

Chanoine Shutter Weir, and the Drum Weir. The needle weir consists of a series of wooden spars resting against a bar at the top across the weir, carried on a row of iron frames providing a foot-bridge, and against a sill at the bottom, though of late years sliding panels or rolling-up curtains have been often substituted for the spars or needles; and this type of weir has been adopted for the first time in the United States for a weir across the Big Sandy River at Louisa, in Kentucky, with large inverted V-shaped frames placed 8 feet apart, and lying one inside the other when lowered on the apron in flood-time, and closed by needles having the exceptional dimensions of 12 inches width, 14 feet length, and  $8\frac{1}{2}$  inches thickness at the bottom and  $4\frac{1}{2}$  inches at the top, which are handled by a floating derrick. The frame weir suspended from an overhead bridge, so that all the movable parts can be raised out of the river in flood-time, as resorted to on the Lower Seine at Poses and Port-Mort, and the barriers substituted for needles, are described and illustrated in the book, but have not hitherto been adopted in the United States.

The Chanoine shutter weir is composed of a series of shutters supported centrally on a trestle, and turning on a horizontal axis, the trestle being maintained in an upright position by a prop, resting at its lower extremity in a cast-iron shoe fixed to the apron when the river is closed; and the weir is opened by withdrawing the props from their shoes, causing the trestles to fall flat on the apron, with the shutters on top of them in a horizontal position. Owing to the rapidity with which it can be opened, this type of weir is advantageous for rivers subject to sudden floods; and it has been adopted in the United States across the deep navigable passes on the Ohio and Kanawha Rivers, where shutters somewhat larger than the biggest in France have been erected.

The drum weir consists essentially of an upper and an under paddle revolving on a central horizontal axis, the row of upper paddles forming the weir; and the under paddles, revolving in the quadrant of a horizontal cylinder forming the drum, are made to close or open the weir by altering the water-pressure on their two sides in the drum, so that when the head of water from the upper pool presses on the upstream side of the under paddles, the upper paddles rise against the current of the river. In spite of the perfect control of this weir which the under paddles afford, the deep foundations required for these paddles below the sill, exceeding the height of the weir above it, have hindered its general adoption; and since the completion, in 1867, of a series of these weirs in the canalisation of the Marne, a tributary of the Seine, they have only been used in Europe for timber passes at the side of the weirs erected across the River Main for canalising it in 1883-6, and across the navigable pass, 9 feet in depth, of the Spree at Charlottenburg. A modified form of drum weir has been quite recently constructed in timber across the Osage River in Missouri, in which the paddles are replaced by a sector of a cylinder which fits exactly in the drum when lowered, and closes the weir when raised. The old bear-trap weir fell into oblivion for many years in America; but within the last few years some weirs

of this type, of improved design, have been constructed; and two, placed alongside a new weir near Beaver on the Ohio River, each 120 feet long and 13 feet high, serve for the passage of drift and for regulating the discharge.

Another peculiar, novel type of weir, also forming part of the new weir across the Ohio, consists of a series of A-shaped frames, which, as in other frame weirs, can be lowered flat on the bed of the river in flood-time; but it differs from ordinary frame weirs in the frames themselves forming the barrier for closing the weir, by being constructed with a widened plated upstream leg touching the plates of the legs of the adjacent frames when standing upright, besides furnishing a support for the foot-bridge along the top of the weir.

The book concludes with three appendices, giving the dimensions of various locks and weirs in the United States, the standard specifications adopted for certain river works and materials, and laws for protecting the waterways in the United States. Altogether, the book affords a large amount of information about works carried out on rivers under Government in the United States; whilst in some of the chapters, such as those on levees, storage reservoirs, and more especially those on movable weirs, interesting particulars are also given of European works.

#### THE FISHERMAN IN AMERICA.

*Bass, Pike, Perch, and Others.* By James A. Henshall. Pp. xix+410. (New York: the Macmillan Company; London: Macmillan and Co., Ltd., 1903.) Price 8s. 6d. net.

*Big Game Fishes of the United States.* By Chas. F. Holder. Pp. xiv+435. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1903.) Price 8s. 6d. net.

THESE two volumes of the "American Sportsman's Library" deal with the fishes of the United States, other than salmon, trout, and char, from the sportsman's point of view. Although the same ground is to a certain extent covered by both, Dr. Henshall has to deal with numerous species inhabiting both fresh and salt water, while Mr. Holder's volume confines itself to a comparatively small number of marine species, and this naturally results in the adoption of a different method of treating the subject by the two authors; this much they have in common, that both have produced books which give the angler information as to the tackle to be employed for each species and the places in which to employ it, and at the same time illustrate their remarks with excellent personal observations on the habits of the fish with which they deal.

The first book under notice combines in a greater degree than almost any other work of which we are aware, systematic ichthyology and directions to the fisherman; the author has adopted the classification of Jordan and Evermann's "Fishes of North and Middle America," and his specific descriptions and most of his nomenclature are taken from that standard work, with the addition of useful observations of his own upon the

specific differences between allied species. While welcoming the restoration of *Esox* as a generic name for the pike—in consonance with Jordan and Evermann's own most recent work—one rather regrets that the author has not reconsidered the reasons which have caused American writers to separate the graylings from the Salmonidæ as a separate family, and to substitute *Stizostedium* for the *Lucioperca* of European authors.

The reader of this book is immediately struck by the great difference between the American and European fish fauna as viewed by the fisherman; among fresh-water forms the only Cyprinoid fish considered in any other light than as prospective bait is the introduced *Cyprinus carpio*, while the place occupied in England by Cyprinoids is taken by numerous species of Percidæ and Centrarchidæ, the only representatives of which in our waters are the common perch and the ruff. From the angler's point of view this is no slight gain, especially as some of the Centrarchidæ, notably the two species of "Black Bass," attain a large size and rise freely to an artificial fly. Justice is also done to the merits of the grayling, but hardly, we think, to the views of either English anglers or poets respecting it. Among the marine fishes, again, our American friends have very many Serranoid and Sciaenoid fishes to set against our bass, and numerous Sparoids where we have but one sea bream that can be considered an "angler's fish," but we find the grey mullets only mentioned as bait for other fish, and no species of Gadoid even mentioned. Mr. Holder is surely right, and the coalfish (the "pollack" of American writers) has not yet met with the recognition it deserves as a sporting fish.

It is, perhaps, hypercritical and unfair to complain of such a matter, but Dr. Henshall's language, especially in dealing with technical descriptions of tackle and gear, is not very intelligible to an Englishman, more especially when the great differences between English and American rods and lines are taken into account; it is a little startling to find an eight ounce rod recommended for pike fishing and puzzling to find no details as to the length and build of such a rod. A "chlorinated sea breeze" is apparently a special product of the western Atlantic, like the author's Bahama negro, for whose observations on fishes and their ways all Dr. Henshall's readers will be grateful.

We are reminded of a certain traveller's tale about a "mixed bag of wild fowl and hippopotami" when dealing with Mr. Holder's "Big Game Fishes," almost on the same line with Dr. Henshall's work; we pass from the grayling and the perch to the huge Serranoids of the Florida and California reefs, the tarpon, and the pelagic Scombridæ, the weights of which are reckoned by the hundredweight, and we pass, too, to descriptions of some of the most exciting fishing man can want. Unfortunately, the English sea fisherman must content himself with smaller game (unless he chooses to fish for the blue sharks, which are common enough off our western shores in the late summer), but a work like this should find readers outside the United States; the tunny and the albacore are within reach of British fishermen in the

Mediterranean, the American tarpon has its counterpart in the Indian Ocean, and huge Serranoids are not confined to American waters. If English or colonial readers should feel encouraged to try their hands at "big game fishing," they will find in Mr. Holder's book all the information they can desire as to the necessary tackle and baits to use, and the kind of place in which to use them, and if Mr. Holder's descriptions of this exciting form of sport do not encourage them to try their hands at it, we really do not know what will.

In marked contrast to Dr. Henshall, Mr. Holder gives no specific descriptions of the fish he deals with, and his only attempt at systematic or anatomical detail in his introductory chapter is not very happy; no reason is given for terming the shark "not a true fish," and to dismiss so important a structure from a systematic point of view as a fish's pectoral arch by saying that "many of the corresponding bones among higher animals are seen, as a pectoral arch, scapula, clavicle, ulna, and radius," is neither useful nor accurate.

The printing and get up of both books is excellent, and both are well illustrated, the one in black and white, the other in colours; the only fault to be found is that the process blocks of fishes have lost in clearness by being printed on rather too rough a paper, and that the figure of *Pseudopleuronectes* in Dr. Henshall's book is printed upside down; there are also in Mr. Holder's book certain references to a non-existent Fig. 9, which are apparently due to an oversight. The index in each case is very good. L. W. B.

#### TECHNICAL PHYSICS.

*Lehrbuch der technischen Physik.* By Prof. Dr. Hans Lorenz. Erster Band. Technische Mechanik Starrer Systeme. Pp. xxiv+625. (Munich: Oldenbourg, 1902.)

THIS book is interesting as the work of an engineer who is also a professor in one of the leading universities of Germany, where it is generally conceded that the science and practice of technical education are best understood, and have led in modern times to the most striking practical and commercial developments. The author rightly considers the fundamental principles of mechanics to be the groundwork of all physics, and has chosen mechanics as the subject of his first volume.

The most striking features of the book, as a whole, are the rigorous mathematical method of treatment adopted, the generality of the principles discussed, and the logical order of the arrangement. In an English "technical" text-book we should rather expect to find the practical applications in the foreground, and the general mathematical treatment of the principles either absent, or introduced only so far as was necessary for purposes of calculation, and not as the groundwork of the whole arrangement. Owing to the difficulty which many students find in appreciating general mathematical reasoning, we are inclined to make the mathematics as concrete and "practical" as possible, and to restrict it to the immediate applications required for illustrations. No doubt this may produce the best results, on the whole, in the case of