nature of the spawn ; (2) the periods of spawning ; (3) the food of the herring. In 1882 the Board of British White Herring Fishery having been dissolved, the present Fishery Board for Scotland was established, to carry on the work of superintending the fisheries, and also to "take such measures for their improvement as the funds under their ministration may admit of." The Board soon recognised the absolute necessity of obtaining accurate scientific information as to the habits and life-history of the food fishes, and therefore appointed a Committee consisting of Prof. Cossar Ewart (convener), Sir James R. Gibson Maitland, Sheriff Forbes Irvine, and J. Maxtone Graham, to carry on scientific investigations.

The preliminary report of work done in the autumn of 1883 and at Ballantrae has been already given in NATURE. The Admiralty has been pleased to provide a gunboat, H.M.S. *Jackal*, Lieut. Prichett, R.N., commander, to help in the investigations and inspect the spawning grounds, and the Board has also at its service the cruiser *Vigilant*, both of which vessels have done excellent work, though it is desirable that they should be replaced by others more capable of sea-going service. The Board is fortunate in having in its service a large staff of intelligent officers not only familiar with all the practical aspects of the fishing industry but deeply interested in the scientific work of the Board, which they aid to their utmost power. The future lines of inquiry which the Board hope to undertake include (1) the examination of the spawning beds round the Scottish coast ; (2) the determination of the food of useful fishes ; (3) the investigation of percentage of young herring, &c., destroyed by present modes of fishing ; (4) the influence of sea-birds, &c., on supply of fishes ; (5) study of spawning, nature of the eggs, and general life and development of herring, &c. ; (6) best means of restocking deserted fishing grounds ; (7) of increasing artificially the supply of shell-fish ; and (8) of inquiry into fungi, &c., hurtful to fish life. The Board is fitting up a marine station at St. Andrew's, where Prof. McIntosh will make investigations for the Board, whilst similar work will be carried on in the Moray Firth. We trust that the impetus given to and the interest excited in the work of the Board may produce most favourable results, both economic and scientific.

We hope to return in a future number to some of the papers of specially scientific interest contained in this Report.

THE HISTORY OF A TYPHOON

PÈRE DECHEVRENS, the indefatigable head of the Meteorological and Magnetic Observatory at Zikawei near Shanghai, has just published the first part of a work dealing with the typhoons of 1882. The present instalment is confined to those of the months of July and August in that year. The various plans and maps showing the course of the typhoons, and the height of the barometer at various times during their progress in different places, are so "fabulously complicated," to use the writer's phrase, that he fears more than one reader will regard his pamphlet as a work of imagination. Père Dechevrens, however, has had the advantage of observations made in China, Japan, and the Philippines by captains of vessels, lighthouse keepers, Customs officers, &c., such as have never before been made of any cyclone. Chinese typhoons, as he points out, fortunately for the meteorologist, though unfortunately for the navigator, ravage places visited by the ships of all nationalities, and hence with a little arrangement and organisation these phenomena may be easily studied in these regions. The Shanghai Chamber of Commerce and Sir Robert Hart have arranged for a regular supply to Père Dechevrens of a regular series of meteorological observations, and one of the earliest results is the pamphlet now before us. As a consequence of these wide and varied observations, the writer, while acknowledging the work of his predecessors, such as Spindler in Russia, Knipping in Japan, and Faura in Manila, claims that, while they were only able to give the history, as it were, of incidents in the life of a typhoon, he, thanks to the vast number and extent of the documents placed in his hands, has been able to connect these various fragments, and to trace the history of several typhoons from their cradle in equatorial maritime regions to their grave in the North Pacific Ocean. This, in his own words, is what Père Dechevrens has now done in his pamphlet. The first section deals with July 1882, and it is divided into several sub-sections, dealing with the formation of a typhoon on July 5, its progress in the China Sea, and a first separation or offshoot from the main storm, its progress on the mainland of China, the second typhoon of July 10 in the China Sea, and before Hong Kong, in the Formosa Channel, "its flight towards India, and its disappearance in the north of China," and finally an account of a typhoon in Hong Kong and Indo-China. The typhoons of August are discussed in a similar manner in detail, the conclusions being supported by observations made in all parts of the China seas and coasts. There are also a large number of diagrams. In his recapitulation the writer points out that, though he has been speaking of various typhoons, such as that in the Formosa Channel, in Hong Kong, &c., he has really been dealing with only one widespread storm, which, during its life of fifteen days, visited every coast from the equator to Siberia, and from the extreme east of Japan to the western frontier of India. The character which Père Dechevrens gives the phenomenon he has so carefully studied is this :—" It allows itself to stray with the greatest ease outside the straight path. In a truly headlong way it throws itself against all obstacles, gets into difficulties from which it can scarcely extricate itself, wastes its energies in whirlwinds, often powerless, which it abandons readily, goes, returns, hastens, stops still, in a word revolving always in the same circle, until, having expended all its strength, it disappears miserably at that part of the Pacific which in a short time would have been able to give it the necessary vigour to sustain a longer career, and, like many others, to reach the shores of North America, or at least, if retarded by the violence of the North Pacific, as far as Behring Straits." Three facts which this study renders prominent are :—

1. The extreme facility with which these typhoons divide and subdivide.

2. The mutual attraction and repulsion of atmospheric disturbances (whirlwinds).

3. The absence of the south-west monsoon in the Philippine Islands.

In his recapitulation these three points are discussed at some length in the summary, and we merely indicate them here to show the student what he may expect in this painstaking and learned publication.

HEALTHY SCHOOLS[1]

THERE can be no more appropriate product of an exhibition which seeks to illustrate the two problems of health and education than a handbook on healthy schools. Within the brief space of 72 pages Mr. Paget has brought together here some of the most important counsels which experience has suggested on structure, drainage, fitting, food, recreation, ventilation, and other conditions on which the health of children in schools depends. No school manager or teacher can read it without much profit ; and the executive of the Exhibition has done the community a service by placing within its reach in a succinct and readable form so much practical knowledge and fruitful suggestion.

[1] "Healthy Schools." By Charles E. Paget, Medical Officer of Health for the Westmoreland Combined Sanitary District ; Honorary Secretary of the Epidemiological Society of London. International Health Exhibition Handbook Series. (Clowes and Sons.)

Mr. Paget divides his handbook into two parts, the first relating to the right construction of schools, and the second to their right administration. Under the former head he discusses in succession the questions of the site, soil, and aspect best suited for the erection of schools; the due provision of light and of air, and the importance of a good supply of water both for drinking and for cleanliness. His estimate of the space required for each child appears to be excessive, and to be almost the only feature of his work which betokens a lack of practical experience, and a striving after an unattainable ideal. It is well known that the minimum space recognised by the Education Department under any conditions as sufficient is eight square feet of area, or eighty cubic feet of internal space for each child; but in schools built by Boards, or out of funds levied by rates, the Department insists on a larger provision, *i.e.* ten square feet of area and 120 cubic feet. Any one familiar with well-planned Board Schools of a modern type knows well that this space suffices to secure ample room for movement, for change of position for the arrangement and supervision of classes, and for a due supply of air. It will, therefore, be somewhat startling to school managers to learn that in Mr. Paget's opinion this provision is absurdly insufficient, and that 800 or even 1,000 cubic feet per scholar would not be too much. Perhaps it is wrong in such a connection to dwell on the question of expense. But when it is considered that the building of a good school, apart from the cost of the site, requires an expenditure of 10*l.* per head—a great London Board School for, say, 500 boys, 500 girls, and 600 infants, in three stories costing about 16,000*l.*—it will be easy to compute what would be the charge on the rates if each of the 1,600 children were to be furnished with an area of forty or fifty square feet in a room twenty feet high. The estimate is clearly enormous, and can certainly not have been founded on an observation of the actual dimensions of any school, whether elementary or secondary. Apart, however, from the consideration of expense, it may well be doubted whether such vast space would in any circumstances be needed. For the purposes of teaching and organisation a certain compactness of arrangement is clearly desirable, and the supervision of the head teacher becomes more difficult and less complete in proportion to the size of the area over which the work of the school is spread. These are considerations, however, which it would be right to overrule, if on sanitary grounds there were any necessity for such large spaces. But when the ordinary precautions which Mr. Paget suggests for insuring light cheerfulness and ventilation are taken, it is scarcely credible that any such necessity actually exists. Mr. Paget's estimate of the amount of cubic space needed in boarding schools, in cubicles, and dormitories, is not so large in proportion, and is indeed not wholly consistent with the demands he makes for space in a purely day school. Nevertheless, by placing it at 1,200 cubic feet per scholar, he practically condemns the arrangements in almost every boarding school in England; for the usual requirements are thought to be well fulfilled with exactly half that amount.

On the extent of the window-space, the provision of fresh air, the right construction and care of offices, the colouring of walls, the admission of light, the right attitude of the scholar, and the distance of his book in reading or writing, and the form of desks, the handbook abounds in judicious and definite suggestion. It is much less full and useful, however, in regard to the fitting of playgrounds, the organisation of games, and recreations generally. Teachers will be disappointed to find how little of practical guidance the book affords as to the best and healthiest forms of recreation, and the proportion which should exist between regulated gymnastics and the free spontaneous exercises which all boys and many girls can readily discover for themselves. On diet, bathing, sanatoria, and many details which specially concern boarding schools, Mr. Paget's advice is especially valuable and complete. His estimate of the time per day which may with full regard to all considerations of health be given to intellectual pursuits, will surprise some of his medical brethren who have been complaining of late of the ordinary school hours as excessive, and have been denouncing little home-tasks of half an hour long in the elder classes as a "burden too grievous to be borne." He computes that between the ages of seven and ten five hours a day is probably sufficient, and between the ages of ten and fifteen seven hours. When it is considered that even the elder and more diligent pupils in an elementary school are never under instruction more than five and a half hours a day for five days in the week, and that the hardest home-lessons ever given in such a school do not occupy nearly an hour a day; and when it is also considered that even in the girls' high school—in which the justest complaints have been made of excessive home-tasks lasting sometimes two hours—the actual attendance in the school itself is generally limited to four hours, it will be seen that the absurdly exaggerated modern outcry about over-strain receives no countenance from Mr. Paget. His own good sense and experience, in short, lead him to recognise the fact that after all the chief business of the boy's or girl's life is training and instruction; and that provided all needful precautions are taken for right distribution and variety of work, and for securing all the conditions of healthy and cheerful life, the hours usually devoted to education in England do not exceed a reasonable amount, but rather fall short of them.

It is not the least of the merits of the book that its suggestions are put forth modestly, and with a remarkable absence of dogmatism. When the writer is not quite sure of his ground he is careful to say that his remarks are tentative and suggestive only, intended to awaken interest in the subject rather than to exhaust it; and to lead the way to a fuller and more careful study of the whole theory of school hygiene with the aid of the numerous appliances now on view at the Exhibition. This reticence on points not yet finally settled tends greatly to increase the confidence of the reader in Mr. Paget's judgment on those topics on which he expresses a decided opinion.

NOTES FROM THE LEYDEN MUSEUM

IT was a very happy thought of the late Prof. Schlegel to publish under the above title a quarterly record of the work done in the Royal Zoological Museum of the Netherlands at Leyden. The publication commenced in 1879, and the five yearly volumes before us, edited by Prof. Schlegel, will be one of the several enduring monuments to his memory. To all those interested in zoological research, the important treasures of the Leyden Museum are of necessity known. However indebted the Museum was to the well-known labours of Temminck, it is to the zeal and knowledge of Schlegel that it occupies its present high position among the museums of Europe. A very few words will show the importance from a zoological standpoint of these volumes, which contain on an average 250 pages each. The first volume contains descriptions of new species of mammals, birds, reptiles, insects, crustacea, and worms. These descriptions are for the most part by the director of the Museum and his Assistants, but help seems also welcomed from every hand, and the well-known names of R. B. Sharpe, P. Herbert Carpenter, Dr. D. Sharpe, Rev. H. S. Gorham, Prof. J. O. Westwood, occur among the British contributors. Besides containing numerous diagnoses of new species, these notes also from time to time present us with very important critical essays. Thus, in vol. i. Dr. A. A. W. Hubrecht's "Genera of European Nemerteans critically revised, with Descriptions of New Species," with a first appendix in vol. ii., is of great interest. It gives, so far