

poses, only inferences can be drawn from data collected from pedigrees. Interrelationships in plants that could have been obtained with certainty from pre-arranged experiments have only to be inferred by actuarial methods, in the case of human heredity.

Though the fundamental principles are the same in both, the plant-breeder should know, how the problems connected with human Genetics, should be approached and tackled as distinct from those of plants.

On the whole, the book should be welcomed with open arms, by all students of genetics, especially in this country. It is the first of its

kind and the authors deserve the gratitude and congratulations of the Scientific World of India for having collected and placed before them in textbook form a mass of data which otherwise would have remained, scattered, and unco-ordinated and consequently useless. The book should find a place not only in all the libraries but also in the hands of every student who studies Botany either in its academic form as in Science Colleges, or in its applied form as in Agricultural College.

T. S. RAGHAVAN.

MARVELS OF FISH LIFE*

TO Dr. Schultz, the senior author of this work, fishes are the most fascinating form of animal life in the world. He has studied fishes in all continents, in lakes, rivers and seas, and in the atom-bombed atolls of Bikini. As the Curator of fishes of the Smithsonian Institution, the subject is to him both a vocation and a hobby. He tells us that his interests in fishes began from his boyhood but soon developed into a serious pursuit. "And the more I learn about fishes, the more I marvel at their variety and the colour and drama and odd quirks and excitement of their ways". His objects in writing this book is to share with others who are not ichthyologists, at least a little of the enjoyment which he and his colleagues get out of knowing the bizarre, astonishing and manifold ways of their favourite animals. The work is addressed to the general reader and not to the specialist, but the non-technical language and the narrative style giving information in the form of personal adventures and anecdotes do not in any way affect the accuracy of observations. In fact, there is a great deal of natural history that is new in this work even for the specialist who has spent most of his time studying fishes in the laboratory.

The opening section deals with the problem of migration in fishes with an account of the life-history of the European freshwater eel and the epic journey it makes to the Sargasso Sea to spawn, all made known to science by the classical researches of the late Johan Schmidt, the Danish Biologist and Physiologist. Unlike the eel that travel to the ocean to spawn there is the salmon which have the strongest homing instinct to come back for breeding to the freshwater streams where they hatched out and spent the early stages of their life-history. These are two extreme cases of migration but there are countless others where a definite migratory journey either for feeding or for reproducing the kind is performed with un-erring instinct. We are next told of the means of locomotion in fishes, of the fishes that jump, glide, fly, walk, skip and burrow. Many of the burrowers can, by hibernation or aestivation, tide over unfavourable conditions

of the surroundings caused by extreme cold or by heat and disiccation. In the latter category are found some of the most interesting fishes of the world, for, they herald the lung breathing habits of the more advanced vertebrates. The authors discuss the habits of the lung fishes, *Protopterus*, *Lepidosiren* and *Neoceratodus*. Under "Fishes dangerous to man" we read of the sting ray and a few of the less poisonous fishes, followed by the piranha of the Amazon, one of the most bloodthirsty fishes of the world, attacking man and beast without provocation, and vicious out of all proportion to its size, so much so that writers of detective fiction have not hesitated to employ it as an instrument of murder. The man-eating sharks and the large tropical barracuda get their due share of attention as enemies to man as also the swordfish which used to be so much dreaded in the days of wooden ships. The *Cardium*, the only vertebrate parasite of man is not so well known; this tiny South American catfish enter the sex organs of humans while bathing or swimming in water and cause unbearable pain and often prove fatal to the unfortunate hosts. Among the poisonous category are many like the puffer whose flesh is definitely known to be poisonous; others less dangerous but none the less best avoided include *Ruvettus pretiosus* the "purgative fish". It is reassuring to hear, however, that not all fish now known as poisonous need be so, for, we are told that the fish that sustained a sailor adrift on a raft for several weeks after he was torpedoed in the high seas during the war happened to be the file-fish usually considered poisonous!

Feeding habits, association with other animals and fighting qualities are briefly discussed in the succeeding sections. We are told of *Dermogenys* and *Betta* which have been most assiduously bred and cultivated for centuries in Siam. The matched combats arranged between male *Betta*, one of the most handsome fishes even in its wild state, provide much amusement to the Siamese. On good authority we have it that there is nothing cruel about fighting *Betta*. "The rankest sentimentalist need waste no sympathy on the fighting fish-its physical discomfort is negligible, its recovery from its minor injuries is complete, and it seems to derive great satisfaction from its particular form of sport. So does the human onlooker"

* *The Ways of Fishes*. By Leonard P. Schultz and Edith M. Stern. (D. Van Nostrand, New York, and Macmillan, London), 1948. Pp. 12 + 1-264. 80 Text illustrations. Price \$ 4.00 or 22 sh. net.

Production of light and electricity by fishes has always excited popular imagination but it is only recently that the physiology of these phenomena has been diligently pursued and, as yet, we know so little. An average sized individual of *Electrophorus electricus*, the electric eel of South American rivers, can produce discharges of about 550 volts; investigators have drawn from an eel almost 600 volts and about 1,000 watts. We are, at present, not in a position to utilize this tremendous output of electrical energy because this impulse is passed and gone in about two one thousands of a second. There are many fishes that light up their surroundings in the dark abysses of the ocean but only one is known which can glow and sing; this one, *Porichthys*, found on the Western Pacific coasts shows rows of shining buttons when disturbed, accompanied, in the male, by a humming sound. Sense of hearing and sight are also discussed. Fishes have no external ear, nevertheless they have an efficient system of sense organs along the lateral line, some of them reacting exclusively to sound. Eyes are well developed in all except the deep-sea dwellers; some have even specialized eyes not unlike bifocal spectacles, the upper part for vision in air, the lower for vision in water.

The most distinctive features of fishes are in regard to their spawning habits. Many indi-

vidual traits are seen. Some are ocean beach spawners; others are nest builders in streams; in every instance there is perfect accord of the habit and habitat of the species. "But the facts of such adaptations for survival, the fascination of their detail and the grandeur of their mass drama, and their ages-long rhythmic repetition make ichthyology such a continuously stirring and wondrous field of exploration".

Not much attention is paid to the commercial aspect of fisheries but the authors have indicated the basic facts of fisheries management under the head "Fishes controllable by man" where we are given an account of the work on the North Pacific Halibut. The last few pages are devoted to the care and maintenance of aquaria and the choice of aquarium fish; these sections would be particularly welcome to the amateur aquarist and fish collector. A classification of fishes up to Families is appended.

The authors have presented a most enjoyable contribution to fish lore which the layman and the serious worker will find of equal interest. It is a pleasure to find such undiluted natural history which has, in these days of specialization, almost disappeared from modern publications.

N. K. PANIKKAR.

SCIENCE NOTES AND NEWS

Royal Society Medallists of the Year

The two Royal medals for the current year went to Professor Harold Jeffreys, F.R.S., for his work in geophysics and his contribution to the astronomy of the solar system, and to Professor James Gray, F.R.S., for his researches in cytology and ciliary movement, and particularly his anatomical and experimental studies of animal posture and locomotion.

The five awards made by the President and Council of the Royal Society are:

The Hughes Medal to Sir Robert Watson-Watt, F.R.S., for his work in atmospheric physics and in the development of radar;

The Darwin Medal to Professor Ronald Fisher, F.R.S., of Cambridge, whose subject is "The Effect of Blood on Evolution";

The Davy Medal to Professor E. L. Hirst, F.R.S., for his work in the determination of the structure of sugars, starches, plant gums, and especially of Vitamin C; the Rumford Medal to Professor Franz Simon, F.R.S., a refugee from Nazi Germany, who helped to produce the atomic bomb, and who won the award for his study of intense cold, having produced the lowest temperature ever recorded—nearly Absolute Zero (minus 458 degrees Fahrenheit);

The Copley Medal to Professor A. V. Hill, F.R.S., for his researches on myothermal problems and on biophysical phenomena in nerves and other tissues.

Protection of Nature Conference

The Conference for the establishment of the International Union for the Protection of Nature which has been meeting at Fontainebleau (France) since September 30th, concluded its proceedings today (7 October 1948).

The meeting was called by the French Government in association with Unesco to draft and adopt the final constitution of the Union which was provisionally created last year at the Conference at Brunnen (Switzerland).

The Constitution, signed by 17 governments and 20 organizations, provides, *inter alia*, that the Union:

(a) shall encourage and recommend national and international action in scientific research relating to the protection of nature;

(b) shall promote and facilitate co-operation between governments, organizations and persons interested in the protection of nature;

(c) shall collect and disseminate information on that subject.

The signatory governments will also establish an extensive programme of education in this field and prepare international draft agreements and a world-wide Convention for the Protection of Nature.

The Conference also took the opportunity to hold a technical symposium to discuss nature protection problems with special reference to Europe and Africa, and has by this means set up Regional Study Groups for