response on the part of susceptible animals with the development of nodules over practically the entire body following subcutaneous inoculation of virus. In tissue-culture monolayers this agent gives rise to the rapid formation of large syncytia and the development of large intranuclear inclusions. Agents of this type have not, so far, been isolated in Kenya. Another type of agent, group III, rarely produces generalized skin eruptions on inoculation of susceptible cattle. In tissue culture the cytopathic changes develop more slowly than those of the first type and the inclusions are intracytoplasmic. Seven separate isolations of agents of this type have been made so far in this Laboratory from different farms, including the farm originally infected.

In addition there have been five isolations of a type of agent from active cases of the disease which gives rise to characteristic cytopathogenic changes in cell cultures but which elicits no clinical response whatsoever on inoculation of susceptible cattle. In this respect these resemble the agents of Group I as described by Alexander *et al.*[10].

Fuller details of the work carried out so far on lumpy skin disease in this Laboratory will be reported shortly.

We are grateful to the Director of Veterinary Services for permission to publish this preliminary communication.

M. L. BURDIN
J. PRYDIE

Veterinary Research Laboratory,
Kabete, Kenya.
Dec. 23.

[1] MacDonald, R. A. S., Ann. Rep. for 1930, Dept. Animal Health, N. Rhodesia, 20 (1931).
[2] Morris, J. P. A., Ann. Rep. for 1930, Dept. Animal Health, N. Rhodesia, 12 (1931).
[3] Von Backstrom, U., *J. South Afr. Vet. Med. Assoc.*, **16**, 29 (1945).
[4] Thomas, A. D., and Mare, C. v. E., *J. South Afr. Vet. Med. Assoc.*, **16**, 36 (1945).
[5] Huston, P. D., Rep. Chief Vet. Surgeon, S. Rhodesia (1945).
[6] De Sousa Dias, A., and Limpo-Serra, J., *Off. Int. des Epiz.*, **46**, 612 (1956).
[7] Diesel, A. M., Rep. Fourteenth Int. Vet. Congress, 492 (1949).
[8] Lalanne, L., *Off. Int. des Epiz.*, **46**, 596 (1956).
[9] Anon., Ann. Rept. Vet. Services, Katanga Prov., Belgian Congo, 74 (1955).
[10] Alexander, R. A., Plowright, W., and Haig, D. A., *Bull. Epiz. Dis. Afr.*, **5**, 489 (1957).

Records of Young Eels in Kenya Rivers

FROST[1] published the first account of the biology of freshwater eels in Kenya. She showed that, of the three species of eel found in the easterly flowing rivers, *Anguilla nebulosa labiata* Peters is the most abundant above 3,000 ft.; *A. mossambica* Peters is comparatively rare, and *A. bicolor bicolor* McClelland is both uncommon and apparently restricted to the lower reaches of rivers. Our own (unpublished) records from the lower Sabaki (Athi) River and from upper tributaries of the Tana River confirm this distribution.

The elvers of *A. mossambica*, the common South African eel, are now well known, and runs up the Buffalo River (Eastern Cape) in February and March have been recorded for three successive years[2-4]. Recently, the elvers of *A. b. bicolor*, known previously only from Madagascar, were found at sea-level in the Mzinga River near Dar es Salaam (Tanganyika) in late January and mid-February[5]. With these elvers were two which could be referred to *A. n. labiata*, the first to be recorded. But apart from two rather damaged early stages (165 and 115 mm.) collected by Frost[1], the largest of which she tentatively assigned to *A. n. labiata*, there have been no records of elvers or young eels in Kenya rivers.

Table 1

Source	No. of specimens	Total length (mm.)	Ano-dorsal fin ratio		Vertebral count†
			Elvers	Adults*	
A. Merilla Barrage (Tana River) April 24, 1958	18	104–161	9·7–13·4	10·0–14·9 (*A. n. labiata*)	105–108
B. Jilore (Sabaki River) Nov. 1956	1	87·5	11·4	14·6 (*A. mossambica*)	91

* Based on Frost's Kenya collection (unpublished).
† Counts determined in *A* by dissection (one) and by X-ray photographs (five); in *B* by X-ray only.

In June 1957 we received reports of numerous 'elvers' having been found among the debris caught up in the draft tubes of the turbines at the Tana Hydro-electric Power Station on the Tana River, at an altitude of approximately 3,800 ft. (0° 40′ S.; 37° 14′ E.). Unfortunately no specimens were kept. However, further investigation in the vicinity of the power station in April 1958 produced eighteen young stages of eels which had been trapped in the syphon-priming chamber of the dam serving this power station (the Merilla Barrage), the construction of which device enables it to function as a very efficient elver trap. Subsequent visits have proved negative, but more young stages are expected in the appropriate season, which is probably during the 'long rain' floods of March–May in this area. The total lengths of the young eels (104–161 mm.) are considerably larger than the lengths of elvers recorded by Frost[5] at sea-level, suggesting that they are in fact post-elvers. Although apparently caught while migrating upstream, there is no indication of their date of arrival at the Tana River mouth, some 300 miles to the east, and it is also possible that they had remained in the priming chamber for some time. We have also been able to examine a much smaller eel (87·5 mm.) caught in a native basket-trap at Jilore on the Sabaki River (3° 8′ S., 40° 4′ E.) by Mr. John Kadenge, this locality being only 20 miles from the sea at an altitude of 100 ft. There is some doubt regarding date of capture, but it is believed to have been trapped during the 'short rain' floods of November 1956.

Adults of the three Kenya species of eel can be separated on the basis of dentition, coloration, the ano-dorsal fin origin formula used by Frost[1], and vertebral counts. These characters are not entirely satisfactory for the young stages, although vertebral counts are probably the most reliable.

Coloration. The eighteen Tana River eels were distinctly mottled, as are the adults of *A. n. labiata*, but after preservation in formalin or alcohol only the largest retained this coloration. The single Sabaki River elver, first inspected after about 18 months in formalin, showed a light peppering of chromatophores above the mid-lateral line, but no suggestion of mottling.

Dentition. As in adult *A. n. labiata*, the largest Tana River eels appear to have a slight groove between the lateral rows of teeth in both jaws, but in the smaller specimens and in the Sabaki River elver the teeth are rather irregularly placed.

(*Continued on p.* 971)

(Continued from p. 950)

Ano-dorsal fin formula. Adult specimens collected by Frost in Kenya have shown that this character cannot be used alone to distinguish between even adult *A. n. labiata* and *A. mossambica*, although *A. b. bicolor*, the 'short-finned eel', is immediately recognizable by this method and is not represented in the present material. Figures for this character are given in Table 1.

Vertebral counts. In both the Tana and the Sabaki specimens the vertebral counts are rather low. Thus Barnard[6] considers 100–105 normal for *A. mossambica*, and Frost (*in litt.*) 107–115 for *A. n. labiata*. But even with X-ray photographs, such counts are difficult in the smaller specimens and an error of two or perhaps three vertebræ is possible.

The eighteen Tana River elvers have been referred to *A. n. labiata* and the single Sabaki River elver is considered to be *A. mossambica*, the first true elver to be recorded in Kenya. There is no doubt from the abundance of adults in the river at certain times of the year that elver and post-elver stages must migrate upstream in considerable numbers, and further observations at the Merilla Barrage and the construction of an elver trap on the Ragati River (Tana system) at our Inland Fishery Research Station should reveal much of interest.

We are grateful to Dr. W. E. Frost for additional adult measurements and for helpful comment on these observations, and we are especially indebted to Dr. Geoffrey Kelham, of Nairobi, for some strikingly successful X-ray photographs of these difficult small subjects.

VERNON D. VAN SOMEREN
PETER J. P. WHITEHEAD

Fish Division (Research),
Ministry of Forest Development,
Game and Fisheries,
Nairobi, Kenya. Dec. 5.

[1] Frost, W. E., Colonial Office Fish. Pub., No. 6 (1955).
[2] Harrison, A. C., *Piscator*, **9**, 19 (1955).
[3] Skead, C. J., *Piscator*, **10**, 28 (1956).
[4] Jubb, R. A., *Nature*, **180**, 47 (1957).
[5] Frost, W. E., *Nature*, **179**, 594 (1957).
[6] Barnard, K. H., *Piscator*, **7**, 8 (1953).

'Bat Erosion' at Niah Great Caves

AT the Great Caves of Niah, Sarawak, West Borneo[1], there is a relatively soft coral limestone of Miocene date in which these vertical cavities are common, and as in Trinidad[2], found where there are no stalactites. On the other hand, the rock in these places is damp and there may often be a ring of very slowly forming drips around the mouth of a cavity. Moreover, only small family groups of *Miniopterus witkampi* regularly use these sites as roosts, rarely more than five at once, hanging in a bunch from the top-dead-centre[3]. It is doubtful whether the scrabbling action of these small bats could ever excavate such cavities, and indeed the remarkable symmetry and the vertical axis of each formation suggests that it is due to solution rather than the activity of bats.

Nevertheless, at least two species of bat at Niah are responsible for erosion of different sorts in the cave. The small *Hipposideros galeritus* (a roundleaf horse-shoe bat) roosts singly and there are certain spots on the cave wall where a bat may be found every day. Here the action of the bats' claws keeps a small area of the surface rough and free from the slimy coating that covers it elsewhere in the deep interior. This roughened patch is often slightly concave, perhaps worn by mechanical erosion.

More positive is the effect of the huge, densely massed colony of *Cheiromeles torquatus* (the naked bat), which occupies a large gallery at one of the highest points of the roof. Fragments of rock quite often fall from this site and are deeply eroded and heavily stained with the bats' excrement. Presumably chemical action weakens the limestone until it breaks under its own weight or under the burden of a *Cheiromeles*, which weighs about six ounces.

Examination of the bat-remains recovered at mid-palæolithic levels in the 1958 Niah dig prove the presence of both *H. galeritus* and *Cheiromeles* at levels corresponding to an age of well over 40,000 years[4], as well as other bats no longer found in the cave[5]; so that, if occupation has been continuous, both these species have had plenty of time to leave their mark.

TOM HARRISSON

Sarawak Museum,
Kuching.

MEDWAY

Department of Anatomy,
University of Birmingham.
Jan. 13.

[1] Harrisson, Tom, *Man*, **57**, 201 (1957); cf. also *Man*, **59**, 1 (1959).
[2] King-Webster, W. A., and Kennedy, J. F., *Nature*, **181**, 1813 (1958); cf. Hooper, J. D., *Nature*, **182**, 2464 (1958).
[3] Medway, Lord, *Sarawak Mus. J.*, **8**, 12, 645 (1958).
[4] Harrisson, Tom, *Nature*, **181**, 792 (1958).
[5] Cranbrook, Earl of, Advance Report on a Continuing Study of Niah Bat Skeletal Remains (*in litt.*).

Galeal Structure in Adult Mosquitoes

IN a previous communication[1], studies of the finer structure of the galeæ in adult mosquitoes were reported. It was pointed out that the galea formed the functional maxilla and typically consisted of a strengthening chitinous rod with a fine outer lamella the tip of which carried a number of variously shaped teeth. Further studies, ranging over eight genera of mosquitoes of the Ethiopian region, have revealed that although there is a variety of morphological types, a progressive reduction in the outer lamella is evident. It should be noted that generic and specific differences in the mouth parts of adult mosquitoes have only been poorly investigated[2], and early studies described only general morphological differences in the trophi, usually of species of known medical and veterinary importance[3–5]. In the present studies, freshly killed mosquitoes were used whenever possible and the heads were soaked in 5 per cent potassium hydroxide for 48 hr. After this they were transferred to a slide, the trophi teased apart with a fine steel point and mounted in polyvinyl alcohol. General examination was carried out at ×100 and detailed examination at ×450.

It has been found that there are four main types of galeal structure which are shown diagrammatically in Fig. 1. Type *A* has a well-developed outer lamella with the distal portion expanded and typically small teeth without pointed tips. Type *B*, which has a simple blade-like appearance, is the commonest form found and the teeth are subject to wide variation in both form and number although the greater proportion are elongate with pointed tips which extend beyond the outer margin of the lamella. Type *C* has the terminal region of the lamella reduced, but this is