

lie welfare too little recognized. The proposed memorial to Franklin is not to be a passive one of stone or bronze, but an active, animate one. It is to be one which will enable the fruits of his work to be plucked every year. It is the kind of memorial which he would best like.

Contributions to this memorial of any size, from the least to the largest, will be equally welcome. They should be made payable to the E. C. Franklin Fellowship Fund and sent to Professor W. H. Sloan, Stanford University P. O., California.

VERNON KELLOGG

NATIONAL RESEARCH COUNCIL

SCIENTIFIC BOOKS

A Review of the Giant Mackerel-like Fishes, Tunnies, Spearfishes and Swordfishes. With twenty plates. By DAVID STARR JORDAN and BARTON WARREN EVERMANN. California Academy of Sciences, San Francisco. 1926.

DR. JORDAN and Dr. Evermann have lately issued a memoir of interest to naturalists generally, and especially to anglers for tuna, swordfish and others of their kind, which abound at the surface in deep seas of certain favored regions. These fishes, the choicest prizes of oceanic anglers, are of many species, representing six different types, the tunas or tunnies, the albacores, the swordfish, the marlin fishes, the spearfishes and the sailfishes. These fishes are all too large for museum purposes, one of the marlins reaching a weight of 1,400 pounds. But few mounted examples or casts are in existence, these expensive and of very recent date. Hence careful studies of the species have been almost impossible. The authors of this book have examined many fresh examples in the markets of Japan and Hawaii, and among angler's trophies at Santa Catalina, but have been compelled to depend chiefly on photographs. The work in regard to distinction of species is therefore mostly tentative, but it is sufficiently detailed to show that the nomenclature hitherto accepted is mostly incorrect and nearly worthless. Except the cosmopolitan swordfish (*Xiphias gladius*) no species seems to be common to the Atlantic and Pacific, and the tropical species do not run much north of the Tropic of Cancer, those north of that line being mostly different from those found southward.

These "giant mackerels" belong to three distinct families, the Tunnies or Tunas (*Thunnidae*) with five genera, *Thunnus*, *Germo* (Albacore), *Parathunnus*, *Neothunnus* (yellow fin) and *Kishinoëlla*. The species of *Thunnus* reach 600 to 800 pounds in weight, those of the dwarf Albacore, *Kishinoëlla*, only 20 pounds.

The famous "leaping tuna" of the Santa Barbara Islands is given a new name (with some doubt), *Thunnus saliens*.

The *Istiophoridae*, sailfishes and their relatives, have a long sharp sword, like the swordfishes, but it is slenderer and the groups differ otherwise in fins, scales and character of flesh. In this family are three well-marked genera, differing in the form of the dorsal fin. Of these, *Makaira*, with the front only of the dorsal elevated, is largest in size of individuals and most numerous in species. In the Pacific these are called marlins or marlin-spike fishes. Different species of this type are found in all warm seas.

Tetrapturus (spearfishes) has the dorsal fin of moderate and nearly uniform height throughout. No species occurs in America.

Istiophorus (sailfishes) has the dorsal fin inordinately high, bright blue with small black spots. Its species, all tropical, are perhaps swiftest of all fishes, abounding off Florida, Cape San Lucas and Southern Japan. The commonest forms are *Istiophorus volador* of the Atlantic and *Istiophorus greyi* of the eastern Pacific.

The *Xiphiidae* or swordfishes have but one species, *Xiphias gladius*, found all the world over except in the Arctic. The largest on record weighed 572 pounds.

In this memoir good illustrations are given of all the species not figured elsewhere.

The species found off our Atlantic Coast and in the West Indies are the following:

Thunnus secundodorsalis	} All these perhaps the same as <i>Thunnus thynnus</i> of Europe.
Thunnus coretta	
Thunnus subulatus	
Germo alalunga	} Perhaps the same.
Parathunnus obesus	
Neothunnus albacores	
Neothunnus allisoni	
Neothunnus albacora	
Makaira albida	
Makaira ampla	
Istiophorus americanus	
Istiophorus volador	
Istiophorus maguirei (perhaps young of <i>I. volador</i>)	
Istiophorus wrighti.	

C. H. GILBERT

STANFORD UNIVERSITY

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN IMPROVED CLOSING BOTTLE FOR SUB- SURFACE SAMPLING OF FLUIDS

EVER since my experience in plankton collecting in the San Joaquin River, 1912-1915, I have been

strongly impressed with the need for a closing bottle (or bucket) with three qualifications not found in any model about which I had knowledge. These qualifications are: low cost, simple construction and operation and light weight. About three years ago I drew up a rough outline of a design which I thought might prove satisfactory.¹ Several months later I succeeded in getting the interest of the Braun Corporation (of Los Angeles) in the matter, and Mr. O. C. Beach, second vice-president in charge of their factory division, drew plans to cover technical details.

After some discussion of these plans by members of the scientific staff of the Scripps Institution it was finally decided by Director T. Wayland Vaughan to place an order for a trial model. This trial model has now been in more or less frequent use by the Scripps Institution for more than a year, and it has yielded some excellent results.

The most striking success has been in the boat work of the past summer (1926), in which more than forty series of subsurface catches at five meter intervals have been made, without a break in any series. This is the best record ever attained by this institution. The record is made still more impressive by consideration of the fact that two separate hauls were taken at each level, and combined, to constitute the catch. Two hauls at each level were made because of the small capacity of the trial model (five liters) which was kept small enough for use in a rowboat, without hoisting equipment. A ten liter capacity is preferable for plankton work where good hoisting equipment is available.

The fundamental features of the bottle are two in number, first, a cylinder for container, second, a sliding rod at the axis of the cylinder with plates (valves) attached at a distance apart suitable for closing the cylinder when the rod is pulled through to the correct position. Practically, there are several additional parts, notably a spider at each end of the cylinder to support and guide the valve rod, each spider set on an internal flange which gives an accurate, water-tight seat for the valves. There are also suitable arrangements for attaching line or cable, and for drainage.

The bottle is sent down open, with the cable attached to the outer rim of the cylinder, so that the weight of the valves causes them to drop below their seats. A messenger sent down to a Nansen trip (or other releasing device) causes detachment at this point

¹ Dr. E. G. Moberg afterward called my attention to the fact that Milne's modification of Meyer's bottle has the same fundamental method of construction. Milne's model was successfully used for some special work of the *Challenger Expedition*.

and the weight is thrown on to the valve rod, the upper end of which is attached to the cable. The weight of the cylinder brings the valve seats down to the valves, which then remain closed by its weight, or by a special holding device.

The simplicity of design is such that it seems certain that the shape and size of the bottle can be varied within rather wide limits for specific purposes. Thus, it might in one case be given the form of a long tube, or in another case it might be made up as a short, broad cylinder.

It is also probable that different materials could be used for manufacture, *e.g.*, pyrex, or other durable glass. For ordinary collecting of marine plankton diatoms brass is a satisfactory material. The trial model now in use (and an improved model in preparation) is constructed entirely of metal and the valves are so accurately seated that there is no leakage after months of usage. On this account it has recently been used for collecting samples for chemical analysis as well as for collecting phyto-plankton.

If insulation should be desired it could undoubtedly be provided at the time of manufacture at a material increase in cost.

For operation from a boat where there is considerable rolling and pitching Dr. E. G. Moberg, who has charge of boat work for the Scripps Institution, has been accustomed to use a stabilizer consisting of a window weight suspended from the bottom of the bottle by about fifty feet of line. Dr. Moberg and Mr. James Ross, mechanic, have also contributed valuable suggestions concerning certain details of construction of the bottle.

WINFRED EMORY ALLEN

SCRIPPS INSTITUTION OF
OCEANOGRAPHY,
LA JOLLA, CALIFORNIA

SPECIAL ARTICLES

THE WIDTH OF THE BASILAR MEMBRANE

DATA upon both the actual and the relative dimensions of the basilar membrane are of fundamental importance in all considerations of possible functional performance. The measurements which I have made of the widths of the basilar membrane in the guinea pig (*Cavia cobaya*) have shown it to differ so essentially from the usual description for mammalia that it seems desirable to make a brief report in a journal which will reach the attention of the workers in the several fields of science who are concerned with the problems of hearing. A full report will be made later in one of the anatomical journals.

In the numerous works on theories of hearing in which some type of movement of the basilar mem-