

## FISH SKELETONS

By D. DWIGHT DAVIS

ASSISTANT CURATOR OF ANATOMY AND OSTEOLOGY

Among the osteological exhibits in Hall 19 is a screen, recently installed, on which are displayed many types of fish skeletons, worthy of study because they reveal such marked variations from the general form of vertebrate skeletons. These variations are due to the fact that swimming involves mechanical principles quite different from those which govern walking and running. In most fishes the whole body undergoes, while swimming, wave-like movements which are strongest in the tail. These require a long, flexible backbone, and a strong, immovable skull to receive the thrust from the backbone. Important as accessory propellers are the fins. The pectoral fins correspond to the arms of a human being, the pelvic fins to the legs.

Adaptation of the fish's respiratory system to under-water conditions has resulted in a complex gill structure, which is also better understood by studying the bony framework by which it is suspended from the skull.

Fishes have developed an astonishing number of forms. Many of them are so curiously shaped that they are scarcely recognizable as fishes at first glance. Among such may be mentioned the sea horses, the rays, and the bat fishes. Naturally, these modifications of the body have strongly affected the skeleton, and it is often difficult

to identify some of the bones composing it.

The skeletons of fishes demonstrate strikingly that evolution from a "lower" to a "higher" form does not always mean an increase in mechanical complexity. A cod-fish, which is relatively low in the vertebrate scale, has sixty-eight bones in its skull, while man, at the top of the scale, has only twenty-two. Mechanical perfection often may be brought about by simplification of a structure, as is shown frequently in the development of human inventions as well as in biological development. Useless "parts" are eliminated, and more perfect design produces a simpler but more efficient machine. Although fishes are well adapted to the sort of life they live, and their smooth carefully streamlined bodies are often cited as examples of nature's mechanical adaptability, many improvements and refinements have been introduced in other animals that have evolved later.

In attempts to reconstruct the long pedigree that leads to the human body in its present form, the sharks are among the most noteworthy of all animals. They have retained a remarkable number of features that were found in the early ancestors of vertebrates. Sharks are therefore often referred to as "living fossils," and their structure, has been studied in great detail.

The fish skeletons on exhibition were prepared and mounted by Mr. Edmond N. Gueret, Curator of Anatomy and Osteology.

## GUIDE-LECTURE TOURS

During August conducted tours of the exhibits, under the guidance of staff lecturers, will be given on a special schedule, as follows:

Mondays: 11 A.M., Plant Life Exhibits; 3 P.M., General Tour of Exhibition Halls.

Tuesdays: 11 A.M., Halls of Primitive and Civilized Peoples; 3 P.M., General Tour of Exhibition Halls.

Wednesdays: 11 A.M., Animal Groups; 3 P.M., General Tour of Exhibition Halls.

Thursdays: 11 A.M. and 3 P.M., General Tours of Exhibition Halls.

Fridays: 11 A.M., Minerals and Prehistoric Life; 3 P.M., General Tour of Exhibition Halls.

There are no tours given on Saturdays or Sundays.

Persons wishing to participate in the tours should apply at the North Entrance. The tours are free. Guide-lecturer's services for special tours by parties of ten or more are available free of charge by arrangement with the Director a week in advance.

## Pyramid Builders Ate Onions

In ancient Egypt onions and garlic were established articles of food. During the building of the great pyramid of Cheops, says Herodotus, 1,600 talents of silver were spent on radishes, onions, and garlic for the workmen, as may be read from inscriptions in Egyptian characters on the pyramid itself.

## GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last month:

## Department of Anthropology:

From Frank Watkins, Chicago—complete suit of Japanese armor, composed of 14 separate parts; from Dr. Henry Field, Chicago—3 human skulls, Iraq.

## Department of Botany:

From Professor L. A. Kenoyer, Kalamazoo, Mich.—620 herbarium specimens, Mexico; from Harde LeSueur, Austin, Tex.—600 herbarium specimens, Mexico; from Servicio Botánico, Caracas, Venezuela—161 herbarium specimens, Venezuela; from Professor C. L. Wilson, Hanover, N.H.—255 herbarium specimens, Guatemala; from James Zetek, Balboa, Canal Zone—35 herbarium specimens, Panama; from Dr. Delzie Demaree, Monticello, Ark.—228 herbarium specimens, Arkansas; from Estate of Mrs. George A. Butler, Chicago—256 bryophytes and lichens, Japan, New Hampshire, and northwest United States; from Don Ignacio J. Aguilar G., Guatemala City, Guatemala—355 herbarium specimens.

## Department of Geology:

From Howell Taylor, Lebanon, Syria—5 minerals and 3 invertebrate fossils, Syria; from John R. Winterbotham, Chicago—a specimen of fossil fish and one of silicified wood, Wyoming and Connecticut; from D. P. Swett, Mina, Nev.—a specimen of gold, silver, lead, and zinc ore, Nevada.

## Department of Zoology:

From E. N. Gueret, Chicago—4 mammal skeletons, New York; from John G. Shedd Aquarium, Chicago—61 fish specimens, Hawaii and Samoa; from H. H. Dodge,

Columbus, Ohio—a beetle (*paratype*), Minnesota; from William D. Field, Lawrence, Kan.—2 butterflies (*paratypes*), Kansas; from W. J. Beecher, Chicago—11 small mammal skins and skulls, Tennessee; from John M. Schmidt, Homewood, Ill.—29 rodents, South Dakota; from Dr. C. L. Turner, Evanston, Ill.—87 tadpoles, Mexico; from Mrs. Robb White, Thomasville, Ga.—a garter snake, Georgia; from Messrs. Burton and Kurfess, Hinsdale, Ill.—26 reptiles and amphibians, Illinois; from E. Gustav J. Falck, Chicago—39 reptiles and amphibians, southeastern Missouri; from Dr. Henry Field, Chicago—441 specimens of snails and shells, 50 fishes, and 151 insects, Iraq; from Chicago Zoological Society, Brookfield, Ill.—an alligator, a snake, 2 black bear cubs, and 19 specimens of birds and small mammals.

## NEW MEMBERS

The following persons were elected to membership in Field Museum during the period from June 16 to July 14:

## Associate Members

Mrs. A. M. Barrett, Mrs. Hugo Dalmar, David W. Davidson, H. S. Demaree, Gaylord Donnelley.

## Annual Members

Paul H. Bonfield, David Borowitz, Mrs. Robert H. Cabell, Mrs. Joseph J. Cavanagh, J. A. Cobbe, Archie T. Coburn, Ralph W. Condee, Dr. John F. Delph, Joseph Foard Gettrust, Mrs. G. S. Grochowski, Albert G. Joseph, Dr. Jarold Kemp, Karl E. Lofquist, Bruce Parsons, John H. Porter, Theodore W. Robinson, Jr., Harold A. Smith, Barnard S. Solar, Mrs. Samuel A. Stein, Mrs. Hannah Sternath, Thomas J. Thomas, John O. Todd.

## MEMBERSHIP IN FIELD MUSEUM

Field Museum has several classes of Members. Annual Members contribute \$10 annually. Associate Members pay \$100 and are exempt from dues. Sustaining Members contribute \$25 annually for six consecutive years, after which they become Associate Members and are exempt from all further dues. Life Members give \$500 and are exempt from dues. Non-Resident Life Members pay \$100, and Non-Resident Associate Members \$50; both of these classes are also exempt from dues. The Non-Resident memberships are available only to persons residing fifty miles or more from Chicago. Those who give or devise to the Museum \$1,000 to \$100,000 are designated as Contributors, and those who give or devise \$100,000 or more become Benefactors. Other memberships are Honorary, Patron, Corresponding and Corporate, additions under these classifications being made by special action of the Board of Trustees.

Each Member, in all classes, is entitled to free admission to the Museum for himself, his family and house guests, and to two reserved seats for Museum lectures provided for Members. Subscription to FIELD MUSEUM NEWS is included with all memberships. The courtesies of every museum of note in the United States and Canada are extended to all Members of Field Museum. A Member may give his personal card to non-residents of Chicago, upon presentation of which they will be admitted to the Museum without charge. Further information about memberships will be sent on request.

## BEQUESTS AND ENDOWMENTS

Bequests to Field Museum of Natural History may be made in securities, money, books or collections. They may, if desired, take the form of a memorial to a person or cause, named by the giver.

Contributions made within the taxable year not exceeding 15 per cent of the taxpayer's net income are allowable as deductions in computing net income for federal income tax purposes.

Endowments may be made to the Museum with the provision that an annuity be paid to the patron for life. These annuities are guaranteed against fluctuation in amount, and may reduce federal income taxes.





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