Both were netted at night lights, one of 84 mm standard length, off Mexico on the night of November 23, 1937, and the other, only 42 mm in length, 1,200 miles farther south, off Costa Rica, on March 1, 1938. These have been compared with equally young Florida sailfish, *Istiophorus americanus,* and with adults of both species.

The study is based on observation of the living and recently dead fish, and on normally preserved as well as stained and cleared specimens. It will appear in a forthcoming number of *Zoologica,* the scientific publication of the Zoological Society.

An interesting feature of the young sailfish, evident at first glance, is that in spite of their diminutive size, they are superficially very much like the full-grown fish. The greatly elongated upper jaw and pelvic fins, the enormous expanse of dorsal fin are as characteristic of the 42 mm specimen as they are of the adult, more than 60 times as long.

When, however, there is added to these externals of the normal, opaque fish, the skeleton and other internal structures, there is found little or no hint of the radical changes to come. These young fish are well balanced, efficiently functioning organisms in their own right. Like most fish they are covered with scales, their jaws are filled with teeth of ordinary pattern, and their two specialized fins seem to impose no unusual activities or habits.

There is no suggestion of the subsequent disappearance of the armor of scales, and their replacement with minute, mucous-canal guards and bony scutes. Without ever having seen the full-grown fish, one would never know that the teeth would all fall out, with the substitution of innumerable sharp and strong dermal denticles covering the whole sword.

The entire head and body will undergo vital changes, together with this radical alteration in the dental armature of the snout, and the consequent shift from a prehensile snapping to a slashing method of attack and feeding. A mobile, twisting body will alter to a stiffened, recoil-guarded handle to the great sword; the parethmoid and other regions of the skull, the vertebrae and caudal complex, the fin bases, the pectoral arch—all will witness an ontologically swift and thorough thickening and extension of ossification. All joints will be stiffened until the whole becomes a taut, tense spring, an organic engine to generate and direct the terrific ramming, hitting and slashing power of the solidly denticled sword.

In the young fish all this excess of bone formation is held in abeyance, adumbrated only, so that the toothed, scaled, prehensile stage of development may function as perfectly as though it would persist throughout the entire lifetime of the fish.

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NEW YORK ZOOLOGICAL PARK

A SUBMERGED MIGRATION ROUTE

BOTANISTS and others have been interested in the presence of southern plants in southeastern Canada and New England. Explanations involve the possibility of a former pathway of migration along the coast, now submerged.

Recently, through the kindness of Mr. George B. Sowers, of Cleveland, the Oberlin Botanical Laboratory has had the opportunity to study two specimens of peat obtained by a contractor working at the Brooklyn Navy Yard. One specimen, an ooze peat deposited under water, was reported to come from 60 feet below the present water-level; the other, a fibrous superficial peat, from a depth of about 40 feet below the present surface. The lowest deposit is described as being overlaid by gravel and underlaid by about 60 feet of clay resting on bed rock. The deposit is said to be continuous and quite extensive along Long Island. Because the samples were obtained in the course of commercial construction work, some difficulty has been experienced in getting the precise relationship of the two specimens examined.

Both, however, have essentially similar pollen spectrums in which deciduous forest pollen predominates, particularly oak and beech. This indicates quite clearly that at the time the peat was formed, deciduous forest conditions prevailed on the then exposed but now submerged surface, presumably affording an opportunity for the northward migration of plants appropriate to deciduous forest conditions.

The pollen examined appears to be slightly less fresh than that in most post-Wisconsin bogs that I have examined but is well preserved. Hickory is present in the lower sample but absent in the upper. Grass and composites are more abundant in the lower; pine more abundant in the upper one and hemlock is present. No hemlock has been found in the lower specimen. This would suggest that the lower specimen was deposited under somewhat more continental conditions than the upper if our information is correct as to the relative depths. Publication of the spectra will be made after further efforts to secure more precise information regarding the stratigraphy.

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THE RELATIONSHIP OF THE AMERICAN PHARMACEUTICAL ASSOCIATION TO THE UNITED STATES PHARMACOPOEIA

SCIENCE for June 20 contains, on page 597, a review by Dr. Charles A. Kofoid of "History of Pharmacy" by Edward Kremers and George Urdang. In this review the following statement is made: "The seventh edition (1862) [of the United States Pharmacopoeia] was the first to be issued under the direct auspices of the American Pharmaceutical Association.

"This statement contains one misprint (1862 instead of 1882) and one misunderstanding. As pointed out in the Kremers-Urdang History the edition of 1882 was prepared under the dominant influence of the American Pharmaceutical Association, and the authors state on several occasions that American professional pharmacy, represented by the American Pharmaceutical Association, took over the patronage and became the guardian of the pharmacopoeial revision work. There is, however, nowhere said that at any time any edition 'was to be issued under the direct auspices of the American Pharmaceutical Association'.

"The issuance of the U.S.P. was prompted first 'By the Authority of the Medical Societies and Colleges' (1820), then 'By the Authority of the General Convention for the Foundation of the American Pharmacopoeia' (New York, 1830) and 'By the Authority of the National Medical Convention' (Philadelphia, 1831). Due to the official participation of representatives of pharmacy in the convention since 1850 the 'Medical' was dropped and it was 'By the Authority of the National Convention for Revising the Pharmacopoeia' that the U.S.P. was issued from 1864 to 1893 (5th to 8th edition). From 1905, *i.e.*, the 9th edition, finally the U.S.P. has been published by the Authority of the United States Pharmacopoeial Convention."

The official publication of the U.S.P. by the American Pharmaceutical Association as such would not have accorded with the urgent desire the association has had and evidenced at all times to make the U.S.P. the common work of American medicine and pharmacy. The growing active interest taken by official American medicine, represented by the American Medical Association, in the pharmacopoeial revision work has been by no one more welcomed by the American Pharmaceutical Association.

It is of especial historical interest that this voluntary undertaking of one hundred twenty years ago should have continued to eventually become recognized as legal standards by both state and national governments, including several of the Pan American republics. There are probably very few other instances of as long standing where professions have voluntarily chosen to submit themselves to such self-regulation and standardization, possible only under a free system of government.

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QUOTATIONS

THE MATHEMATICAL TOOL

THERE can be a bottleneck in mathematics just as surely as in machine tools. And to avoid it requires just as careful a program of long-range preparation. The War Preparedness Committee of the American Mathematical Society and the Mathematical Association of America is right in proposing that grade-school boys of 11 and 12 who have mathematical aptitudes be sought out and encouraged to take courses that will lay the foundation for careers in engineering, physics or directly in the technical branches of the armed forces.

The kind of training here needed is not the kind emphasized in certain New York City high schools which make such a fetish of accurate arithmetic that 100 per cent. is the only passing grade. Such a system may turn out some trustworthy bookkeepers, but it will not develop men with mathematical imagination, men who can use mathematics as a tool to shape out the approximations and compromises that are actually involved in engineering design.

The youthful mind, naturally imaginative, is riper than most pedagogues seem to think for symbols and instruments that offer interesting short-cuts through the drudgery of the multiplication table. The accountant doesn't add or multiply by hand—he leaves it to the calculating machine. The engineer doesn't fill a page with figures to extract a square root—he reads it from a slide-rule.

Thornton C. Fry, mathematical research director of the Bell Telephone Laboratories, estimates in a new survey of industrial mathematics that in the design of a modern four-engined transport plane about 100,000 hours are spent on mathematical analysis of structures, performance, lift distribution and stability. In calculations of such magnitude short-cuts and approximations are worth money—they may save thousands of hours. Such work, and similar calculations called for in electric power, communications and petroleum prospecting, must be directed by men who have got beyond the bugbears of arithmetic and are not afraid to look a differential equation in the face.

Probably a majority of the people are afraid of mathematics, and that awe is largely traceable to the early, teacher-inspired worry about not getting the example exactly right. Mathematics could be made a fascinating game. The pupil should be encouraged to approximate, or guess, the answer the minute the problem is put before him; then work it out the regular way and see how close he came; and finally check it with a slide-rule or calculating machine. That—skipping the middle stage of all-out arithmetic—is the way the engineer does it.—*The New York Times.*