

of the Caribbean Sea. The account of the Jamaican seal is all the more interesting because it seems likely to become extinct, possibly partly because it is one of those animals which, to preconceived ideas at all events, seem out of place. But in this connection we are reminded that there is also a Mediterranean seal, and that the leopard is actually as European as the brown bear. Another extinct animal which we are glad to have an account of is the Antarctic wolf of the Falkland Islands, finally exterminated by the sheep-farmers in self-defence; its possible introduction to the Falklands is discussed, and the question whether it was really distinct or merely a modified form.

These extracts will serve as a fair sample of the score of essays in the new volume. In the case of rare or extinct forms there is an indication of the known specimens now or formerly in collections. The value of photographs from life of rare, and especially of "threatened," species is emphasised by the author, who illustrates his essays with eighteen photographic plates. Even in the London "Zoo" it is not always easy to photograph an animal. The clouded tiger was under observation for five years before a satisfactory picture (which we are enabled to reproduce) could be obtained.

O. V. A.

#### MINERS' WORM.<sup>1</sup>

THE dreadful disease known as ankylostomiasis, "tunnel disease," "cachexia of miners," or "miners' worm," is definitely known to be caused by the nematode worm *Ankylostoma duodenale*. The alarming spread of the disease in the mines of Hungary, France, Germany, and Belgium, and its recent introduction into some of the mines of this country, have necessitated a thorough investigation of the anatomy, development, and life-history of the worm. Already some 750 papers treating of the disease have been published, but only a few of these deal with the parasite itself, and still fewer with the details of its anatomical structure.

The splendid work before us now gives in full detail the gross and minute structure of the adult worm, but a second part is yet to come from the pen of the same distinguished parasitologist in which the development and life-history will be described. If the second part is as full of detail and as well illustrated as the first, the monograph will be the most complete account of any single species of animal that the world possesses.

The *Ankylostoma* was first discovered by Dubini in 1838 in the intestine of a peasant woman who died in the hospital at Milan, but it was not until some years later that he associated the worm with disease and published an account of it. Soon after Dubini's discovery the worm was found in Egypt by Pruner and by Bilharz. Dr. Looss considers carefully the suggestion that has been made that the worm Heltu mentioned in the Ebers papyrus of ca 1550 B.C. was *Ankylostoma*, and that the disease was known to the ancient Egyptians, but he comes to the conclusion that there is not sufficient evidence to support this suggestion.

The discovery of *Ankylostoma* in Brazil by Wucherer, and in other warm and tropical places, led to the belief that ankylostomiasis was peculiar to such climates, but the epidemic of "tunnel disease" among the workers in the St. Gothard Tunnel, and the recognition by Perroncito of its identity with

ankylostomiasis, was the first indication of the serious part this worm was to play in the medical history of the present day.

Dr. Looss devotes some pages to a full discussion of the systematic position of the species and of the generic characters of this and the other genera of the family Agchylostominae. I must confess to some disappointment that, influenced by the writings of Stiles, of Washington, the author has come to the conclusion that the genus must be written *Agchylostoma*.

"I freely confess," he writes, "that I find the term *Agchylostoma* abominable," and throughout the monograph he uses the spelling *Ankylostoma* in roman letters and *Agchylostoma* in italics. It is extremely inconvenient, in any case, to restore an ancient and "abominable" spelling of a generic name, and it is to be especially deplored in a monograph of such value and importance as this one; but no rules of nomenclature can justify the course adopted of spelling a generic name in two distinct ways on almost every page.

The text consists of 140 pages of elaborate details of microscopic anatomy and histology, and the illustrations consist of ten plates of very beautiful drawings by the author, lithographed by Werner and Winter, of Frankfort.

The monograph was originally written in German, but has been translated with very great skill into English by Mrs. H. M. Bernard.

SYDNEY J. HICKSON.

#### THE ROYAL COLLEGE OF SCIENCE.

MR. HALDANE and the other members of the departmental committee who for the last two years have been considering the important questions referred to them have earned the nation's gratitude. If the scheme they propose be carried out (and there is reason to believe that it will be, and at once) a great step forward will have been made towards providing that complete higher education the absence of which has made us the laughing stock of those countries the Ministers of which are more intelligent than our own. As the reporters are careful to show in their general review, many of our scientific industries are an easy prey in international competition as it is carried on to-day.

We give below extracts from the recommendations made in the final report, just issued, which will sufficiently indicate the proposals of the committee; many paragraphs have been omitted which deal with details.

The unification of the teaching which already exists or is already provided for at South Kensington, and the additional buildings, teaching and research suggested, will certainly provide an institution admirably designed to meet modern needs. But we are grateful to the reporters for more than this; they tell us with no uncertain sound that technical education must crown, and not replace, a general education, so the resources of the Royal College in the future will not be frittered away in trying to teach those who have not learned how to think and in turning out incomplete men. A sufficiency of professors is also postulated, so we may hope that researches as well as teaching will be intensified, both for professors and students.

Messrs. Wernher, Beit and Co. are happy endowers; it is not often that such munificence as theirs, which set the inquiry going, leads to such a rapid and satisfactory result. Their 100,000*l.* is now supplemented, roughly, by the interest of a million from the State, of another from the County Council, perhaps

<sup>1</sup> "The Anatomy of *Agchylostoma duodenale*, Dub." By A. Looss. Records of the Egyptian Government School of Medicine. Vol. iii. (Cairo: National Printing Department 1905.)

almost another from the City Guilds, while the State and the Royal Commissioners for the Exhibition of 1851 provide between them some four or five acres of land to build on gratis!

Some paragraphs of the recommendations refer to a question which is academic in more senses than one—whether the new Royal College of Science shall be under the government of the University. Our own view is that the question should be left to settle itself. There certainly at present must be a special governing body to start it, and the one suggested seems all that can be desired. There certainly also at some future time must be a very close connection with the University; it is too early to define that time.

#### *Extracts from Conclusions and Recommendations.*

The conclusions at which we have arrived are:—

(1) That the position of this country makes further provision for advanced technological education essential.

(2) That the students, by whose advanced technological education the nation would profit, are not actually obtaining it to the extent which is desirable, and that this is due to:—

(a) The lack of facilities for instruction in certain important subjects.

(b) The absence of such coordination among existing institutions of technological education as would permit the concentration of the more advanced courses in a limited number of institutions.

(c) An insufficient appreciation, especially on the part of employers, of the value of such education.

(3) That the opportunities for research in our technological institutions are inadequate to the industrial needs of the Empire, owing not to any want of ability on the part of the professors, but to the fact that much of their time is frequently absorbed in the giving of comparatively elementary instruction in pure and applied science.

(4) That in any institution in which the highest technological education is given, the equipment should be adequate for the purpose, and the staff should include, at the head of the several specialised branches of the work, men of the first rank in their profession.

From this point of view the recommendations which we have the honour to submit in reply to our terms of reference may be summed up as follows:—

That the present combination of conditions at South Kensington points to the desirability of so utilising the resources there available, and of making additions to these, as to form on that site an institution of the highest standing, an institution which, with the staff, equipment, and students that it will command, would go far towards remedying the above mentioned defects.

In a preliminary report we inquired whether the Board of Education were in a position to inform us (1) that, if it were found possible to establish a scheme such as we had sketched in outline, they would be willing to allow the Royal College of Science (including the Royal School of Mines) to be brought into it under a common government and administration; and (2) that the existing Government contribution to the support of these institutions would be continued under the new conditions on the scale already made necessary by the provision of the new laboratories of the Royal College of Science.

The Board have replied to the first of these questions in the affirmative, and, in reply to the second, the Government have intimated that they will be prepared to bring the Royal College of Science and Royal School of Mines, including the new laboratories, into a scheme framed on lines approved by the Board of Education, in accordance with this report, and to make a grant of 20,000*l.* per annum in respect of the cost of staff and of the laboratory expenses, with provision in addition for certain other minor expenses.

The favourable disposition of the Government has greatly strengthened our position, and enabled us to obtain the support and cooperation which we consider necessary to ensure the success of the scheme described generally in our preliminary report.

The gift of a capital sum in excess of the minimum

referred to (100,000*l.*) in the preliminary report has been secured.

The commissioners of the 1851 Exhibition are prepared, if satisfied with the scope and constitution of the new institution, to place at the disposal of its governing body the unoccupied portion of their estate at South Kensington.

The council of the City and Guilds of London Institute have indicated their willingness to bring the Central Technical College into a scheme to be framed to their satisfaction on the general lines we are able to recommend in this report.

The London County Council, on July 27, 1903, received a report from its General Purposes Committee upon the proposal contained in the letter which Lord Rosebery had a short time previously addressed to the chairman of the Council, and resolved to place on record its opinion that, subject to certain conditions being fulfilled (about which we may say we do not anticipate any difficulty), the Council would be well advised, when the time came, to contribute a sum not exceeding 20,000*l.* per annum towards the maintenance of the institution.

In our opinion a sufficient maintenance fund is assured, at any rate, to justify a commencement, if not to carry out the scheme we have in view as fully as we hope may be possible hereafter.

The main object is the establishment, at South Kensington, of an institution or group of associated colleges, of science and technology, where the highest specialised instruction should be given, and where the fullest equipment for the most advanced training and research should be provided, in various branches of science, especially in its application to industry, for which no sufficient provision already exists elsewhere. The number of the departments will be limited by the resources available, and at first a selection will have to be made among them. The scale on which the departments are established should be capable of gradual expansion with the increase in the number of students, fitted by preliminary education, to take advantage of the teaching and training contemplated.

The scheme should, in the first instance, and subject to necessary adjustments, include the work of the Royal College of Science, the Royal School of Mines, the Central Technical College, and departments to be established on the additional site at South Kensington.

Such being the scope of the new institution, it is necessary that we should make recommendations with regard to the composition and functions of its governing body. Of the relation of the new institution to the University of London, it is necessary to premise that we are agreed that it is desirable that the new institution should be established immediately, and that its organisation should proceed without delay, and there is substantial agreement among us that for this purpose a governing body of the character sketched in a subsequent paragraph should be at once appointed with power to take immediate action. We wish, however, to put in the forefront of our recommendations under this head a proviso that they should not be regarded as in any way intended to prejudice the future settlement of the question of the relation between the new institution and the University. This is a question on which divergent views are held.

We do not consider that the establishment of the new institution should be delayed pending a decision between these two views, or that the general lines of its organisation (except, possibly, as respects the governing body) should be regarded as other than permanent.

Subject to the proviso we have already made, we recommend that a governing body should be established consisting of forty members appointed as follows:—

Six by the Crown.

Four by the Board of Education.

Five each by the University of London, the London County Council, and the council of the City and Guilds of London Institute.

Four by the teaching staff of the new institution.

Two by the commissioners of the Exhibition of 1851.

One each by the Royal Society, the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Electrical Engineers, the Iron and Steel Institute, the Institution of Naval Architects, the Society of Chemical Industry, the Federated Institution of Mining Engineers, and the Institution of Mining and Metallurgy.

For the purposes of the new institution the governing body should have the entire disposal of the accommodation provided by the Royal College of Science, including the buildings in course of construction at South Kensington, the Central Technical College, and all buildings which may be erected on the additional site at South Kensington.

The site and buildings of the Royal College of Science, including the buildings in course of construction, should either remain the property of His Majesty's Government or be transferred to the governing body of the new institution, as His Majesty's Government may determine.

The site and buildings of the Central Technical College should, if and so long as they desire it, remain the property of the City and Guilds of London Institute, who should provide for their maintenance and repair.

The governing body should be incorporated, and subject to such special provisions as may be made by their instrument of incorporation they should receive and expend fees and other funds which may be assigned to the purposes of the new institution, they should appoint the professors and the other members of the staff, they should determine the departments and subjects of instruction, they should control the arrangement of the courses of instruction, and the award of diplomas, and they should make provision for the protection of students now in the constituent institutions and of the existing diplomas. Further, in each of the departments of the new institution the governing body should appoint a board, not necessarily consisting of members of their own body, and including members of the teaching staff and persons with practical experience of industrial requirements, to give expert advice with regard to such particulars connected with that department as the governing body may refer to them.

We recommend that it be an instruction to the governing body to enter into negotiations with the University of London, with King's College, and pending its actual incorporation, with University College, with regard to the coordination of the engineering work of these colleges with that of the new institution. We recommend that instruction in the higher branches of technology should, as far as possible, be concentrated at South Kensington. In the establishment of new departments we do not think it will be possible at present to go much beyond the various branches of engineering, with mining and metallurgy, though we hope provision may be made later for other subjects. We think the principal technical and engineering societies should be consulted as to the departments most requiring development and expansion, and as to the number of students for whom it is desirable to make provision in each department. In view of the character of the subjects which will, it may be expected, predominate on the South Kensington site, it must, we think, before long become a question whether the biological department of the Royal College of Science shall be retained there. As soon as this question becomes ripe for settlement, the provision to be made for that department will be a matter for negotiation.

We think that it may be found possible, even in the immediate future, to make arrangements for the establishment of departments dealing adequately with the greater number of special sections of applied science named. Thus it would seem that certain of these departments might be accommodated in the buildings of existing London institutions, while, for others, special accommodation would fall to be provided at once in the first additions to the buildings already available on the South Kensington site. For example, in view of the character and standard of the work now carried out by the Central Technical College, we think prominence should be given in the new institution to certain specialised developments of mechanical and electrical engineering.

We have already reported that we think a fully equipped central school of mines should be maintained, providing a full course of instruction in mining and metallurgy, especially in the mining and metallurgy of metals produced in India and the Colonies, but not found in workable quantities in the United Kingdom.

It should be borne in mind that the traditions and prestige of the Royal School of Mines and the association of that school are valuable assets, and we think care should be taken to preserve those traditions and that diploma.

In our opinion, accommodation should be provided in this department for 100 to 120 fully qualified students, *i.e.* fifty or sixty entries in each of the two years contemplated, so that forty to fifty students might be expected to pass out each year after successfully completing the course.

Vacation work under the guidance of school authorities, in districts where practical work is conducted, is a great and valuable feature of American and Canadian schools of mines. We think it would be advantageous for students of the Royal School of Mines to have one short period of practical mine surveying and of mining work generally, in a metalliferous mine, and another similar period of experience of the work of a coal mine.

No student should be admitted to any specialised technical department who has not received, either in the new institution itself or elsewhere, an adequate training of a technical and scientific character such as should be common to every branch of engineering. He should have spent two years on a course of instruction in science, such as he could obtain in a well organised college or technical institution, after having reached the standard of general education usually marked by university matriculation. An examination test should be imposed on all candidates for admission to the higher departments, except in the case of students who show, by some recognised qualification, that they have received the necessary preliminary training, and when there are more candidates for admission to a particular department than can be received, the best should be selected on a competitive basis.

The preliminary training to be given in the new institution should be of the kind which has just been referred to. It should consist of a course of two years' instruction in science, technology, and engineering, of such a character as the governing body consider the most suitable preparation for the specialised courses, and it should be, in the main, common to all students proceeding to advanced instruction in any department. We have already indicated our opinion that students who have not attained a certain standard of general education are not fitted to obtain the fullest advantage from the specialised instruction of the higher departments. We therefore think that evidence of this should be required before admission to the preliminary department.

#### NOTES.

SIR ALEXANDER B. W. KENNEDY, F.R.S., has been elected a member of the Athenæum Club under the provisions of the rule which empowers the annual election by the committee of three persons "of distinguished eminence in science, literature, the arts, or for public services."

PROF. ALBRECHT PENCK, of Vienna, has accepted the professorship of geography in the University of Berlin, vacant by the death of Prof. von Richthofen.

THE Nichols medal of the American Chemical Society for the year 1905 has been awarded to Prof. Marston Taylor Bogert, of Columbia University, for his researches on the quinazolines.

Science announces that Dr. C. D. Walcott has resigned the secretaryship of the board of the Carnegie Institution at Washington, and is succeeded by Mr. Cleveland H. Dodge.

A MEMORIAL tablet has been unveiled on the house, in Eisenach, in which the late director of Zeiss's works, Prof. Abbe, was born.

ARRANGEMENTS have been made to hold a hygiene exhibition in Dresden in the year 1909 under the directorship of Dr. Lingner.

FROM Tübingen the death is announced, on January 25, of Prof. W. Mayer, the director of the university pharmacological museum, and a member of the pharmaceutical examinations commission.