diagrams, expressed in English units, have been prepared by the translator. The design of the details of the more important types of turbines is then investigated, and such details as the shape, the construction, and the strength of the blades, and the design of the bearings of the shafts are fully dealt with.

In section iv., a full description is given of the various types of steam turbine which have so far been constructed and have been practically successful, and, in the case of several, the results of experiments by trained observers are given in detail. This portion of the book will be found of particular value to users of steam power who are anxious to have some knowledge of the relative merits of the various types of turbine now on the market. The application of the steam turbine to marine purposes is scarcely dealt with in as full and comprehensive a manner in Dr. Stodola's book as the rest of the subject, and a little more information might well have been given as to the relative merits of the steam turbine and the reciprocating engine for various purposes.

The last section of the book deals with some of the more advanced scientific problems, treated largely from a mathematical point of view, which occur in connection with the theory and construction of the turbine. We might instance such problems as that of the distribution of pressure in any cross section of an expanding gas or steam jet, the deflection, due to its own weight, of a horizontal disc of variable thickness, and the straightening out of such rotating discs under the action of centrifugal forces.

In an appendix, the possible future of the heat engine is briefly discussed; the main directions in which increased economy may be hoped for appear to be in the decrease of the passive resistances, such as friction, &c., in the supply of the heat to the motor only at the highest possible temperature and in the abstraction of the waste heat only at the lowest possible temperature, and in the avoidance, so far as possible, of all non-reversible changes of condition. Dr. Stodola is of opinion that in the future a heat motor which combines the high thermal results of the gas engine with the constructive advantages of the steam turbine will supplant all other types. Such a motor will be found in the gas turbine, a motor which at present has not reached practical constructive stages.

(2) After a brief account of the history of the steam turbine from the days of Hero, and a discussion of the lines upon which recent invention has proceeded, Prof. Musil gives a very useful bibliography; then, as is usual in books on this subject, there follows a classification of the various steam turbines now in use. The theory of the well known Laval nozzle is then dealt with mathematically, and the proportions of such nozzles are worked out in detail; the results of experimental investigation into this question are given, and the effect on the flow through such nozzles of superheating the steam is discussed. The thermodynamic problems involved in this branch of the theory of the turbine are also treated by the author with the aid of entropy diagrams.

The remainder of the book is devoted to detailed descriptions of several types of turbines, beginning with the Laval, which is described in detail with a number of illustrations. The important problems due to the use of a flexible shaft in this turbine are investigated, also the question of the governing of the turbine. The steam consumption of this type when under test is given in a series of tables, and the relation of the actual steam consumption to the theoretical is dealt with in some detail. The second type of turbine taken up is the Parsons, again illustrated with a number of well drawn plates, and here also the question of the governing of the turbine forms an important section; details of the actual steam consumption under varying loads are given, and the results have been put into the form of a series of curves, which will be of great use to the student.

It may be well to point out that Prof. Musil expressly excludes from the scope of his text-book the application of the steam turbine to marine purposes. The other types of turbines which are dealt with by Prof. Musil include the Zoelly, the Riedler-Stumpf, the Curtis, and the Rateau. For each type good descriptions of the mechanical details are given, with very clearly drawn illustrations, and in the case of the Zoelly and the Rateau results of tests are also given. Prof. Musil's book will be found of especial value by students in engineering colleges, and by draughtsmen in those engineering works where turbines are now built. T. H. B.

OUR BOOK SHELF.

An Angler's Hours. By H. T. Sherringham. Pp. xii+264. (London: Macmillan and Co., Ltd., 1905.) Price 6*s.* net.

MR. SHERRINGHAM deserves the thanks of all anglers who have an idle hour and no fishing for having re-published his essays in book form, and he who is forced by sad circumstances to enjoy his fishing vicariously will find his time well spent in our scribe's company. There is a pleasant and old-world flavour in his style; whether he rises early to catch tench while the dew is still thick, or drowses away his Sunday afternoon in the July heat of a sunny garden, he is an entertaining companion, who boldly confesses to his crimes in the first person or conceals his triumphs, like Julius Cæsar, in the third with equal art. But there is instruction in his essays too, such mild instruction as may best suit an idler, and much shrewd observation of the habits of fishes delicately imparted in pointing the moral of a failure or adorning the tale of a success.

Many important considerations are thus put forward and discussed; for instance, the possibilities of the fly as a lure for other fish than trout and their kind, and the hopes held out to the fisherman who finds himself by some sluggish southern stream if he will only not despair but go forth and tempt the Cyprinids that haunt its troutless waters with flies and tackle suited to their tastes.

Again, there is the harmless, necessary worm; Mr. Sherrington handles him gently (especially when dragging him from his burrow), and adjures us to treat him as a friend in need and no mere despicable device for luring fish to an undeserved and unedifying end. We may be cursed with the instincts of a poacher, but must confess to a leaning towards that conception of the angler's art which advocates the

removal of fish from the water by the most effective means if fish are wanted, and by the most pleasant if amusement is our aim or if the waters hold few fish. We recall a schoolboy who fished for loaches with a gentle if he wanted loaches, but used a kitchen fork tied to the end of a stick if he wanted sport, and we have known others who rose superior to adverse circumstances, one who found all he wanted with a fly rod and small dace on the Cambridge Backs and another who could glory in the capture of eels with a gaff in the same unpromising water.

Mr. Sherringham has not withdrawn the veil that shrouds his early exploits, and he may have been more orthodox; but now he despairs of nothing, but finds good in all; if there are no fish he can study nature, and if there is no water he can shrewdly meditate on the ways of fish and men; an hour with him and his rod by a troutless tarn is as good as an hour by the Kennet in the mayfly time. We will not attempt to cull passages and quote them, or to draw invidious distinctions between one essay and another, but will leave each idle angler to do this for himself, with a candid admission that our own hours with Mr. Sherringham were all pleasant and instructive, but we should like more of them. A word of praise is also due to the publishers, who have produced a book the size and print of which add to its convenience as an adjunct to a pipe, an easy chair, and idleness.

L. W. B.

Botany of Cook's First Voyage. Illustrations of Australian Plants. By Sir Joseph Banks, P.R.S., and Dr. D. Solander, F.R.S. Part iii. Pp. iv+25; with 75 plates. (Trustees of the British Museum, 1905.) Price 25*s*.

INASMUCH as Solander was a pupil of Linnæus, this work furnishes a link with the founder of systematic botany, and it is known that Linnæus himself looked forward with great anticipation to the publication of the results of the collections made on this the first voyage of Captain Cook. The expectation was not fulfilled, and although certain of Solander's original descriptions were transcribed for sending to press, the MS. on Australian plants did not even reach this stage. A draughtsman, Sydney Parkinson, accompanied the expedition and executed a number of drawings, of which less than a third were finished for engraving purposes. Parkinson died on the voyage home, and other artists continued the work. The specimens and drawings were available, and were consulted by Gaertner and Sir Joseph Hooker, but unfortunately Bentham failed to do so when compiling his "Flora Australiensis." Possibly Banks was responsible for some of the work, but the text is taken from a MS. by Solander, and this is reproduced with brief notes and determinations by Mr. J. Britten, who has also written the interesting introduction printed with this part. In the notices of the earlier parts reference was made to some of the generic names, and, at a time when the rules of nomenclature are being discussed, it is appropriate to instance the name Banksia, that the majority of botanists associate with a genus of the order Proteaceæ, whereas Mr. Britten, in accordance with his views, adopts Isostylis, and refers Banksia to the genus of the order Thymelaceæ, otherwise known as Pimelea. This is merely quoted as an illustration of the confusion of names which renders it most desirable that a uniform system should be universally adopted. The present volume, with the two preceding parts, completes the Australian plants, and for this worthy tribute to the authors botany is indebted to Mr. Britten for his careful revision and to the British Museum for the production.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Education in Belgium and Holland.

DURING a recent cycling tour in parts of Belgium and Holland, as well as during the outward and homeward voyages on a Dutch trading steamer plying between a neighbouring Cornish port and Amsterdam and Antwerp, I have been greatly struck by several examples of the apparent educational superiority of Holland and Belgium over our own country, and at the present moment these examples may not be without interest to your readers.

(1) We were staying at a little inn near Dinant, in Belgium, and our hostess, seeing us occupied in drying some botanical specimens, brought us the herbarium of her son, a boy of about thirteen. These specimens were admirably dried and mounted, and were labelled with details concerning the characters of the order, &c., in such wise as to constitute a valuable educational asset. On inquiry, we found that the lad was a pupil at the lycée of Dinant, and that botany was a compulsory subject there, although the lad had not yet reached the stage of learning foreign languages. The boy himself was so bright and intelligent, and so brimful of enthusiasm for botany, that we at once supposed him to be exceptionally intelligent; but some old friends of the family informed us that until a year ago he was shy and "lumpish," and that the transformation had been effected by the lycée. Commend me to such schools!

(2) The skipper of the Dutch steamer on which we returned told me that in the elementary schools of Amsterdam the children are taken at intervals to the "Zoo" to receive object-lessons on the animals about which they read at school, and on other occasions are taken into the fields to receive object-lessons on the wild flowers; and what struck me especially was that this "mere sailor"—this skipper of a tramp steamer—fully appreciated the value of such practical instruction as giving an interest and sense of reality to his children's school-work. It was also rather surprising to hear such a man express the opinion that a little knowledge of astronomy rendered certain theological doctrines impossible of belief.

(3) The skipper of the outgoing Dutch steamer explained to me that the standard for mates' and masters' certificates in the Dutch mercantile marine is higher than in ours, there being three stages of mates' certificates instead of our two, and that before taking out a master's certificate it is necessary to attend a course of simple medical instruction for some months—surely a very reasonable regulation. On the subject of Englishmen's usual inability to speak a foreign language, he opined that this inability was due to our laziness—not realising, probably, the absurdities of our traditional school system.

(4) The second mate of one of these steamers—a rough lad of twenty-one—seeing me reading a volume of verse in a well known "series" with distinctive binding, asked me if I knew a book like that with Longfellow's poetry, for he had it at home and liked it! I cannot imagine an Englishman of the same age and status knowing a poet even in his own language, much less a foreign poet.

I must not occupy your space by drawing from these facts the moral that is obvious enough, but will conclude with two statements on which it is not pleasant to reflect. These Dutch steamers have driven out a line of English steamers which formerly traded between Fowey and Antwerp, and now practically monopolise the china-clay trade between these two ports; and of the total crews of forty-one carried by the two boats mentioned above, thirty-nine were Dutchmen and two were Germans from the Dutch border, whereas everyone knows that on English vessels often only a small minority of the crew are English. Are such results surprising?

F. H. PERRY-COSTE.

Polperro, Cornwall, June 22.