

Table 1

Diets*	Basal	Devoid of casein animal prot. factors	Devoid of casein animal prot. factors + orotic acid
Ground cereals (wheat, maize, barley, oats, rye)	88	88	88
Crude rennet casein	5	—	—
Purified casein devoid of casein animal prot. factors (ref. 3)	—	5	5
Wheat germ	5	5	5
Calcium lactate	1.5	1.5	1.5
Sodium chloride	0.5	0.5	0.5
Orotic acid†	—	—	0.001

* The three diets are supplemented with carrots and fresh vegetables *ad libitum* twice a week.

† Orotic acid manufactured by Biochemical Inc., Co., Cleveland, Ohio

Table 2

Diets	Basal		Devoid of casein animal prot. factors		Devoid of casein animal prot. factors + orotic acid	
	I	II	I	II	I	II
Generations						
No. of animals	10	10	10	10	10	10
No. of young per litter	11	11	10.1	8.3	10.2	9.2
Mortality of young in 21 days (per cent)	2	2	72	100	6	7
Mean weight of young at 21 days (gm.)	48	48	32	—	46	43

(a) one of the animal protein factors; (b) a precursor or a part of the animal protein factors, should the animal protein factors prove to be unique substances; or (c) a substance with high spring action on the animal protein factors of casein.

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¹ Viviani, R., Marchetti, M., Rabbi, A., and Moruzzi, G., *Nature*, **176**, 464 (1955).

² Moruzzi, G., Rabbi, A., Viviani, R., and Marchetti, M., *Acta Vitam-inol.*, **8**, 135 (1954).

³ Piccioni, M., Rabbi, A., and Moruzzi, G., *Science*, **113**, 179 (1951).

The Striped Marlin (*Makaira audax* Phillipi) in South Africa

MARLIN fishes of the genus *Makaira* Lacépède, 1803, occur throughout almost all tropical and temperate seas, and are of interest not only to the scientist but are also the prime quarry of the big-game angler. The systematics of these large wide-ranging fishes is troublesome, since few scientists can hope to examine an adequate series of fishes from over a wide area, and the number of species accepted by workers varies from three to the patently unacceptable sixteen of Jordan and Evermann (1926).

Makaira audax Phillipi, 1887, the well-known 'striped marlin', has hitherto been regarded as confined to the wide area of the Pacific. Although variable in colour and markings more or less according to where it occurs, and though these variations have been described as different species, the species is in effect sharply defined by the elevated front lobe

of the dorsal fin, which is never less than, but almost always higher than, the depth of the body below, and about one and a third in the upper caudal lobe. The lateral line is virtually obsolete. The spear is slender, its width at tip of lower jaw about one-seventh of the preocular length of the mandible. The body is usually clearly striped.

By most American workers this species is regrettably labelled *M. mitsukurii* Jordan and Snyder, 1901, even though *audax* Phillipi clearly has priority.

This characteristic fish has been reliably recorded from the Western Pacific coast of America, Hawaii, Fiji, the seas about Japan, the Philippines, Australia and New Zealand. It has not before been certainly recorded from the Indian Ocean. Morrow¹ states that specimens of this species were seen alive in the sea off the coast of Kenya, but not captured. He also regards *Makaira brevirostris* (Playfair), 1866, as possibly this species; but from Playfair's description and the illustration², it is quite clear that Playfair's fish was a specimen of the widespread *indicus* Valenciennes, 1831.

LaMonte³ records *Makaira mitsukurii* J. & S. (= *audax*) from Ceylon on the basis of a brief description and an illustration by Deraniyagala⁴. But it is quite plain that this Ceylon fish cannot be *audax*. In any event there is confusion, since in the first paper the fish figured is clearly only about 6 ft. in length, whereas the dimensions given in the "Atlas" show it as almost 12 ft.

The present account is based on a specimen captured by an angler off Mossel Bay, South Africa, at about lat. 34° 5' S., long. 22° 12' E. It was taken to Cape Town; but as there was doubt about its identity, on request of the Press I went by air to Cape Town to examine the fish, when I found that it was unquestionably *audax*. This is far south for any marlin to be captured, but is in line with their presence off New Zealand and the west coast of South America. It is noteworthy that specimens of the black marlin, *M. indicus* Valenciennes, have also been captured and many more have been seen at other parts along the shores of South Africa.

The main dimensions of this 160-lb. Mossel Bay specimen, in inches, are as follows: total length, 108; standard length, 89; snout tip, to eye, 21; to hind margin opercle, 34; to anal origin, 61½; depth of body, 13½; height of dorsal lobe, 18; of anal lobe, 11; upper caudal lobe, 24; lower, 23; tail spread, 34½; pectoral fin, 20½; pelvic fin, 14½; width of spear at tip lower jaw, 1⅞, at two inches from apex, only ¾. The colour was brilliant purple, the numerous conspicuous transverse stripes faint lavender. The specimen is in my possession and will be mounted for retention in this Department.

Assistance from the South African Council for Scientific and Industrial Research has enabled this specimen to be preserved.

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¹ *Ann. Mag. Nat. Hist.*, (12), **7**, 819 (1954).

² Playfair, "Fishes" (Zanzibar, 1866).

³ *Bull. Amer. Mus. Nat. Hist.*, **107**, Art. 3, 334 (1955).

⁴ *Spolia Zeyl.*, **26**, 139, Pl. 1, Fig. 5 (1951); "Atl. Col. Vert. Ceylon", **1**, pl. 27 (1952).