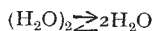


THOUGH articles of scientific interest only occasionally appear in British monthly periodicals read by the general public, they are more frequent in the American magazines published here. The *Monthly Guide to Periodical Literature*, the first number of which has just been issued by the Advertising Agency of London, is therefore not without value from the scientific side; for it shows the titles and writers of articles in the chief magazines and reviews which reach us from the United States, and also in similar periodicals having their origin on this side of the Atlantic. Assuming that the editors of the various popular magazines know the pabulum best appreciated by their readers, an examination of the list of articles shows that science is given but scant attention by the reading public. A few editors with scientific knowledge as well as literary capacity might do much to increase interest in natural knowledge, and raise their readers' minds above the dead level of indifferent fiction and sensational science.

THE *Zeitschrift für physikalische Chemie* contains a very ingenious application by J. J. van Laar of thermodynamics to the results of Ramsay and Shields upon the association of liquids. Assuming that θ simple molecules of water are associated to form a compound molecule, Dr. van Laar applies the thermodynamical conditions of equilibrium to the rate of change of the constant of association with temperature, and applies the resulting formula to the experimental figures of Ramsay and Shields. The value of g , the heat of dissociation of the molecule $[\text{H}_2\text{O}]^\theta$ thus determined, should be constant if the right value of θ is assumed, and this is the case for water at temperatures between 0°C . and 60°C . if $\theta=2$. The results are not so good if θ be taken as 3 or 4, and hence the author concludes that the association is correctly expressed by



with an absorption of 1930 calories per 18 grams of water. Ethyl alcohol also appears to be bimolecular, but for methyl alcohol and acetic acid $\theta=3$ at least. The contraction ensuing when alcohol and water are mixed and the phenomenon of the maximum density of water are also considered from this point of view, with the striking result that the assumption of the partial association of liquid molecules explains, not only the contraction on mixing with alcohol, but also the irregular expansion of water.

THE additions to the Zoological Society's Gardens during the past week include a White-throated Capuchin (*Cebus hypoleucus*) from Central America, presented by Mrs. Vernon; a Blue and Yellow Macaw (*Ara ararauna*) from South America, presented by Mr. H. W. Stride; two Java Sparrows (*Padda oryzivora*) from Java, presented by Mr. Walter Buchanan; an Indian Dial-Bird (*Copsychus saularis*) from India, presented by Mr. W. H. St. Quintin; a Delalande's Gecko (*Tarentola delalandii*) from West Africa, presented by Mr. May; two Spotted Salamanders (*Salamandra maculosa*), European, presented by Mrs. Brett; a Hocheur Monkey (*Cercopithecus nictitans*) from West Africa, a Vulpine Phalanger (*Trichosaurus vulpecula*) from Australia, ten Nose-crested Iguanas (*Iguana tuberculata rhinolophus*) from Nicaragua, two Whooper Swans (*Cygnus musicus*), European; a Starred Tortoise (*Testudo elegans*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

NEW MINOR PLANET (1899 E.Y.).—Herr Otto Knopf, of the Jena Observatory, gives the elements and ephemeris of this planet in *Astronomische Nachrichten*, Bd. 151, No. 3612, from which the following abridgment is obtained:—

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Elements for Epoch 1900 January 0^o Berlin Mean Time.

M = 345 32 15.3
 ω = 3 32 19.9
 Ω = 89 46 43.3
 i = 15 22 20.0
 ϕ = 5 13 16.4
 μ = 651'' 293
 $\log a = 0.490821$

Ephemeris for 12h. Berlin Mean Time.

1899.	R.A.			Decl.
	h.	m.	s.	
Jan. 18	...	4 9 34	...	+17 32.5
22	...	9 22	...	17 54.2
26	...	9 36	...	18 16.4
30	...	10 15	...	18 38.9
Feb. 3	...	11 19	...	19 1.9
7	...	4 12 46	...	+19 25.0

SCIENCE TEACHERS IN CONFERENCE.

THE Committee responsible for the arrangements in connection with the English Education Exhibition, which is now being held at the Imperial Institute, very wisely decided that a series of conferences, lectures and demonstration lessons arranged by the chief educational bodies throughout the country would form a valuable adjunct to their exhibition. The invitations which the Committee sent out met with a very cordial reception, and the programme of meetings for the discussion of educational questions includes nearly every grade and phase of English school life.

One of the most interesting of these events was a conference of science teachers from all parts of the country, arranged by the Technical Education Board of the London County Council. The success which attended similar gatherings during January 1899 convinced the promoters that nothing but good resulted from the discussion of methods of teaching different branches of science, and the meetings on January 10 and 11 were arranged in much the same way as those of the first conference last year. But whereas the subjects considered in 1899 were various branches of physics and chemistry, the greatest prominence was this year given to plans of instruction in natural history and manual training.

THE TEACHING OF BOTANY.

At the first meeting held on the morning of January 10 at the Imperial Institute, when the methods of teaching botany was the subject dealt with, the chair was taken by Sir John Lubbock. Papers were read by Prof. Miall, F.R.S., of the Yorkshire College, Leeds, and Miss von Wyss, of the North London Collegiate School for Girls.

Prof. Miall gave it as his opinion that the teaching of botany in schools is not spreading, though there is hardly any scientific inquiry which is at once so practicable and inviting. A special reason for encouraging the study of botany is that a knowledge of the great facts of plant-life is essential to scientific agriculture. Those who live by agriculture, which is still our greatest industry, are already beginning to demand that, in our rural schools at least, the scientific basis of agriculture shall somehow enter into the course of instruction. A school course may conveniently be divided into three stages according as the pupils are children (age 8-12), boys and girls (13-16), or young men and women (17-19). The science lessons given in the first stage should take the form of object lessons. In the second stage systematic science may be begun, and here chemistry and physics will be the common choice, but natural history should be kept alive by school natural history clubs and rambles. In the third stage, students who will follow some pursuit in which natural history plays a part, should take up natural history again and study it methodically in the light of their chemistry and physics.

In the first stage the following maxims were recommended by Prof. Miall. (1) No technical terms in Latin and Greek. (2) No lectures or information lessons. (3) No books in class. (4) Let all lessons be interrogations of actual objects, and largely of live plants. (5) Try to make the class active and

responsible throughout. Later, it was urged that everything that is taught at all in a school should come round pretty nearly every day for at least one year. In the third stage of teaching, when botany is studied for some special purpose, the great problems of the nutrition and reproduction of higher green plants should be specially studied. Such a course of plant physiology should occupy several hours a week for two or three years.

Miss von Wyss described how object lessons in botany might with advantage be given. She deprecated the idea that botany could be satisfactorily taught to young children apart from the study of zoology, and urged that such object lessons should be co-ordinated with the teaching of drawing and literature. The current idea that there is a difficulty in obtaining specimens in a large town was shown by the experiences Miss von Wyss related to be quite erroneous, and the success which object lessons have met with at the North London Collegiate School for Girls was dwelt upon.

JUVENILE RESEARCH.

The afternoon meeting at the Imperial Institute was presided over by Sir Henry Roscoe. Prof. H. E. Armstrong, F.R.S., described in an interesting address the methods he had employed with his own children at home to educate them in the way of discovering for themselves the answer to questions which were presented in their ordinary life. The address was illustrated by practical demonstrations by Prof. Armstrong's little daughter and two young sons, and a series of lantern slides made it quite clear how the system described had been developed. In reading a book by the late Henry Drummond, called "The Monkey that would not Kill," the children came across the statement that a stone was lighter in sea-water than in air, and to satisfy themselves of the truth of the statement was the object of the piece of research which the children entered upon under the general supervision of their father. The steps in the inquiry were worked through again before a large audience, and the children themselves explained with remarkable intelligence what the object and result of each experiment were. Throughout the course of training, which was exemplified by the demonstration, each child kept a careful account of everything which was done, illustrating each step by means of sketches and recording every numerical result obtained. Prof. Armstrong maintained that the teaching of science to children was not commenced early enough, and that too little faith is shown by teachers in the reasoning faculties of young children.

OBJECT LESSONS.

The second day's meetings were held at the Shoreditch Technical Institute. Prof. Woods Hutchinson was to have given an address in the morning on "The Early Teaching of Natural History in Schools," but he was too ill to attend. Mr. J. W. Tutt read a paper on "Object Lessons in Natural History," in which he detailed the educational advantages of this method of instruction, the mode of giving a good object lesson, and a suitable scheme of lessons for young children. A discussion, in which a large number of teachers took part, followed. But, from one cause and another, the subject in hand received very little attention, and few actual working methods were explained.

MANUAL WORK IN METAL.

The concluding meeting was presided over by Sir J. F. D. Donnelly, and was concerned with the discussion of "Metal Work as a Form of Manual Instruction in Schools." Papers were read by Prof. W. Ripper, of University College, Sheffield, and Mr. Bevis, Director of Manual Instruction for the Birmingham School Board. Prof. Ripper's paper was concerned with the general considerations which make a development of the subject of manual instruction in metal desirable. It was pointed out that there has been a decided advance in this direction in recent years, and it was stated by Prof. Ripper that the exhibition of metal work in the Education Exhibition at the Imperial Institute is better than that of the recent Chicago Exhibition. Mr. Bevis gave an account of the course of instruction in metal work which was given to boys of Standards V. and VI., who were between the ages of ten and thirteen years, in the schools of the Birmingham School Board.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. A. H. Evans, M.A., of Clare College, who is favourably known as one of the authors of the "Cambridge Natural History," was, on January 10, elected an Esquire Bedell in succession to the late Mr. Gill.

The Special Board for Biology propose that legal powers shall be obtained to vary the conditions of the Gedge Bequest for the furtherance of physiological research, so as to equalise the conditions on which "advanced students" compete with ordinary students for the prize under this foundation.

IN his dedication of the fourth volume of "The Linacre Reports" to the Vice-Chancellor of Oxford University, Prof. R. Lankester avails himself of the opportunity to make some remarks upon the want of encouragement given by Oxford Colleges to work of the kind contained in the volume. The position of science at Oxford has already been dealt with in detail in these columns (vol. liv. 1896). The present method of apportioning the College endowments is most unsatisfactory, and Prof. Lankester's suggestion that two-thirds of such endowments should be given for the encouragement of the study of the natural sciences, and one-third for the subjects comprised under the general terms *Literæ Humaniores* and *Modern History*, is a more reasonable distribution. In any case, Oxford is not likely to become a University for students of science while a past professor is justified in making a statement such as the following concerning the distribution of endowments:—"It is, I know, useless to urge this, which is the judgment and practice of almost every University excepting our own, upon the consideration of those who now have the control of that splendid potential source of energy, the College endowments. They have, unfortunately, with rare exceptions, been brought up in complete ignorance of the scope and significance of the studies which they refuse to recognise; they deliberately and conscientiously use the advantage of their position so as to maintain the present one-sided system, and to discourage the study of the natural sciences by those who come as students to Oxford."

It is not only at Oxford that study and research in the domain of the natural sciences receive little encouragement. In the preface to the volume of "Studies in Biology from the Biological Departments of the Owens College," Profs. S. J. Hickson and F. E. Weiss refer to the fact that no more Bishop Berkeley Research fellowships will be available for original work. The remark "Biology is now left in our College without any fellowship or scholarship to enable a promising student to devote a year of his life to original investigation before commencing his career as a teacher or medical student, and our well-equipped research laboratory has consequently to remain unoccupied during the greater part of the year. We cannot help feeling that if these facts were more generally known some help might be forthcoming from those who realise what biology has done and is doing for the development of rational methods of modern medical research." Why the Bishop Berkeley fellowships, which once promised to rank among the best characteristics of Owens College institutions, are not now available is not explained.

At a general meeting of Convocation of London University held on Monday, the report of the standing committee was presented. The report dealt with the election by Convocation of members of the Senate under the new statutes. It stated that the representatives allotted to Convocation will have to be chosen in May. The representatives of Convocation will consist of the Chancellor (elected for life), the chairman of Convocation, and sixteen members, of whom eight will retire every two years. These eighteen will form a majority of the members of the Council for external students, who will have to advise the Senate regarding the whole of the present work of the University. The Academic Council, elected mostly by teachers of the University, will perform a like function for internal students. There is no restriction on the choice of candidates. The new constitution will probably be in the hands of the University before the next meeting of Convocation in May, and by that time the University will probably have taken up its abode in its new home at the Imperial Institute. After a short discussion, the report was adopted.