's New Winning.*—About 300 men, &c., are employed in this mine during the day, and the total quantity of air circulating in the mine is about 80,000 cubic feet per minute. The face workings are divided into seven separate and distinct districts, none of which are overcrowded. The Act in other respects also is complied with.

*Newcastle Wallsend Colliery.*—There are about 750 men, &c., employed in this mine during the day, and the quantity of air circulating in the mine is about 170,000 cubic feet per minute. The face workings are divided into separate and distinct districts, none of which are overcrowded. The provisions of the Act in other respects also are complied with.

*Newcastle Co's Colliery.*—About 375 men, &c., are employed in this mine during the day, and supplied with about 170,000 cubic feet of air per minute. The face workings are divided into eight separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with.

*Co-operative Colliery.*—There are about 300 men, &c., employed in this mine during the day, and the quantity of air circulating in the mine is about 40,000 cubic feet per minute. The face workings are divided into separate and distinct districts. The provisions of the Act in other respects also are complied with.

*Lambton Colliery.*—There are about 350 men, &c., employed in this mine during the day, and are supplied with about 80,000 cubic feet of air per minute. The face workings are divided into ten separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with in other respects also.

*Burwood Colliery.*—About 120 men, &c., are employed in this mine, and the quantity of air circulating in the mine is about 17,000 cubic feet per minute. The districts and number of men in each district are in accordance with the Act. All produce now drawn at No. 3 shaft; old drawing-shaft used as second opening. The provisions of the Act are complied with.

Stockton

*Stockton Colliery.*—There are about 200 men, &c., employed in this mine, and supplied with about 25,000 cubic feet per minute. The Act is complied with, except subsection 5, section 12, as, on 17th February, owing to an inrush of water, the manager withdrew the men, and afterwards readmitted and allowed them to continue working before it has been stated by the Examiner or Inspector that the mine is safe. Proceedings have been taken against the Company, and two penalties inflicted. Third (sinking) Shaft.—Cylindrical tubing, 10 feet in diameter, has been sunk about 135 feet through the alluvial measures. About 6 men are employed.

*Wickham and Bullock Island Colliery.*—About 300 men, &c., are employed in this mine during the day, and the quantity of air circulating in the mine is about 60,000 cubic feet per minute. The face workings are divided into separate and distinct districts, and the provisions of the Act are complied with.

*Hetton Colliery.*—There are about 280 men, &c., employed in this mine during the day, and are supplied with about 80,000 cubic feet of air per minute. The face workings are divided into separate and distinct districts, none of which are overcrowded. The provisions of the Act in other respects also are complied with.

*Ferndale Colliery.*—About 60 men, &c., are employed in this mine, and the total quantity of air circulating in the mine is about 10,000 cubic feet per minute. The provisions of the Act are complied with.

*Brown's Colliery.*—There are about 350 men, &c., employed in this mine during the day. The total quantity of air circulating in the mine is about 51,000 cubic feet per minute. The face workings are divided into separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with in other respects also.

*Duckenfield Colliery.*—About 250 men, &c., are employed in this mine during the day, and are supplied with about 53,000 cubic feet of air per minute. The face workings are divided into separate and distinct districts, none of which are overcrowded. The provisions of the Act in other respects also are complied with.

*South Waratah Colliery.*—This mine has been idle for some time past owing to a mishap by a collapse of surface strata in the main shaft. Men have been engaged in effecting repairs, and the mine is now about ready for work. The provisions of the Act are complied with.

*New Lambton C Pit.*—About 125 men, &c., are employed in this mine during the day, and are supplied with about 20,000 cubic feet of air per minute. There are two separate and distinct districts. The Act complied with in every other respect also.

*Ebbw Vale Colliery.*—About 40 men, &c., are employed in this mine during the day. The total quantity of air circulating in the mine is about 11,000 cubic feet per minute. The Act is also complied in every other respect.

*West Burwood Colliery.*—About 28 men, &c., are employed in this mine, and are supplied with about 3,000 cubic feet of air per minute. The provisions of the Act are complied with.

*Hillside Colliery.*—Thirteen men, &c., are employed in this mine. The ventilation is good, and the Act complied with in every respect.

*East Lambton Colliery (Adamstown).*—About 40 men, &c., are employed in this mine during the day. The total quantity of air circulating in the mine is about 7,000 cubic feet per minute. Other provisions of the Act are also fully complied with.

*Rotunda Colliery (North Lambton).*—Only 2 men at present employed in this mine. The Act fully complied with.

*Dog and Rat Colliery (North Lambton).*—This mine has been commenced during the six months. There are 4 men, &c., employed, and the Act complied with.

*Elemore Vale Colliery (Wallsend).*—About 12 men, &c., are employed in this mine, and supplied with about 3,000 cubic feet of air per minute. The provisions of the Act are complied with.

*Summerhill Colliery (Plattsburg).*—There are 10 men, &c., employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Maryland Colliery (Plattsburg).*—About 15 men, &c., are employed in this mine. The ventilation is good, and the provisions of the Act complied with.

*North Co-operative Colliery (Plattsburg).*—About 6 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Dudley Colliery (Charlestown).*—There are about 220 men, &c., employed in this mine during the day. The total quantity of air circulating in the mine is about 60,000 cubic feet per minute. The provisions of the Act are complied with.

*Durham Colliery.*—About 12 men, &c., are employed at the second shaft in connection with an under-level drift for water standage. Several men are also employed at the surface in the erection of the pit-head gear and machinery at the main shaft. Everything in good order, and the Act fully complied with.

*Burwood Extended Colliery.*—This mine has been idle for a considerable time, but is in readiness for work at any time. The provisions of the Act are fully complied with.

*Toronto Colliery (Lake Macquarie).*—Two men are employed at this mine. The ventilation is satisfactory, and the Act complied with.

*Morrisett Colliery (Lake Macquarie).*—This mine has been under inspection during the half-year, but operations are now temporarily suspended.

*Wallarah Colliery (Catherine Hill Bay).*—There are about 110 men, &c., employed in this mine, and supplied with about 20,000 cubic feet of air per minute. The provisions of the Act are complied with.

*Acaba Colliery.*—Work at this mine is at present temporarily suspended.

*Northumberland Colliery (Kassifern).*—Only 2 men at present employed in this mine. The ventilation is satisfactory, and the Act complied with.

*South Stockton Colliery (Teralba).*—There are 4 men employed in this mine. The ventilation is good, and the provisions of the Act complied with.

*Northern Colliery (Teralba).*—About 120 men, &c., are employed in this mine during the day. The quantity of air circulating in the mine is about 30,000 cubic feet per minute. The provisions of the Act are complied with.

*Garilee Colliery (Teralba).*—There are about 30 men, &c., employed in this mine. The quantity of air circulating in the mine is about 9,000 cubic feet per minute. The Act is complied with.

*South Wallsend Colliery (Cardiff).*—About 45 men, &c., are employed in this mine, and supplied with about 10,000 cubic feet of air per minute. The provisions of the Act are complied with.

*West Wallsend Colliery.*—There are about 250 men, &c., employed in this mine. The total quantity of air circulating in the mine is about 65,000 cubic feet. The face workings are divided into separate and distinct districts. The provisions of the Act are complied with.

*Seaham Colliery.*—About 180 men, &c., are employed in this mine. The total quantity of air circulating in the mine is about 25,000 cubic feet per minute. Steps are being taken to erect a new waddle fan, 30 feet in diameter, for ventilating purposes. The provisions of the Act are complied with.

*Thornton Colliery (Thornton).*—About 23 men, &c., are employed in this mine during the day. The ventilation is good, and the Act is complied with in other respects also.

*Thornley Colliery (East Maitland).*—There are 12 men, &c., employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Bloomfield Colliery (East Maitland).*—Eight men are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Marshall's Colliery (East Maitland).*—Only 2 men are employed in this mine. The ventilation is good, and the Act complied with.

*Ingance Colliery (East Maitland).*—About 4 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*South Rathluba Colliery (East Maitland).*—Four men are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*East Greta Colliery (West Maitland).*—About 15 men, &c., are employed in the two adits at this mine. The ventilation is satisfactory, and the Act complied with.

*Abram Colliery (Farley).*—Two men are at present employed in this mine. The ventilation is good, and the provisions of the Act complied with.

*Pioneer Colliery (Farley).*—There are two men employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Denton Park Colliery (West Maitland).*—Only 2 men are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Greta Colliery.*—This mine has been idle for some time, but everything is in readiness for resuming work at any time. The provisions of the Act are fully complied with.

*New Anvil Creek Colliery.*—There are about 20 men, &c., employed in this mine, and supplied with about 6,000 cubic feet of air per minute. The provisions of the Act are complied with.

*Ellesmere Colliery (Singleton).*—About 30 men, &c., are employed in this mine, and supplied with about 10,000 cubic feet of air per minute. The provisions of the Act are complied with.

*New Park Colliery (Singleton).*—There are about 20 men, &c., employed in this mine, and the quantity of air circulating in the mine is about 8,000 cubic feet per minute. The Act is complied with.

*Elliott's Colliery (Singleton).*—About 8 men are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Rosedale Colliery (Singleton).*—About 15 men, &c., are employed in this mine. The ventilation is good, and the Act complied with.

*Dulwich Colliery (Singleton).*—About 10 men, &c., are employed in this mine. The ventilation is satisfactory, and the provisions of the Act complied with.

*Kyuga Colliery (Muswellbrook).*—Only 2 men are employed in this mine at the present time. The Act is fully complied with.

*Morley Colliery (Gunnedah).*—Two men and 1 boy are employed in this mine. The work is not constant, as trade is slack at times. The Act is complied with in every respect.

*Gladstone Colliery (Gunnedah).*—Only 2 men are occasionally employed in this mine as trade demands. The ventilation is good, and the Act complied with.

*Centenary Colliery (Curlewis).*—Only 7 men are employed in this mine at present. The ventilation is good, and the other provisions of the Act are also fully carried out.

#### ACCIDENTS IN MINES.

The accidents investigated by us in the Northern District during the six months ending 30th June, 1893, are 30 in number. Of this number, 19 were fully reported on at the time, and 11 were found to be of a minor character, and full reports were not written thereon. Of the 19 accidents in the annexed tabulated list, 6 proved fatal, all from falls of coal. Of the non-fatal accidents, 7 were caused by falls of coal, 4 by explosion of gas, 1 by ignition of powder, and 1 by falling down shaft.

The first fatal accident occurred to a miner named John Bartholomew Carey, by a fall of coal in Elliott's Colliery, Rix's Creek, near Singleton, on 3rd January. The District Coroner, Wm. Walker, Esq., held an inquest on the body of deceased, at Singleton, on 3rd and 4th January. The inquest was attended by Inspector Bates, who heard all the evidence and fully agrees with the verdict of "accidental death," as returned by the jury.

The second occurred to a miner named Theophilus Jones, by a fall of coal at Burwood Extended Colliery, on 17th January. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased, at Charlestown, on 18th January. The inquest was attended by Inspector Bates, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The third occurred to a miner named Robert Pritchard, by a fall of coal at Duckenfield Colliery, on 2nd March, terminating fatally on 11th June. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased, at Newcastle, on 12th June. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The fourth occurred to a miner named Thomas Lewis, by a fall of coal, at Brown's Colliery, on 24th April. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased at Miumi, on 25th April. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The fifth occurred to a miner named Francis Sanderson, by a fall of coal, at Newcastle-Wallsend Colliery, on 29th May, terminating fatally on 7th June. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased at Plattsburg, on 7th June. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The

The sixth occurred to a miner named Benjamin Miller, by a fall of coal, at Brown's Colliery, on 8th June. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased at Plattsburg, on 9th June. The inquest was attended by Inspector Bates, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The first of the non-fatal accidents occurred to a miner named Ephraim Hargreaves, at Seaham Colliery, on 6th January, by explosion of gas, resulting in burns on arms, head, and chest.

The second occurred to a manager named James Race, at Thornley Colliery, East Maitland, on 24th January, by explosion of gas, resulting in burns on head, arms, and chest.

The third occurred to a shiftman named Saml. Somerville, at Thornley Colliery, on 24th January, by explosion of gas, resulting in burns on head, arms, and chest.

The fourth occurred to a shiftman named John Stevens, at Thornley Colliery, on 24th January, by explosion of gas, resulting in burns on head, arms, and chest.

The fifth occurred to a miner named Samuel Dresser, at Hetton Colliery, on 9th February, by a fall of coal, resulting in fracture of leg.

The sixth occurred to a miner named William Dowsen, at Newcastle-Wallsend Colliery, on 3rd March, by a fall of coal, resulting in fracture of leg.

The seventh occurred to a miner named Thos. McNaughton, at A. A. Co.'s No 2 pit, on 21st March, by a fall of coal, resulting in internal injuries.

The eighth occurred to a miner named Robert France, at Newcastle-Wallsend Colliery, on 12th April, by a fall of coal, resulting in fracture of collar-bone.

The ninth occurred to a miner named John Donaldson, at Newcastle Co.'s pit, on 3rd May, by ignition of loose powder, resulting in burns on arms, chest, and head.

The tenth occurred to a miner named Guivano Missi, at Dudley Colliery, on 16th May, by fall of coal, resulting in injury to head.

The eleventh occurred to a miner named Antony Weirs, at A. A. Co.'s New Winning, on 23rd May, by a fall of coal, resulting in severe internal injuries.

The twelfth occurred to a shaftman named Henry Williams, at South Waratah Colliery, on 3rd June, resulting in injury to leg, head, and arm, by falling down shaft on to cradle.

The thirteenth occurred to a miner named James Robertson, junr., at Seaham Colliery, on 19th June, by fall of coal, resulting in severe internal injuries.

ACCIDENTS ON SURFACE.

One fatal accident occurred to an engineman named Alfred Nuttall, by loaded coal-waggons, at New Anvil Creek Colliery, on 24th April. The District Coroner, J. N. Brooks, Esq., held an inquest on the body of deceased at Anvil Creek, on 24th and 26th April. The inquest was attended by Inspector Bates, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The first non-fatal accident occurred to a stoker named Henry Hawkes, at Wallarah Colliery, on 12th May, resulting in injury to head and arms, by empty waggons.

The second occurred to a surfaceman named Henry Markes, at Wallarah Colliery, on 1st June, resulting in injury to leg, on railway.

The tabulated list of accidents is hereto appended.

We have, &c.,  
 JOHN DIXON,  
 THOS. L. BATES,  
 WILLIAM HUMBLE,  
 Inspectors of Collieries.

TABULATED LIST of Fatal and Non-fatal Accidents in the Northern Collieries of New South Wales, investigated by the Inspectors of Collieries during the half-year ending 30th June, 1893.

No.	Date.	Colliery.	Person killed or injured.	Occupation.	Remarks on nature and extent of injuries.	Non-fatal.				Fatal.	Total.	
						Explosion of gas.	Fall of coal.	Ignition of powder.	Falling down shaft.	Fall of coal.	Non-fatal.	Fatal.
1	1893. 3 Jan.	Elliott's, Rix's Creek	John Bartholomew Carey.	Miner	Fatal injury by fall of coal					1		1
2	6 "	Seaham	Ephraim Hargreaves	"	Burns on arms, head, and chest, by explosion of gas.	1					1	1
3	17 "	Burwood Extended	Theophilus Jones	"	Fatal injury by fall of coal					1		1
4	24 "	Thornley	James Race	Manager	Burns on head, arms, and chest, by explosion of gas.	1					1	1
5	24 "	"	Samuel Somerville	Shiftman	" " " " " "	1					1	1
6	24 "	"	John Stevens	"	" " " " " "	1					1	1
7	9 Feb.	Hetton	Samuel Dresser	Miner	Fracture of leg by fall of coal		1				1	1
8	2 Mar.	Duckenfield	Robert Pritchard	"	Fatal injury by fall of coal—died 11th June					1		1
9	3 "	Newcastle-Wallsend	William Dowsen	"	Fracture of leg by fall of coal		1				1	1
10	21 "	A.A. Co.'s No. 2 Pit	Thomas McNaughton	"	Internal injuries by fall of coal					1		1
11	12 April.	Newcastle-Wallsend	Robert France	"	Fracture of collar-bone by fall of coal		1				1	1
12	24 "	Brown's No. 4 Tunnel	Thomas Lewis	"	Fatal injury by fall of coal					1		1
13	3 May	Newcastle Co.	John Donaldson	"	Burns on arms, chest, and head, by ignition of loose powder.			1			1	1
14	16 "	Dudley	Guivano Missi	"	Injury to head by fall of coal		1				1	1
15	23 "	A.A. Co.'s New Winning	Antony Weirs	"	Severe internal injuries by fall of coal		1				1	1
16	29 "	Newcastle-Wallsend	Francis Sanderson	"	Fatal injury by fall of coal—died 7th June					1		1
17	3 June	South Waratah	Henry Williams	Shaftman	Injury to leg, wound on hand, and arm, by falling down shaft on to cradle.				1		1	1
18	8 "	Brown's No. 2 Tunnel	Benjamin Miller	Miner	Fatal injury by fall of coal					1		1
19	19 "	Seaham	James Robertson, junr.	"	Severe internal injuries by fall of coal		1				1	1
ACCIDENTS ON SURFACE.						4	7	1	1	6	13	6
1	24 April.	New Anvil Creek	Alfred Nuttall	Engineman	Fatal injury by loaded waggons							1
2	12 May	Walarah	Henry Hawkes	Stoker	Injury to head and arms by empty waggons						1	1
3	1 June	"	Henry Markes	Surfaceman	Injury to leg on railway						1	1
											2	1

The Half-yearly Report on the Collieries in the Northern District of New South Wales, and accidents investigated by the Inspectors of Collieries during the six months ending 31st December, 1893.

The Examiner of Coal-fields, Sydney,—  
Sir,

Newcastle, 22 January, 1894.

Pursuant to the provisions of section 26 in the Coal-mines Regulation Act, 1876, we have the honor to transmit to you this our six-monthly report on the state of the various collieries in the Northern District for the half-year ending 31st December, 1893.

The total number of collieries under inspection in the Northern District during the half-year is 69.

No work has been done at the following 14 collieries during the half-year, viz.:—Awaba, Killingworth, North Stockton, Teralba, Shamrock Hill, Young Wallsend, Swansea, Richmond Vale, Stanford-Greta, Maitland, Leconfield, Fern Valley, Richmond Hill, and Nicholais Tunnel.

Eight new collieries have been added, viz.:—Electric, Liddle's, Rosehill, Sunlight, Ray's, Green's, Bebeide, and Oakvale.

PRESENT STATE OF MINES.

*A. A. Co.'s No. 2 Colliery.*—About 200 men, &c., are employed in this mine during the day, and are supplied with about 80,000 cubic feet of air per minute. The face workings are divided into six separate and distinct districts, none of which are overcrowded. The provisions of the Act in other respects also are complied with.

*A. A. Co.'s New Winning.*—There are about 300 men, &c., employed in this mine during the day, and the total quantity of air circulating in the mine is about 80,000 cubic feet per minute. The face workings are divided into seven separate and distinct districts, none of which are overcrowded. The Act in other respects also is complied with.

*Newcastle-Wallsend Colliery.*—There are about 700 men, &c., employed in this mine during the day, and the quantity of air circulating in the mine is about 170,000 cubic feet per minute. The face workings are divided into separate and distinct districts, none of which are overcrowded. The provisions of the Act in other respects also are complied with.

*Newcastle Co.'s Colliery.*—About 430 men, &c., are employed in this mine during the day, and are supplied with about 90,000 cubic feet of air per minute. The face workings are divided into eight separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with.

*Co-operative Colliery (Plattsburg).*—There are about 200 men, &c., employed in this mine during the day, and supplied with about 36,000 cubic feet of air per minute. The face workings are divided into five separate and distinct districts. The Act is complied with.

*Lambton Colliery.*—There are about 380 men, &c., employed in this mine during the day, and the quantity of air circulating in the mine is about 80,000 cubic feet per minute. The face workings are divided into ten separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with.

*Burwood Colliery.*—There are about 110 men, &c., employed in this mine during the day, and supplied with about 26,000 cubic feet of air per minute. The face workings are divided into three separate and distinct districts, none of which are overcrowded. The Act is complied with.

*Stockton Colliery.*—There are about 200 men, &c., employed in this mine, and supplied with about 30,000 cubic feet of air per minute. The Act is complied with in regard to ventilation.

*Wickham and Bullock Island Colliery.*—There are about 340 men, &c., employed in this mine during the day, and are supplied with about 60,000 cubic feet of air per minute. The face workings are divided into seven separate and distinct districts, none of which are overcrowded. The Act in other respects also is complied with.

*Hetton Colliery.*—About 200 men, &c., are employed in this mine during the day, and the quantity of air circulating in the mine is about 60,000 cubic feet per minute. The face workings are divided into five separate and distinct districts, none of which are overcrowded. The provisions of the Act are complied with.

*Ferndale Colliery.*—There are about 60 men, &c., employed in this mine, and supplied with about 12,000 cubic feet of air per minute. The provisions of the Act are complied with.

*Brown's Colliery.*—This colliery has been under inspection during the half-year, but all work is now temporarily suspended.

*Duckenfield Colliery.*—About 300 men, &c., are employed in this mine during the day, and the quantity of air circulating in the mine is about 50,000 cubic feet per minute. The face workings are divided into separate and distinct districts. The Act in other respects also is complied with.

*South Waratah Colliery.*—There are about 160 men, &c., employed in this mine, and supplied with about 30,000 cubic feet of air per minute. The face workings are divided into separate and distinct districts. The provisions of the Act are complied with.

*New Lambton C. Pit.*—There are about 61 men, &c., employed in this mine during the day. The quantity of air circulating in the mine is about 20,000 cubic feet per minute. The districts are in accordance with the Act. The Act in other respects also is complied with.

*Ebbw Vale Colliery.*—About 43 men, &c., are employed in this mine, and supplied with about 12,000 cubic feet of air per minute. The Act is complied with in other respects also.

*West Burwood Colliery.*—About 27 men, &c., are employed in this mine, and supplied with about 6,000 cubic feet of air per minute. The Act is complied with.

*Hillside Colliery.*—About 14 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*East Lambton Colliery (Adamstown).*—About 25 men, &c., are employed in this mine, and supplied with about 10,000 cubic feet of air per minute. The provisions of the Act are complied with.

Dunkirk

- Dunkirk Colliery (New Lambton).*—This mine has been under inspection during a portion of the half year, but is now finally abandoned.
- Rotunda Colliery (North Lambton).*—Two men are employed in this mine. The ventilation is satisfactory, and the Act complied with.
- Dog and Rat Colliery (North Lambton).*—This colliery has been under inspection during a portion of the half-year, but is now finally abandoned.
- Electric Colliery (North Lambton).*—Only 2 men are employed in this mine. The ventilation is good, and the Act complied with.
- Liddle's Colliery (Waratah).*—Three men employed in this mine. The ventilation is satisfactory, and the provisions of the Act complied with.
- Rosehill Colliery.*—Two men are employed in this mine. The ventilation is good, and the Act complied with.
- Ray's Colliery (Lambton).*—One man occasionally employed getting house coal. The Act is complied with.
- Green's Colliery (Grovestown).*—One man opening a small mine for household coal. The Act is complied with.
- Sunlight Colliery (Grovestown).*—One man occasionally employed getting house coal. The Act complied with.
- Beaside Colliery (Grovestown).*—One man occasionally employed getting house coal. The Act complied with.
- Elemore Vale Colliery (Wallsend).*—About 15 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.
- Summerhill Colliery (Plattsburg).*—About 9 men, &c., are employed in this mine. The ventilation is good, and the Act complied with.
- Maryland Colliery (Plattsburg).*—About 16 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.
- North Co-operative Colliery (Plattsburg).*—About 14 men, &c., are employed in this mine, and supplied with about 4,000 cubic feet of air per minute. The provisions of the Act are complied with.
- Dudley Colliery (Charlestown).*—This colliery has been under inspection during a portion of the half-year, but all work is at present temporarily suspended.
- Durham Colliery.*—There are about 48 men, &c., employed in connection with this mine. The surface arrangements, machinery, &c., are nearing completion, and so far will bear favourable comparison with any colliery machinery yet erected in the Colony. Everything in and about the colliery is in good order, and the provisions of the Act fully complied with.
- Burwood Extended Colliery.*—Only a few persons employed in connection with this colliery, keeping the workings in repair and the mine free from accumulations of water. Everything on surface and below ground in good order, and a splendid current of air is circulating through the workings. The Act is fully complied with.
- Toronto Colliery (Lake Macquarie).*—About 3 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.
- Morrisett Colliery (Lake Macquarie).*—Three men are employed in this mine. The ventilation is good, and the Act complied with.
- Wallarah Colliery (Catherine Hill Bay).*—There are about 120 men, &c., employed in this mine, and supplied with about 15,000 cubic feet of air per minute. The provisions of the Act are complied with.
- Northumberland Colliery (Fassifern).*—Four men at present employed in this mine. The ventilation is satisfactory, and the Act complied with.
- South Stockton Colliery (Teralba).*—Four men employed in this mine. The ventilation is good, and the Act complied with.
- Pacific (formerly Northern) Colliery (Teralba).*—There are about 160 men, &c., employed in this mine. The quantity of air circulating in the mine is about 40,000 cubic feet per minute. The provisions of the Act in other respects also are complied with.
- Gartlee Colliery (Teralba).*—About 34 men, &c., are employed in this mine, and supplied with about 6,000 cubic feet of air per minute. The Act is complied with.
- South Wallsend Colliery (Cardiff).*—About 35 men, &c., are employed in this mine during the day. The ventilation is satisfactory, and the Act complied with.
- West Wallsend Colliery.*—Only 6 men are at present employed in this mine. The quantity of air circulating in the mine is about 40,000 cubic feet per minute. The provisions of the Act are complied with.
- Seaham Colliery.*—There are about 230 men, &c., employed in this mine, and supplied with about 35,000 cubic feet of air per minute. The provisions of the Act are complied with.
- Thornton Colliery (Thornton).*—About 25 men, &c., are employed in this mine, and supplied with about 5,000 cubic feet of air per minute. The Act in other respects also is complied with.
- Sunderland Colliery (East Maitland).*—This mine has been under inspection during a portion of the half-year, but is now finally abandoned.
- Thornley Colliery (East Maitland).*—About 10 men, &c., are employed in this mine, and supplied with about 4,000 cubic feet of air per minute. The provisions of the Act are complied with.
- Bloomfield Colliery (East Maitland).*—About 8 men are employed in this mine. The ventilation is good, and the Act complied with.
- Marshall's Colliery (East Maitland).*—Two men are employed in this mine. The ventilation is satisfactory, and the Act complied with.
- Inganee Colliery (East Maitland).*—This mine has been under inspection during the half-year, but all work is at present suspended.
- South Rathluba (formerly North Borehole) Colliery, East Maitland.*—Three men are employed in this mine. The ventilation is good, and the Act complied with.
- East Greta Colliery (West Maitland).*—There are about 20 men, &c., employed in this mine. The ventilation is satisfactory, and the Act complied with.
- Abram Colliery (West Maitland).*—Two men are employed in this mine. The ventilation is good, and the Act complied with.

*Pioneer Colliery (West Maitland).*—Only 2 men are employed in this mine. The ventilation is good, and the Act complied with.

*Denton Park Colliery (West Maitland).*—Two men are employed in this mine. The ventilation is good, and the Act fully complied with.

*Greta Colliery (Greta).*—There are about 250 men, &c., employed in this mine. The quantity of air circulating in the mine is about 60,000 cubic feet per minute. The face workings are divided into separate and distinct districts. The Act in other respects also is complied with.

*New Anvil Creek Colliery.*—About 30 men, &c., are employed in this mine, and supplied with about 9,000 cubic feet of air per minute. The provisions of the Act in other respects also is complied with.

*Ellesmere Colliery (Singleton).*—About 25 men, &c., are employed in this mine, and supplied with about 8,000 cubic feet of air per minute. The Act is complied with.

*New Park Colliery (Singleton).*—About 25 men, &c., are employed in this mine. The quantity of air circulating in the mine is about 5,000 cubic feet per minute. The Act is fully complied with.

*Elliott's Colliery (Singleton).*—Six men are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Rosedale Colliery (Singleton).*—About 15 men, &c., are employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Dulwich Colliery (Singleton).*—There are 13 men, &c., employed in this mine. The ventilation is good, and the provisions of the Act complied with.

*Oakvale Colliery (Singleton).*—Two men are employed driving an adit at this mine. The provisions of the Act are complied with.

*Kyuga Colliery (Muswellbrook).*—Two men are employed in this mine. The ventilation is good, and the Act complied with.

*Morley Colliery (Gunnedah).*—There are 3 men employed in this mine. The ventilation is satisfactory, and the Act complied with.

*Gladstone Colliery (Gunnedah).*—There are 4 men employed on this mine. The ventilation is satisfactory, and the provisions of the Act fully complied with.

*Centenary Colliery (Curlwies).*—There are 16 men, &c., employed in this mine, and supplied with about 6,000 cubic feet of air per minute. The provisions of the Act are complied with.

#### ACCIDENTS IN MINES.

The accidents investigated by us in the Northern District during the six months ending 31st December, 1893, are 26 in number. Of this number, 18 were fully reported upon at the time, and 8 were found to be of a minor character, and full reports were not written thereon. Of the 18 accidents in the annexed tabulated list, 3 proved fatal, all from falls of coal. Of the non-fatal accidents, 10 were caused by falls of coal, 2 by falls of stone, 1 by explosion of shot, 1 by ignition of loose powder, and 1 by a falling prop.

The first fatal accident occurred to a miner named Joseph Holmes, by a fall of coal at Seaham Colliery, on 3rd July, terminating fatally on 17th July. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased at Newcastle, on 18th July. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The second occurred to a miner named Thomas Dix, by a fall of coal at Wickham and Bullock Island Colliery, on 30th October. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased on 31st October, at Newcastle. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The third occurred to a miner named Edward Fanning Lister, by a fall of coal at the A. A. Company's New Winning, on 7th December. The District Coroner, G. C. Martin, Esq., held an inquest on the body of deceased at Hamilton, on 19th December. The inquest was attended by Inspector Humble, who heard all the evidence, and fully agrees with the verdict of "accidental death," as returned by the jury.

The first of the non-fatal accidents occurred to a miner named John Speers, at Duckenfield Colliery, on 18th July, by explosion of shot, resulting in severe burns.

The second occurred to a miner named Richard Mooney, at Lambton Colliery, on 19th July, by fall of coal, resulting in fracture of leg.

The third occurred to a miner named Samuel Rundle, at Dudley Colliery, on 3rd August, by fall of coal, resulting in injury to hip.

The fourth occurred to a miner named Jonathan Holland, at Hetton Colliery, on 3rd August, resulting in fracture of collar-bone, by fall of coal.

The fifth occurred to a miner named William Hope, at Newcastle Company's "A" pit, on 17th August, by fall of coal, resulting in fracture of ribs.

The sixth occurred to a miner named Richard Mason, at Hetton Colliery, on 24th August, resulting in fracture of leg, by fall of coal.

The seventh occurred to a miner named John Welsh, at Seaham Colliery, on 24th August, resulting in injury to hip, by fall of coal.

The eighth occurred to a miner named William Anderson, at Burwood Colliery, on 24th August, by fall of coal, resulting in fracture of leg.

The ninth occurred to a wheeler named Alfred Lever, at Elemore Vale Colliery, on 29th August, resulting in burns on face, by ignition of loose powder.

The tenth occurred to a miner named John McLaughlan, at Maryland Colliery, on 12th September, resulting in fracture of collar-bone and ribs, by fall of coal.

The eleventh occurred to a miner named Robert Price, at Hetton Colliery, on 7th October, resulting in fracture of leg, by fall of coal.

The twelfth occurred to a miner named George Birchnall, at the A. A. Company's No. 2 pit, on 16th October, resulting in injuries to head, by fall of stone.

The thirteenth occurred to a miner named William Yates, at New Anvil Creek Colliery, on 16th October, by fall of coal, resulting in internal injuries.

The fourteenth occurred to a miner named James Hall, at Ebbw Vale Colliery, on 6th November, resulting in fracture of thigh, by fall of stone.

The fifteenth occurred to a miner named Charles Fretwell, at Newcastle-Wallsend Colliery, on 18th December, resulting in fracture of leg, by a falling prop.

#### ACCIDENT ON SURFACE.

One non-fatal accident occurred to an engine-boy named John Durie, at South Waratah Colliery, on 13th September, resulting in injury to foot, by a crank shaft.

The tabulated list of accidents is hereto appended.

We have, &c.,

JOHN DIXON,  
THOS. L. BATES,  
WILLIAM HUMBLE,

Inspector of Collieries.

TABULATED List of Fatal and Non-fatal Accidents in the Northern Collieries of New South Wales, investigated by the Inspectors of Collieries during the half-year ending 31st December, 1893:—

No.	Date.	Colliery.	Person Killed or Injured.	Occupation.	Remarks on Nature and Extent of Injuries.	Fatal.		Non-fatal.					Total.	
						Fall of coal.	Explosion of shot.	Fall of coal.	Ignition of loose powder.	Fall of stone.	Fall of timber.	Fatal.	Non-fatal.	
1893.														
1	8 July	Seaham	Joseph Holmes, jun.	Miner	Fatal injury by fall of coal—died 17th July	1							1	
2	18 "	Duckenfield	John Speers	"	Severe burns by explosion of shot		1							1
3	19 "	Lambton	Richard Mooney	"	Fracture of leg by fall of coal			1						1
4	3 Aug.	Dudley	Samuel Rundle	"	Injury to hip by fall of coal			1						1
5	3 "	Hetton	Jonathan Holland	"	Fracture of collar-bone by fall of coal			1						1
6	17 "	Newcastle Co's. A Pit	William Hope	"	Fracture of ribs by fall of coal			1						1
7	24 "	Hetton	Richard Mason	"	Fracture of leg by fall of coal			1						1
8	24 "	Seaham	John Welsh	"	Injury to hip by fall of coal			1						1
9	24 "	Burwood	William Anderson	"	Fracture of leg by fall of coal			1						1
10	29 "	Elmore Vale	Alfred Lever	Wheeler	Burns on face by ignition of loose powder				1					1
11	12 Sept.	Maryland	John M'Laughlan	Miner	Fracture of collar-bone and ribs by fall of coal			1						1
12	7 Oct.	Hetton	Robert Price	"	Fracture of leg by fall of coal			1						1
13	16 "	A. A. Co.'s No. 2 Pit	George Birchall	"	Injuries to head by fall of stone					1				1
14	16 "	New Anvil Creek	William Yates	"	Internal injuries by fall of coal			1						1
15	30 "	Wickham and Bullock Island	Thomas Dix	Shiftman	Fatal injury by fall of coal	1								1
16	6 Nov.	Ebbw Vale	James Hall	Miner	Fracture of thigh by fall of stone					1				1
17	7 Dec.	A. A. Co.'s New Winning	Edward Lister	Fanning	Fatal injury by fall of coal	1								1
18	18 "	Newcastle-Wallsend	Charles Fretwell	"	Fracture of leg by falling prop						1			1
						8	1	10	1	2	1	3	15	
ACCIDENT ON SURFACE.														
1	13 Sept.	South Waratah	John Durie	Engine-boy	Injury to foot by crank shaft									1

## GEOLOGICAL SURVEY OF NEW SOUTH WALES.

## Progress Report for 1893 by the Government Geologist.

Sir,

I have the honour to submit the following progress report for the year 1893.

On the 5th of February I proceeded to Tamworth, and thence to Bowling Alley Point and Nundle, where I made an examination of the belt of serpentine which traverses this country, and of the deposit of chrome iron ore which occurs in it. On my return to Sydney I made a report with reference to the question of specially reserving this land for mining for chrome iron.

On the 24th of February I visited Burradoo, and examined some quartz pebble drift in the Parish of Mittagong, near Doudle's Folly Creek, where Mr. F. Griffiths had gone to considerable expense in erecting a diamond-washing plant, under the impression that the drift contained diamonds and other gems. A considerable quantity of this drift, taken from different parts of the land, was washed without discovering any gems, although three small diamonds were said to have been found in the preliminary work. Ultimately the work was abandoned by Mr. Griffiths. The following is a description of the *modus operandi*:—The drift was taken away from the face in trucks, which were emptied into an inclined revolving trommel of 1-inch mesh. The large stones were thus excluded and fell into a truck, by which they were removed to the dump. The small drift passing down the trommel was carried by a flow of water into a puddling-machine (made of wrought-iron), in which it was disintegrated by a number of knives fixed on four arms, which revolved about a central axis. The muddy water escaped by an overflow, carrying with it the light stones, and was then raised by an elevator, at the top of which it fell upon a screen, where the stones were discarded and fell down the dump. The muddy water fell through the screen into a gutter, whence it was returned to the trommel. When the contents of the puddling-machine had been well puddled they were run out of an aperture at the bottom into a pit which was kept locked, and from which they were taken as required to the washing-tubs. They were here washed on sieves of three different meshes, and the pebbles were then carefully sorted on an iron plate, with the object of picking out any gems that might be present. The pebbles remaining on the coarsest sieve were sorted first, then those on the second sieve, and lastly those remaining on the finest sieve. This drift was found to contain doubly-terminated quartz crystals, titaniferous iron, and zircons, but no sapphires or diamonds were found by Mr. Griffiths.

I also visited the drift known as Southey's Diamond-mine, 7 miles south-east of Mittagong. This drift is much coarser than that just described, and resembles more the diamantiferous drift of Bingara. It is stated that more than twenty diamonds have been found in this drift at different times, and it also contains fine gold, zircons, &c. A shaft was sunk some years ago close to this drift to a considerable depth, and on the spoil-heap can be seen pieces of volcanic breccia. Unfortunately the shaft was full of water, so that I was unable to observe the mode of occurrence of the volcanic rock, but its presence has given rise to the belief in the minds of some people that the diamonds may have had a similar origin to those of the celebrated Kimberley Mines of South Africa. An application for aid from the Prospecting Vote to test this drift having been made, I recommended the granting of a sum sufficient to sink a shaft that would either prove or disprove this theory. My recommendation was approved, but I regret to say that the money has never been taken up by the applicants.

On the 8th March I proceeded to Braidwood, *via* Tarrago, and inspected the work then being done by Mr. Geological-Surveyor Anderson, *viz.*, the geological survey in detail of the country between Major's Creek and Braidwood.

From March 15th to 19th I was, in company with Professor David, in the Wallerawang and Rydal district. We made a special examination of the Mount Lambie beds, with the object of settling the disputed question as to whether the fossil plant *Lepidodendron australe* is found in rocks of Devonian age, or does not descend below the lower Carboniferous rocks. The question is important in connection with the classification of the geological formation. We succeeded in proving that the fossil does occur in Devonian rocks, and subsequently published a paper on this subject in the Records of the Geological Survey. We also found a number of marine fossils not previously described as occurring in the Mount Lambie beds, and one, a species of *Pteronites*, recognised by the Palæontologist as new to Australia.

On the 20th of March I inspected a galena lode, known as Meyer's Reef, situated about 11 miles East of Tarrago. A copy of the report which I had the honour of furnishing you on this lode is appended hereto.

On the 29th March I proceeded to Scrubby Rush, between Woodstock and Mount M'Donald, and inspected the auriferous reefs there, several applications having been made for aid from the Prospecting Vote. The reefs at Scrubby Rush are, for the most part, what are known as segregated lodes, *i.e.*, they occupy fissures conformable with the bedding-planes of the country rock, instead of cutting across the latter, as is the case with true fissure veins. The general direction or strike of the slates at Scrubby Rush is north and south, but they have been contorted laterally in places, and consequently the segregated veins which filled the fissures between these beds have, generally, a north and south, but occasionally (for a short distance only) an east and west, direction. The reefs are widest where their direction is east and west, and they narrow where they resume their meridional course. The average yield of gold has been found to be about half-an-ounce per ton.

On the 6th June I inspected a Forest Reserve on Bogalara Run, near Bowning, and reported against the proposal to proclaim it a reserve for gold-mining purposes.

In July I visited the Sugarloaf Reefs, near Newbridge, and reported upon a number of applications for aid from the Prospecting Vote.

On the 23rd September I inspected the area of land constituting the Pitt Town Settlement, near Windsor, with the object of reporting upon the question of an artesian water supply for the settlement.

On the 20th October I visited Wellington, and inspected some areas which it was proposed to withdraw from the temporary common. I also visited the Mitchell's Creek Mine, and inspected the works which have recently been erected there for the purpose of treating a large parcel of tailings by the MacArthur-Forrest or cyanide of potassium process. Owing to the presence (in the tailings) of a certain amount of copper, it is doubtful whether this process is the best that could be adopted; for not only is a considerable proportion of the cyanide wasted in dissolving the copper, but the dissolved copper

Section of Bore No 2 No 11 Diamond Drill at Cremorne

Main data table with columns: Borehole 5" Diam, Nature of Strata, Thickness of Strata (ft in), Depth from Surface (ft in), and a detailed description of strata layers. Includes a vertical borehole diagram on the left and a 'Coal Seam (section enlarged)' diagram on the right.

See also Geographical and Max. 21/12/1911

See also Geographical and Max. 21/12/1911

is subsequently deposited on the zinc shavings, and retards the action of the latter in precipitating the gold. Moreover, the gold which is finally precipitated is found to be mixed with a large proportion of copper, instead of being pure.

On the 25th October I proceeded to Lewis Ponds and inspected some land which it was proposed to alienate, but which I reported would probably be required for machinery-sites in the future.

From the 6th to the 27th November I, in company with Mr. Boulton, Superintendent of Public Watering Places, travelled over a considerable area of the Western District. I reported upon proposals for putting down bores for artesian water at Tarrion, near Brewarrina, and at the Quarry Reserve, near Bourke, and I also inspected and reported upon a supposed find of gold on the Fort Bourke Run. Copies of these reports are appended. During this trip I was enabled to obtain much valuable information in regard to the Cretaceous water-bearing basin, and to make several corrections on the Geological Map of the Colony.

On the 28th November I visited Gulgong in company with Mr. Crouch, District Surveyor. We made an inspection of the Temporary Common, and agreed upon certain recommendations as to its curtailment.

On the 18th December I proceeded to Narrandera, and travelled thence to the newly-discovered auriferous reefs on Portion 80, Parish of Fennel, County of Bourke. I subsequently had the honour to furnish you with a report on the question of the resumption of the land for mining purposes.

On the 28th December I travelled to Burragorang, *via* Camden, and inspected a coal-seam which Messrs. Barry & Co. propose to prospect by boring with the diamond-drill. The summit of Burragorang Mountain is about 1,950 feet (by aneroid observation) above sea-level, and is composed of beds of Hawkesbury Sandstone, which are here about 550 feet thick. The chocolate (Narrabeen) shales outcrop, as one descends the cut road on the mountain side, at a height of 1,400 feet above sea-level, and lower down the outcrop of the coal-seam is met with at an elevation of about 1,025 feet. The seam, which appears to have a good roof, appears in section as follows:—

	ft.	in.
Randed bituminous coal .....	0	6
Splint and bituminous coal.....	3	10
Shale band.....	0	0½
Splint and bituminous coal.....	0	11½
Friable bituminous coal .....	0	6
	<hr/>	
	5	10

A sample of the "splint and bituminous" coal taken haphazard was analysed by Mr. J. C. H. Mingaye, F.C.S., Analyst to the Department, and gave the following result:—

Moisture at 100° .....	2.80	
Volatile hydrocarbons .....	26.80	
Fixed carbon .....	62.50	} Coke, 70.4 %.
Ash .....	7.90	
	<hr/>	
	100.00	

Sulphur, .576 per cent. Specific gravity, 1.345.  
One pound of this coal will convert 12.1 lb. of water into steam.

Considering that the sample was taken from the outcrop, the analysis must be considered as warranting the opinion that the seam will be found to consist of good steam-coal. It must be remembered, however, that the sample analysed was not representative of the whole thickness of the seam.

During my absence in the Western District the No. 2 bore, which was put down at Cremorne under the supervision of the Superintendent of Diamond Drills, struck a 10 foot 3 inch seam of coal at a depth of 2,917 feet. The successful issue of this bore, proving as it does the continuity of workable seams of coal from Newcastle to Illawarra, is of immense importance to the future of New South Wales, for it not only adds enormously to our proved reserves of coal, but it assures the future of Sydney as a manufacturing port.

I have made a detailed geological section of the strata passed through by the bore from its commencement, and a complete record of it will be found appended hereto.

The last 30 feet of the section, including the coal-seam itself, were examined by Professor David, who was good enough to act for me during my absence.

Professor David also ascertained (by means of thermometers in a specially-constructed apparatus) the temperature of the rocks at a depth of 2,733 feet to be 97° Fah., which is considerably lower than was anticipated. This represents a rate of increase of temperature as we descend of 1° for every 80 feet, and at this rate the actual temperature at the level of the coal-seam (2,917 feet) should be 99.3° Fah., a temperature which could of course be considerably reduced by ventilation.

The coal proves to be of good quality for steam purposes. The following analysis by Mr. J. C. H. Mingaye, F.C.S., shows the mean composition of the seam:—

Hyroscopic moisture .....	0.66
Volatile hydrocarbons .....	17.57
Fixed carbon .....	71.09
Ash .....	10.68
	<hr/>
	100.00

Sulphur, .724 per cent. ; specific gravity, 1.346 ; calorimetric value, 13.0 ; coke, 81.77 per cent.

During the year a new edition of the Geological Map of the Colony was published. Considerable care was exercised in obtaining the very best colours in the market, and in consequence of this, and the excellence of the draftsman's and lithographer's work, the new map is generally considered to be in advance of anything of the kind yet issued by the Department. The boundaries of the different formations were drawn by Mr. O. Trickett, L.S., and the printing was done at the Lithographic Branch of the Lands Department, under the supervision of Mr. J. Taylor. The map has been awarded a medal at the Chicago Exhibition.

The senior Geological Surveyor, Mr. Wm. Anderson, was engaged during the first half of the year in continuing his detail survey of the Shoalhaven Valley. During the month of March, as already stated, I made an examination of his work, which I found very satisfactory, and he was making good progress when,

when, in accordance with the retrenchment proposals, his salary was removed from the Estimates, and his services had to be dispensed with from the 30th June. I desire to place on record here my appreciation of Mr. Anderson's work, and my regret at the loss of so intelligent and zealous an assistant.

Mr. J. E. Carne, F.G.S., is now the senior Geological Surveyor on the staff, but he has been absent since the 23rd January, having proceeded to Chicago in charge of the New South Wales mineral exhibits at the World's Fair. It is satisfactory to know that owing to a great extent to Mr. Carne's skill and experience in similar work the mineral exhibits attracted a great amount of attention and admiration from visitors of all nationalities, and it is fair to assume that the Colony will in the future reap the benefit of the attention which its wonderful mineral exhibits received. I venture to hope that during the coming year Mr. Carne will be able to devote his time to the work of the Geological Survey Branch.

The appended report by Mr. Carne shows that he visited a number of mines and smelting-works in America.

In connection with the report on Colonial Coke which I had the honour to furnish last year, it is interesting to note that in large silver-smelting works in America Mr. Carne found that the coke used (of American manufacture) was very inferior to our New South Wales coke, both in regard to the strength or density and in the percentage of ash; and he was informed that they found it more economical to use this inferior coke, taking into consideration the difference in price between it and the best Welsh coke.

Mr. Geological-Surveyor G. A. Stonier, F.G.S., has done a very considerable amount of travelling during the year, his time having been principally occupied in dealing with applications for aid out of the Prospecting Vote, and reporting upon the advisability or otherwise of alienating certain areas of land within gold-fields. He has also reported upon a number of cases in which the Lands Department desired to cancel gold-field reserves, curtail temporary commons, &c., &c. His annual report is appended.

Mr. Geological-Surveyor Jaquet, A.R.S.M., F.G.S., has been engaged during a considerable part of the year in preparing the manuscript, plans, and sections of his Monograph on the Geology of the Broken Hill Lode. This Monograph is now in the press, and it will, I think, be found to be well worth the time and labour which Mr. Jaquet has devoted to its preparation, both in the office and in the field.

During the month of January, Mr. Jaquet made a careful examination of the Mount Allen Mine, in connection with the question of compensation to be paid to the New Mount Hope Copper-mining Company, on account of the resumption of the M.C.P. on which the Mount Allen Mine occurs. He also visited the Nymagee and Cobar Copper-mines. In August he inspected and reported upon a silver-lead lode at Belconon, near Queanbeyan. In October he reported upon the gold and silver lode at Back Creek, near Rockley, the alluvial gold deposits at Neville, near Carcoar, and also the recently-discovered auriferous deposits in Marsden's Paddock, near Blayney. He has also reported upon a recent-discovery of auriferous ground near Queanbeyan. On 22nd October, Mr. Jaquet proceeded to Braidwood, to take up the work which had been interrupted by the retirement of Mr. Geological-Surveyor Anderson, viz., the geological survey of the Shoalhaven Valley. With the object of ensuring a practical outcome from Mr. Jaquet's work at as early a date as possible, I instructed him to proceed at once with the mapping of the auriferous drifts which are known to occur in the valley of the Shoalhaven. Mr. H. G. M'Kinney, M.I.C.E., has recently furnished a report to the Minister for Works on the practicability of bringing to this locality a supply of water sufficient to work the auriferous drifts by hydraulic sluicing (*vide* Annual Report of the Department of Works for 1892), and it is hoped that Mr. Jaquet's report will, in connection with Mr. M'Kinney's, result in the opening up of employment for a number of miners.

Mr. Jaquet also dealt with several applications for aid out of the Prospecting Vote, and reported upon several areas which the Lands Department desired to alienate.

Mr. G. W. Card, A.R.S.M., F.G.S., in addition to his ordinary duties as Curator of the Museum, has done good work in the microscopical examination of rocks. He has also supplied a considerable amount of information to the public in answer to inquiries. In consequence of the space lately occupied as a Geological Museum being required for offices for the Agricultural Branch, the geological collection has, in accordance with your instructions, been removed to the old building in the Domain, formerly occupied by the Technological Museum. I venture to express the hope that this arrangement will be only a temporary one, and that a more suitable structure for the display of our fine collection will be provided as soon as practicable.

Another new mineral has been found at Broken Hill during the past year. It was discovered in the Australian Broken Hill Consols Mine by Mr. George Smith, at that time Assistant Manager, and now General Manager. A careful analysis of the mineral was made by Mr. J. C. H. Mingaye, F.C.S., Analyst and Assayer to the Department. At the request of the finder, I read a short description of the new mineral at one of the monthly meetings of the Royal Society. The composition of the mineral is sulph-antimonide of nickel and cobalt ( $\text{Co S}_2$ ,  $\text{Co Sb}_2$ ,  $\text{Ni S}_2$ ,  $\text{Ni Sb}_2$ ), and I have given it the name Willyamite, after Willyama, the native name for Broken Hill.

At the Laboratory a large amount of work has been performed by and under the superintendence of Mr. J. C. H. Mingaye, F.C.S. A total number of 3,015 samples were received during the year for analysis and assay. The analyses included thirteen samples of well and artesian waters, a number of rocks from the Broken Hill district, numerous coals, fireclays, &c., &c.

At the request of the Trustees of the Australian Museum, Mr. Robert Etheridge, jun., the Palæontologist and Librarian, was allowed to act for Dr. Ramsay (who was absent on sick leave) during a considerable part of the year. Notwithstanding this fact, Mr. Etheridge, with the assistance of Mr. Dun, has found time to keep the current work of the Department fairly well up to date.

Mr. W. S. Leigh, the Superintendent of Caves, has also done good work during the year. Besides making periodical visits to the different caves and reporting on several fresh discoveries, he has designed and supervised the construction of the various improvements necessary for the safety of visitors.

On the 20th February the keeper of the Jenolan Caves, Mr. J. Wilson, discovered another large and distinct branch of the Imperial Cave. The new cave is, in point of beauty and interest, equal to anything yet found. It has been reported upon by Mr. Leigh, who, in company with Messrs. Etheridge and Barber, has also, during the year, explored a number of caves in the Coleman limestone, about 20 miles north-east of Kiandra.

In conclusion, I have to report that all the officers of this Branch of the Department have shown energy and care in the discharge of their duties.

The Under Secretary for Mines and Agriculture.

I have, &c.,  
EDWARD F. PITTMAN,  
Government Geologist.

APPENDIX

## APPENDIX I.

Sir,

Department of Mines, Sydney, 13 February, 1893.

I have the honour to report that I have made an examination of the country in the neighbourhood of Bowling Alley Point, with the object of ascertaining the advisability or otherwise of making a reserve to protect the deposits of chromite existing there. A belt of serpentine runs for some miles on the eastern side of the Peel River. The direction of this belt is about N. 30° W., and its width appears to be about 300 yards. At a point (within this belt of serpentine) about three-quarters of a mile east of the "Bowling Alley Point Hotel" there are several small outcrops of chromite. One big mass, which is lying on the surface, is about 8 or 10 feet square, and a number of smaller masses are to be seen embedded in the surface rock. Beyond a narrow costeaning trench across the strike of these bunches, no prospecting has, however, been done, and in view of the uncertainty as regards the persistency in depth which characterises chromite deposits, it is impossible to say what quantity of the mineral exists there until its depth has been defined.

A number of assays of chromite from this district have been made from time to time in the Geological Survey Laboratory, and have yielded from 37½ to 47 per cent. of Cr<sub>2</sub>O<sub>3</sub>.

Although the deposit alluded to was the only one of which I could hear in the district, it is possible that other deposits may occur anywhere within the belt of serpentine shown on the lithograph, or between it and the belt of diorite which extends along its western boundary.

With regard to the question of a reserve, however, it is pointed out that a considerable area of the land referred to is held under gold-mining lease, while the outcrop of chromite already described is the subject of a mineral lease application (20 acres) by B. D. Williams, and it is probable that a number of areas near the banks of the Peel River are held under miners' rights.

I have, &amp;c.,

EDWARD F. PITTMAN,

Government Geologist.

## APPENDIX 1A.

## Report on Galena Lode known as Meyer's Reef.

Geological Survey Branch, Department of Mines, Sydney, 2 May, 1893.

I HAVE inspected the lode known as Meyer's Reef, which is situated on portion M.L.1., Parish of Cullulla, County of Argyle, about 11 miles East of Tarrago, and have to report as follows:—

The country in which the lode is situated consists of slates, shales, and sandstones—probably of Upper Silurian age. About four years ago several shafts, the deepest of which was about 70 feet, were put down by O'Neill, Blake, and Party, about 5 chains north of the present workings, on a lode having a dip W. 20° S. at 20°. This lode was found to contain slugs of carbonate of lead, which were also scattered through the shales and mudstones close to the outcrop.

These were evidently the result of the oxidation of a galena lode, but no solid deposit of the latter mineral appears to have been discovered by this party (possibly because sufficient prospecting was not done), and the workings were abandoned.

The galena lode (Meyer's Reef) on which mining operations are at present being carried on bears N. 30° E., and dips E. 30° S., at an angle of about 70°. Two shafts have been sunk upon it; the first, which was aided out of the Prospecting Vote, reached a depth of 60 feet, when work was discontinued.

The second shaft is situated about 50 feet N.E. by N. of the first, and at the time of my visit was down to a depth of 96 feet. The galena lode, which was very narrow at the surface, was said to be 6 feet wide at the bottom of the shaft; but I was unable to inspect it there, as there were about 5 feet of water in the bottom. At a depth of 92 feet from the surface, however, I found the lode showing in the face of a small drive (which had been put in for a distance of 5 feet), and here it consisted of a dark shaly gangue with streaks and bunches of fine-grained galena, and with occasional patches of carbonaceous shale.

The lode proper was about 3 feet 6 inches wide in this drive, and about 18 inches East of it, was what appeared to be a well-defined hanging-wall, showing that the galena had not filled the fissures for its entire width. I took a representative sample from across the full width of the lode (viz., 3 feet 6 inches), and on my return to Sydney it was assayed by Mr. J. C. H. Mingaye, F.C.S., Analyst to the Department. The result showed that the average contents of the lode for the width mentioned above, were 15.45 per cent. of lead and 2 oz. 9 dwt. of silver per ton. It is quite probable that the lode may continue to improve, as it has already done from the surface down to the depth from which I took the sample referred to; but it is evident that, unless a material improvement does take place, the deposit cannot be worked at a profit, in view of the cost of cartage and railway freight to Sydney.

EDWARD F. PITTMAN,

Government Geologist.

The Under Secretary for Mines and Agriculture.

## APPENDIX 1B.

Geological Survey, New South Wales, Department of Mines, Sydney, 25 September, 1893.

At the request of Mr. Backhouse, I visited the site of the settlement at Pitt Town Common on Saturday the 23rd instant, and find that it is about 3 miles east of the Mulgrave Railway Station, and about 150 feet above sea-level. The settlement is situated on undulating country, consisting of Wianamatta shale, underneath which, at a depth probably of less than 100 feet, will be found the Hawkesbury sandstones. There is, in my opinion, no probability of an artesian water supply being obtained by boring. The settlers at present obtain their drinking-water from a number of small holes in the gully or watercourse, which receives the whole of the drainage of the horseshoe range upon which the dwelling-houses have been or are being erected. It is evident, therefore, that every successive shower of rain must help to render this water unfit for domestic use, and it is of the utmost importance that some other less objectionable source of supply should be obtained as soon as possible, for should the coming summer be a hot and dry one, the settlers will probably have considerable difficulty in obtaining sufficient water for their necessities. It is possible that a little soakage-water might be obtained (owing to the late wet season) by sinking wells in the valleys, but I am of opinion that if dry weather were to set in this source would be quite inadequate. Some of the surrounding gullies appear to be eminently suitable for the construction of dams, and this would probably be the cheapest and most expeditious way of meeting the difficulty. I understand that a supply could be obtained by pumping from Cattai Creek, but this would be a comparatively expensive scheme.

EDWARD F. PITTMAN,

Government Geologist.

The Under Secretary for Mines and Agriculture.

## APPENDIX 1C.

Department of Mines, Sydney, 7 December, 1893.

I HAVE the honor to report that I have inspected the site of the supposed deposit of gold on the Fort Bourke Run. The locality is situated about 16 miles north of Bourke. I found a miner named Whitehead in charge of the claim. Three shafts have been sunk on the edge of a nearly circular plain or dry lake, the material penetrated being; (1st) about 5 feet of dark blue or purple clay—the joints being coated with carbonate of lime; (2nd) about 2 feet of whitish clay stained red in places by peroxide of iron; (3rd) dark bluish or blackish clay. These clays undoubtedly belong to the Lower Cretaceous Series, and at the back of the shafts, and bordering the plain referred to are low spurs formed of Upper Cretaceous sandstones, quartzites and beds of kaolin.

Two samples of the clays which were said to be auriferous were brought to Sydney by me, and were carefully assayed in the Geological Survey Laboratory by Mr. Mingaye, but were found to contain neither gold nor silver. These results confirm the opinion which I formed from an inspection of the ground, which has no appearance of being an auriferous formation, and which differs in no respect from the Cretaceous plains which are characteristic of the district generally.

EDWARD F. PITTMAN,  
Government Geologist.

The Under Secretary for Mines and Agriculture.

## APPENDIX 1D.

Sir, Geological Survey Branch, Department of Mines, Sydney, 15 December, 1893.

I have the honour to report that, in company with Mr. Boulton, Superintendent of Public Watering-places, I have made a geological inspection of the country between Byerock and Brewarrina, for the purpose of ascertaining whether artesian water is likely to be obtained by boring along that road. The trip outwards to Brewarrina was made along the road, *via* Gongolgan and Mr. Willis' Tarrion Station, while the return journey was made by the direct road (*via* Pink Hills), so that a good scope of country was examined.

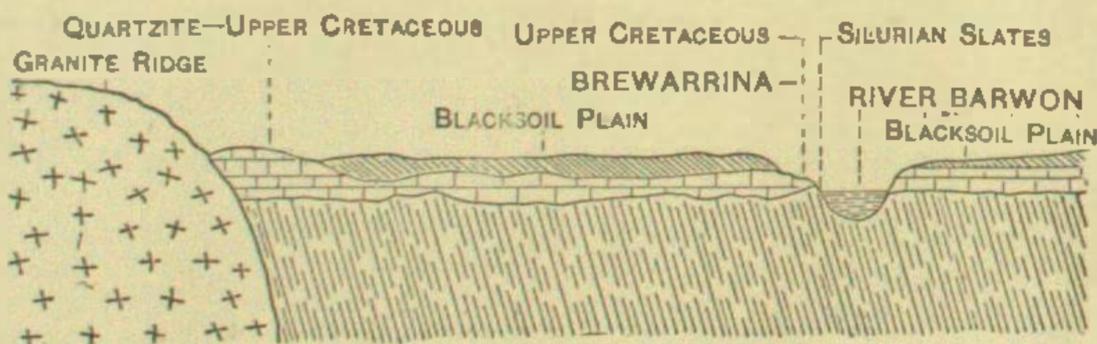
From Byerock to within half a mile of Gongolgan the road lies over gently undulating country—the valleys or depressions being covered by shallow Pleistocene or recent deposits, while on the summits of nearly all the low ridges may be seen outcrops of altered slates (of Upper Silurian age) intersected by quartz reefs. It is not to be expected, therefore, that artesian water would be found anywhere between Byerock and Gongolgan.

These Silurian sediments are succeeded by granite as the road approaches Gongolgan. A fine outcrop of granite is seen in the bed of the Bogan close by the bridge on the northern side of the town, and other outcrops of the same rock occur at intervals along the road for a distance of 10 miles towards the Tarrion. In between these out-crops the country is covered by black soil—the flood-drift left by the over-flow of the Bogan River; but there seems little reason to doubt that granite would be found underlying it at no great depth, and that, therefore, the occurrence of artesian water for a distance of 10 miles along the road north of Gongolgan is improbable.

After leaving the last outcrop of granite the road runs (still in a northerly direction) over black-soil plains for a distance of 7 or 8 miles. It is quite possible that these black-soil plains may overlies beds of Lower Cretaceous age, although there is no geological evidence at the surface to prove this assumption. If the Cretaceous beds do underlie this area, however, I am inclined to think (from a consideration of the geological evidence to be seen further along the road towards Brewarrina), that they are of no great thickness, and that, therefore, the occurrence of artesian water in them is somewhat doubtful.

Just south of the Tarrion an isolated hill, known as Mount Bendemeer is reached. This hill is composed of coarse quartz-pebble conglomerate and sandstone beds, having a strike N. 50° E., and dipping E. 50° S., at angles varying from 10° to 20°. These beds possess characters in common with both the Devonian and Upper Cretaceous rocks, and in the absence of palæontological evidence I am not yet in a position to state their precise age, though I am inclined to regard them as Devonian.

Almost immediately after leaving the Tarrion, granite is again met with to the west of the road to Brewarrina, and the same formation extends to within a mile and a half of the town. The granite ends in a low ridge, from the northern flanks of which horizontal beds of typical Upper Cretaceous quartzite extend towards Brewarrina. These beds are not continuous however; between the granite ridge and the town they have been denuded and replaced by black-soil deposits. They reappear, however, in the banks of the river (the Barwon) at Brewarrina, where they are seen to lie upon the upturned edges of a series of slates and shales, traversed by lenticular quartz veins. There is little doubt that these slates and shales are of Palæozoic (Upper Silurian) age. They can be traced (outcropping in the gullies) for several miles to the west of Brewarrina. They have an east and west strike, and their dip is northerly at an angle of 80°, showing that they have probably been tilted by the intrusion of the granite, which has already been described as reaching to within a mile and a half of the river. A section of this mile and a half of country would therefore appear as follows, and it will be seen that there is no probability of water-bearing (Lower Cretaceous) belts occurring between the Tarrion Station and Brewarrina.



On the direct road back to Byerock (*via* the Pink Hills) the granite continues to near the Tarrion Creek Crossing, then black-soil country to within 6 miles of Tarcoon on the Bogan River. Here granite is again met with, and continues to within 28 miles of Byerock, after which the road passes over 6 miles of Silurian slates, then 5 miles of granite, and then Silurian country into Byerock.

Summary



*Summary.*

My examination of the country along the road from Byerock, *via* Gongolgan to Brewarrina leads me to the conclusion that, for the greater part of the distance, there is little or no probability of artesian water being found. There is a possibility that Lower Cretaceous beds may underlie the black-soil plains over part of the area extending from 10 to 18 miles north of Gongolgan. On the other hand, it is possible that this area may be underlaid by granite, and indeed it may be said that this hypothesis is quite as likely as the former.

In any case I am of opinion that if Lower Cretaceous beds do occur here, they are probably very near the shore line of the old Cretaceous sea; in other words, they are likely to be of no great thickness, and therefore the chances of obtaining artesian water would not be sufficiently great to justify the putting down of a bore at Government expense, unless it were considered that the requirements of travelling stock rendered it imperative that a supply of water should be provided at this point.

The accompanying geological sketch map shows the result of my examination of the district.

The Under Secretary for Mines and Agriculture.

I have, &c.,

EDWARD F. PITTMAN,  
Government Geologist.

## APPENDIX I E.

Sir,

Geological Survey, Department of Mines, Sydney, 22 December, 1893.

I have the honour to report that I have inspected the auriferous reefs recently discovered on A. C. P. Portion 80, Parish of Fennel, County of Bourke, distant about 18 miles, N. E. of Narrandera.

The prospector of the reef was Mr. Smith, who now holds a permit to search for gold, and who has performed a considerable amount of work, including an underlay shaft 24 feet deep (disclosing a well-defined reef, varying in width from 1 to 3 feet) and a vertical shaft which has struck the same reef on the underlay at a depth of 35 feet. The reef here has a strike of N. 20° W., and dips W. 20° S. at about 45°. The country rock consists of somewhat felspathic slates and sandstones, and I could see no indications of intrusive dykes in the vicinity. Smith has a fair amount of stone at grass. I examined this stone carefully, and could not see any gold with the aid of a glass, nevertheless samples taken indiscriminately from the paddock and dollied, yielded very fair prospects of fine gold when washed in the dish.

Next to Smith's claim is O'Farrell's, which is also held under permit, and adjoining O'Farrell's, is Duval's, junior, which is the subject of an application for a permit. There is a dispute between O'Farrell and Duval, junior, the latter asserting that O'Farrell's ground has been laid out in a different way to that in which he applied for it, and that the alteration has given him (O'Farrell) a considerable amount of the ground applied for by Duval. There is no doubt that O'Farrell's application is prior to Duval's, but Duval states that the alteration in O'Farrell's description was made *after* he (Duval) had sunk his shaft and found gold. This is denied by O'Farrell; but the facts can doubtless be ascertained upon enquiry.

Duval has undoubtedly done more work than O'Farrell, and, as a matter of fact, the declaration as to payable gold having been found was made by O'Farrell on account of a small hand specimen taken from a small hole, the depth of which does not exceed 3 feet or 3 feet 6 inches, and which, Duval asserts, is outside O'Farrell's ground and inside that applied for by him. The reef here bears about N. 40° W., and dips in a contrary direction from that in Smith's claim. Two samples were taken by me from the small hole just referred to. The first, which weighed about 1½ lb., was dollied and washed, but did not yield a colour of gold. The second sample weighed about 5 or 6 lb. It was first roughly crushed, and then about one-third of it was dollied and washed, and yielded a fair prospect of gold. A sample was also taken from Duval's shaft, and yielded, if anything, a better prospect than that from O'Farrell's.

Meyer's Claim is to the South of Smith's, and is on a rubble reef, which is quite distinct from the reef being worked by Smith and Duval, junior. Meyer's application for a permit has not yet been granted, but he is systematically prospecting the ground, and has done a considerable amount of work, including several shafts, the deepest of which is 30 feet, with a drive from the bottom 15 feet long. Two samples from Meyer's reef were taken, and both gave good prospects; in fact, colours of gold can be obtained almost anywhere in the vicinity of the reefs.

I am of opinion, however, that O'Farrell's declaration of payable gold is decidedly premature. No crushing whatever has been done on the field beyond dollying hand specimens in a mortar, and O'Farrell himself has done very little work—certainly not sufficient, in my opinion, to warrant him in declaring payable gold. As far as I can ascertain it has been known for some time past that colours of gold can be obtained from stone taken out of the reefs, and there appears to be an opinion current amongst some of the miners that the first man to declare payable gold will obtain special privileges. It is more than probable that this opinion has to some extent been responsible for the declaration which has been made.

It must not be forgotten that although very rich gold was obtained at the Gladstone and Belmore reefs (not 3 miles distant from the present find), the deposits were decidedly patchy, and in view of this, and of the fact that such a small amount of work has been performed at the new find, I do not feel justified at present in recommending the resumption of any part of the land. In my opinion that course would not be warranted until the results of one or more bulk crushings were known, and, if possible, one of the bulk samples should consist of stone taken from a depth of at least 50 feet. Smith has one shaft already down 35 feet, so that it should not take long to sink the extra 15 feet and extract a few tons of stone. Another crushing might be taken from Duval's shaft at the other end of the reef.

There are at present only four claims on the field on which work has been systematically performed. These are Smith's, Masey's, Duval's (junior), and Meyer's, and of these only the first two are held under permits. I venture to recommend that permits should be issued to Meyers and Duval, junior, as soon as possible, as they are using every effort to prospect the land. It is also, in my opinion, very necessary that survey of the principal claims should be made as soon as possible, as there is a dispute already between two of the applicants, and this can only be satisfactorily settled by defining the boundaries of the ground. It would, I think, be preferable to have the surveys made by one of the surveyors on the staff of the Department.

I would also strongly urge that all permits should be cancelled promptly if not worked in a satisfactory manner, as there are evidently many speculative applications, the only effect of which is to prevent the proper prospecting of the ground.

A large ironstone lode, bearing N. 60° W., runs through Masey's permit. A sample of this was taken by me, and has been sent on for assay.

I have, &c,

EDWARD F. PITTMAN,  
Government Geologist.

The Under Secretary for Mines and Agriculture.

#### APPENDIX 2.

Progress Report by Mr. J. E. Carne, F.G.S., Geological Surveyor,

Sir, Geological Survey Branch, Department of Mines and Agriculture, 19 February, 1894.

I have the honour, in accordance with your instructions, to furnish the following brief notes summarising the work performed by me during the past year, reserving for a later date a more detailed report of mining exhibits and appliances inspected:—

During the whole of the period mentioned I have been occupied in connection with the representation of the mining interests of New South Wales at the World's Columbian Exposition, Chicago, U.S., pursuant to an agreement entered into early in the previous year between the Honorable the Minister for Mines and Agriculture and the New South Wales Commission to the Exposition, whereby I was chosen to undertake, on behalf of each, the work necessary to secure an exhaustive and imposing display of the known mineral resources of the Colony at the above Exposition; and to increase the certainty of obtaining this result I was supplied with the able and experienced services of the late Mr. T. Ford, to whose untimely death in September last I will allude further on.

To the large quantity of exhibits held in stock from previous exhibitions, others were added from the latest discoveries and developments, special prominence being given to such as have so far baffled all attempts at economic treatment, with a view of taking advantage of any new processes or appliances which it was confidently anticipated would form a notable feature in the mining and metallurgical display at the World's Fair, an anticipation, however, not to be realised.

With the exception of a few cases, the mining exhibits were despatched by the 23rd January, on which date I also took my departure for America. The total number of packages forwarded reached 2,550, of a net weight of 275½ tons, and a measurement of 11,106 cubic feet. The exhibits by the s.s. "Alameda," which sailed on the 28th November, 1892, were the very first to arrive at the Exposition.

Upon my arrival in Chicago, on the 24th February, I found the two first consignments of mineral exhibits spread over a large area in the Mines and Mining building, on account of the weakness of the flooring. The first operation, therefore, was the strengthening of it under the spaces on which trophies were to be erected, an expense which should justly have been borne by the Exposition authorities, but which was imposed upon exhibitors.

After a careful examination of the space—8,250 square feet—set apart for the New South Wales Mines Court, I prepared a plan of arrangement which met the approval of the Executive Commissioner—the Honorable A. Renwick, M.D., M.L.C.—and work was vigorously begun. Early in March Mr. Ford arrived, *via* London, having been engaged for two weeks, by instruction from this Department, assisting in the identification and arrangement of the mineral exhibits in the New South Wales section of the Imperial Institute, and he at once joined in the work of preparation at Chicago with the energy and hearty co-operation which always characterised his labours on behalf of the Colony. Aided by the counsel and full confidence of the Executive Commissioner, we were enabled to have the Mines Court practically complete on the opening day, 1st May, notwithstanding that the facilities for handling heavy exhibits, and obtaining necessary materials and supplies, were the crudest we had yet encountered at any exhibition in which we had taken part, a matter for intense surprise to visitors who had indulged in anticipations based upon a knowledge of the labour-saving appliances invented in America.

As the rest of the courts in the Mines and Mining building were, with two or three exceptions, in a very backward condition on the opening day, the New South Wales display was thrown into prominent relief, owing to its finished appearance amongst so much disorder; and even when all were ready, the extent, variety, and massiveness of the exhibits evoked most favourable comment; the freely expressed opinion of the public being that in minerals, wools, and hardwood timbers, New South Wales took the lead from all competitors.

The experience of each exhibition in which I have had the honor to take part, strengthens the opinion that to produce an effect at once imposing and attractive, massiveness must be aimed at as much as superficial extent, the general public being more impressed with bulk than small picked specimens, and the mining community better able to form a just conception of the size and value of the veins and deposits from which the various exhibits are taken.

As before stated the area of the New South Wales Mines Court was 8,250 square feet, which is less than was occupied for a similar purpose at at least two of the previous exhibitions; but it was only with great difficulty that the Executive Commissioner was enabled to secure even the above area, as space was in great demand. But as regards quantity of material used in the display, the last occasion greatly exceeded any previous attempt, the trophies being of necessity closer together. The wall space devoted to geological maps, sections, and mining views amounted to about 1,500 square feet. The Court had a frontage of 87 feet to the main central avenue of the building, and a depth of 160 feet at right angles. Its main features were the handsome silvered column of the Broken Hill Proprietary Company, 40 feet high, the large triple archways springing from four pillars of coal and shale, with a superstructure bearing statistical information of the quantity and value of the mineral productions of the Colony, the whole having a dimension of 56 ft. by 28 ft.; the high coal sections forming an avenue in the main portion of the Court, the large metal and ore trophies, and the gold and gems and polished marbles.

I venture to think that New South Wales has never before had such a creditable and exhaustive display of her natural resources before the world, nor yet one which excited such universal attention. As a national advertisement, the New South Wales exhibit at the World's Fair was unrivalled. Though in one sense it was unfortunate that just at the moment when the Colony was worthily holding its place among the nations of the earth at the greatest World's gathering yet attempted, and inviting and attracting attention, her financial affairs should have been disturbed by a bank panic, yet such an unfortunate occurrence

occurrence could not have happened at a more opportune time, when she had on view at a World's Exposition such abundant evidence of her vast natural resources as must, and did, convey a feeling of confidence in her future prosperity, which no temporary monetary uneasiness can really disturb.

It is also gratifying to note that at no previous exhibition of late years has such abundant evidence been afforded of intelligent interest on the part of the general public, which took the form of frequent inquiry and practical note of whatever struck the observer as specially worthy of remembrance; a large sprinkling of the visitors of both sexes and all ages being supplied with note-books for this purpose.

Unremitting efforts were made during the currency of the Exposition to direct attention to, and stimulate research in, the treatment of the argentiferous zinc-lead sulphides of the Broken Hill and other silver-fields of the Colony; but the general verdict of mining men was that the question of the admixture of the sulphides of the metals mentioned was, to a more or less intense degree, agitating silver-miners and smelters in all silver-producing countries. In Missouri and some other localities in the United States zinc and lead sulphides are separated by mechanical means, but so far as I could judge, in each case the condition of the two ores was coarsely granular or crystalline, and more or less separate, and not, as in the case of the Broken Hill sulphides, finely and intimately mixed to a degree which renders mechanical separation nearly, if not quite, impracticable. Samples of the latter were freely distributed to individuals for test purposes, and supplied to several zinc oxide and metallic zinc works. One ton was handed to the agent of the Krupp Company for practical experiment at the works in Germany. The balance of the 10 tons exhibited by the British Broken Hill Company was handed to the Field Columbian Museum, which is now being temporarily fitted up in the Fine Arts building at the World's Fair, under the direction of Mr. F. J. V. Skiff, late Chief of Mines and Mining, and from whom samples can be obtained by those desiring to carry on research work. Instructions had been received to sell this exhibit with others from Broken Hill, but the terms offered for the sulphide ores by the only available smelting works within reasonable distance of Chicago were such as to leave no margin. In the case of zinc-lead ores a deduction of 50 cents (2s.) per unit was made for every unit of zinc over 10 per cent. in addition to the ordinary smelting charges.

In view of the development of the iron industry in New South Wales, special attention was drawn to the exhibits of iron ores. The quality of the brown hematite from Mittagong, Picton, and Blayney districts, and the magnetites from near Blayney and Cowra, was very favourably commented on; but the magnetite from Iron Mountain, Port Stephens, was not regarded with favour, owing to the excessive percentage of titanitic acid present, to say nothing of the excess of silica.

The Port Stephens ore is, as far as I am aware, the only extensive bedded deposit of iron ore as yet known in the Colony. Professor David describes it\* as evidently the result of beach concentration. It is a compact, granular admixture of magnetite, ilmenite, and quartz sand. Believing that the two latter minerals could possibly be separated from the magnetite by crushing and treatment with an electromagnetic separator, I ventured to send samples to the celebrated electrician, Mr. Edison, who has given considerable attention to the treatment of the titaniferous magnetite beach sands of New Zealand, as well as concentration of lean magnetic iron ores of America, but I regret to say I received no acknowledgment of either letters or samples.

I was informed by Mr. John Birkinbine, Mining and Civil Engineer, of Philadelphia—an authority on the iron ores of America—that ores containing over two per cent. of titanitic acid are hardly marketable in the United States.

Titanium in the form of sphene (silicate of titanium and lime) is not very objectionable in an iron ore, as it fuses and slags off; but in the form of ilmenite (oxide of titanium and iron), it is very infusible, and rapid destruction of the furnace lining results.

The iron ores smelted in America are chiefly from the Lake Superior region, and consist mostly of red hematites of very high grade, yielding from 60 to 66 per cent. of metallic iron, the latter from hand-picked ore.

These lodes are remarkable, not only for their enormous surface development, but also for their persistence in an unaltered oxidized condition to great depths.

In addition to the compact ores, very rich earthy varieties occur in great abundance, and are most cheaply and quickly mined by means of steam shovels.

In New York State lean crystalline magnetites are concentrated to a high degree of purity by magnetic concentrators.

The iron ores of America are not smelted at the mines, but are shipped to the most advantageous localities for reduction works, just as will be necessary in New South Wales when iron-smelting operations are begun.

Considerable attention was given to coke in America, and especially to the quality of the article used in smelting operations. From observation and inquiry it was elicited that coke, containing what may be regarded as an excessive proportion of ash, is used with satisfactory results in silver and other smelting works in the western States, the saving effected in the cost price of the lower grade local coal as compared with that of the superior article from England, or even from Pennsylvania, far more than compensating for any loss occasioned in smelting with the former. It need hardly be stated that great skill, experience, and close attention to detail is requisite in the operation.

As a notable instance in corroboration of the above statement, at the Germania Silver-lead Smelting Works, at Salt Lake, Utah, the fuel used is a mixture of Colorado and Utah coke, with local coal. The Colorado coke averages upwards of 11 per cent. of ash, whilst the Utah averages from 14 to 16 per cent., and is very soft and brittle, resembling cinders in the coke heap. At the time of my visit coke from Trinidad, Colorado, was being used, which contained 22 per cent. of ash, and from the manager's books I learned that coke has been used with 27 per cent. of ash.

The coke most largely produced and used in America is the Connellsville coke, manufactured by the H. C. Frick Company, of Pennsylvania, which is stated to contain an average of from 8 to 10 per cent. of ash; the average of analyses made by the Carnegie Steel Company of a year's consumption being 9.79 per cent.

When the Germania Smelting Works of Salt Lake were first started, some twenty-one years ago, coke was imported from South Wales, England, and afterwards from Pennsylvania (U.S.) Gradually, on the score of economy, the English article gave way to the latter, and later on the Pennsylvania to the local Utah and Colorado coke,—the Welsh coke costing 22 dollars (about £1 8s) per ton at the smelting works, whilst the very low price of the Pennsylvania coke at the Ovens (now about 5s. 6d. per ton) was increased abnormally by the cost of railway transport.

Attention

Attention was paid to the display of coal from Vancouver, British Columbia, and Japan, in view of their competition with New South Wales coals in the Pacific and other neighbouring seas, and the country bordering them. In both of the above fields the coal measures are of Cretaceous age, and, therefore, much younger than the productive measures of New South Wales, and hence are brittle coals. In Japan there is but one small coal basin, on an island, from which lump coal can be obtained; the specimens exhibited in the Japan Mining Court being encased in cement to keep them in 1-foot cubes.

Some of the Vancouver coal is of excellent quality as regards composition; but for steaming purposes, owing to excess of volatile constituents, about 10 tons more per day are required to produce a given working power as compared with the best southern steam coals of New South Wales. The brittleness of the Vancouver and Japan coals will probably place them at a disadvantage for ocean transport when firmer coals are offering. The local selling price of Vancouver coal is excessive, the Canadian-Pacific S.S. Co. paying 14s. 6d. per ton for Nanaimo coal at Vancouver, against 10s. per ton for Southern coal in Sydney. The advertised local retail price of the former is 28s. per ton at Vancouver.

It is unnecessary to specify here the exhaustive coal display from the enormous coal-fields of the south-eastern states of America, as their coals are unlikely to come in direct competition with ours.

Probably a use may yet be found for the inferior graphite from Undercliff, New England. At several exhibitions efforts were made to ascertain its suitability for industrial purposes, but hitherto without avail. A sample was tried at Chicago as a lining for sand moulds for iron castings with hopeful results, and at the close of the fair about 1 ton was supplied to a firm of iron-founders in Pennsylvania, who have promised a report upon the practical test they will thus be enabled to make.

The calcining of sulphide ores—chiefly of copper—in revolving cylindrical and other furnaces was made the subject of special observation and inquiry. At the Germania works before mentioned the argentiferous sulphide ores are roasted in Brückner furnaces, the charge being 15 tons and the time of roast about forty-eight hours. At the time of charging, the fires are driven full until the ore ignites and combustion ensues, when they are slacked until near the finish of the operation, and then again forced. A jet of steam is driven into the furnaces during the process of calcining.

Ores averaging from 9 to 11 per cent. of zinc are treated, the zinc being wasted. A special parcel on the company's books contained 26 per cent. of lead, 17 per cent. of zinc, and 8 per cent. of copper, but this was exceptional.

The copper mines and reduction works of Butte and Anaconda, in Montana, were also visited. The ore raised and treated in this important copper-producing region—second only to Lake Superior—consists of iron pyrites with copper glance, yielding on an average from 4 to 7 per cent. of metallic copper, though large bunches of rich copper glance occur, which are sent direct to the smelter. The great bulk of the ore, however, requires concentrating, which is performed either by means of Harz or Cullen jiggs and Frue Vanners, or jiggs and tables.

The concentrates are then roasted in Brückner cylindrical revolving furnaces, or in the O'Hara, or modified Spence, forms of reverberatory furnaces.

Stall-roasting is also in vogue in some works. The roasted concentrates are reduced to matte in water jacket or reverberatory furnaces, both forms being in use at each plant; in most instances no flux is used. The matte is converted into blister copper of from 98 to 99 per cent. purity in Manhés Bessemer converters.

The Butte copper lodes were originally worked for silver, and at the present time the ore contains a fair percentage of that metal, which is separated locally from a portion of the output during the electrolytic refining of the blister copper at Anaconda and Great Falls. The silver contents add appreciably to the value of the Butte copper ores.

The celebrated Comstock Silver-lode of Nevada was also visited, but here, as in Colorado, the mines were practically shut down owing to the fall in silver, due to the repeal of the Sherman Silver Purchasing Bill.

The marbles from New South Wales attracted considerable attention, especially the slabs from Mullion Quarries, near Orange, which were the largest at the fair. The freestone and syenite exhibits were also favourably commented on. In connection with the latter a trial was made of the Pittsburgh crushed steel for cutting and polishing purposes, and apparently with satisfactory results.

The paint ochres of the Gordon Emery and Color Company's property, near Orange, and from J. Clabby's land, were highly commended by persons interested in ochres, and some practical inquiries made.

Inquiries were also made for gem stones, particularly opals, but unfortunately the display of the latter was very poor, both as regards quality and quantity, notwithstanding that every effort was made to secure suitable specimens from White Cliffs, either as private exhibits or by purchase.

The new Geological Map of the Colony, prepared under your direction during the year, reached the Exposition in time for examination for award. The judge, Mr. H. Lundbohm, Director of the Geological Survey of Sweden, in his report, highly commended the progress displayed in scientific detail and artistic finish.

From the 15th July to the 15th October I was actively engaged on the Committee of Judges in Mines and Mining, to which I was appointed on behalf of New South Wales on the recommendation of the Executive Commissioner; and, though taking no part in the judging of the Colony's exhibits, other than fully representing their claims, I was enabled to closely watch the progress of examination, and report in Committee.

New South Wales secured eighty-seven awards in the mining section, a list of which is herewith appended. It is necessary to point out that under the Thatcher system of judging adopted at the World's Fair—much against the wishes and opinions of the Foreign Commissioners—there is but one class of award, which is represented by a bronze medal and a diploma. The fundamental principle underlying the system is non-competition. The merit of an exhibit was to be recognised independently of any similar ones in the same class, and the use of the terms "better" and "best" were prohibited. The public is believed to be able to decide by inference from the wording of the judges' reports, embodied in the diploma, as to the best exhibits in any class, the diploma being supposed to specify the special points of excellence in each case. The idea of thus enabling a distinction in merit to be drawn between awards having an equal value as regards medal and grade, may be very well in principle, but, unfortunately, like other things excellent in principle, may not be practicable, and especially so, as, under the above system, each judge had to work independently of his colleagues in the same section; therefore, the terms used in depicting

depicting the merits of an exhibit do not possess the same uniform weight and value as they would in the report of a jury, in which each adjective has a special and equal value. Again, some judges write full reports, while those of others are terse and scanty. The practical result of the judging at the World's Fair may be summed up in the statement that the inferior exhibits have been weeded out, and the public is left to judge, as best it can, from the diplomas, as to the most meritorious of these selected for awards.

On the 22nd September occurred the untimely death of Mr. Thomas Ford, Assistant Superintendent of the New South Wales Mines Court. In his death the Colony has lost an officer who has rendered valuable services in connection with her official representations, and I, an esteemed friend and able assistant, whose worth has been amply demonstrated during several years of co-operation. Whatever measure of success has attended our efforts at the various exhibitions in which we have taken part, has been largely due to his zealous and energetic assistance. Unfeigned regret was expressed by all the official representatives in the Department of Mines and Mining at the World's Fair, to whom he had endeared himself by his manly, courteous bearing.

The Exposition closed on 30th October, and packing was at once commenced. In accordance with the wishes of the Executive Commissioner to reduce the expense of returning the exhibits to the lowest possible amount, in view of the financial depression, all bulk exhibits which could be easily replaced when occasion required were disposed of either by donation or sale on assay, reserving only good representative specimens of each for the Mining and Geological Museum. The private exhibits were disposed of in like manner, in accordance with the owners' instructions.

The New South Wales mineral exhibits were in great request for scientific and scholastic institutions in the United States and other countries; hence the donations and exchanges effected will be the means of making our mineral resources widely known.

From the various courts in Mines and Mining, valuable additions to our Museum collections were obtained.

Having completed the packing on the 13th December, I had nearly a month at my disposal before the departure of the next Vancouver mail steamer. This was occupied in visiting such of the principal mining centres and metallurgical works of America as time would permit.

Before closing my report I desire to express my appreciation of the great courtesy and consideration which I received at the hands of the Honorable Arthur Kenwick, M.L.C., &c., Executive Commissioner, and of the friendship and assistance of my colleagues in the New South Wales Courts, and especially acknowledging the services of my two assistants—Charles Tanner and William Walker—who rendered most painstaking help, particularly after the death of Mr. Ford.

My best thanks are due to the Chief of Mines and Mining, Honorable F. J. V. Skiff, and his staff (especially the able and courteous Secretary, Mr. E. L. Burchard), for their unfailing courtesy and kindness. Mr. Skiff and his officers extended at all times the heartiest goodwill and assistance to the New South Wales mining contingent.

To the President and Commission of the Colony to the World's Columbian Exposition, I am indebted for the full confidence reposed in me, which I trust has not been misplaced.

I have, &c.,

The Government Geologist, Sydney.

JOSEPH E. CARNE,  
Geological Surveyor.

List of Awards to New South Wales Exhibits in the Department of Mines and Mining at the World's Columbian Exposition, Chicago, 1893.

Exhibitor.	Exhibit.
Minister for Mines and Agriculture .....	Collection of gold-bearing ores.
" " .....	" " (in bulk).
" " .....	" reef and alluvial gold specimens.
" " .....	" silver ores.
" " .....	" " (in bulk).
" " .....	" tin ores.
" " .....	" " (in bulk).
" " .....	" copper ores.
" " .....	Copper ore, Burraga.
" " .....	Collection of antimony and bismuth ores.
" " .....	" iron, manganese, and cobalt ores.
" " .....	Iron ore, Fitzroy mines.
" " .....	" Glasson's mine, near Blayney.
" " .....	Gilkrist's mine, near Blayney.
" " .....	Chrome iron-ore, Nundle.
" " .....	Manganese oxide, Woodstock.
" " .....	Collection of coal specimens.
" " .....	" building stones.
" " .....	" marbles.
" " .....	" inlaid table (N.S.W. marble).
" " .....	" brick and pottery clays.
" " .....	" gem stones and associated drifts.
" " .....	" rocks, Barrier Range.
" " .....	" fossils of New South Wales.
" " .....	" maps and publications of Department of Mines and Agriculture.
" " .....	Geological Map of New South Wales.
Commissioners for New South Wales .....	Refined tin.
" " .....	" copper.
" " .....	Marble, Mullion Creek, near Orange.
" " .....	Photographs of Broken Hill Silver-mines.
" " .....	" cave views.
" " .....	Catalogue of Mineral Court.
Professor Liversidge .....	Crystallised and other gold specimens.
" .....	Collection of metalliferous minerals.
" .....	" gem-sands and other minerals.
" .....	" minerals from New Caledonia.
" .....	Crystal models.
" .....	Publications.
M. Isaacsohn .....	Collection of gold and other metals and minerals.

T. Horton .....	Collection of New England minerals.
Crown of Peak G.M. Co. ....	Auriferous lodestuff.
Eleanora G. and A. Co. ....	" " with antimony ore.
Garibaldi G. and A. Co. ....	" " "
Mitchell's Creek G.M. Co. ....	" " "
Mount Gahan G.M. Co. ....	" " "
Peak Hill Proprietary G.M. Co. ....	" " "
Broken Hill Block 10, S.M. Co. ....	Silver ores.
Broken Hill Proprietary S.M. Co. ....	" and trophy.
British Broken Hill S.M. Co. ....	"
White Rock S.M. Co. ....	"
Spiers and Rigg .....	Tin ores and gem-stones.
Great Cobar Copper Mining Co. ....	Copper ores.
Lark and Sons .....	Antimony star, crude, and oxide.
W. Brazenall, junr. ....	Iron-ore and castings, Mittagong.
D. J. C. Donnelly, M.P. ....	" near Cowra.
W. G. Hayes .....	" near Picton.
W. M. Rothery .....	" Cliefdon.
G. Hayton .....	" Newbridge.
Carcoar Cobalt Co. ....	Cobalt-ore.
Australian Agricultural Co. ....	Coal section.
J. & A. Brown .....	"
Burwood Coal Co. ....	"
Greta Collieries Co. ....	"
Hetton Coal Co. ....	"
Newcastle Coal Co. ....	"
Newcastle-Wallsend Coal Co. ....	"
T. Saywell, Zigzag .....	"
South Bulli Coal Co. ....	"
Wallerah Coal Co. ....	"
West Wallsend Coal Co. ....	"
Wickham and Bullock Island Coal Co. ....	"
Australian Kerosene Oil and Mineral Co. ....	Petroleum oil coal, Joadja.
" " " " .....	" " Katoomba.
Genowlan Shale Co. ....	" " Genowlan.
New South Wales Oil and Shale Co. ....	" " Hartley.
L. Bishop .....	Sandstone, Mores.
T. Browne .....	" Ravensfield.
J. Burns .....	Marble, Rockley.
W. M. Lewis .....	Building stones, Maitland, &c.
R. Saunders .....	Sandstone, Pymont.
" .....	Granite, Moruya.
" .....	Syenite, Bowral.
Cullen Bullen Cement Co. ....	Cement.
Australian Alum Co. ....	Alum and alumstone.
Kalsomine and Metallic Paint Co. ....	Kalsomines.
Gordon Emery and Colour Company .....	Paint ochres.
J. Clabby .....	"

## APPENDIX 3.

Report by Mr. G. A. Stonier, Geological Surveyor.

Sir,

Geological Survey Office, Department of Mines, 31 January, 1894.

I have the honour to hand you the report of my work for the year 1893. From the commencement of the year till 12th January, I was engaged in office work in Sydney, leaving on the following day for Yalwal, to report upon the alienation of some of the town allotments. From Yalwal I travelled to Marulan, and examined the Caloola Silver-mine and a deep lead, to test which aid was asked from the Prospecting Vote. Several patches of alluvial gold had been obtained, but they had not extended any distance, and the run of gold could not be followed. The lead is worth prospecting, and is said to have been traced to Nerriga with very few breaks. I examined a wash at Nerriga two years ago, which crosses the Shoalhaven River. It is practically untested, although a fairly large sum of money has been spent in prospecting in the immediate neighbourhood.

From Marulan, I went to Mogo, Moruya, Bermagui, Bega, and Bombala, dealing chiefly with the alienation of certain lands, and returning to Sydney on 10th February. At Nelbothery, near Bombala, a considerable sum of money has been spent in the construction of a well-equipped pumping-station and a reservoir, to which the water is forced from the Little River, and then gravitates to a deposit of drift. The drift is undoubtedly of large extent, and for many years miners asserted that it would pay if sluiced on a large scale. Ultimately a company was formed, the necessary capital supplied, prospecting shafts were sunk, and the yield of gold supposed to have been ascertained; on the completion of the machinery a large paddock was opened out, but the first washing proved much below expectations. I understand that it is intended to test other portions of the drift, which can be done without the expenditure of much money. At Mahratta, 5 miles south-east from Bombala there is an unprospected and narrow strip of basalt, which is worth attention. Several shafts were sunk and bottomed in shallow ground.

I returned to Sydney on the 10th February, and left again on the 20th for the Northern District, visiting Murrurundi, Melrose, Herbert Park, Rockvale, Dundee, Wilson's Downfall, Emmaville, Nine-mile, Inverell, Elsmore, Warialda, Kookabookra, Cell's Creek, Niangala, and Swamp Oak, dealing with various land alienation and Prospecting Vote cases. At Rockvale there is a quartz vein known as "The Buck," from 3 to 8 feet wide, which can be traced on the surface for a considerable distance. It is well defined, but has not been proved to any depth. The gold which it carries is particularly fine, and appears to have been set free chiefly by the decomposition of pyrites, so that, when the upper portion of the vein, some 30 feet, has been crushed, much of the gold in the remaining portion will not be free, and the method of treatment will require modification. The mine is within easy distance of the battery, to which it is connected by a tramway with a fair down-grade. The shoot of gold is exceptionally long, and, like most shoots of any length, the metal will probably be found to be somewhat irregularly distributed through it. North of Glen Innes it is surprising to find the number of men who are making a living at tin-mining. At Dundee there are fully seventy men working on a wide alluvial deposit following Hogue's Creek. At Emmaville, Nine-mile, and Wilson's Downfall, the ground has been worked several times, and

miners

miners are still able to make a living by fossicking. At Collas Hill, near Inverell, a considerable sum of money has been spent in attempting to prove the diamondiferous drift, but it appeared to me that the drives were heading too much to the west, and I therefore recommended aid from the Prospecting Vote to drive from the southernmost tunnel in a southerly direction. The old river-channel is remarkable for the number and size of the granite boulders which it contains. At Elmore the work in progress is of importance and interest, as much from a practical mining as from a scientific point of view. Three miles in a direction east-south-east of the township of Elmore, a company is tracing the continuation of the old Newstead lead, which is passing into 200 feet ground, with a good show of stanniferous wash. Nearer to the township, Mr. Bottrill expects his shaft to be 120 feet deep before striking bed-rock. At Elmore itself the leads are being traced gradually into the deep ground, but it is as uncertain to-day as it was several years ago which way the channel really goes. A mile to the south-west of the township, a bore has been put down, and, at the time of my visit, was thought to have been bottomed. In consequence, however, of my opinion that bed-rock had not been reached, the bore was continued; at a depth of 178 feet the basalt was pierced, and a bed of wash struck, which is said to be 14 feet thick, and to carry good tin. It is intended to sink a shaft at the spot where the bore was put down. The importance of these developments cannot be over-estimated, for it is the first time that a determined effort has been made to test the deep ground. That the leads existed, and carried rich deposits of tin was maintained at all times by the late C. S. Wilkinson, and only the expense of prospecting in deep and wet leads has prevented the work being undertaken earlier. From the Newstead shaft I secured a good collection of seed-vessels, which are described in *Appendix*. At Ashford I had an opportunity of examining a coal-seam already described (Annual Report, Department of Mines, 1885, p. 139), and was fortunate in procuring specimens, which Mr. Etheridge describes as being "probably *glossopteris*."

I returned to town on the 29th April, and left again on the 7th May for the Western District, visiting Cudgegong, Tannabutta, Meroo, Hargraves, Hill End, Sofala, Crudine, and Wattle Flat. This portion of the Colony has yielded a large amount of gold in the past, and a number of men are "making tucker" by reworking the alluvial deposits. There have been several new discoveries, but they have not proved to be extensive, and most of the work is confined to the old ground. The gold is associated both with felsite and diorite, but more frequently with the former than with the latter. There are several good sections of the sediments of the district, and one of the best is developed along the road from Hill End to Sofala, the rocks consisting to a great extent of thin-bedded mudstones, which have been subjected to a number of faults, and are without a persistent dip, forming probably several anticlines and synclines. The existence of an anticline has been demonstrated at Hill End (E. F. Pittman, Annual Report, 1880). Some of the flat veins, referred to in that report, appear, as suggested by Mr. Ackermann, to have resulted from the infiltration of siliceous water into the opened bedding planes at the rounded apex of the anticline. Immediately to the west of the township of Hill End there are good sections showing that the cleavage planes are not coincident with the bedding planes; and at Monkey Hill, a fine section of the alteration of the sediments by an intrusive felsite. The beds are considered to be of Upper Silurian age, but confirmatory evidence, in the shape of good collections of fossils, is much needed; the lithological resemblance of some of the beds to portion of the New England *Lepidodendron* area is interesting.

The trip was completed on the 31st May, and from 5th June to 21st I was in the Narrabri and Gunnedah districts. At Narrabri I examined a deposit of gravel, reported to yield  $\frac{1}{2}$  dwt. of gold to the dish, but on inquiry the statement was amended to  $\frac{1}{2}$  dwt. to the load. The oldest rocks in the district consist of slates, &c., with intrusive granite of several types, and serpentine carrying auriferous and other metalliferous veins. Unconformably on these rocks are sandstones, &c., with the Gunnedah coal-seams, the upper portion of which are conglomeratic, having a large number of jasper pebbles. From one of these conglomeratic beds, possibly redistributed, the gold has been obtained. One of the shafts which has been sunk is 20 feet deep, but the so-called wash does not average more than a few feet, and occupies a maximum area of 3 square chains. There are no facilities for bringing a head-race on to the deposit, even supposing that the wash contained sufficient gold to pay the cost of sluicing. Mr. McNeill pointed out the places where he had obtained the best prospects, and washed two dishes of dirt which gave several particularly fine and flaky specks, but I felt considerable doubt about their being gold. It is said that ten loads were washed and yielded  $\frac{1}{2}$  dwt. of gold to the load. At Burindi, between Barraba and Gunnedah, some fossil bones were supposed to have been discovered, but they proved to be merely the result of jointing, &c., in a series of thin-bedded argillaceous limestones; the beds immediately above the limestones are fossiliferous, and the specimens which I collected are enumerated in *Appendix*. At Gunnedah I inspected portion of the coal-field. Since the publication of the first report (Annual Report, Department of Mines, 1886, p. 151), coal has been found on Mineral Purchase 2, Parish Gunnedah, and appears to be a continuation of one of the Gunnedah seams. The relation of the Gunnedah to the Curlewis seams has not been worked out, but from the information I was able to gather during my last visit it would seem that the Curlewis are below the Gunnedah seams, and are separated by about 250 feet of sandstone, conglomerate, &c.

From 23rd June to 13th July my annual leave of absence was spent at the University, doing petrological work.

On 20th July I left Sydney and visited Parkes, Molong, Wellington, Woodstock, Young, Oberon, and Tannabutta. At Parkes I secured a good collection of rocks to illustrate the petrology of the district. At the time of my visit the various old alluvial leads were being fossicked; but of much more importance was the attention being paid to the veins. At the Bushman's Reef the payable shoot of gold, which had been lost, had been struck at the 375-foot level, which meant not only several months of work in sight, but an accurate knowledge of the dip of the shoot. The aid granted to Ramsay's reef has been expended, and the results are highly encouraging. For several years the reefs have not looked as promising as at the present time. The bedded character of the limestone at Molong has been referred to in previous reports. I collected various fossils, and amongst them is a new species.

I returned to town on the 7th September, and from the 18th September to 23rd December I was in the Northern District, and visited Woolomumbi, Bingara, Drake, Timbarra, Boonoo, Cangi, Woodburn, (Evans River), Wellingrove, Hillgrove, Tia, Nowendoc, Baraba, and Manilla. At Cangi I inspected the Sir W. Scott Mine, where a well-defined vein from 6 inches to 4 feet in thickness has been proved to a depth of 139 feet. The shoot has a length of 115 feet, and dips to the north. A tunnel is being driven to cut the shoot, and when the drive is completed there will be some 60 feet of backs ready for stoping.

The

The stone, from the outcrop to what is known as the 130-foot level, has been mined and crushed, and has yielded up to 1 oz. 14 dwt. of gold to the ton. The stone to be worked from the tunnel is expected to yield fully 2 oz. to the ton. The quartz contains galena, zincblende, and copper, iron and arsenical pyrites, and, on account of the presence of these minerals, the gold was somewhat difficult to save by the ordinary amalgamation method, and when retorted in the usual way was worth £2 7s. 6d. per ounce above the 75-foot level, and £2 13s. 6d. below that level. It is remarkable that the vein has not been traced into the adjoining leases, and it is not likely that there will have been only one place where the walls opened and admitted of the deposition of auriferous quartz. At Tia, Oxenbridge and Party have prospected an old river channel of Pliocene (?) age, and have found payable gold on the sidling of the channel, and not in the deepest ground; the wash in sight does not average more than 9 inches, and will take several months to block out. The channel is very wide, and in places the basalt rests directly upon the bed-rock. The Tiara Mine, now being worked by Orange and Party, has a well-defined vein, in which a payable shoot of auriferous quartz has been worked to a depth of 130 feet, and is well worth further attention. The owners of the mine have commenced to sink the main shaft deeper, with a view of testing the vein at the lower levels, and it would be advisable to carefully try the outcrop of the reef, in order to ascertain if there are not other shoots of gold. A five-head battery run by water-power is in working order, and within a reasonable distance from the mine. At Evans' River a number of men, in all about 90, are employed in "combing" the present sea-beach, and in working a deposit of black sand a quarter of a mile inland from the coast, and evidently an ocean placer. The deposit is covered by drift-sand, which latter occupies a large area, and has been but little prospected.

Wherever it has been possible I have collected specimens of minerals, fossils, and rocks, which have been forwarded to you from time to time. While in Sydney I have been occupied with office work, and the preparation of various reports, and contributed two papers, viz., Leucite Basalt at Lake Cudgellico, and Tachylyte at Bulladelah, to the Records of the Survey.

I have, &c.,  
GEO. A. STONIER,  
Geological Surveyor.

The Government Geologist.

#### APPENDIX 4.

##### Progress Report by Mr. J. B. Jaquet, Geological Surveyor

Sir,

Geological Survey Camp, Warri, Braidwood, 23 January, 1894.

I now have the honour to furnish you with my Progress Report for the year 1893. From the 2nd until the 12th January I was engaged in writing my report on the geology of the Broken Hill lode and in work relating thereto.

On the latter date mentioned above I left Sydney *en route* for Mount Hope, and, travelling *via* Carrathool and Hillston, reached this town on the 17th. The object of my journey was to map out and sample the deposits of ironstone occurring at Mount Allen, near Mount Hope. I was engaged in the neighbourhood of Mount Hope for seven days. I afterwards visited Nymagee and Cobar in order to make certain inquiries having reference to the nature of the copper ores mined at these localities, and the methods adopted for their treatment.

I arrived back in Sydney from Cobar on the 1st February, and on my return was engaged in writing my report and in work connected therewith.

On the 24th February, after having devoted a few days to my Broken Hill work, I left Sydney for Canowindra and the Cudgegong River. In both of these districts I dealt with papers having reference to the alienation of certain lands. I returned to Sydney from Wellington on the 4th March.

From the 4th March until the 22nd of August I was engaged uninterruptedly upon my Broken Hill monograph, and in work relating thereto.

I also reported from a personal knowledge of the localities on two applications for aid from the Prospecting Vote coming from the Barrier Ranges District.

On the 22nd August I left Sydney for Queanbeyan, and on the following day inspected the recently-discovered silver lead lode at Belconon, near that town. My report on this metalliferous deposit forms *Appendix*.

On the 1st September I left Sydney for the new Menangle Gold-field, near Kiandra, and was engaged during the first eight days of this month in journeying to and from this field and in dealing with papers having reference to the alienation of certain land.

During the remaining portion of September I was occupied with my Broken Hill report.

On the 2nd October I left Sydney for Rockley for the purpose of inspecting the gold and silver lodes occurring at Back Creek, near this town. My report on these deposits forms *Appendix*.

From Rockley I journeyed to Carcoar and inspected the alluvial gold deposits, distant 10 miles from this town, at Neville.

Before returning to town I inspected the deposits of gold then recently discovered in Mr. Marsden's paddock, near Blayney. My report on this gold deposit forms *Appendix*.

On my return to town I completed the monograph dealing with the geology of the Broken Hill lode, &c. This work is now in the hands of the printer.

On the 22nd October I left Sydney for the Braidwood District, and, taking up my residence in camp, proceeded to carry out the detailed geological survey of the Shoalhaven Valley, commenced by my late colleague, Mr. W. Anderson.

On the 30th October I journeyed to Major's Creek and dealt with a paper having reference to the alienation of land near that town.

On the 6th November I left camp for Queanbeyan and examined some auriferous ground which had been discovered in a water-course near this town. My report on this deposit forms *Appendix*.

On the 7th December I left camp for Nerriga, and having inspected a reserve near this town, reported as to its revocation.

On the 16th December I journeyed to Araluen, and on the following day dealt with a paper having reference to the alienation of land near Bell's Creek.

On the 6th November I received your further instructions having reference to the mapping out, &c., of the Shoalhaven Auriferous Drifts.

I may mention that I have now nearly completed my mapping out and prospecting of those auriferous drifts which will be available for sluicing should the first section of the proposed Government race be constructed and shall be in a position shortly to write my report concerning the same.

In carrying out this work I have been ably seconded by my assistant, Mr. E. C. Whittell.

I have, &c.,

JOHN B. JAQUET,

Geological Surveyor.

The Government Geologist, Sydney.

APPENDIX 4A.

Report upon the Deposit of Galena at Belconon, near Queanbeyan.

Sir, Department of Mines, Geological Survey Branch, Sydney, 31 August, 1893.

I now have the honour to report upon the deposit of galena occurring at Belconon, near Queanbeyan, which I have recently examined, in accordance with your instructions:—

*Position of the metalliferous deposit.*—The metalliferous lode is situated in the County of Murray, on the right bank of the Murrumbidgee River, and about 200 yards below the point where this river junctions with the Molonglo.

*Geology of the district.*—The country is composed of Silurian (?) slates, possessing for the most part an almost vertical dip, interstratified with beds of crystalline limestone, these sedimentary formations being intruded by large bosses and by dykes of quartz felsite. It is on the side of a hill which overlooks the Murrumbidgee River, composed of quartz felsite in which the Belconon ore deposit occurs.

*Nature of the lode.*—The lode trends N. 20° E., and, as far as one is able to judge from the work already performed, dips about 80° at S. 30° E. A good western wall—which can be readily recognised by reason of the slickenside faces and deposits of flucaun upon it—has been discovered in one place, but no defined eastern wall would seem to exist. At present, however, in no place has a complete section of the lode been exposed in the workings. Immediately adjoining the western wall the deposit would seem to be composed entirely of quartz, galena, and other commonly-occurring veinstones, but these give place beyond to country rock (quartz felspar) in which thin veins and small nests of ore occur.

*Probable dimensions of lode.*—The plane of faulting, which forms the western wall, has evidently determined the position of the ore deposit, and in considering the probable extension of the latter, both in a vertical and horizontal direction, this slide may be placed as a favourable indication of its permanency.

*Work done.*—The lode has been opened from the hillside, on its western wall, by means of an open cutting, 35 yards long, which has penetrated into the rock for distances varying from 4 feet to 10 feet; the face is still in ore.

*Ore contained in lode.*—The ore at present won consists of galena, copper, pyrites, and iron pyrites, associated in part with a gangue of quartz and in part with quartz felsite.

*No oxidised ore present in the lode.*—Very little oxidation appears to have taken place, and the only evidence in the workings situated on the outcrop which suggests that the ore has been affected by its proximity to the atmosphere is the presence of a small quantity of copper carbonate.

*Results of assays of samples from lode.*—I selected four samples of the best ore from various places where the lode was exposed, and these samples were on my return to town assayed by Mr. J. C. H. Mingaye, F.C.S. They yielded as follows:—

A.—Silver .....	1 oz. 19 dwt. 4 gr. per ton.
Gold .....	a trace.
Lead .....	27·71 per cent.
B.—Silver .....	1 oz. 19 dwt. 4 gr. per ton.
Gold .....	a trace.
Lead .....	37·71 per cent.
C.—Silver .....	1 oz. 8 dwt. 6 gr. per ton.
Gold .....	a trace.
Lead .....	10·65 per cent.
D.—Silver .....	1 oz. 8 dwt. 6 gr. per ton.
Gold .....	a trace.
Lead .....	15·33 per cent.

Having regard to the results of these assays, I am unable to speak favourably of the Belconon lode, nor am I able to recommend its further exploitation at the present time.

*Low value of ore.*—The average quantity of lead contained in these picked samples is only 22·8 per cent., and, taking lead as worth £13 per ton, the utmost value of the prospects of the ore after treatment would be £2 17s. Now, it will, I think, at once be apparent that this sum of money would not be sufficient to pay for the cost of mining, dressing, and smelting at a spot distant 20 miles from the railway. The silver and gold, it need hardly be said, are not present in sufficient quantities to pay for their own extraction.

*Prospects of the district as regards future metalliferous discoveries.*—I was shown elsewhere on Mr. Campbell's run a spot where shode-stones of galena had been obtained, and the district for some distance around would appear to be likely to contain metalliferous deposits; hence I am of opinion prospecting operations should be continued.

I have, &c.,

JOHN B. JAQUET,

Geological Surveyor.

The Government Geologist.

APPENDIX 4B.

MINUTE on Report on Gold Find at Blayney.

11 October, 1893.

It appears from Mr. Jaquet's report that the gold which has been found near Blayney has probably been shed from a quartz reef close by, and has retained its angular form owing to its being embedded on the side of the hill in stiff red clay, the product of the decomposition of the augite andesite which Mr. Jaquet describes as forming the surface rock higher up the hill.

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It is advisable that costeaning trenches should be dug, with the object of discovering the reef which probably formed the matrix of the gold, and the flat should also be prospected for alluvial gold.

Attention is directed to that part of Mr. Jaquet's report in which he states that until further prospecting has been done a large rush of men, especially if unprovided with the means of subsistence, would be unwarranted.

E. F. PITTMAN,  
Government Geologist,  
11/10/93.

The Under Secretary for Mines and Agriculture.

Geological Survey, New South Wales, Department of Mines,

Sydney, 9 October, 1893.

Sir,

I have the honour to report that, in accordance with your instructions, I have inspected the recently-discovered deposit of gold near Blayney, and beg to report concerning it as follows:—

*Locality of discovery.*—It is situated about a mile and a half west of the town of Blayney, on Portion No. 209, Parish Errol, owned by Mr. S. Marsden.

*Circumstances leading up to gold discovery.*—About five weeks ago two prospectors—Messrs. H. Coker and E. King—having obtained permission of the owner of the land, started to sink a shaft on the flat, at a point distant about 7 chains in a south-south-easterly direction of the spot now being worked. The shaft was sunk with a view of proving whether auriferous wash existed below. After sinking through 12 feet of stiff clay, they bottomed on decomposed andesite, and on this bottom they found a layer, about 3 inches thick, of angular and sub-angular fragments of quartz, which deposit, on being washed, yielded colours of gold. The result obtained did not encourage further prospecting at this spot, and, moreover, in the immediate vicinity of the new shaft were several old ones, now filled in, which were put down some years ago, with, as their abandonment indicates, disappointing results. The prospectors now directed their attention to the ground in the neighbourhood of the cutting "A," from which a quantity of quartz rubble had at one time been removed for the purpose of paving a yard. The surface soil here gave in the dish colours of gold, and on this account the present workings were commenced.

*Work carried out.*—An irregular-shaped excavation, "B," 36 feet long, which varies in width from 2 feet to 12 feet, and in depth from 2 feet to 3 feet. A trench, "C," situated on the hillside immediately above the last-named working, which trends approximately N.E. and S.W., is 24 feet long, 3 feet wide, and from 3 to 5 feet deep. A shaft, "D," 8 feet deep, into which the trench opens. Two small shafts, "E" and "F," each 5 feet deep. A costeaning trench, "G," 15 feet long and 3 feet deep.

*Mode of occurrence of the gold.*—The material removed from the workings enumerated above is a stiff ferruginous clay—produced on the decomposition of the underlying andesite—which has scattered through it angular fragments of reef quartz. In some places the quartz is present in greater quantities than others. It is only the larger shaft, "D," that has passed through the clay, and reached the surface of the bedrock, nor did the gold occur along the bottom, but scattered in a more or less irregular manner all through the clay. Excepting about an ounce got in the trench "C," I was informed by the prospectors that all the precious metal hitherto won was obtained in the shaft. A dishful of clay raised from the trench "C" was washed under my supervision, but it only yielded a few colours of gold.

*The gold already won.*—Up to the time of my visit 45 oz. of gold had been obtained, for the most part in pieces weighing several pennyweights, while the largest nugget scaled over 3 oz. A few pieces of gold, intimately associated with quartz, have been met with. None of the metal in a parcel containing 7 oz. examined by me was water-worn.

*Reefs will probably be found in the hill above the present workings.*—The general appearance of the gold won, the occurrence of fragments of reef quartz in the clay, and the occasional finding of pieces of gold imbedded in quartz, all indicate that the gold has been derived from a reef near at hand. The trench "A," from which quartz rubble was raised some time ago, appeared to me to follow pretty closely the back of a reef; but the excavation was not deep enough to permit me to speak with certainty on this point. Copper lodes occur, and were at one time worked with considerable advantage in the vicinity of the gold discovery. I am of opinion that success may attend the prospecting for gold reefs, not only upon the hill where the rich gold discovery has been made, but also throughout the district where the same geological features prevail.

*Methods which should be adopted in further proving the ground.*—Having regard to the irregular distribution of the metal in the clay, there is but little to assist the miner in his search for shed gold. It will probably be found that all the ground situated between the flat and that point on the hillside at which the auriferous reef or reefs occur, will contain gold in small, and, for the most part, not payable quantities, and that occasional patches of rich clay, like the one recently worked by Messrs. Coker and King, will be met with. Several shafts should be sunk on the flat immediately below the present workings, for it is possible payable patches of ground may occur there. The question as to whether a quartz reef is outcropping in the trench "A," which I have referred to elsewhere, should at once be ascertained, for if such is the case it may contain in places rich shoots of gold ore. Again, the determination of the dip and strike of any one reef will be of valuable assistance in search of others, as they will probably be found to pursue a parallel course. With this purpose in view the costeaning trench "G" should be deepened until it reaches the bed-rock, and then continued in a south-easterly direction.

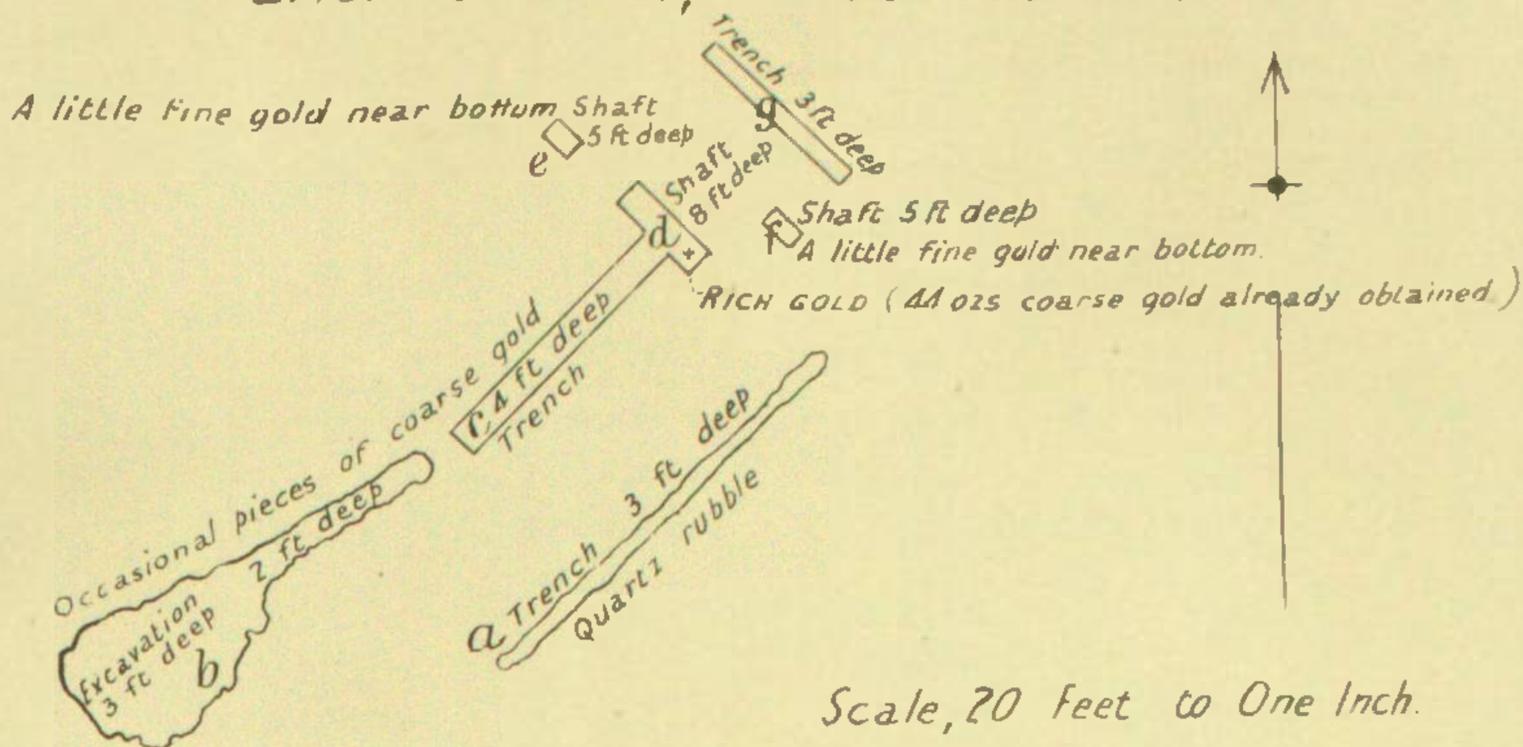
*Water for washing the gold-bearing ground.*—No perennial water-course is to be found near the site of the gold discovery, and in order to obtain a supply of water for gold-washing purposes, it may be advisable to erect a dam across the blind gully shown on the accompanying plan at the point where it junctions with the flat. I may mention here that gold-bearing ground obtained on the hillside will require first to be puddled, and it is necessary that machines for this purpose should be erected.

*Should Mr. Marsden throw open the ground the circumstances render the immediate rush of a large number of miners to Blayney inadvisable.*—If gold reefs be discovered, as I have previously stated I believe will be the case, their exploitation may eventually give employment to a large number of miners; but before several shafts have been bottomed on the flat, and other prospecting works have been proceeded with, I am of opinion that a large rush of men unprovided with means of subsistence, to Blayney, would probably be followed with disastrous results.

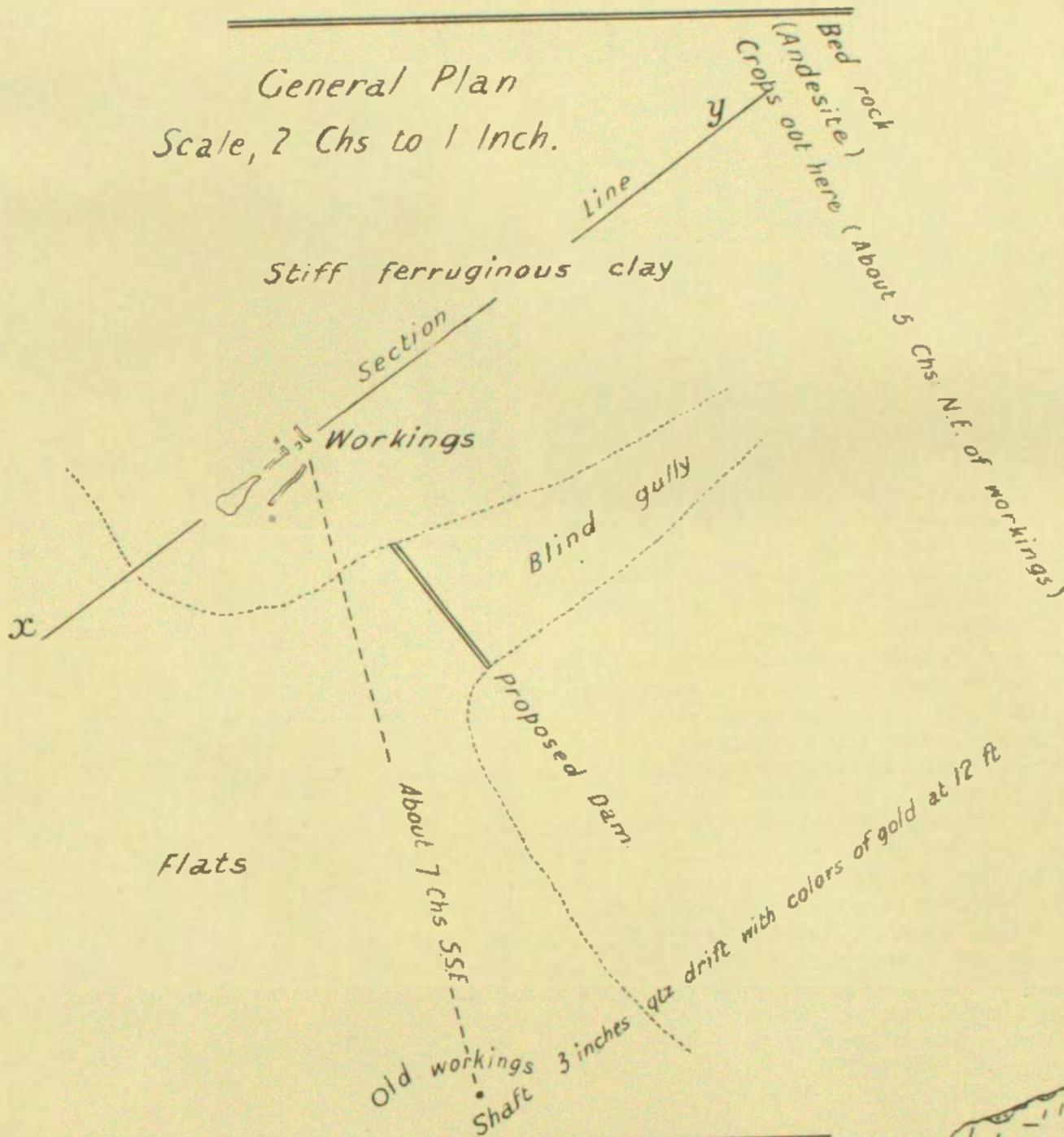
*Description of the country rock.*—Since writing the above report I have received from the lapidary a thin section of the andesite rock, and hence am now enabled to describe it more in detail. It is a much altered

SKETCH MAP

Shewing gold workings on portion 269  
Parish of Errol, near Bathurst.

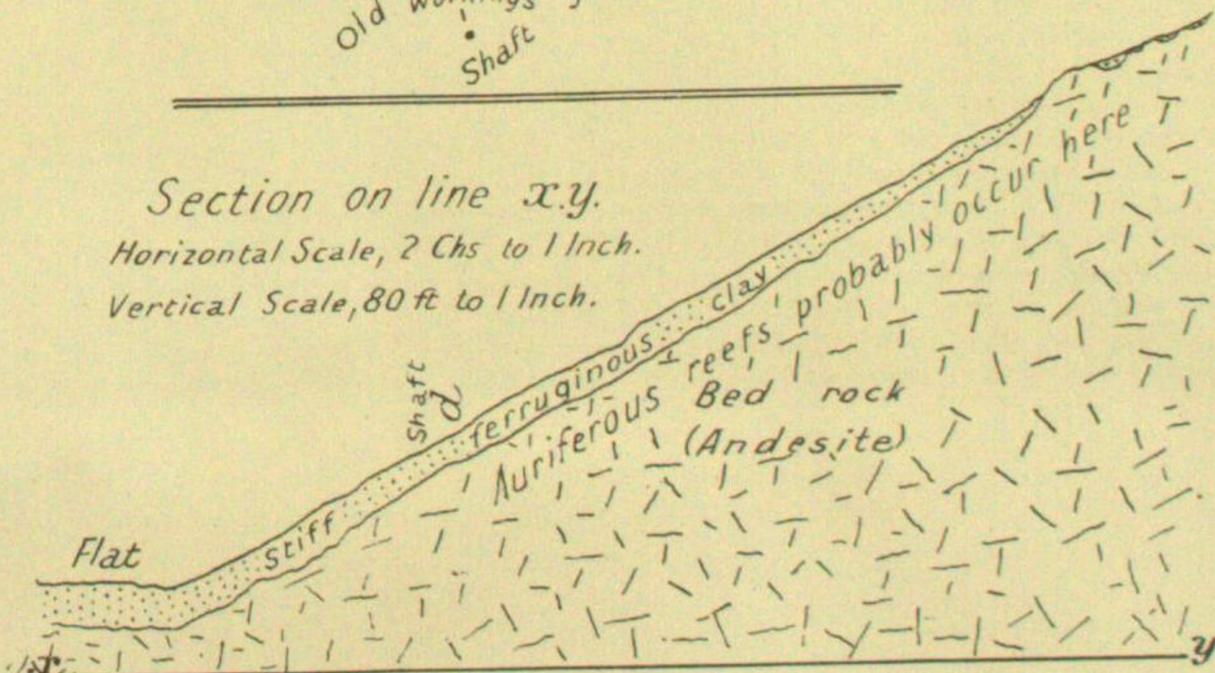


General Plan  
Scale, 2 Chs to 1 Inch.



Section on line x.y.

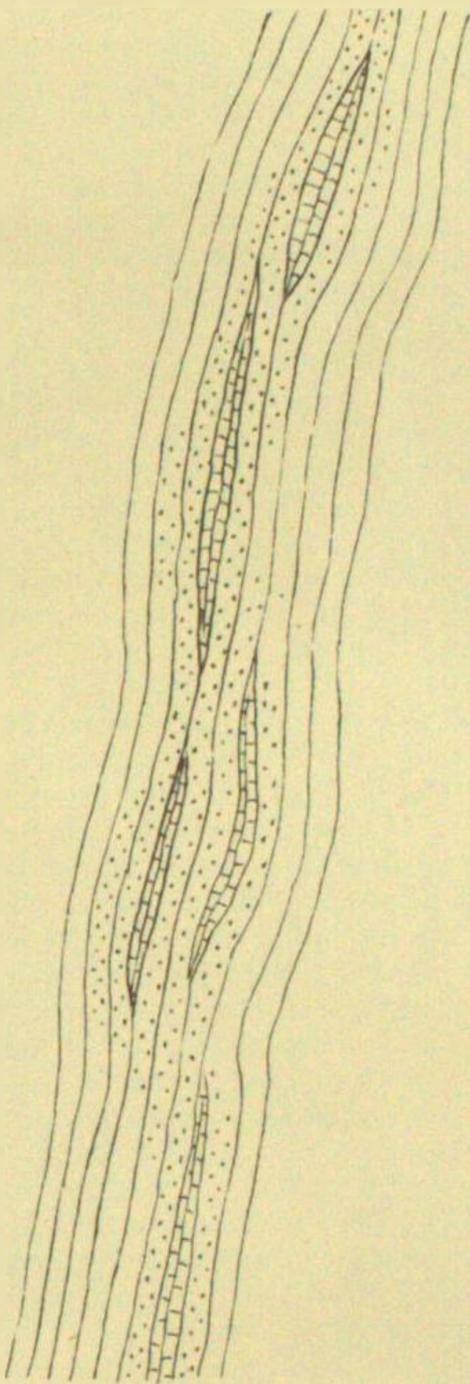
Horizontal Scale, 2 Chs to 1 Inch.  
Vertical Scale, 80 ft to 1 Inch.



## *Ideal Section*

*Shewing mode of occurrence of gold  
Back<sup>at</sup> Creek*

*Parish of Bringellet . County of Bathurst.*



### *Reference.*

-  *Micaceous slates  
and schists.*
-  *Do Do  
Impregnated with gold.*
-  *Quartz with gold.*

*Sig. 1202*

altered augite andesite,\* consisting essentially of porphyritic crystals of augite and plagioclase, with some magnetite embedded in a cryptocrystalline groundmass. The augites are frequently twinned, and have been in many places more or less altered into chlorite; elsewhere crystals of this mineral have passed into uralite, and good sections of this paramorph are to be seen. The feldspars are lath-shaped, and much kaolinised. I may mention here that while the north-western side of the shaft "D" has bottomed on andesite, yet in the south-eastern corner a rock which appeared to me to be a much-decomposed micaceous schist has been met with. I did not observe any of the latter rock cropping up at the surface, but its presence in the shaft referred to suggests that in places the andesite may occur embedded in schistose rocks.

I have, &c.,

JOHN B. JAQUET,  
Geological Surveyor.

The Government Geologist.

#### APPENDIX 4C.

##### Report upon a Geological Examination of the Back Creek Gold and Silver Field.

Sir,

Department of Mines, Geological Survey Branch, 31 October, 1893.

I have the honour to report that, in accordance with your instructions, I have made a geological examination of the Back Creek Gold and Silver Field, and have to report concerning it as follows:—

Back Creek is situated within the Caloola Gold-field, in the Parish of Bringellet, County Bathurst, and is distant about 6 miles in a north-north-westerly direction from the town of Rockley.

The geological formations consist of much-flexured micaceous slates and schists; interstratified with these schistose rocks occasional beds of crystalline limestone occur.

Both gold and silver ores have been mined on the field. Rich alluvial ground has been worked on the slopes below and around the claims now being prospected; but the deposits of shed-gold have long since been exhausted, and at the present time the miners are directing their attention to the reefs, &c., where the metal occurs *in situ*.

The accompanying sketch will explain the general mode of occurrence of the gold ore. It would appear as if contemporaneously with the flexuring of the rocks in places lenticular cavities were produced along their bedding-planes, and that these openings were afterwards filled by segregation (?) with auriferous quartz. The gold, however, occurs not only in the quartz lenses, but also in the country immediately around them.

I was informed that in some instances the schist lining a vein had yielded gold, while the quartz itself was barren. The quartz is somewhat peculiar in that it always has a quantity of white mica or talc associated with it.

Now, the absence of permanent reefs and the general nature of the auriferous deposits makes mining on the field somewhat hazardous. One can never be certain as to how far a quartz vein when found will extend, either in a vertical or horizontal direction, nor is there any indicator to guide the miner from the pinched end of one vein to the commencement of the next; perhaps, however, the lodes more often follow one another in a direction coincident with the dip and strike of the containing rock. The only course that the explorer can pursue is to push forward his workings in that direction where the prospect obtained shows the country rock to be carrying the most gold.

On M.L. Portion 198, Parish of Bringellet, worked by the Back Creek Gold-mining Company, a vertical shaft has been sunk to a depth of 15 feet, and from the bottom an underlay shaft has followed the auriferous rock, which is about 2 feet wide, and consists here, as elsewhere, on the field in part of quartz and in part of schist, for a distance of 30 feet. In some of the stone free gold can be seen, and I was informed by the manager, Mr. McKay, that 2 tons of the ore which was treated by the Clyde Works, at Sydney, yielded at the rate of 2 oz. 5 dwt. per ton.

In another place on the Company's property a tunnel has been driven into the hillside for a distance of 60 feet, and in this tunnel some quartz reefs have been met with.

The Company owns a battery of ten head of stamps, situated on Back Creek.

On Block 30, which is now known as the Boss Gold and Silver Mine, a wide deposit of silver ore has been worked. I was informed by Mr. Seaver, who is now in charge of the property, that several tons of rich silver ore had been raised and sent away to Europe for treatment.

The lode, as seen in several cuttings, has no defined walls. It would seem as if it represented a band of schist which has been more or less replaced by quartz, together with some silver ore, for it possesses bedding-planes which are conformable with those of the rock enclosing it; in places lenticular patches of quartz similar to those met with in the gold-workings occur. The argentiferous rock is from 3 to 6 feet wide, and it dips from 15° to 45° in a direction east-north-east. A shaft has been sunk on the hanging-wall side of the lode, about 60 feet distant from the outcrop; but, inasmuch as at the present time it is full of water, an examination of the ground was not possible.

Owing to the silver-bearing mineral or minerals being finely disseminated through the quartz, it is in consequence difficult to determine the exact form in which the metal is present, but it occurs, at any rate in part, as chloride. I understand that experiments have been undertaken which show the ore to be amenable to treatment by pan amalgamation, and that it is the intention of the proprietors to erect a plant with a view of adopting this method of extraction.

On Blocks 193 and 195, leased by Holsten and Party, in a shallow cutting, the cap of a quartz reef impregnated with iron oxide has been exposed.

Some ore which was obtained from this cutting yielded, on being assayed by Mr. J. C. H. Mingaye, F.C.S., gold at the rate of 2 dwt. 4 gr. per ton, and silver at the rate of 3 dwt. 6 gr. per ton.

Elsewhere on this property were several small excavations; but in no instance, other than that referred to above, was any reef or deposit that might reasonably be expected to yield either silver or gold in payable quantities pointed out to me.

I have, &c.,

JOHN B. JAQUET,  
Geological Surveyor.

#### APPENDIX

\* The Rev. J. Milne Curran, F.G.S., described (Journ. R. Soc., N.S. Wales for 1891 (1892) xxv, p. 221), an augite porphyrite from near Blayney, but the description which he gives of this rock shows that it differs from the one referred to above.

## APPENDIX 4D.

## Report upon a Deposit of Auriferous Drift near Queanbeyan.

Sir,

Geological Survey Camp, near Braidwood, 8 November, 1893.

I have the honour to report that, in accordance with your instructions, I have examined the deposit of auriferous drift recently discovered at Queanbeyan.

The place where the gold is found is situated upon a low hill, distant about half a mile from the centre of the town of Queanbeyan, on the right-hand bank of the river.

The precious metal was obtained from a deposit of gravel, which is seen exposed on the walls of a small watercourse. The auriferous drift is 1 foot thick, and rests upon altered slates, while it is covered above by a bed of clay and alluvium 3 feet thick. I was informed by Mr. J. J. Wright, J.P., that he had seen a dish of this drift washed, and that it yielded 2 or 3 grains of gold.

The great difficulty which would beset the miner endeavouring to win gold from the shallow drift in and around the watercourse would be the inadequate supply of water available for sluicing or other washing purposes. The numerous small creeks upon the hillside only flow for a short time after rain has fallen, when they carry off the storm-waters. Water could be pumped up from the river, situated about 60 feet below, or it might, perhaps, be obtained by means of a race from a point higher up the Queanbeyan River; but I do not think a sufficient profit would accrue on sluicing the ground to pay the interest contingent on the latter method being adopted, nor the pumping charges which would accompany the former. Should any large extent of ground yielding gold in the proportion mentioned above be met with, a handsome profit would undoubtedly follow on its being carted to the river, and there washed.

In any case, I would recommend prospectors to direct their energy to the exploration of the deeper ground in the vicinity, where a probability exists of payable drift being discovered on the bottom. The hill upon which the discovery of payable gold was made, for the most part, consists of layers of quartz gravel interbedded with bands of clay. Several shafts have been sunk in the drift, the greatest depth reached being 25 feet. The gravel raised from these shafts yielded a little gold, but their abandonment would seem to indicate that no payable prospects were obtained. However, it must be pointed out that the bed-rock was never reached, and so no evidence is at present available as to the value of the deepest ground.

The circumstances would seem to me to warrant the putting down of one or more shafts for the purpose of proving the gold contents of the drift on the bottom.

I have, &amp;c.,

JOHN B. JAQUET,

Geological Surveyor.

The Government Geologist.

## APPENDIX 5.

## Progress Report of the Curator and Mineralogist.

Sir,

I have the honour to submit my report of progress made during the past twelve months.

The duties allotted to the Curator being very varied, they will be referred to under different headings.

*The affording of information.*—A large amount of information bearing upon mining matters has been given to the public. For this purpose the office is open at all times. Every possible assistance is given, and many minerals are determined by the application of simple tests. There is at present no system of recording such inquiries.

*Preliminary examination of samples submitted for the purpose of assay or analysis*—The number of samples selected for treatment in the Departmental laboratory has been over 3,000. This number falls short of that for last year, owing partly to the acquisition of a few pieces of apparatus, such as specific-gravity instruments, the use of which has rendered further examination unnecessary. The recognition of a strontium-mineral (celestine) from Bourke district, and of fuller's-earth from Wingen, may be mentioned here. The whole of the clerical work connected with the receiving of samples and the despatch of returns has been done in this office, necessitating the writing of between 2,000 and 3,000 letters.

*The microscopic examination of rocks.*—The use of the microscope in the examination of rocks has been of very considerable service. In accordance with your instructions, I have examined in this way a number of bore-samples, with a view to obtaining evidence that might throw light upon the prospects of obtaining artesian water. The study of thin sections has been made use of as far as opportunity offered in investigating rock-samples, and the results obtained have been of considerable service to several miners. It is very satisfactory to find the science of petrography developing a most important practical side, more especially in America.

*The Museum.*—Although at present under the cloud resulting from the sudden removal of the whole of the collections to the old iron building in the Domain, the year's work has been encouraging. The interest taken both by visitors and by persons to whom applications for specimens have been made has been greater than could have been expected. The response made by mine-managers and others has been so generous that the necessity of sending a collector to replenish our stock has been obviated. The list of persons to whom we are indebted for donations is a lengthy one (see below). Among the many valuable additions may be mentioned marshite and willyamite, from Broken Hill; a magnificent mass of crystallised-pyrite, from Mount Stewart; several important collections from Broken Hill, and a beautiful series of North-of-England minerals. Several officers of the Department have rendered us great assistance in procuring specimens, among whom Messrs. Hebbard and Atherton have been indefatigable. To all who have helped in any way our cordial thanks are due.

The work of remounting the fossil series has made considerable progress under the superintendence of the Palæontologist. Several cases have been arranged tentatively by myself with the object of rendering assistance to prospectors and others desirous of learning rough-and-ready methods of determining common minerals. It has been gratifying to notice the interest that has been taken in this "Instruction Series," and to know that it is valued and appreciated by the public. Every effort will be made to make the arrangement of the Museum during its temporary stay in the Domain as satisfactory as possible. Among the objects in view is the arrangement of a series of specimens illustrative of the structure of the principal ore deposits of the Colony.

Thirty-

Thirty-one collections of geological specimens have been prepared, of which those for the Imperial Institute and the Geological Museum, Perth, were very complete. The places to which they have been sent are given below, those marked with an asterisk being in exchange:—

- Albury—Mechanics' Institute.
- Austria.
- Colombo, N.S.W.—School of Arts.
- \*Darlington, England—Mr. S. Watson.
- Dubbo—Mechanics' Institute.
- \*Dublin, Ireland—Royal College of Science.
- Enfield—Municipal Council.
- Gundagai—Literary Institute.
- Gunnedah—Mr. Van Weenen.
- Hunter's Hill—St. Joseph's College.
- \*Kapunda, S. A.—School of Mines.
- London—Imperial Institute (two).
- \*Melbourne—Mr. J. Mitchell.
- Merewether—School of Arts.
- \*Mount Victoria—The School (two).
- \*New Caledonia—(1) The Museum, Noumea; (2) The Topographical Survey.
- Parramatta—The Marist Brothers.
- \*Perth, W. A.—The Geological Museum.
- \*Petersham—Mr. A. Lambert.
- Richmond—Agricultural College.
- Riverview—St. Ignatius' College.
- Sale, Vic.—School of Mines.
- Sydney—(1) Mr. Macdonald; (2) The Mint, per the Deputy Master; (3) The University (two).
- \*United States—Mr. G. Pennypacker, Pennsylvania.
- \*Wallangarra, Queensland—Mr. W. A. Dalton.

Three short papers have been contributed to the "Records" of the Geological Survey.

It is with great pleasure that I conclude my report with a testimony to the great diligence that has been shown by the officers with whom I have been directly associated. It is not too much to say that the large amount of work alluded to above could never have been accomplished by mere machine-like attendance to duty. It is my earnest hope that nothing may interrupt this loyal co-operation and mutual good feeling during my tenure of office.

Mr. E. C. Whittel acted as Curator's assistant until Easter. He attended the Agricultural Show at Glen Innes in charge of the Departmental exhibit, and remained there a few days to collect specimens in the Kingsgate District.

Mr. L. H. Harper succeeded Mr. Whittel, and, while being capable of rendering assistance in any portion of the work when required, has developed a most useful aptitude for label-writing.

Mr. Morrison has been principally engaged in the clerical work of the office, and Mr. Allen in the sorting of specimens and the preparation and despatch of collections.

As a carpenter can only be engaged for work of great urgency, Mr. C. Cullen, the collector, has rendered great assistance in attending, as far as possible, to the repairs and other matters inseparable from the current work of a museum.

The Lapidary, Mr. W. H. Gilding, has been principally occupied with miscellaneous work. It is to be hoped that more of his time may be available during the ensuing year for work in which his skill as a lapidary may be better displayed.

The rock sections referred to above have been cut by Mr. C. Murton with his accustomed skill and care.  
I have, &c.,  
The Government Geologist. GEORGE W. CARD, A.R.S.M., F.G.S.

#### DONATIONS to the Mining and Geological Museum.

Donor.	Donation.
L. J. Altman	Rock crystal; crocidolite, in the rough; crocidolite, polished; specimens of auriferous quartz.
T. W. Atherton	Lodestuff, gold slickenside.
E. A. Baker	Auriferous quartz.
— Barber	Granite, barytes, &c.
J. F. Barnes, M.P.	Auriferous talc-schist, with pseudomorphs of oxide of iron after pyrites.
T. Beedle	Marble (six blocks).
— Biddell	Fossiliferous volcanic tuff.
C. Butler	Auriferous lodestuff.
J. W. Cade	Auriferous specimens.
T. Campbell	Opals, topaz, and other minerals.
W. Campbell	Stannine, copper-pyrites, and silver ore.
— Collins	Copper ore, auriferous ore.
J. Conroy	Auriferous stone.
A. G. Cooper	Auriferous quartz, and specimens showing free gold.
T. Crane	Auriferous quartz.
W. A. Cunes	Calcite, silver ore, &c.
M. D'Arcy	Specimens of mispickel.
E. C. Davies	Galena, actinolite, magnetite, and hematite.
D. C. J. Donnelly, M.P.	Wolfram, syenite, quartz, graphic-granite.
W. J. Duckett	Segregation of hornblende.
W. Edmunds	Quartz, with micaceous hematite.
R. Elliott	Silver ore.
W. England	Tourmaline crystal.
C. L. Garland, <i>pro</i> Mount Stewart Lead and Silver Mining Co.	Magnificent specimen of crystallised iron-pyrites.
J. G. Gough, M.P.	Auriferous pyromorphite.
H. Hansen	Auriferous ferruginous felspathic rock.
J. Hebbard	Calamine, marshite.
J. Holloway	Brown iron ore.
G. Hunt	Auriferous ore.
J. F. Hunt	Auriferous siliceous pyrites.

Donor.	Donation.
S. Juleff	Auriferous lodestuff.
— Kelly	Jasper.
— Lane	Pyromorphite, cerussite, embolite.
C. A. Lee, M.P.	Wolfram crystal.
F. Litchfield	Purple fluor, gemstone matrix, mispickel, &c.
C. W. Marah	Marshite.
J. C. H. Mingaye	Sperryllite, ullmannite.
W. Moore	Auriferous quartz.
T. Moulton	Quartz showing free gold.
W. E. Myring	Gold in slate.
C. S. M'Glew	Tourmaline, tin-bearing granite.
J. M'Killop	Erythrine.
G. Paulson	Bornite, garnet, quartz crystals, gypsum, galena, iridescent iron ore, cupreous silver ore, gemstones, including diamond.
J. M. Paxton	Salt crystallised on surface of ground.
J. M. Paxton	Coal nodule.
J. N. Paxton	Aluminous mineral.
J. R. Peebles	Auriferous lodestuff.
J. M. Petrie	Crystallised and massive mispickel.
— Poole	Coal.
D. A. Porter	Tourmaline in quartz, gabbro, quartz, hyalite, bronzite.
H. G. Rienits	Thinnfeldia odontopteroides, shale with impressions of plants, plants encrusted with oxide of iron.
J. Riley	Granite showing gold.
G. J. Rivers	Blende, quartz with free gold.
G. Short	Antimonite.
— Smith	Willyamite, dyscrasite, covellite, &c.
J. Walker	Salt.
W. C. Wall, M.P.	Auriferous quartz.
J. J. Williams	Chlor-iodide of silver and free gold in quartz.
C. Wooller	Altered sandstone, quartz from igneous dyke.
W. Wright	Bornite.
Warden, Mount Stewart	Pyromorphite.
R. Young	Crystalline oxide of manganese, bone-breccia.

## APPENDIX G.

## Annual Report of the Palæontologist for the Year 1893.

Sir, Geological Survey, N.S. Wales, Department of Mines, Sydney, 2 January, 1894.

I have the honour to hand you herewith a Progress Report of the Palæontological work done during the Year 1893.

In June last my services were requisitioned by the Trustees of the Australian Museum to take up the Curatorial duties during the absence of Mr. E. P. Ramsay, LL.D., the Curator, on sick leave. I occupied the position of Acting Curator for seven months continuously, three of which should have been devoted to the work of this Department. Absence, thus accounted for, will explain the non-completion or further preparation of parts of the Palæontological Survey Memoirs.

*Records.*—Parts 3 and 4 of Vol. III of the *Records of the Geological Survey of New South Wales* have been published. These contain the following Official Papers by myself:—

- (a.) On the Occurrence of a Plant allied to *Schizoneura*, in the Hawkesbury Sandstone; Part 3, pp. 74-77, t. 3.
- (b.) Idiographic Carvings of the Aborigines at Point Piper, Rose Bay, Port Jackson, &c.; Part 3, pp. 80-86, t. 15.
- (c.) On the Occurrence of *Trigonia semiundulata*, McCoy, in New South Wales, and its Significance; Part 4, pp. 115-118.
- (d.) Note on an Aboriginal Skull from a Cave at Bungonia; Part 4, pp. 128-132.

The following in conjunction with Mr. W. S. Dun:—

- (a.) The Australian Geological Record for the Year 1891; Part 3, pp. 86-109.
- (b.) The Australian Geological Record for the Year 1892; Part 4, pp. 132-153.

*Miscellaneous Determinations.*—The following are the more important Miscellaneous Determinations made during 1893:—

1. Notes on Corals from the Palæozoic Limestone of Waratah Bay, Victoria. Forwarded by Prof. Sir F. McCoy, Director of the National Museum, Melbourne.
2. Miscellaneous Foreign Fossils for the Technological Museum, Sydney. Forwarded by J. H. Maiden, Esq., Curator.
3. Encrinital Limestone, containing *Fenestella*, *Spirifera*, and *Aviculopecten*, from the Permo-Carboniferous rocks, 6 miles west of Kempsey; Flesh-coloured Limestone, containing *Trachypora Wilkinsoni*, Eth. fil., from the Upper Marine beds of the same locality. Forwarded by Mr. E. Rudder.
4. Diatomite from Wyrallah, containing sponge spicules and feeble frustrules of *Melosira*. Forwarded by Mr. J. Brackenridge.
5. *Thinnfeldia odontopteroides* and other plant-remains from a bed of shale in the Hawkesbury Sandstone at Mount Piddington. Forwarded by Mr. H. G. Rienits.
6. Fossils from the Jenolan Caves Limestone. *Palæoniso Brazieri*, Eth. fil., *Loxonema antiqua*, De Kon., and a large *Favosites*. The two former species were previously only known from the Yass Limestones. Collected by Mr. W. S. Leigh, Superintendent of Caves.
7. *Trigonia*, from the Arumpo Bore, at a depth of 647 feet. [See above, under *Records*.] Forwarded by Mr. J. W. Boulton, Officer-in-Charge, Public Watering Places Branch.
8. Fossil Fruits from the Tertiary Deep Lead at Newstead Mine, Newstead, near Inverell. Forwarded by Messrs. J. Penberthy and D. Anderson.
9. Fossils from the Upper Devonian of Mt. Lambie, and Permo-Carboniferous rocks of the Western Coal-field. Forwarded by Mr. H. G. Reinits.

10. Cretaceous Fossils (*Inoceramus*, &c.) from the White Cliff Opal-field. Forwarded by Messrs. Rodgerston, Warden and P.M., and W. G. Mackenzie.
11. Silurian Corals from the Molong District, *Syringopora* and *Halysites*. Forwarded by the Rev. J. M. Curran.
12. Devonian and Cretaceous Fossils from the White Cliff Opal-field. Forwarded by Mr. W. H. Clouston.
13. Permo-Carboniferous Fossils from Burragorang. Forwarded by Mr. W. A. Cuneo.
14. Silurian *Orthis* from Cowra. Forwarded by Mr. D. C. J. Donnelly, M.L.A.
15. A new plant allied to the Genus *Oingularia*, from the Newcastle Coal-measures. Forwarded by Mr. J. B. Henson.
16. Rich Diatomite, containing *Cocconeis* and *Navicula*, said to be from a New South Wales locality, but probably Victorian. Forwarded by Mr. Beale.
17. *Martiniopsis oviformis*, M'Coy, from Permo-Carboniferous rocks of Ulladulla. Forwarded by Mr. W. P. Allan.
18. A Mesozoic Cycad (*Otozamites*) from volcanic ash in Western Victoria. Forwarded by Mr. J. Dennant.
19. Portion of a Crocodilian jaw from Yallaroo. Forwarded by Mr. E. Quinn.
20. Permo-Carboniferous Fossils from the Nowra Grit (Upper Marine), at Nowra. Forwarded by Mr. Kelly.

*Exchanges.*—The following exchanges have been prepared:—

1. Professor F. W. Hutton, F.R.S., Canterbury College, N.Z. Small general series of New South Wales fossils.
2. G. Sweet, Esq., Melbourne—A similar collection, and a small series of Fish from the Hawkesbury rocks of Gosford.
3. B. Dunstan, Esq., Technological College, Sydney—Teaching collection of characteristic New South Wales fossils.
4. Professor R. Tate, Adelaide—Permo-Carboniferous fossils from New South Wales.
5. Professor C. Eg.-Bertrand, Lille, France—Specimens of Kerosene Shale, &c.

*Collections prepared.*—Collections for teaching purposes, have been either named, or prepared, for the following:—

1. Rev. J. F. Paul—General New South Wales fossils.
2. Albury Museum (N.S.W.)—The same.
3. B. Dunstan, Technological Museum, Sydney—Silurian and Permo-Carboniferous fossils of New South Wales.
4. St. Vincent's High School, Sydney—Collection of New South Wales fossils.

*Field-work.*—During January, in company with Mr. W. S. Leigh and Mr. R. A. Barber, of Humewood, near Yass, an examination of the Cooleman Caves, Cooleman Creek, at the head-waters of the Goodradigbee River, was made, the party proceeding cross-country from Yass. A separate Report has been furnished.

In conclusion, I have to again call your attention to the efficient manner in which Mr. W. S. Dun has assisted me, and had it not been for his exertions during my late absence the work must have fallen hopelessly into arrear. During the year Mr. Dun has prepared a paper and two Bibliographical Indices as follows:—

1. On Palatal Remains of *Palorchestes azael*, Owen, from the Wellington Cave Bone deposit. *Records Geol. Survey, New South Wales*, 1893, iii, Pt. 4, pp. 120-124, t. 16.
2. A Locality Index to the Reports of the Geological Survey of New South Wales, from 1875-1892 inclusive. *Ibid*, pp. 154-194.
3. Bibliography of the Geology of the Broken Hill District—*J. B. Jaquet's Geol. Broken Hill Lode and Barrier Ranges Min. Field—Appendix* (in litt.)

The Government Geologist.

I have, &c.,

R. ETHERIDGE, JUNR.,  
Palaeontologist.

#### Fossils registered during 1893.

Fossil.	Localities.	Donor or collector.
<i>Cambrian.</i>		
<i>Archæocyathinae</i> .....	Wirralpa, South Australia .....	Prof. R. Tate.
Miscellaneous fossils.....	South Australia .....	T. Stephens.
<i>Conocephalites</i> and <i>Dikelocephalus</i> .	Caroline Creek, Tasmania .....	
<i>Silurian and Siluro-Devonian.</i>		
Graptolites .....	Tarilta, near Castlemaine, Victoria .....	R. A. F. Murray.
" .....	Victorian localities .....	R. Etheridge and W. S. Leigh.
Corals .....	Humewood, Yass .....	" "
" .....	Old Limekilns Ridge, Humewood, Yass .....	" "
" and <i>Pentamerus</i> .....	Murray Cave, Cooleman River .....	" "
<i>Stromatopora</i> (?) .....	Boambola, Haggetty Point .....	" "
" .....	North of Murray Cave, Coolaman River .....	" "
<i>Heliolites</i> .....	Falls, Sally Flat, Goodradigbee River .....	" "
Annelid markings .....		E. F. Pittman.
Coral .....	Cudgegong .....	J. McCauley.
<i>Pentamerus Knightii</i> .....	Yarrangobilly .....	W. S. Leigh.
" &c. ....	" .....	J. Milne Curran.
<i>Syringopora</i> and <i>Halysites</i> .....	Molong .....	D. C. J. Donnelly.
<i>Orthis</i> .....	Cowra .....	" "
Coral (?) .....	" .....	T. Atherton.
<i>Favosites</i> .....	Hill End .....	
" .....	Gordon River, Tasmania .....	

Fossil	Locality.	Donor or collector.
<i>Lituities (?)</i>	Jenolan Caves	W. S. Leigh.
<i>Favosites Gothlandica (?)</i>	"	"
<i>Palaeoniso Darwinii</i>	"	"
<i>Loxonema antiqua</i>	"	"
<i>Stromatopora</i>	"	T. W. E. David.
Corals	"	J. C. Wiburd.
Coral	South-east of Collington, County Beresford	W. Anderson.
<i>Rhynchonella</i>	Mudgee District	Dr. Woola.
<i>Favosites, &amp;c.</i>	Bungonia Caves	L. Guymer.
Brachiopoda	Lobb's Hole, Yarrangobilly	Warden Love.
<i>Spirifera yassensis</i>	Balcombe Bridge, Yass	R. Etheridge.
<i>Heliophyllum yassense</i>	Hatton's Corner, Yass	Technological Museum.
Mollusca, corals, &c.	Wellington Caves	J. Sibbald.
<i>Lingulocaris M' Coyi</i>	Spring Plains, Victoria	R. Etheridge.
<i>Favosites grandipora</i>	Lilydale, Victoria	"
<i>Phacops caudatus</i>	Reedy Creek, Victoria	R. Helms.
<b>Devonian.</b>		
<i>Spirifera disjuncta</i>	Mount Lambie	"
<i>Rhynchonella pleurodon</i>	Shoalhaven River	W. Anderson.
Brachiopoda and Pelecypoda	Brick-kiln Creek, Parish Bendoura	"
<i>Lepidodendron australe</i>	Portion 93, Parish Bendoura	"
<i>Rhynchonella, &amp;c.</i>	Mount Lambie	E. F. Pittman.
<i>Lepidodendron australe</i>	Near Mount Lambie	"
Brachiopoda, &c.	Solitary Creek, Mount Lambie	"
<i>Spirifera disjuncta</i>	Campbell's Creek, Portion 7, Parish Windeyer, County Wellington (drift).	P. T. Hammond.
"	Lagoon Creek, Sunny Corner	T. Atherton.
Plant and fish remains	Mansfield, Victoria	Exchange—G. Sweet.
<b>Carboniferous and Permo- Carboniferous.</b>		
<i>Productus brachytharus</i>	Darr River, Queensland	Prof. Liversidge.
" (type)	"	"
<i>Strophalosia Gerardi</i>	"	"
" (type)	"	"
<i>Rhynchonella</i>	Fossil Hill, Croydon, Queensland	"
<i>Martiniopsis oviformis</i>	Shoalhaven	Dr. J. C. Cox.
<i>Spirifera tasmaniensis</i>	Castle Forbes Bay, Tasmania	"
<i>Spirifera, Rhynchonella, and Gasteropoda.</i>	Six miles west of Bulladelah	G. A. Stonier.
<i>Martiniopsis subradiata and Spirifera.</i>	Galvin's Creek, Parish Wingecarribee	"
<i>Lepidodendron australe</i>	Burindi Homestead, County Dowling	"
Corals, Brachiopoda, and Plants	"	"
<i>Trachypora Wilkinsoni</i>	Six miles north-west of Kempsey	E. Rudder.
Crinoid stem	Drake	"
<i>Spirifera, Sanguinolites, and Fenestella.</i>	Bundanoon	W. Cuneo.
<i>Noeggerathiopsis (?)</i>	Wollongong	"
Polyzoa	Poliohbin	R. Scobie.
<i>Clarkia</i>	Wollongong	H. G. Rienita.
<i>Martiniopsis and Aviculopecten oviformis</i>	Hartley Vale	"
"	Ulladulla	P. Allen.
<i>Aphanaisa Mitchelli</i>	Lochiavar Road, Farley	W. D. Filmer.
<i>Mytilus Bigsbyi</i>	"	"
<i>Michelinia</i> (type)	Carroll	D. A. Porter.
Annelid markings	Boat Harbour, Gerringong	W. S. Dun.
Brachiopoda, Pelecypoda, corals, &c.	Black Head	"
Mollusca and corals	Gerringong	"
<i>Spirifera, Orthia, &amp;c.</i>	Shelly Ridge, 20 miles west of Tamworth	C. T. Musson.
<i>Poteriocrinus Smithii</i>	Rockhampton, Queensland (cast of type)	R. Etheridge.
<i>Productus cf. fimbriatus</i>	Stanwell, Queensland	"
<i>Spirifera</i>	"	"
<i>Lepidodendron veltheimiamum</i>	Drummond Range, Queensland	"
Fossil wood	Nattai River, Burragorang	W. Cuneo.
"	Mount Kembla	A. G. Hamilton.
<i>Lepidodendron australe</i>	Boran Creek	D. A. Porter.
<i>Glossopteris</i>	Kowmung Walls	W. S. Leigh.
"	Cassilis	Dr. Woola.
Plants	Newcastle	J. B. Henson.
"	Cremorne Bore, No. 1	E. F. Pittman.
<i>Glossopteris</i>	Mungahon-Wollar Road, Mudgee	Dr. Nicoll.
<i>Gangamopteris</i>	Bacchus Marsh, Victoria	Exchange—G. Sweet.
Mollusca	Nowra	— Kelly.
<b>Mesozoic.</b>		
Plants, &c.	Cremorne Bore, No. 2	E. F. Pittman.
<i>Esteria</i>	"	"
Plants	Thirlmere	W. Cuneo.
"	Bulli Colliery, Bulli	T. Evans.
"	Victoria Pass, Mount Victoria	H. G. Rienity.
"	Mount Piddington, Mount Victoria	"
"	Nandewar Ranges	C. T. Musson.
<i>Alethopteris</i>	Mersey River, Tasmania	"
<i>Cinnamomum intermedium</i>	Collingwood, New Zealand	Exchange—J. Dall.
Leaves	"	"
<i>Lucina</i>	"	"
<i>Monotis richmondiana</i>	Wairoa, New Zealand	"
Plants and Fish	Talbragar	Dr. Woola.
Fish	Galgong	J. Johnston.

Fossil.	Locality.	Donor or collector.
<i>Teniopteris</i> , &c.	Manly	L. F. Harper.
Fern	Mount Illawarra Colliery	J. Rowan.
<i>Teniopteris</i> and <i>Phyllopteris</i>	Starfield, Mount Morgan, Queensland	A. G. Vogan.
<i>Inoceramus</i>	Strickland River, New Guinea	Geographical Society.
<i>Cytherea</i> (?)	Whitecliff Opal-field	H. G. Mackenzie.
<i>Cardium Brazieri</i>	Queensland (type)	J. E. T. Woods, per R. Etheridge.
<i>Teredo</i>	" "	" "
<i>Maccoyella reflecta</i>	Mount Abundance, Queensland (type)	" "
<i>Mytilus inflatus</i>	Palmer River, Queensland	" "
<i>Pseudaricula australis</i>	Cooltanconna, South Australia	R. Etheridge.
<i>Trigonia</i>	Tambo, Queensland (cast of type)	" "
<i>Monotis richmondiana</i>	New Caledonia	J. G. Engler.
Coral and Bivalves	Onailon, New Caledonia	" "
<i>Inoceramus</i> , &c.	Whitecliff Opal-field	H. G. Mackenzie.
Opalised shells	" "	W. C. Rodgerson.
<i>Belemnites Canhami</i>	South Australia	Prof. Tate.
<i>Tertiary—Recent.</i>		
Aboriginal tomahawks	Thirlmere	W. Cuneo.
" "	Shoalhaven District	Dr. J. C. Cox.
" "	Eastern Marshes, Tasmania	" "
" flint chips	Bearbong, Castlereagh River	W. L. R. Gipps.
" skeleton	Oberon District	J. C. H. Mingaye.
Post-Tertiary Bones	Wellington Caves (four collections)	J. Sibbald.
" "	Bungonia Caves	G. Guymer.
<i>Thylacoleo carnifex</i>	Goodradigbee Caves	R. Etheridge and J. Mitchell.
Crocodile maxilla	Yallaroo, New South Wales	R. Martin, per E. Quinn.
<i>Diprotodon</i>	Mudgee District	Dr. Nicoll.
Bones, Post-Tertiary	Terrible Vale, Kentucky	J. G. Taylor.
<i>Prochaerius celer</i> (cast)	Darling Downs, Queensland	C. W. Devia.
Coprolites	Condamine River, Queensland	" "
Gasteropoda	Raised Beach, Black Head	W. S. Dun.
Mollusca	" Bondi	L. F. Harper and P. T. Hammond.
Crustacean	Between Cambridge Gulf and Kimberley, Western Australia	D. C. J. Donnelly, M.L.A.
Plantæ (Cret.—Tert.)	Mount Potts, Shag Point, &c., New Zealand	Exchange—Christchurch Museum.
<i>Cinnamomum polymorphoides</i>	Macquarie Harbour, Tasmania	" "
<i>Octhodocaryon Wilkinsoni</i> , <i>Spondylostrobilus Smythii</i> , <i>Pentacune Clarkei</i> .	Gulgong	" "
Fossil Fruits	Newstead Mine, Newstead	J. Penberthy and D. Anderson.
<i>Trigonia semiundulata</i>	Arumpe Bore, Pooncarrie	J. W. Boulton.
<i>Unio Johnstoni</i>	Tamar River, Tasmania	" "
<i>Waltheimia lenticularis</i> , <i>Hemipatagus tuberculatus</i> , and corals.	Tata Island, New Zealand	Exchange—J. Dall.
<i>Pecten</i> , <i>Lucina</i> , <i>Cardium</i> , <i>Trochita</i> , <i>Natica</i> , <i>Cardita</i> (?) <i>Arca</i> (?), <i>Cellepora</i> , Echinid.	Gouland Downs, New Zealand	" "
<i>Gervillia</i>	Anahau, Golden Bay, New Zealand	" "
<i>Pectunculus</i>	Napier (?)	" "
Mollusca, &c. (2 collections)	South Australia	Exchange—Prof. R. Tate.

## APPENDIX 7.

## Annual Report of the Librarian for the year 1893.

Sir, Geological Survey, N.S. Wales, Department of Mines, Sydney, 2 January, 1894.

I have the honour to herewith report on the work performed in the Departmental Library since 1st January, 1893.

During the year 107 works and pamphlets have been received, of which 35 were purchased, and the remainder, 72, presented and received as exchanges. Of Societies' Proceedings, Reports, and Serial Publications, 1,185 volumes and parts of volumes have been acquired, 225 by purchase and 960 as presentation and exchanges, giving a total of 260 purchased and 1,032 presentations and exchanges, or a grand total of 1,292 works, reports, and parts of volumes registered during the year.

The Library is now in correspondence with 163 institutions, from 142 of which exchanges have been received.

An exchange of duplicates was made with Messrs. Angus and Robertson, with your approval, by means of which several desirable works were acquired for the Library.

All presentations have been suitably acknowledged immediately on receipt of the present.

The general register, register of periodicals, letter-book, and invoice ledger have been regularly kept up to date.

The General Library Slip Catalogue is complete to date.

During the year the following Departmental publications were distributed through the medium of the Library:—

- (1.) Records of the Geological Survey of New South Wales, Vol. iii, Pt. 2.
- (2.) Do do do Vol. iii, Pt. 3.
- (3.) Do do do Vol. iv, Pt. 4.
- (4.) Annual Report of the Department of Mines and Agriculture for 1892. (To Societies and Institutions.)
- (5.) Geological Map of New South Wales. (New Edition.)

The larger portion of the Library work has been conducted by Mr. W. S. Dun, to whom I am indebted for a great deal of valuable assistance.

I have, &c.,

R. ETHERIDGE, JUNR.,

Librarian.

The Government Geologist.

APPENDIX 8.

## APPENDIX 8.

Progress Report by Mr. J. C. H. Mingaye, F.C.S., M.A.I.M.E., Analyst and Assayer.  
Department of Mines, Geological Survey Branch, Laboratory,

Sydney, 6 February, 1894.

Sir,

I have the honour to hand you herewith the following progress report on the work performed in the laboratory under my supervision during the year 1893:—

Three thousand and fifteen numbered samples were received for analysis and assay; 177 ultimate and proximate analyses were furnished, and 16 qualitative analyses made.

The total number of assays performed, exclusive of those made for gold and silver, are 628.

From 1883 to 1893 the following numbered samples were received in the laboratory for analyses and assay:—

Year 1883 .....	242 samples.	Year 1889 .....	3,287 samples.
" 1884 .....	664 "	" 1890 .....	3,323 "
" 1885 .....	1,428 "	" 1891 .....	4,082 "
" 1886 .....	1,807 "	" 1892 .....	3,570 "
" 1887 .....	2,222 "	" 1893 .....	3,015 "
" 1888 .....	*5,245 "		

\* The large increase this year due to the mining boom.

A large amount of varied work has been performed for the Government Metallurgist.

The whole of the analytical work required by the Public Watering-places Branch has been performed in the laboratory, and consisted chiefly in the analysis of the artesian and well waters, with a view of ascertaining their value for stock and irrigation purposes.

Some thirteen samples were received from this Department:—

Water from Mongulla Artesian Bore.
" No. 2 Corrella Bore (artesian).
" No. 3 " "
" Well at Bingara.
" Sibraa's Artesian Bore.
" Kelly's Camp Artesian Bore.
" Yantabulla "
" Enngonia "
" Belalie "
" Kerribri "
" Warroo Springs, Hungerford Road.

Also two samples of soil taken from the neighbourhood of the Barrigan artesian bores near Bourke.

The total solid matter in these waters ranged from 34.35 to 70.112 grains per gallon, and consisted mainly of alkaline carbonates, chloride of sodium, with lesser amounts of carbonate of lime and magnesia, silica, alumina, organic matter, &c. Nearly the whole of the solid matter is soluble in water, giving a strong alkaline reaction. The waters were slightly alkaline before evaporation. The composition of the soils in the neighbourhood of these bores is one of great interest. The soluble matter found in the two samples furnished was 1.0328 per cent. and 0.9416 per cent. An analysis of each was made.

A large number of fire-clays have been examined, and analyses made with a view of ascertaining their values for the manufacture of fire-bricks, pottery, &c. Reports were furnished in each case as to the refractory nature of the clays, the sample being fashioned into small bricks, and heated at a high temperature in a coke assay furnace. On comparing the bulk of the analyses of our fire-clays with British and Foreign ones, it is found that the alkalis present are much higher than usually contained in the best fire-clays utilised for the manufacture of a first-class fire-brick.

A sample of coal obtained from the Leconfield Colliery, near Branxton, was observed to contain patches of a greenish-yellow substance. From its character the presence of vanadium was suspected, and on examination the presence of that metal in small quantity was detected. An estimation being made on the coal ash, yielded 0.07 per cent. of vanadic anhydride.

A mineral furnished from the Bourke district was found to be celestine. The presence of strontia, in this mineral was suspected by Mr. Card, A.R.S.M., who had previously tested it by the blow-pipe. Although a large number of minerals have been examined in the laboratory for strontia, this is the first discovery of a strontia mineral on record.

A number of analyses of rocks peculiar to the Broken Hill district were made for Mr. Geological-Surveyor Jacquet's report on the Broken Hill district. These minerals are as follows:—Diorite, quartz felsite, coarse granite, pitch stone (?), serpentine, amphibolite, and diorite. A large number of analyses and examinations were made of samples of iron ochres, with a view of ascertaining their value for the manufacture of paints, &c.

A sample of water was examined from Kelso, and a report given as to its fitness for brewing purposes.

A mine water taken from a shaft in the Peak Hill Gold-mine was tested, and was found to contain free sulphuric acid, also a large amount of sulphates of iron, copper, alumina, and magnesia.

A large number of platinum sands and concentrates have been examined for the presence of platinum, platinoid metals, gold, and tin. Some of these samples gave results which, if the sample represented anything like averages, should pay to work for the gold, platinum, and tin present.

Every care has been exercised in keeping down working expenses in the laboratory, the strictest economy being observed.

In concluding my report, I beg to state that my thanks are due to the Assistant Analyst Mr. White, also to the assistants, Messrs. Hildebrandt and Neilson, for the highly satisfactory manner in which they have carried out the work entrusted to them. Messrs. H. Fletcher, Dolan, and Burns have also largely contributed to a share of the work.

The Government Geologist.

I have, &c.,  
JOHN C. H. MINGAYE, F.C.S., M.A.I.M.E.,  
Analyst and Assayer.

## APPENDIX D.

Progress Report by Mr. W. S. Leigh, Superintendent of Caves.

Department of Mines and Agriculture, Geological Survey Branch,

Sydney, 14 February, 1894.

Sir,

I have the honour to submit the following progress report on the caves for the year 1893:—

During the year I have inspected the following caves in connection with their general supervision, improvement works, and new discoveries, &c., viz., Jenolan (four visits), Wellington, Bendithera, Wombeyan, and Cooleman.

The most important new discovery was made at Jenolan, where Mr. J. Wilson, keeper, discovered on the 20th February, another large and distinct branch of the Imperial Cave, which, in point of beauty and interest, is equal to any other known cave of the group. It branches off from the "Right Imperial," near the "Gem of the West," and its passages, intersecting each other at various points, total over 2,000 feet in length. (*See Appendix M.*)

Subsequently, further extensions, consisting of two small branches, were discovered in this cave (*See Appendix N.*)

In January, Mr. Etheridge, Palæontologist, and myself, accompanied by Mr. R. A. Barber, of Humewood, Yass, visited the Cooleman Limestone, situated about 20 miles north-east of Kiandra, with the view, principally, to the examination of a number of caves there, the existence of which had long been known to the local residents. In addition to examining the three caves located for us, viz., the "Cooleman," "Murray's," and "Barber's," five or six other openings in the limestone were discovered and partly explored. Had time admitted of it, and with proper appliances at our disposal, I feel certain some good finds would have resulted. For the reasons given in our report (*see Appendix L*), it is perhaps as well that the caves in this limestone remain locked up for the present. The reserve was inspected, and an extension thereto recommended. Geological notes on the surrounding country were also taken by Mr. Etheridge. (*See Appendix L.*)

The total amount collected at the different caves for the use of the magnesium light was £185 14s. 10d., and the expenditure in connection therewith as follows:—Purchase of magnesium wire, £132 10s.; repairs to lamps, £2 2s. 6d.; total, £134 12s. 6d., leaving a profit for the year of £51 2s. 4d.

The total number of visitors who signed the visitors' books at the different caves was 4,108.

Following are particulars showing number of visitors, improvements, &c., at each of the caves for the year 1893.

*Jenolan Caves.*

Number of visitors, 1,511. On account of the shortness of funds it was found necessary in July to suspend for the time being improvement works at these and the other caves. Good progress had, however, been made in the carrying out of the more urgent and important works. At the time operations were suspended the men were engaged in opening up the new cave, and so far the work accomplished is most satisfactory. I estimate it will take two men about four months to complete necessary improvements in this cave. The ironwork for same has not yet been provided.

It having been decided to light the Lucas Cave with electricity, a new dynamo and six arc lamps and fittings were procured from the Western Electric Company, Chicago, for the purpose. The arc lamps, the first to be used at Jenolan, should, on account of its spacious chambers, produce a grand effect in this cave. The passages will be lighted with the ordinary incandescent lamps.

As the present dynamo in use for the Imperial Cave lights was driven direct from the turbine, it was found necessary in the new arrangement to remove same to a position suitable for driving from a counter-shaft, by which the new dynamo will also be driven. This portion of the work, which embraced the supply and erection of counter-shafting, pulleys, belting, &c., building of concrete foundations and erection of dynamos, was performed by Mr. J. J. Patterson, contractor. The cables have also been laid to the mouth of the cave.

The other portion of the work, viz., the hanging of the lamps and the running of the wires, &c., through the cave, was to have been carried out by the Electric Light Department, simultaneously with the portion already done, but that Department has not yet been able to spare the services of the Chief Electrician, who has been entrusted with the work.

*Wombeyan Caves.*

Number of visitors, 240. It was intended to open up the cave discovered here in 1892, but, for the reasons already given, the work was not proceeded with. It has been approved, provided the money voted will admit of it, to carry out some necessary works, principally in the Wollondilly Cave. It is also intended to plant the space in front of the Accommodation-house with trees, when the proper season arrives. The area of the horse-paddock has been increased by 25 acres.

*Yarrangobilly Caves.*

Number of visitors, 636. It was found necessary, owing to the increased number of visitors to these caves, to allow the keeper temporary assistance during the summer season.

*Wellington Caves.*

Number of visitors, 987. An additional area of 35½ acres has been dedicated for the preservation of caves.

*Bungonia Caves.*

Number of visitors, 57. This number does not include those to the "Look-down," a favourite resort for sightseers on the caves reserve. The road to the caves, in respect to which there have been a number of complaints, and a good amount of correspondence, has not yet been definitely defined. The last communication from the Lands Department in this matter is to the effect that the old road is impracticable, and that the necessary deviations are to be surveyed.

*Bendithera Caves.*

Number of visitors, 73. A number of fresh openings in the Bendithera limestone have been found, but not yet thoroughly explored.

*Abercrombie Caves.*

Number of visitors, 604. The keeper has just reported the discovery of a series of new caves, not very extensive, but he states that some of the chambers will prove of great interest to visitors.

I have, &c.,

W. S. LEIGH,  
Superintendent of Caves.

The Government Geologist.

## APPENDIX 9A.

Report on the Caves in Coleman Creek, Coleman Plains, at the head-waters of the Goodradigbee River; with Notes on the surrounding District: By W. S. Leigh and R. Etheridge, Junr.

1. *Introduction.*

In the present report will be found a description of the Caves, so far as known, occurring on the Coleman Creek, or the western branch of the head-waters of the River Goodradigbee, traversing the Coleman Plains, in the Parishes of Murray and Coleman, County Cowley. The journey to and the investigation of the caves was made in company with Mr. R. A. Barber, of Humewood, near Yass, who most obligingly provided the horses necessary.

As the Yass-to-Kiandra road appears to be but little known we preface our report on the Caves with a general description of the route and country passed through. This is followed by miscellaneous geological notes collected at the same time.

2. *Previous knowledge.*

The only reference bearing on the physical structure and geology of the head-waters of the Goodradigbee known to us are a few pages in the Rev. W. B. Clarke's "Southern Gold-fields of New South Wales\*," and a paragraph in the same author's early "Report on the existence of Gold along the Rivers and Creeks flowing from the Muniong Range, &c., and on some auriferous Localities."† In the former he briefly describes the Counties of Cowley, Buccleuch, and Selwyn. His remarks will be referred to later on.

3. *The Route.*

The Murrumbidgee River on the Yass-to-Kiandra Road is crossed by the Boambola Crossing at Haggetty Point—a dangerous ford when the river is at all high. The bed is occupied at this point by a dark quartz porphyry, but whether in the form of a dyke or interbedded, time did not permit us to ascertain. On both banks are heavy outcrops of Siluro-Devonian limestone, a scarp on the roadside, opposite Hazlewood, on the north bank containing *Stromatopora*. The ford is about 11 miles from Humewood—our point of departure. The beds of limestone partake of the same physical character as those lower down the Murrumbidgee, near the Taemas Bridge, examined last year by Mr. J. Mitchell and one of the Writers, and there is a repetition of the same bold scenery. After regaining the southern heights above the river, our course lay along the eastern flank of a portion of the watershed between the Goodradigbee and Murrumbidgee Rivers, here known as the Mullion, or more properly speaking, the Mulyan Range. After crossing Mullion Creek, the north-west corner of the Parish of Urayarra, County Cowley, is entered, and the head branches of Tinker's Creek crossed; then over a small dividing ridge—an offshoot of the Mullion Range, descending on Webb's Swamp Creek. These waters are all affluents of the Cotter River, itself a branch of the Murrumbidgee. Here commences the large Forest Reserve No. 725. The whole of the country between the Boambola Crossing and this point presents that nondescript sandy soil which appears to indicate underlying Silurian beds, little rock being seen in place, except in the beds of rivulets and on the ranges. After following a newly-surveyed road for some distance, an important branch of the Cotter is crossed, locally known as Condo Creek, but it appears to us to be that denoted on the official maps Mount Coree, or Pabral Mountain Creek, and forms the boundary between the Parishes Urayarra and Tidbinbilla, County Cowley. Our aneroid readings made Condo Creek 2,000 feet above sea-level. It is a fine, rocky, precipitous, glenlike rivulet, with clay-slates, shales, and grits, having a general meridional strike, standing about on edge. The shales are thin-bedded, fissile, and micaceous. The track, after following the creek for some little way, rises along the sidings, and gradually the ascent of the north-eastern slopes of Mount Brindebella commences. This hill attains a height, according to our measurement, of 4,350 feet. The same rocks continue to near the crown, which, from its somewhat rampart-like nature, is locally known as "Gibraltar." It consists of a cream-coloured granite.

At the summit of Mount Brindebella is the marked-tree broad-arrow S. 85, and between this and a similar tree, broad-arrow R. 85, lower down on the ascent, the boundary of the Parishes Tidbinbilla and Brindebella crosses. About three-quarters of the way up from Condo Creek is Lee's Springs, forming a fairly good camping-ground.

Mount Brindebella, which appears to be an offshoot from the Main Dividing Range between the rivers Goodradigbee and Cotter, known as the Bimberi or Murrumbidgee Range—Condo Creek, amongst others, cutting it off from the latter on the west side—was shown‡ by Clarke as early as 1852 to be auriferous. On looking both northward and southward a most magnificent view of the whole Murrumbidgee Range is obtained—to the north, following the course of the Goodradigbee to its junction with the Murrumbidgee at Cave Flat, denoted in the view by the Barren Jack Range—to the south, trending into the Bimberi Range proper, with the noticeable points of Long Bimberi, Bimberi, and Mount Murray succeeding one another in gradual succession, at the immediate source of the final eastern branch of the Goodradigbee, as distinguished from the western branch, or Coleman Creek. Along the northern line, Mount Coree (or Mount Goree, or Pabral, as it is sometimes called) is the highest elevation, more lofty than Brindebella, possessing a bold scarp-like front to the south-west. It is the site of a trigonometrical station.

A good deal of scattered quartz is noticeable on the slopes of Mount Brindebella, but no well-defined reefs were seen by us. The Rev. W. B. Clarke, speaking of this hill, says,§ "The whole of Cowley in

\* 12mo. Sydney, 1860, pp. 86-90, 93-109

† Sixteenth Report, dated 26th May, 1852. Further Papers relative to the recent Discovery of Gold in Australia. Parliamentary "Blue Book," 28th February, 1853, p. 81.

‡ Southern Gold-fields of New South Wales, 1860, p. 90.

§ Southern Gold-fields of New South Wales, 1860, p. 104.

in this direction is composed of the same drab and gray shales, with interspersed quartz veins, rising in Pabral Peak (Mount Corree) into lofty eminence, the quartz chiefly brown, but on the slopes of Brindebella Mountain, descending to the Goodradigbee, the quartz becomes white." We may remark, incidentally, that the vertical shales and schists around Mount Brindebella, have, in lithological and physical appearance, the strongest possible resemblance to those cropping out along the Long Plain, between Kiandra and Yarrangobilly.

The descent on the south-eastern aspect of the mountain along the old track is far steeper than on the ascent, necessitating a dismount. The same highly-altered rocks are again seen in place with a good deal of white scattered quartz. After crossing a few subsidiary spurs, the Goodradigbee River is reached, the height being 2,200 feet above sea-level. At the river-crossing a raised alluvial beach is noticeable, consisting of coarse boulders and sand. After fording, the track runs over some beautiful alluvial flats, but the river is again crossed at a horseshoe bend in Portion 21 (Parish Brindebella), and continued over the foot-ends of spurs until the residence and mining claim of Mr. W. Reid is reached.

The old river-bed is here being worked, consisting of small boulders and heavy gravel, in places very irregularly deposited. Layers of white pipeclay and other clays of various colours occur throughout the section, and near the lowest level to which the claim has been carried, namely, 96 feet, a bed of impure lignite makes its appearance at the northern end. These clays were assayed by Mr. J. C. H. Mingaye, F.C.S., &c., and found to be non-auriferous. In places, pockets and lenticular patches of a black graphite-looking powder occur. Some peculiar pipings are visible at the south end of the workings, in which the drift, instead of lying horizontally or inclined, is deposited in vertical lines. The direction of the old river-course is, roughly, north and south, and the run of the several auriferous washes coincides. The deposition of the drift in the north-east corner is in saucer-shaped lines, and probably represents a deviation of the bed in that direction. Between the claim at its southern end, and the present course of the Goodradigbee, is a Silurian rise, which must have then represented its western bank, with shales in place, the junction of the old course with the present channel on the east being quite apparent. The road passes over this rise, and crosses the Goodradigbee for the last time, entering the Parish of Bramina, County Buccleuch, when the Goodradigbee-Cotter watershed is left, and that of the Goodradigbee-Tumut entered on.

After traversing various low spurs, the first affluent of the Goodradigbee in this parish is crossed, termed on official maps the Coleman Creek. This, however, as pointed out by Mr. R. A. Barber, is an error, and should be known by the local name of Coleman's Creek. It takes its rise in a magnificent range of heavily-timbered hills, rising tier upon tier, and furrowed by precipitous gullies, and forming the watershed before mentioned. After pursuing the upward course of the creek for some distance, the track deviates across the sidings at the heads of branches of Coleman's Creek, on to Diamond Hill, a prominent point of the watershed, to the height of 4,570 feet by aneroid measurement, a much steeper, altogether shorter, climb than that of Mount Brindebella. The summit of Diamond Hill is long and undulating, the rocks quartzites and porphyries. Hereabouts the Parish of Peppercorn, County Buccleuch, is entered, and the direct Kiandra track is soon left, and a path taken to the left across the so-called Peppercorn Plains, with head branches of the creek of the same name, which is itself crossed at the site of the old Peppercorn Station. Peppercorn Creek is the next most important branch of the Goodradigbee south of Coleman's Creek, and joins the river in the south part of the Parish Bramina, County Buccleuch, ultimately separating the Parishes of Murray and Peppercorn of the same County.

As Diamond Hill is descended, Peppercorn Hill, a prominent peak-like elevation, becomes visible. It is an offshoot of the Long Plain Range, as that part of the Goodradigbee-Tumut watershed is called. Behind the Long Plain Range is the Long Plain itself, between Kiandra and Yarrangobilly, with the final swampy heads of the Murrumbidgee after its great southern bend. After crossing Peppercorn Creek the Parish of Murray, County Cowley, is entered, and spurs of the Long Plain Range traversed, consisting of a hornblendic granite.\*

Soon after this the large expanse of the Coleman Plains bursts on the view, a series of well-grassed limestone downs, trending in an east and south direction. Across the plains the Coleman branch of the Kiandra track leads. At an out-station in Portion 12 we crossed a large patch of granitic porphyry, ultimately reaching the Coleman Creek, or west branch of the Goodradigbee head-waters, by a short cut, when a camp was formed, opposite a small island near the Blue Waterhole, in Portion 9.

The principal peak of the Long Plain Range, overlooking the Coleman Plains, is known as Rorke's Peak, a name not mentioned on official maps.

The Goodradigbee River, soon after leaving the parish of Bimberi, County Cowley, divides into two main heads, one coming from the south-west, rising in the western gullies of Mounts Murray and Bimberi, Parish of Coleman, County Cowley, and the other branch from the south-east, taking its rise by one branch on the Coleman Plains, Parish of Murray, County Buccleuch, at the eastern foot of the Long Plains Range, and by another in the Coleman Mountains on the north. These hills are a subsidiary range of the main Murrumbidgee Range, extending along the northern boundary of the plains to the junction of the two branches.

The union of the two branches is known as "The Junction," and is denoted by a marked gum-tree, broad-arrow M 85. The west, or "Mount Murray Branch," as it is termed on the official maps, we did not follow up, our researches being confined to the eastern arm, or Coleman Creek.

The limestone of Coleman Plains, according to the Rev. W. B. Clarke,† "forms extensive cliffs vertically stratified and abounding in caverns. The perpendicular cliffs are 80 to 100 feet in height, sometimes perfectly smooth, sometimes fissured in every possible direction. It is through these lofty and pinnacled cliffs that the Goodradigbee (*sic*) passes, having a breadth of not more than 30 feet in places, and overhanging cliffs of at least 100 feet."

Nowhere is this more marked than from the Junction upwards for the first part of the course of the western branch or Coleman Creek. The sides of the tortuous creek are most precipitous and straight-walled, in places chasm-like, fully 100 feet, and probably more, with several likely-looking holes and fissures on the north bank. On the south side of these cliffs, soon after leaving the Junction, is an archway called "The Murderer's Cave," the scene of a brutal murder some years ago. The archway is of no depth, leading to a small hole, possibly the entrance to a cave. So important a physical feature as  
this

\* Consisting of quartz, hornblende, and some biotite.  
† Southern Gold-fields of New South Wales, 1860, p. 106.

this chasm is worthy of a name, and we propose, in consequence, to distinguish this portion of the Cooleman Creek as "Wilkinson's Cliffs," in memory of the late Geological Surveyor-in-Charge, Mr. C. S. Wilkinson, L.S., F.G.S., &c. From the edge of the cliffs the ground rises in a slope, with a rather high inclination, into steep wooded hills—those on the north being the terminal spurs of the Cooleman Mountains, and on the south those from the Black Ridge. The latter hill separated the two branches of the Goodradigbee on the south.

On passing through Wilkinson's Cliffs the creek opens out with long sloping banks, and its course is interrupted by a small cascade about 30 feet high, caused by a highly fossiliferous flaggy limestone, which has worn away more heavily than the thicker and more highly metamorphosed Cave Limestone. A large body of water must at times pass over this fall, and rush with terrific force between Wilkinson Cliffs. We propose to term these the "Cooleman Falls." Above the cascade the declivity of the banks gradually gives way, and opens out into a small alluvial flat, locally known as Sally Flat, from the prevalence of a stunted Eucalypt, called "Sally." Limestone here continues on the north side of the creek, but the rise above the flat on the south is occupied by a flesh-coloured granite, which apparently forms the heights of the Black Ridge above—at any rate, it was in place as far up that hill as our examination led us. On emerging from the timber at the further end of the flat the granite ceases, and precipitous gorge-like walls again commence, equally narrow with those below. For distinction sake, we propose for this chasm the name of "Clarke's Gorge," after the late Rev. W. B. Clarke, F.R.S., &c. At the eastern end of this chasm is a beautiful waterhole, known to some as the "Blue Waterhole," although by others this name is applied to another hole higher up the creek. On passing through Clarke's Gorge, a smaller flat is met with, on which we camped, with a small branch creek, also with limestone sides, coming in from the north. Near the lower outlet of Clarke's Gorge, on the south side, is a small natural archway, which can be entered for about 25 feet, but partially collapsed, and leading into an interior passage. Hereabouts must issue the underground rivulet of Barber's Cave, to be more fully noticed later on. A few hundred yards above our camp, in Portion 9, at the foot of a limestone bluff, occurs the upper "Blue Waterhole," from which it has hitherto been supposed this branch of the Goodradigbee takes its rise. This is, however, erroneous, as we hope to show in the sequel. No doubt a very strong spring or underground flow issues here, for, although the creek, except in times of flood, is dry above, and at ordinary times there is no apparent intake, yet, a few yards below the Blue Waterhole, the rush of water over the stony bed is strong and copious. The surface of the Blue Waterhole is perfectly tranquil, and the water is of a pale sea-blue. Beyond this point the course of Cooleman Creek is very circuitous, with alternating isolated bold cliffs and elopes, and occasional small flats at the bends. It soon divides into two main channels, and on following the right-hand branch the Cooleman Creek is reached on the north bank. The left-hand branch turns to the south-east in the direction of Mount Murray, and the divide between the Murrumbidgee and Goodradigbee waters on the south. We were told that at its head the water flows, passing under an arch, but the intermediate portion is perfectly dry. Possibly this is the occurrence mentioned by Clarke, when he says that the Goodradigbee issues "under a natural bridge of excavated rock, as on Coolalamine (*sic*) Plain."\*

The precipitous cliffs and bluffs of the right-hand branch, although wanting in the rugged grandeur of Clarke's Gorge and Wilkinson's Cliffs, are still fine, often rising straight for 50 or 80 feet perpendicular. Those between the two caves, the Cooleman and Murray Caves, we suggest may be known as "Nichols' Cliffs," after Mr. H. W. Nichols, who assisted† the Rev. W. B. Clarke in his researches in the southern gold-fields.

About 2 miles above the Cooleman Cave occurs the Murray Cave, on the south bank of the right-hand branch, or, as it is termed on official maps, the Cave Creek. After running for perhaps another 2 miles in a general north-east direction, and giving off sundry smaller branches, it suddenly curves back upon itself, the waters coming from an extension of the plains to the north-east. Each subdivision of the Cooleman Creek more or less possesses the same physical characters. Near the main Cave Creek, in the direction of Mount Rorke, is a small bubbling rivulet terminating in a circular basin-shaped depression, through which the water appears to get away, as there is no other apparent outlet. The bed of the creek is filled with moderate-sized boulders and pebbles, but there is no permanent water above the highest Blue Waterhole. At the same time, immense bodies must traverse it in rainy seasons, and taking into consideration the large catchment area thus opened up, it appears to us inconsistent to consider the upper Blue Waterhole simply as the source of the west branch of the Goodradigbee.

The Cooleman Plains, or, as Clarke wrote the name, Coolalamine Plains,\* lie in an amphitheatre, enclosed on the north by the Cooleman Mountains, on the east by the Goodradigbee River and the Mount Coree or Murrumbidgee Mountains, on the west by the Long Plain Range, and on the south by the Currangorambla Mountains.

The plains consist of low rises and depressions, to which the name of "downs" would be far more applicable than that of "plains." The south-east, or Mount Murray branch of the Goodradigbee is usually spoken of as the main source of that river, but bearing in mind our previous remarks, we are inclined to support the opinion of Mr. R. A. Barber, that the south-west arm, or Cooleman Creek, is just as much entitled to that distinction.

#### *The Cooleman Cave.*

This cave is situated near the south-east corner of Portion 4 of 40 acres, Parish of Murray, County Cowley, on the north bank of the main west branch of the Goodradigbee River, about  $3\frac{1}{2}$  miles above its junction with the main stream. The entrance is at the foot of a limestone bluff, which rises perpendicularly to a height of 70 or 80 feet above a grassy slope, and forms an irregular diagonal fissure or archway 20 feet wide by 15 feet in height. The fissure is divided into two openings by a central pillar of rock 3 feet in diameter, the lower opening, through which the cave is entered, being about 10 feet above the bed of the creek.

On entering the cave it is noticed that this immense fissure extends back into the limestone about 30 feet, and forms an entrance-hall 40 feet long by about 15 feet in height. It contains no stalactitic growths, the roof presenting a face of bare rock, the floor being strewn with small detached boulders.

The principal passage of the cave branches off at the western end of the entrance-hall, its general bearing being W.  $10^{\circ}$  N. It has an average width of 10 feet, and 6 feet in height, and can be traversed on

\* Southern Gold-fields of New South Wales, 1860, p. 86.

† Southern Gold-fields of New South Wales, 1860, p. 104.

on a perfectly level floor for a distance of about 100 yards, at which point the passage opens out, and terminates in a circular chamber 20 feet in diameter. Two or three small holes or waterways, too small to follow, branch off this chamber.

The floor surface of the passage bears abundant evidence of its being frequently wholly under water as at the time of our visit that portion not so covered was coated with a sediment of brown mud. Near the terminal chamber is a long funnel-shaped up-cast from the roof, through which a large quantity of mud and debris has found its way into the cave from the surface. A fair number of stalactites are met with at intervals along the passage, but, by reason of the frequent flooding of this portion of the cave, few stalagmites are seen.

To the right of the entrance hall is a narrow passage, which can only be negotiated in a stooping or recumbent attitude. Its general bearing and length is N. 40 feet W. 10° N. 30 feet, and S. 45 feet back to entrance hall. Thus an inspection of same can be made without retracing one's steps. The stunted roots and broken remnants of stalactites now remaining show that this passage was once rich in the finer miniature forms of dripstone growths. In fact, both passages of the cave have been denuded of all the more delicate calcareous formations to such an extent that only a few of the more massive specimens now remain.

#### *Murray's Cave.*

This cave is situated within Reserve No. 661 for Recreation, in the same parish, and about 1½ mile west of the Cooleman Cave, on the west terminal branch of the Goodradigbee, the general bearing of the river at this point being S. 70° W. Like the last cave described, the entrance is at the foot of a lofty limestone peak, standing back about 50 feet on the south side of the creek, and 10 feet above the level of same. The entrance much resembles a Gothic archway, 4 feet wide at the base and about 18 feet in height at apex, which spans a dry water-course, running direct from the cave to the creek, the bed of same being covered with water-worn boulders. Passing beneath the archway and along a passage 15 feet in length, a large chamber, the principal opening of the cave, is entered. It is about 70 feet long by 40 feet wide, and averages 20 feet in height, and is in most respects similar to the main chamber of the Cooleman Cave.

The floor is almost completely covered with small pieces of fractured limestone, resembling rough road metal, through which crop up here and there a few stunted stalagmites. The greater portion of the roof is bare rock, the other portion being covered with small spherical-shaped calcareous excrescences, dirty white in colour. Two passages lead off from this chamber, one immediately to the left of entrance, the general bearing of which is S. 10° E., and the other directly opposite the entrance running due south. The former is tunnel-shaped, with a circular roof, and can be traversed with comparative ease a distance of 320 yards, the width varying from 4 to 15 feet, with an average height of 15 feet.

It is evident that during wet seasons large volumes of water must pass through the cave, the floor and sides being much waterworn, and numerous pools of water, with pebbly bottoms, are met with at intervals along the passage. Heaps of fine sand are also noticed at different points. The passage terminates in a slightly enlarged chamber, to the left of which, on a level with the floor, is a cavity, apparently very deep, and completely filled with water. In this chamber is also a talus of mud, which must have entered through a crack in the limestone at the extreme end of the cave. The roof of the passage was at one time completely covered with stalactites of various designs, but now only the more massive groups and broken stumps of the lighter specimen remain.

At 120 yards from the entrance, projecting from the wall, are two large circular canopies, the lower portions of which, in the form of a fringe of delicate stalactites, have been broken off. Near the same spot are the fractured remains of a series of long, fluted stalactites, which, when intact, would, on being tapped, give off musical sounds. These formations are generally dirty white and fawn coloured. Throughout the passage there is a strong drip of lime-charged water from the roof, and the broken stalactites appear to be rapidly reforming.

The other passage, running south, opposite the cave entrance, is very narrow and tortuous, and partly blocked at intervals with stalagmo-stalactitic pillars.

Running across the floor, and intersecting each other at various angles, are small, knife-like ridges, enclosing numerous shallow pans or basins, each of which is filled with small nodular concretions of carbonate of lime.

This cave is apparently named after Sir T. A. Murray, at one time Speaker of the Legislative Assembly, and who was the first to take up country in this quarter.

#### *Barber's Cave.*

The first important gully on the south side of the creek below our camp has two arms, right and left. Near the mouth of the left-hand arm, about 20 chains distant from the creek, is a large circular depression, from the bottom of which rises a limestone peak, having a central opening or fissure, 5 or 6 feet wide, the mouth of a cave which was explored for a considerable distance. It is in the form of a long, winding passage, falling rapidly in the direction of the creek, its general bearing being north-east, and contains a fairly good assortment of dripstone specimens.

The fact of these being almost intact is evidence of the cave not being generally known. At 90 feet from the entrance, bearing N. 10° E., is an irregular-shaped chamber, 20 feet across, which is partly filled with large pieces of fallen limestone. At 144 feet beyond this, the passage running S.E. by E., and keeping its downward course, are two circular canopy-like projections from the wall, 5 or 6 feet in diameter. Being almost pure white, and standing out some distance over the passage, they present a striking contrast to the sombre-looking parent rock on which they have formed.

Immediately beyond this the floor takes a sudden drop of 15 feet, the passage becoming much more tortuous and steep. At this point a rumbling sound of running water strikes the ear, the first sight of which is obtained 70 feet further on. Here a rapidly-flowing subterranean creek runs parallel with the track for a short distance, and disappearing beneath the limestone, reappears 34 feet lower down, when it finally disappears beneath the main passage and takes its downward course to join the waters of the Goodradigbee River. At 160 feet beyond this, the passage, bearing N.E. by E., still rough and tortuous, opens into a chamber about 20 feet wide and 30 feet in height, at which spot a glimpse of daylight is obtained through a second entrance or outlet. This opening corresponds with one noticed outside, not many feet above the level of the river, the distance between the two openings, through the cave, being close on 600 feet. At 39 feet beyond this the passage terminates in two small crevices, too small to follow in their present state.

At

At intervals throughout the cave some fine groups of stalactites of various designs are met with, which, not having been tampered with, as in the other caves beforementioned, makes this perhaps the most attractive of the Cooleman Caves yet discovered.

The gully on which this cave is situated takes its rise in spurs of the Black Ridge, and in its upper branches is water-carrying. It is probable, therefore, that the water within the cave is derived from the soakage of this, as the lower portions of the gully are quite dry.

#### Other Cave Openings.

Almost facing Barber's Cave, on the opposite side of the gully, at the southern end of the right arm before referred to, is another circular depression, at the bottom of which is an outcrop of limestone.

An opening in the rock, too small to explore very far in its present state, serves as an inlet for any surface-water which may accumulate at this end of the gully, and if properly explored, would probably be found to lead to large cavities.

In a limestone scarp, above and opposite to this, is another opening or immense vertical fissure, which apparently splits the whole of the exposed bluff. With the aid of proper appliances it might be possible to traverse the fissure a considerable distance.

Below the junction of the two head branches of the Goodradigbee, a comparatively short distance down the main stream, on the eastern bank, is a small orifice, into which a stone can be thrown and heard falling for a considerable time.

Again, a little further down, an underground creek issues from beneath a large limestone bluff on the west bank, forming at its point of issue a fine pool. On account of the quantity of water, the creek could not be followed very far inwards.

A few hundred yards still lower down the stream, on the same side, another subterranean creek issues from an opening partly choked with fallen blocks and undergrowth, and after forming a small stream of its own, joins the main Goodradigbee River.

Two such instances are recorded by Clarke on this very river—one that the Goodradigbee issues "after the first collection of waters through a cavernous underground channel";\* and again, "the other branch of the Goodradigbee also issues from the bottom of a limestone cliff, passing into a pool."†

Considering the large extent of Cooleman Limestone, and the numerous openings in it, it is evident that the best caves there are yet undiscovered, and fortunately being thus locked up, cannot be subjected to such acts of vandalism as have been so freely perpetrated in the present known caves.

We therefore think it would not be advisable to undertake a systematic exploration of same until such time as ample funds are available for carrying out necessary works for their improvement and protection, and the prospect of a sufficient number of visitors to warrant the appointment of a caretaker.

We would, however, point out that the present reserve does not take in the whole of the best limestone, and would recommend an extension to same, particulars of which with plan will be furnished on a separate paper.

#### Geological Notes.

In investigations similar to those we were engaged on, so much remains to be done in a given space of time that it is impossible to follow out in detail the geological structure of the country traversed, and without this detail actual accuracy is impossible. The following notes must, therefore, be regarded simply as an outline for future amplification.

As early as 1852, the late Rev. W. B. Clarke wrote, on the Murrumbidgee, as follows:—‡ "The country along the Murrumbidgee, about 149° E., and between 36° and 35° S. is chiefly composed of granite and granitic rocks which pass into the slate system. This, similar to the construction of the same formation as described in my twelfth report, embraces, although in a much more extended degree, various beds of limestone and calcareous grits, which are charged with innumerable fossils, among which corals of Silurian genera, pentameri, and various trilobites are most prominent. Hills of porphyry and bands of porphyritic compounds also occur in the midst of the slate system, and, owing to the former, the latter has at various points been transmitted and disturbed."

In briefly describing the Counties Cowley and Buccleuch, Clarke recognised the probable age of the schists as Silurian, for he says:§ "I would not hesitate, even without fossiliferous evidence, to class the Murrumbidgee schists as Silurian—a conclusion justified by their positive passage through sandstone into fossiliferous limestone, containing undoubted corals described by Sir R. I. Murchison."

The extent of these limestones is also referred to thus||:—"There is a band of cavernous fossiliferous limestone striking for fully 200 miles at intervals along the meridian of the head of the Goodradigbee." The whole of this southern part of the County Cowley from the junction of the Cotter with the Murrumbidgee¶ "is composed of the same drab shales and grey slates, with interspersed quartz veins," a fact which came prominently under our notice in that portion traversed by us. "The same formation continues," adds Clarke, "with slight interruptions of granite and quartziferous porphyry—the former connected doubtless with the Bogong Mountain—to the Coolalamine Plain."\*\*\*

The limestone area of the Cooleman, Clarke computes, at from 30 to 40 square miles. The portion generally travelled by us amounted to about 25½ square miles, but there is no reason to doubt that Clarke's estimate may be correct were the whole of the outlying patches taken into consideration, many of which we did not see. Along the edges of the scarp-like cliffs the limestone here and there, and particularly in the neighbourhood of the Cooleman and Murray Caves, rises into pinnacle-like heights, separated by grassy slopes. Away from the creeks the only indication of its presence is a few scattered bumpy projections through the soil. Its appearance as a rock is similar to other massive cave limestones in New South Wales, such as Yarrangobilly, Goodradigbee, &c., and weathers, when not seen in cliff faces, into rounded masses, with a fluted or grooved surface.

The limestone *en masse* has unquestionably undergone much metamorphism. This has been dwelt upon by Clarke, who says††:—"The crystallising character and arrangement of the limestone on the east side of the plain, and its nearly total want of fossils. . . . points to metamorphic agency, the origin

\* Southern Gold-fields, p. 88.

† Southern Gold-fields, p. 106.

‡ Further Papers relative to the Discovery of Gold in Australia—Parliamentary Blue Book, 23th February, 1853, p. 84.

§ Southern Gold-fields of New South Wales, 1860, p. 102.

¶ Southern Gold-fields of New South Wales, 1860, p. 88.

\*\* Southern Gold-fields of New South Wales, 1860, p. 104.

†† Southern Gold-fields of New South Wales, 1860, p. 104.

‡‡ Southern Gold-fields of New South Wales, 1860, p. 105.

origin of which may be found in the porphyritic rocks with which the marble is in contact." It is a white slightly yellow, or flesh-coloured rock, weathering, as a rule, of a light leaden blue, and is highly crystalline. Clarke's expression is that it varies from a compact grey limestone to a sub-crystalline marble. The latter appearance is very marked in places. We did not trace the extent of the cave limestone up the course to the south-east, or Mount Murray branch, of the Goodradigbee; but the Rev. W. B. Clarke's description,\* so far as we can follow it, states that "the rock along this arm of the river is highly crystalline white marble, a connected mass of crystals of carbonate of lime, many of them extremely well developed and striated on their planes. The crystals are white, and their external surfaces worn, so as to exhibit the striation on the rock. Originally these were due perhaps to fossils. This kind of rock continues for about 2 miles."

At the Goodradigbee Falls is an excellent section of a highly fossiliferous calcareous shale, rather than a limestone, overlain by a thick mass of the cliff or cave limestone. It is a very marked bed of some considerable thickness, and crops out on the south bank as a series of irregularly weathered and iron-stained reefs. It is probably owing to the more readily yielding nature of these strata that the falls owe their nature. The calcareous shale is crammed with fossils, but, on the weathered surfaces, all in the form of casts or impressions. Some excellent examples of *Favosites* and *Heliolites* may be gathered. The strike appears to be about N. 10° W., and the angle of westerly dip low—not more than 5°. The dip throughout the Coleman area does not exceed 40° westerly, the highest observed by us being 25°, but Clarke gives it from 20° to 40° to the west.† The bed of fossiliferous shale is overlain by a thick deposit of the Cave Limestone, highly jointed, and if our reading of the section is correct, exhibiting faint lines of bedding, corresponding with that by the shale below, but almost obliterated by metamorphic action.

In all the creek sections outcrops of a light chocolate coloured limestone are met with, in some cases accompanied by reefs of decomposed iron ore, apparently limonite. This limestone is also highly altered, but in a few instances where less so, has proved fossiliferous. Good examples may be seen on the south bank of Cave Creek, immediately to the west of the Murray Cave entrance, and on the bluff at the west end of Wilkinson's Cliffs. One of the reefs of iron-ore is visible on the downs to the north of the Murray Cave.

When casually examined the long and more or less vertical plane lines visible in the cliff and bluff exposures may be taken as planes of bedding, as they were by us, and an on-edge position assigned to the bulk of the limestone. From the observations made, however, in connection with the strata of the Goodradigbee Falls, we have come to the conclusion that these are simply joints—an opinion supported by an occasional irregularity and sudden stoppage of the lines, the occurrence of the fractures at right-angles to them, and their variability of direction.

The granite of Sally Flat, below Clarke's Gorge, is flesh-coloured to light pink in colour; and, according to Mr. G. W. Card, the Curator, who kindly determined it, consists of quartz, white and pink felspar, some of the crystals showing simple twinning, and a little biotite. We suspect that this granite is intrusive, and it is to this that a good deal of the local metamorphism is due. The Sally Flat granite is an extension of the rock forming the Black Ridge; at any rate, it is traceable as far up the slopes of this spur as time would permit us to climb. Another exposure takes place on the western bank of the main Goodradigbee below the "Junction," coming down to the river's edge, and is much jumbled up with limestone blows. How far the limestone continues up the slopes of the terminal spurs of the Coleman Mountains we are not in a position to say; but if the higher portions of the Black Ridge are composed of this flesh-coloured granite, then, in all probability, those of this portion of the Coleman Mountains, at least, are composed of the same rock.

On the river, hereabouts, the granite is seen abutting against the limestone bluff with the large pool below it, and from the side of which an underground flow of water takes place. At the eastern boundary of the Sally Flat granite is a terribly hard dyke rock containing cubical crystals of iron pyrites. Between this dyke and the granite is one of the chocolate bands of limestone already referred to.

A lode of silver-lead ore has been opened on the down to the south of the Murray Cave (M.L. 20, Parish Murray), but does not appear to have been a great success.

The decomposed ironstone reef to the north of the Murray Cave, on assay by Mr. J. C. H. Mingaye, was found to be neither gold nor silver bearing.

With time at one's disposal no doubt an excellent collection of fossils could be made at the Coleman Downs. So far, we believe, the only specimens gathered formed a part of the Rev. W. B. Clarke's collection, and were described by Professor de Koninck. We were fortunate enough to rediscover *Pentamerus Knightii*, J. Sby., one of the species previously recorded by Clarke. Large sections of this shell are visible on weathered surfaces, and on boulders in the creek bed, accompanied by numerous *Stromatoporidae*. The occurrence of *P. Knightii*, at Coleman, will go far towards placing this limestone on the same horizon as the beds at the numerous localities detailed in a recent paper by one of us.‡ Immediately to the east of the Murray Cave entrance the sloping cliff face has been worn quite smooth, the surface showing innumerable sections of crinoid stems, *Favosites*, *Pentamerus*, and others not determined. The unequal distribution of the organic remains throughout the Coleman limestone is due, no doubt, to the unequal effects of metamorphism, and possibly to an insufficient examination of the area. Clarke also mentions the occurrence of a large bivalve, a *Calymene*, near *C. Blumenbachii*, Brong., and an *Encrinurus*.§

The fossils described|| by the late Professor L. G. de Koninck, from Calamine (which, we believe, to be identical with Coleman), are the following, all European species be it observed:—

- Favosites aspera*, D'Orb.
- Pentamerus Knightii*, J. Sby.
- Betzia Salteri*, Dav.
- Cyathophyllum vermiculare*, Goldf.
- Favosites basaltica*, "
- " *alveolaris*, "

The three first are placed in the Silurian section of his work, the three last in the Devonian. The application of Professor de Koninck's determinations to the stratigraphy of our New South Welsh rocks is

\* Southern Gold-fields of New South Wales, 1860, p. 105.

† Southern Gold-fields of New South Wales, 1860, p. 100.

‡ R. Etheridge, Junr.: The Pentamerids of New South Wales.—*Records Geological Survey New South Wales*, 1892, III, Pt. 2, p. 49.

§ Southern Gold-fields of New South Wales, 1860, p. 106. In the paper on the Pentamerids, previously quoted, an omission was made as to the

first record of *Pentamerus Knightii* in Australia, which is due to the late Sir R. I. Murchison, from information supplied by the Rev. W. B. Clarke.

(See *Quarterly Journal Geological Society*, VIII., p. 135.)

|| Recherches sur les Fossiles paléozoïques de la Nouvelle-Galles d. Sud. 3 parts and atlas. (4to, Bruxelles, 1876-77).

is exceedingly difficult. We think it may be safely assumed, from his context, that the fossils transmitted by the late Rev. W. B. Clarke, instead of being forwarded in parcels representing a formation from a certain locality, as they should have been, were simply sent as so many individual specimens. De Koninck, in absolute ignorance of the geography of New South Wales, and in a great measure its geology also, simply determined his species from their geological alliances elsewhere, and then grouped them in wide horizons, absolutely irrespective of locality.

Space does not permit us to go into this subject thoroughly now, but a careful perusal of those portions of his work devoted to the Silurian and Devonian will convince an unbiassed reader of the soundness of this reasoning. By the light of the species quoted above, the Cooleman limestone may be either Silurian or Devonian, but at present we do not think that sufficient *published* evidence exists for a satisfactory solution of the subject. This and the other allied limestones throughout the country may be *either the one or the other*, but with a very strong bias in favour of the Upper Silurian. Facts are being daily gathered, which we hope will soon lead to a solution. Allowing for the extraordinary mixture of forms of more than one formation known to exist in some of our rocks, we do not think that for the present we can do better than continue the use of the compound term so wisely adopted by the late Mr. C. S. Wilkinson—that of Siluro-Devonian.

We have, &c.,

W. S. LEIGH,

Superintendent of Caves.

R. ETHERIDGE, JUNR.

Palæontologist.

The Government Geologist.

#### APPENDIX 9B.

##### Report on New Cave, Jenolan Caves.

Sir, Department of Mines and Agriculture, Geological Survey Branch, 24 March, 1893.

I have the honour to report, as requested, on the new cave, Jenolan Caves, discovered by Mr. J. Wilson, keeper, on the 20th February, 1893.

Although entered from the Imperial Cave, it may, from its size and position, being almost as large as that cave, and on a higher level, be considered a distinct cave. Also, in my opinion, it excels the "Imperial" in beauty and variety of formation, and the discovery may rank as one of the most important yet made at Jenolan.

The entrance is at the end of a passage running N. 20° W., 70 feet from a point about 12 feet north of the "Gem of the West" in the Imperial Cave, Right Branch. The opening was originally very small, but having been enlarged, it now measures 6 feet by 18 inches. Immediately inside, two high sloping rocks have to be scaled, and at 80 feet from the entrance is a chamber, about 70 feet long, and 40 feet wide, and 15 feet high, at which point the cave branches into two main leads, right and left, each of which has a number of offshoots or sub-branches. One of the best of the latter is situated on the right of passage between the entrance and the chamber referred to, and must have been originally a large, clear cavity, but an enormous quantity of material having fallen in from the roof, it is now necessary in making an inspection, to follow a circuitous and spiral-like course over large water-worn limestone boulders embedded in red clay and drift. These are piled on each other to a height of 70 or 80 feet, the top tier being within 10 feet of the roof, and forms the floor of a chamber about 50 feet long by 40 feet wide, which contains a grand collection of differently-formed stalactites. Projecting from the rugged walls and overlapping each other are snowy-white and salmon-coloured "canopies," and from lines of fracture in the roof, intersecting each other at various angles, depend rows of long tapering stalactites. The exposed surfaces of most of the detached limestone blocks have a crystalline stalagmitic coating, which sparkles brilliantly under the light of the magnesium lamp.

*Left branch.*—Returning to the junction chamber before-mentioned, where the cave divides into two branches, the main left branch is entered through an opening to the left, running S. 60° W. The first portion is in the form of a very irregular-shaped winding passage, averaging 10 feet wide by 8 feet in height, the bare rocks projecting, which are much water-worn. Most of the floor for a distance of 70 or 80 feet is composed of a stalagmitic coating over red muddy clay. The black and fawn-coloured walls are relieved at intervals with groups of pure white and reddish-brown stalactitic growths of various designs.

*Sub-branch to left.*—At 90 feet the cave bearing N. 20° E. becomes larger and more lofty, at which point a comparatively small passage branches to the left, the general bearing of which is S. 60° E. Following this branch a distance of 22 feet, a large chamber is entered, being about 50 feet long by 30 feet wide, the floor of which, forming a steep gradient, is ripple-marked and crystallised. It contains a good collection of differently coloured dripstone-growths. Running S. 30° E. from this chamber is a passage which can be traversed 90 feet along the centre of the floor of which, for a distance of 40 feet, is a channel 5 feet deep. The side of this natural cutting reveals a section of the floor-bed, which is composed of rounded water-worn boulders and gravel. Beyond the end of the channel the river-drift is crusted with a stalagmitic deposit, which forms the floor of the cave, in which occur at intervals a number of depressions resembling miniature lakes, whose beds are thickly covered with calcite crystals, salmon-coloured, and bunched together like small shrubs. These, and numberless slender stalactites of different shades of the same colour and pure white, depending from the roof, only 2 feet overhead, combine to make one of the prettiest sites of the cave.

Returning to the main cave the left branch, here tunnel-like in shape, bearing generally north-west, is followed a further distance of about 100 feet. Recesses in the walls and conical-shaped openings in the roof are occasionally met with, the floor for the most part being coated with guano, the upper surface of which has generally a thin stalagmitic crust, which is very brittle in places. In the next 90 feet a series of small chambers is passed through, in which are noticed some large deposits of carbonate of lime, in the form of buttresses against the walls. A peculiarly constructed stalagmite is also seen. It is about 9 inches high, by 2 inches in diameter, and sends out from its base a lateral shoot quarter-inch wide, which, running horizontally for about 7 inches, shoots up again at right angles, and again turns inwards and down again at right angles until it almost touches the lower horizontal-bar, thus forming an almost complete rectangle. This specimen has grown on the muddy floor.

*Branch tunnel like passage.*—Near this point a small branch-tunnel, about 3 feet wide by 1 foot high, running west 30 feet, is passed. It contains a centre line of stalactites, and the whole can be viewed without

without leaving the main passage. It is necessary to crawl over the next 30 feet, after which the passage enlarges considerably, forming a comparatively large chamber, one side of which is covered with a large talus heap, the broken boulders and debris composing same having fallen in from the roof. The walls of passage are still much water-worn.

*Circular depression in floor.*—Sixty feet further on is a large hole in the floor, about 20 feet wide and 15 feet deep, separated from which, by a treacherous bank of loose gravel and clay, is a circular depression, about 15 feet wide at the top, and at least 90 feet deep. In this instance almost the whole width of floor has sunk in, and as the only available track for passing same is a narrow ledge of loose gravel, it is, in its present state, a very dangerous spot. This hole is supposed to connect with a cavity on a lower level, referred to hereafter, which leads to the underground river, near the "Lily of the Valley" in the Imperial Cave.

*Hole leading to underground river.*—In close proximity, and dipping in the same direction, is another hole, which was descended to a depth of about 50 feet on to the floor of a lower level branch. From this point a roomy passage runs west 25 feet, on emerging from which a long weird-looking chamber is entered, whose damp sombre walls contrast strangely with those of the main branches immediately overhead. As if to make the change still more complete, the usual stillness is broken by the sound of fast dripping and running water.

This cavity is close on 400 feet in length, by about 15 feet wide, and from 30 to 40 feet in height, and differs in general appearance from any other cave at Jenolan. It resembles a long-rugged Gothic-shaped archway, in which small fissures and niche-like cavities occur at various places in the walls, the whole being coated with a brown muddy sediment. The floor is also thickly covered with guano and brown mud, and a number of fine stalactites and other calcareous growths have been coloured by the agency of the same material. The whole place is very moist, and pools of water are met with at intervals along the floor, the largest of which apparently running to a great depth under a shelving rock, blocks further progress at the northern end of chamber. At two or three places on the walls are noticed semi-circular cup-like excrescences, containing small nodular concretions of carbonate of lime, the whole formation being about the size of, and resembling very much a bird's nest with eggs. By descending a narrow fissure-like hole in the floor of this chamber, the underground river can be reached at a depth of over 100 feet. At one point on the descent, which is made over large rugged boulders, similar to the descent to the river in the Mammoth Cave, Jenolan, a glimpse is obtained through a small opening in the rocks of the "Lily of the Valley," in the Imperial Cave.

Continuing from the depression in the main passage by which we descended to the branch just described, at 50 feet further on a lofty conical-shaped cavity, 20 feet in diameter, is entered. A large portion of the roof having fallen in, comparatively speaking very recently, only fresh black rock and clay meets the eye. Beyond this for a distance of about 30 feet, progress is made by wriggling oneself along in a prostrate attitude, the passage not being more than 18 inches high, and closely packed, as also a small branch opening to the left, with fine white stalactitic growths, through which it is difficult to force one's way without breaking some of the specimens.

On emerging from this, a small chamber with sloping floor is entered, which, together with a small branch grotto, is profusely adorned with pure white and sparkling dripstone growths. From this portion a south-easterly course is taken over a steep talus heap for about 20 feet, when the "Alabaster Hall," the terminal and perhaps the most attractive chamber of the left branch is entered. It is a conical-shaped cavity about 18 feet in diameter by 40 feet in height, the whole wall surface of which is coated with a snowy white calcareous excrescence. Round the wall run terraced ledges of carbonate of lime, resembling a series of frozen cascades, supported here and there by miniature buttresses of the same material.

Depending from beneath the projecting portions are clusters of fine long stalactites, covered in most instances with splendid specimens of the "Mystery" type of formation, a growth very general throughout the cave. Near the centre of chamber stands a fine translucent stalagmite, 3 feet high, and 6 inches in diameter, which, though not quite so large, closely resembles in shape "Lot's Wife" of the Imperial Cave. On the left of chamber is a small ante-room or grotto, which is an almost perfect reproduction of the larger cavity on a smaller scale. This contains some very pretty shawl-like hangings and innumerable "Mysteries," and other varieties of dripstone formation. The stalagmitic floor of this chamber is ripple-marked and glossy, the crystallised surface of which presents a view under the light of the magnesium lamp similar to the "Diamond-walls" in the Imperial Caves.

*Right branch.*—The general bearing of the main passage of the right branch is north and north-west, branching from the first or junction chamber, almost directly opposite the mouth of the left branch. For the first 140 feet the winding passage, having an average width of 10 feet by 8 or 10 feet in height, is similar in most respects to the first portion of the left branch, the floor having been formed by a deposit of carbonate of lime on a bed of red clay, gravel, and guano. At 30 feet is a pretty little grotto resembling "Josephine's Grotto" in the right Imperial Cave, also a round opening in the roof something like a belfry. Portions of the floor and sides are ripple-marked and crystallized, and the grey angular projections of water-worn rock forming the other portion are spotted here and there with snowy-white patches of dripstone, the long, tapering stalactites comprising which reaching occasionally to within a few inches of the floor. At one spot is a very interesting collection of "Mysteries," which sprout up from the floor like a bed of thin twigs, twisted and curled in most unusual shapes.

*Sub-branch to left of passage.*—At 135 feet is a branch passage to the left, formed by a very lofty and narrow fissure in the limestone. With the exception of a cavity 15 feet wide by 25 feet high, and adjoining the main passage, which contains some canopy-like projections and other stalactitic growths, this branch, which can be traversed for a distance of 123 feet, is devoid of all forms of calcareous growths.

*Sub-branch to right of passage.*—Returning to the main lead, 16 feet further on two passages branch off to the right, running almost parallel in a north-east direction. The first can be traversed for about 50 feet, being a passage about 8 feet wide and 10 feet in height, rich in different forms of dripstone formations, including innumerable "Mysteries."

The first portion of the second branch is a lofty, narrow passage, opening at 36 feet into a chamber 50 feet long by 20 feet wide, partly filled with large rugged boulders embedded in red clay and river wash. The main feature of this chamber is a large patch of the "Mystery" type of formation before referred to. These growths completely cover a projecting portion of the wall 20 feet in extent, the majority of which are not more than 3 inches in length and not thicker than a very fine needle, and are twisted and curled

curled into as many different shapes as would be possible in the manipulation of a piece of pliable wire. Nothing but sombre-looking bare rock is presented to the eye in the other parts of the chamber.

From this chamber a descent of 30 feet is made through a water-worn vertical fissure, at the bottom of which is a horizontal cavity about 10 feet wide by 18 inches high, which runs back a considerable distance. The roof of this cavity is thickly studded with pipe-like stalactites, on the right of which is a small grotto, containing a good collection of calcite crystals, rivalling in beauty the "Queen's Diamonds" of the Imperial Cave.

From the junction of the sub-branches just described, the right branch, running generally north-east and north-west over a sinuous course, opening out at intervals into small chambers, can be traversed a further distance of 200 feet to present terminus. The richness, multiplicity of form, and diversity of colour of the calcareous adornments of this portion of cave, combine to make it one of the most interesting and pleasing of the cave sights of Jenolan. Depressions occur along the floor, in which, solutions of carbonate of lime having been evaporated, are now found clusters of salmon-coloured calcite crystals, about 3 inches high, and most evenly distributed over the whole surface. Near the end of the branch one has to pick one's way through miniature forests of delicately-formed stalactites and stalagmites, some of which are thickly studded with fine lateral shoots on "Mysteries."

At three places the passage converges to such an extent that it was found necessary to chip away a good portion of the rock to enable one to squeeze through and proceed further.

There is abundant evidence throughout the cave of its having been formerly a subterranean water-course. Where not covered with the calcareous deposition, the limestone walls are generally much water-worn, and the floors are mostly composed of layers of water-worn boulders, river-drift, and clay. On this account, the opening up and cutting of tracks through the floor-bed, in places now very low, should not prove a very laborious undertaking, the only drawback being the disposal of the material from the cuttings. Most of the steep descents and rises are so arranged that it will be possible in almost every instance, in providing means of access, to build concrete staircases in lieu of manufacturing iron ones.

The total length of passages discovered to date is close on 40 chains, and there are several likely-looking openings in both branches, not accessible in their present state, which may lead to other chambers and branches, it being my firm opinion that such exist.

I have, &c.,  
W. S. LEIGH,  
Superintendent of Caves.

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APPENDIX 9C.

Report on recently-discovered branches of the New Cave at Jenolan.

Sir, Geological Survey Branch, Department of Mines, Sydney, 13 October, 1893.

I have the honour to report that during my visit to Jenolan in connection with the electric light work of the Lucas Cave, I inspected two recently-discovered branches of the new cave.

They are situated about 50 yards from the entrance, and are not more than 40 feet apart, the track to same taking an upward circuitous course between and over large masses of detached rock, and an ascent of 70 or 80 feet being attained on reaching the second branch. The cavities are about equal in size, each having a floor space of about 900 square feet, and like that portion of the main cave off which they branch, are very rugged and irregular; in fact, on account of the small and tortuous nature of the passage leading to the second branch, a person of more than average proportions could not in its present state gain an entrance.

The calcareous growths in both branches are very similar to those of the main cave, which, in point of beauty, variety, and richness, cannot be excelled at Jenolan.

The ceilings are covered with a white excrescence of carbonate of lime, from which depend long tapering stalactites of various shades of colour ranging from a snowy white to deep terra-cotta. The greater portion of the floors and sides is coated with a sparkling ripple-marked and crystallised stalagmitic layer.

On the whole, I consider the new discoveries exceptionally good, and will add greatly to the importance of the new cave. They were discovered by Mr. J. Wilson, keeper.

I have, &c.,  
W. S. LEIGH,  
Superintendent of Caves.

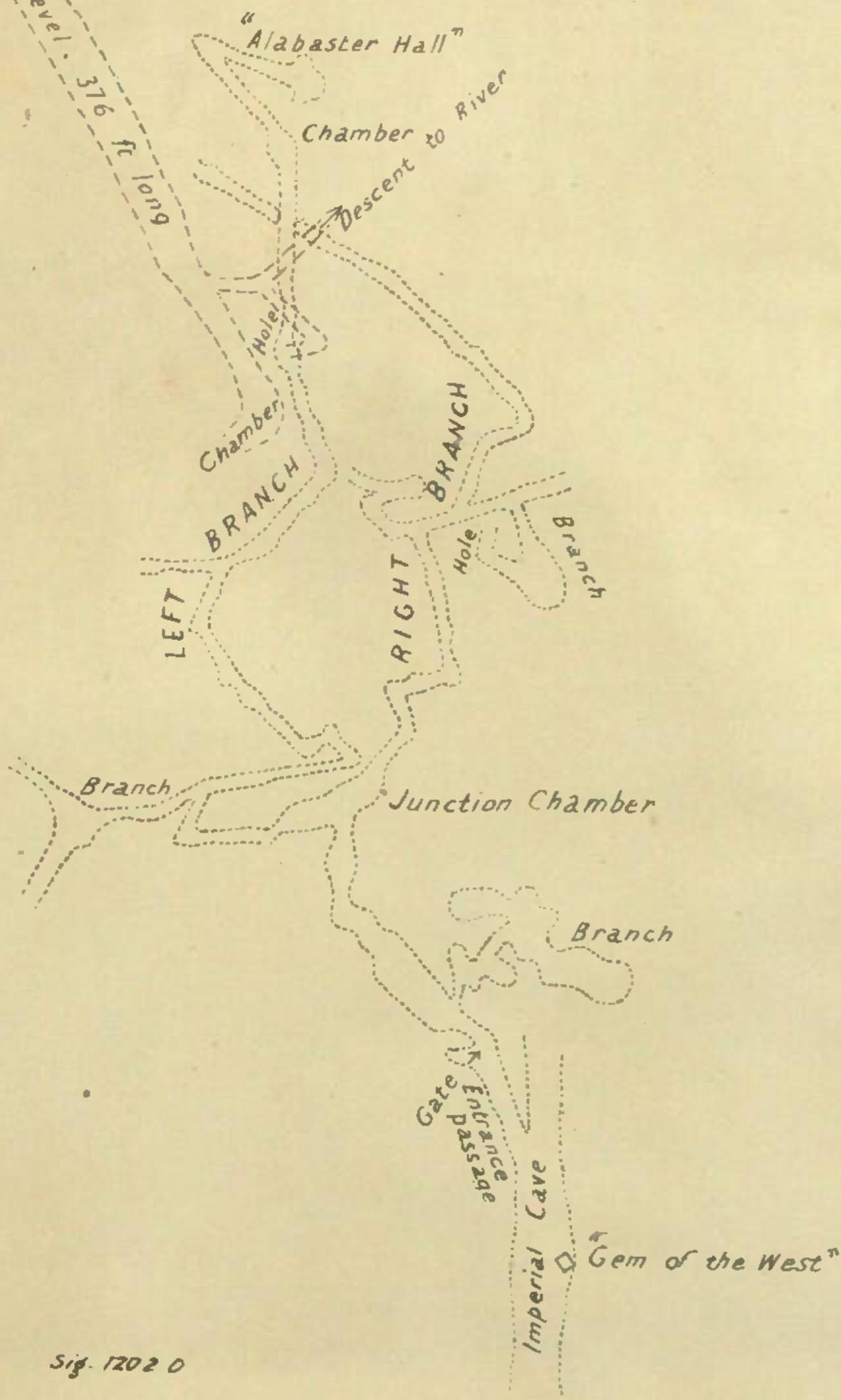
[Plans, &c.]

# PLAN OF THE NEW CAVE JENOLAN CAVES

Deep pool

SCALE 0 20 40 60 80 FEET

Cave, on lower level, 376 ft long



Sig. 12020