to ensure a provision of higher agricultural education for farmers in all parts of the country, a national system that is not dependent on the caprice or the poverty of any county council.

The novel feature in the memorandum besides the Inter-Departmental Committee is a proposal to create a Rural Education Conference, consisting of representatives of the County Councils' Association, the Agricultural Education Association, and other agricultural organisations, with certain officers of the two Boards. Such a consultative committee seems to smack of the Board of Agriculture's favourite attitude of asking the farmers what it can do for them, but perhaps the influence of the Board of Education, which takes a less humble view of its own expert qualifications and powers to give a lead, will supply the stiffening and find a means of translating the suggestions of the conference into practice.

SCIENCE TEACHING IN GERMAN SCHOOLS.

THE habit of self-depreciation, or at any rate the latest manifestation of it, which is now so prominent a feature of our national life, can be traced to its beginning in a general dissatisfaction with our system of education. At a time when there was no misgiving as to the superiority of our navy, when our commercial supremacy was still unchallenged, and when no foreigner dared to be our rival in the world of sport, it was nevertheless felt that in the science of education we had much to learn from abroad. If our secondary schools, especially the great "public schools," were allowed to have been successful in the formation of character, yet the intellectual equipment of those who passed through them was, and still is, held by many to be miserably inadequate. Germany, on the other hand, is regarded as the land, *par excellence*, where not only the schoolmaster knows and does his business, but where a parental Government has elaborated an almost ideal system of mental training. It is interesting, therefore, to hear that in one important province of school work—the teaching of natural science—there is another side to the picture.

Dr. Erich Leick¹ finds it necessary to bring before the minds of the German public certain points that with us for some years have been received as axiomatic, and are no longer discussed. In England we believe and act on the doctrine that no scheme of education, even for the children of well-to-do classes, should omit all reference to the living world of nature. It is, moreover, generally agreed that courses of practical lessons where common objects are studied by each pupil form the best means whereby the power of observation, clearness of expression, and the inductive methods of science can best be acquired, let alone a general interest and love for living things. Yet in Germany up till now, so we learn from Dr. Leick, natural-history lessons, if given at all in the secondary schools, have been of the old didactic kind, in which the teacher lectures almost entirely for one, or at most two, school hours in the week, and practical work is conspicuous for its absence. This seems to hold good for other branches of science, especially in the classical gymnasia, where, as Dr. Hoppe² tells us, practical work in physics is not insisted on, and is done only by "Freiwillige." His pamphlet, in fact, is written to show that some boys will do laboratory work out of school if allowed, and he gives hints as to the best exercises for such volunteers.

¹ "Die biologischen Schülerübungen." By Erich Leick. (Leipzig: Quelle and Meyer, 1909.)

² "Freiwillige Schülerübungen in Physik in humanistischen Gymnasien." By Prof. Dr. Edmund Hoppe. (Leipzig: Quelle and Meyer, 1909.)

It need scarcely be said that thoughtful teachers in Germany are dissatisfied with this state of things, and it is gratifying to read in Dr. Leick's account that the example of England is gradually affecting German science teaching. In fact, anyone who has read Mr. O. H. Latter's article on the teaching of science in secondary schools, recently published as an educational pamphlet by the Board of Education (see NATURE, August 12, p. 192), may well rub his eyes with astonishment at the antiquated systems still prevailing in many of the German Gymnasien and Realgymnasien compared to those of our own schools. Is it too much to hope that our improved methods of teaching may bring forth fruit in the next generation, and do much to remove the reproach we are constantly hurling at ourselves that we are an unscientific nation?

The limits of this notice forbid a discussion of either of these interesting pamphlets. Suffice it to say that Dr. Leick, after a review of the gradual introduction of inductive methods into the study of natural science, describes the ups and downs that biological teaching has met with in Germany, and acknowledges the part played by the authorities of Hamburg and Bremen in insisting on natural history being taught in their schools. He shows clearly enough the kind of mental training that biology alone can give, although he is no revolutionary who would sweep away humane letters out of the field. Especially noteworthy is his tactful reference to the problem of sex, how it can best be dealt with by natural-history lessons in the hands of a sympathetic teacher. Doubtless the details of his scheme invite criticism, especially the use of the compound microscope by young pupils, but they offer food for thought to all who have to teach his subjects.

Dr. Hoppe's little work may be well offered to those classical masters in our public schools, if such there be, who still believe, like Darwin's headmaster, that natural science is a waste of time, and have forgotten in their zeal for grammar the true spirit of inquiry of the ancient Greeks. Teachers of practical physics may gain some useful hints from his list of exercises.

But, as has already been suggested, the chief interest to British teachers in these pamphlets lies in the fact that they give us glimpses of what we should not have suspected in so scientific a country as Germany. They confirm the present writer's impression after hearing a science lesson in a German Realschule, that the boys were standing aside and watching rather than taking off their coats and joining in the work themselves.

M. D. H.

ANTON DOHRN.

THE whole biological world will feel a pang of grief at the news of the death of Anton Dohrn, the founder and director of the Zoological Station of Naples. It is true that he had accomplished the great work which he set himself forty years ago, and had seen the projects and dreams of his youth fully realised—and more than realised. I met Dohrn first in 1870 at Liverpool, when Huxley was president of the British Association, and in May and June of the next year went, after a winter spent in Leipzig, to join him at Jena, where he was a "privat-docent" in zoology. He was then thirty years of age, and had done some excellent embryological work on the Crustacea, in furtherance of which he had passed some months at Naples and Messina. His father, with whom I later spent some weeks at Naples, was a very remarkable man, one of the iron-willed, somewhat grim type of North Germans, a handsome old gentleman, known throughout Europe as a great collector of Coleoptera,

a hobby which brought him into close personal friendship with similar enthusiasts in Italy, Spain, England, and France, whom he visited from time to time. He enjoyed an ample income from a sugar-refining business in Stettin, where he resided, and was anxious that Anton should accept the post of director of the Hamburg Zoological Garden, marry, and settle down there. But when I knew him at Jena, Anton had already made up his mind to do something really large and important for the progress of zoological science. Like others who had visited the Mediterranean in order to study its rich marine life, he had felt the difficulty of carrying on such work in lodgings, without apparatus, without library, and at the mercy of the fishermen whom it was necessary to employ and to conciliate. The French naturalist Coste had, when employed by the Government of the Second Empire to study economic questions connected with the national fisheries, established a laboratory, with aquaria, tanks, and fishing-boats, at Concarneau, on the Brittany coast. Henri de Lacaze-Duthiers had also arranged a permanent marine biological laboratory for himself and his pupils. The plan took shape in Anton Dohrn's mind of establishing a larger and more completely equipped laboratory than these on the Mediterranean coast, and, but for the war between France and Germany, he would probably have carried out his first intention and placed his laboratory on the coast near Marseilles. When I knew him he had already thought out the scheme which he realised, and had determined to try to secure a site at Naples in the Villa Reale, which stretches along the shore. He had succeeded with no little difficulty in securing a certain sum of money from his father—his heritage, in fact—and he intended deliberately to risk this in his enterprise. His plan was to secure the cooperation of all European universities in building and maintaining the Naples laboratory, or "station," as he proposed to call it. This meant, in all cases but that of England, the cooperation of the State Governments. But in order to obtain this support and cooperation he realised that it was necessary, at whatever effort and risk, to make a plunge—to start the "stazione," to erect a fine and imposing building, to demonstrate the convenience and excellence of its organisation, and thus to secure approval and unhesitating financial assistance. His plan was to sink his own fortune in that first step, and he did so. He obtained help from friends both at home and in this country as the building grew, and by tactful appeal and untiring effort—involving years of work given up to persuading statesmen, politicians, associations, professors, millionaires, and emperors of the value and importance of the great Naples "Stazione Zoologica"—he achieved for it a splendid and permanent position.

During the two months which I passed in 1871 at Jena, Dohrn, Kleinenberg, Abbé, and I used to dine in Dohrn's study, our meal being sent in from the Black Bear Hotel. We were usually joined by Willie Preyer, the professor of physiology, in our after-dinner walk in the "Paradise," which resembled Christ Church meadow on a smaller scale. I attended Gegenbaur's lectures, and was kindly given a place by Haeckel in his laboratory, where I was one day visited by the Grand Duke of Saxe-Weimar, who told me that he was a cousin of my Queen, and kissed Haeckel on both cheeks, much to my astonishment. I was working at the embryology of Mollusca, and especially at that of *Pisidium*, a minute bivalve, the haunt of which Kleinenberg showed to me. He himself was preparing his celebrated work on *Hydra*. Abbé was experimenting and applying mathematical knowledge in the optical workshop of Zeiss, which led later to the splendid result which all the world knows.

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Those delightful men, with the exception of the veteran Haeckel, are all dead now. Haeckel remains not only alive and active, but faithful to Jena. In those days Jena was a singularly beautiful place. The nearest railway station was at a distance of seven miles. It was a very small town. I had a room overlooking the "Prinzessen-garten," and was kept awake by the nightingales. Dohrn and I took long walks in the wooded hills of the Thuringer Wald, and I learnt and discussed fully with Dohrn his plans for the Naples "station." He adopted the name "station" because he hoped that, in the course of time, other thoroughly equipped marine zoological laboratories would be set up elsewhere on the same sort of international cooperative basis as that which he intended to adopt at Naples. Port Jackson was one point which we selected for a future station, and some favoured spot on the Japanese coast another. Already, before we left Jena, and before he had opened any negotiations with the Neapolitan municipality, Dohrn had planned the series of monographs of the fauna and flora of the Gulf of Naples which has been so splendidly realised. Dohrn was a profound student of Goethe, and had a saying of the great teacher for every occasion. He was what appeared to me, with my English upbringing, singularly introspective, and he puzzled, even occasionally alarmed, me by his self-conscious and systematic cultivation of his will-power. I have no doubt that he was fully endowed with this power, as his remarkable accomplishment of what he set out to do proves, and I do not suppose his anxiety to keep it at a high pitch of activity was really of any effect in the end. When we were at Jena he did not smoke and drank very little. It was not, I think, until he was past forty that he took to tobacco. I left him at the end of June, 1871, promising to join him at Naples in October. He arranged to take an unfurnished flat in the Palazzo Torlonia, where we were to have ample space, and to take down with him plans for the projected laboratory, and an architect. Whilst he negotiated with the municipality and the Italian Government, I was to set up a temporary laboratory in our flat and pursue embryological work. This plan was carried out. Dohrn had succeeded in obtaining the definite and effective support of the new German Imperial Government, and his path with the Naples municipality was smoothed. But there was a good deal of haggling and putting forward of the palm of the hand (which Dohrn ignored) before the site to be occupied by the "Stazione" in the Villa Reale (or Nazionale, as it is now called) was made over, with many queer and strenuous conditions, to Dohrn, and so to the building contractor. When I left Naples in May, 1872, after an attack of typhoid fever, the walls of the laboratory were a couple of feet above ground. An example of the innumerable difficulties which Dohrn had to surmount is the challenge to a duel brought to him by the representative of the Neapolitan architect whom he had agreed (in order to conciliate the Neapolitans) to employ for the design of the elevation. This gentleman considered himself insulted because Dohrn refused to promise him a ten per cent. commission instead of the five per cent. which is usual in northern Europe. I had to act as Dohrn's second, and conferred with the Neapolitan architect's friend. On my insisting that Dohrn was a soldier of the German Emperor, and a very deadly man with the sabre—and determined not to yield to any nonsense—the challenge was withdrawn, and the insulted architect completed his task very satisfactorily. On another occasion, in my presence, Dohrn was deliberately threatened with assassination by a Neapolitan who could not get his own way. "You forget," the Neapolitan said, "that the night is dark and that for a few francs I can get a couple of men to deal with you." Another very

awkward thing was that the young German architect who had come to Naples with Dohrn, and was living with us in the Palazzo Torlonia, suddenly went quite mad, and had to be sent home under escort. Happily he completely recovered. A great feature in our life at the Palazzo Torlonia was the occupation of one of the chief "flats" (ours was high up in a building against the Posilippo cliff) by the Baranowski family. Dohrn had made their friendship in Sicily a year before, and we spent nearly every evening with them. Baranowski had been governor of the Russian province of Orenburg, and was now employed by the Russian Government on important missions in China. His wife, a Polish lady, her sister, two daughters, and a son, took up their residence in the chief "suite" of our Palazzo, and in the late winter were joined by Baranowski himself, whose official business did not allow him to remain for long. All those dear friends of the Palazzo Torlonia are now dead and gone, with the exception of the elder of the two sisters, who three or four years later married Anton Dohrn, and is the mother of his four now grown-up sons. She nursed him in his last illness during the past six months at Munich. In 1874, when the Naples laboratory was built and its machinery at work, its rooms filled with professors and investigators from all parts of Europe, including the wonderfully gifted and beloved Frank Balfour and his friend Dew-Smith, I again spent three months at Naples. Dohrn was suffering from the labours he had gone through in securing the position of the laboratory, and also from the climate of Naples. He was engaged, but his marriage was delayed and his future wife's family were no longer at Naples. A very remarkable Englishman, Grant by name, who had been lecturer in English literature and a close friend of Dohrn's at Jena, was with him, and remained for some years in Naples. His delightful book, "Stories of Naples and the Camorra," is the memorial of the work Grant did there. He died some years ago. Later I made two short visits to Naples, and saw my friend with his family growing up around him. In the 'nineties he visited Oxford and received an honorary degree. For some years the University, following the example of Cambridge, had rented a table at the Naples station, and provided the travelling expenses of a graduate selected to pursue investigation there.

During the thirty-six years of its existence, the Naples station has increased vastly in size and the perfection of its organisation. Its biological library is one of the best in the world, its staff of servants, assistants, and skilled workers of all kinds unrivalled. Having secured capable assistants in all departments and the funds for carrying on the now large and celebrated institution, Dohrn was able to pursue some of the problems of vertebrate morphology which had occupied his mind already in Jena days. I think that the most important of the general ideas which he had arrived at in those early times was, first, that degeneration or simplification of organic structure is a result of evolution as well as increase of complexity, and that the relatively simple or less complicated members of a group are not necessarily more primitive or archaic than the more elaborately structured members. Also of great value was his determination to take a free and unprejudiced view as to the lines of the animal pedigree, and he particularly objected to being tied in any way to the conclusions of Haeckel on this subject. He successfully resisted the notion that either Amphioxus or the Ascidians represent in any definite or complete way the lower phases of vertebrate ancestry. He held that they were specialised, and, in the sense of being simplified, degenerate. He sought himself to connect the verte-

brate stock with that of the chaetopod worms; but though this hypothesis led him into many interesting discoveries of detail—which are published in a series of papers in the *Mittheilungen* of the Zoological Station of Naples—it cannot be said to have been placed on a secure footing, and we are still speculating, with very little assurance, as to the nature and structure of the pre-vertebrate ancestors of Vertebrata.

Dohrn was a great lover of classical music, like his father, and I think that music and philosophy were his chief relaxations from the severe labour of business correspondence and scientific discussion. He was very fortunate in having the opportunity, some fourteen years ago, of receiving the German Emperor at the Naples laboratory. He was able thoroughly to interest that able man in the work of the institution, who recognised that it was a real honour and glory to the German name, and accordingly gave to it his warm friendship and support. From that time forward large assistance has been given to the Naples laboratory from Berlin, and I believe that some definite responsibility in regard to the institution—involving possibly its ownership—now passes to certain authorities in Berlin.

It is a great and satisfactory thing which I have had to record here—the success of a noble effort. Dohrn's example in founding a "station" for marine zoology has been followed in a modest way elsewhere. The Marine Biological Laboratory at Plymouth, which I joined with others in founding some twenty-five years ago, was, confessedly, an attempt to provide on our English coast an institution similar to, if less spacious than, that established by Anton Dohrn at Naples. The Plymouth laboratory has done good service to science and to fishery interests, but London is not Berlin, nor are the ways of British departments of Government in regard to science in any way similar to those of the German Imperial Government. The former are ignorant, envious, and destructive; the latter are intelligent, friendly, and helpful.

E. RAY LANKESTER.

NOTES.

IN reply to a question asked in the House of Commons on Thursday last, the Postmaster-General stated that arrangements have been completed with the Marconi Company for the transfer to the Post Office of all their coast stations for communication with ships, including all plant, machinery, buildings, land, and leases, &c., and for the surrender of the rights which they enjoy under their agreement with the Post Office of August, 1904, for licences or facilities in respect of coast stations intended for such communication. In addition, the Post Office secures the right of using, free of royalty, the existing Marconi patents and any future patents or improvements, for a term of fourteen years, for the following purposes:—communication for all purposes between stations in the United Kingdom and ships, and between stations on the mainland of Great Britain and Ireland on the one hand and outlying islands on the other, or between any two outlying islands; and (except for the transmission of public telegrams) between any two stations on the mainland; and on board Post Office cable ships. All the stations will, under the International Radio-telegraphic Convention, be open for communication equally to all ships, whatever system of wireless telegraphy they may carry and the Post Office will be free to use or to experiment with any system of wireless telegraphy at its discretion. All inland communication of messages by wireless telegraphy will be entirely under the control of the Post Office. Arrangements have also been made with Lloyd's for the transfer