and the chimpanzee remarks the writer of the article, closely approaches the management of an untaught child. These creatures do not seem as much like lower animals as do the majority of the so-called "dumb brutes." Coaxing and perseverance have been responsible for the exhibitions which from time to time have taken place.

IN the *Journal of Botany* (August) Dr. G. Murray publishes a short note on Atlantic diatomaceæ. Some few species were obtained in all the captures, even far out at sea, but an increase in the quantity of the take was generally found to indicate the proximity to land. Miss A. L. Smith describes some interesting microfungi, and Dr. W. G. Smith refers *Nidularia dentata* to the genus Sphærobolus. Biographical notices of the botanists L. A. Deschamps and F. Noronha are contributed by the editor.

THE number of the *Minnesota Botanical Studies* published in July is mainly given up to articles dealing with flowerless plants. Mr. Bruce Fink presents a list of lichens collected on the northern boundary, and Mr. H. L. Lyon catalogues the pteridophyta which grow in the State. Contributions to the algal flora are furnished by Dr. H. F. Schrader, who describes a new species of Alaria, and by Mr. Skinner, who discusses the tide pool vegetation at Port Renfrew. The distribution differs considerably from that found on our coasts, seeing that a Corallina extends throughout the whole tidal range, while a Codium is associated with it in the higher pools.

THE *Agricultural News* of Barbados for August 15 reprints from the *India Rubber World* an interesting article on the subject of the preparation of Para rubber in Ceylon, in which full and detailed instructions are given for collecting and coagulating the rubber. The text is elucidated by illustrations.

A PAMPHLET on "The Boiling Lake of Dominica," by Mr. F. Sterns-Fadelle, has lately been published (office of the *Dominican*, price 1s.). It gives an historical and general account of this well-known geyser, which will be useful to travellers in the West Indies.

THE annual report of the Yorkshire Philosophical Society for 1902 contains part ix. of a catalogue of British plants in the herbarium of the Society, and a popular article on "Sea Sand," by Mr. Hugh Richardson, in which the characters and origin of the grains of sand are discussed.

IN the *Proceedings* of the Nova Scotian Institute of Science (vol. x. part iv.) Dr. H. M. Ami shows that the slates yielding *Dictyonema Websteri*, and which were regarded by Sir J. W. Dawson as Upper Silurian, belong to the Upper Cambrian.

A PAMPHLET entitled "A Historical Sketch of the Experimental Determination of the Resistance of the Air to the Motion of Projectiles," by the Rev. Francis Bashforth, has recently been published by the Cambridge University Press.

MESSRS. CHARLES GRIFFIN AND CO., LTD., have published a second edition of "Animal and Vegetable Fixed Oils, Fats, Butters, and Waxes," by the late Dr. C. R. Alder Wright. The new edition has been revised and partly rewritten by Mr. C. Ainsworth Mitchell, who, though he has retained the general arrangement of the original work, has, especially in the chapters dealing with the manufacturing processes, modified the text and brought it up to date.

A NINTH edition of Bloxam's "Chemistry" has been published by Messrs. J. and A. Churchill. The book has been rewritten and revised by Prof. J. M. Thomson, F.R.S., and Mr. A. G. Bloxam. A change has been made in the present edition in the order of treatment of the non-metallic elements, and carbon is now considered after hydrogen, oxygen, and nitrogen. The plan of making no division, in the portion of the book dealing with organic chemistry, between the treatment of the fatty and aromatic compounds has again been followed.

A NEW edition—the twelfth—of "The Art of Retouching," by Mr. J. Hubert, has just been issued by Messrs. Hazell, Watson and Viney, Ltd.

MESSRS. GEORGE ROUTLEDGE AND SONS, LTD., announce for early appearance a series of "Nature-Study Readers" for general school use, under the editorship of Mr. John C. Medd. The aim of the books is to present varied aspects under which nature may be most conveniently studied alike in urban and in rural districts. Each subject is to be treated by a different writer, who has devoted special attention to it, and knows from personal experience what is within the capacity of, and calculated to interest, children of from nine to thirteen years of age.

MR. R. LYDEKKER, F.R.S., will shortly issue, through Messrs. Hutchinson and Co., a volume of zoological essays entitled "Mostly Mammals."

THE additions to the Zoological Society's Gardens during the past week include a Himalayan Bear (*Ursus tibetanus*) from East Asia, presented by Lady Constance Mackenzie; a Common Otter (*Lutra vulgaris*) from Scotland, presented by Mr. J. B. A'Deane; a Rock Thrush (*Monticola saxatilis*), European, presented by Mr. W. H. St. Quintin; a Delalande's Gecko (*Tarentola delalandii*) from West Africa, presented by Mr. P. C. Challice; a Black Lemur (*Lemur macaco*), a Black-headed Lemur (*Lemur brunneus*) from Madagascar, a Black Sternothere (*Sternothoerus niger*) from West Africa, seven Dalmatian Lizards (*Lacerta mosorensis*) from Dalmatia, twelve Sharp-headed Lizards (*Lacerta dugesi*) from Madeira, an Indian Eryx (*Eryx johni*) from India, a Black-tailed Snake (*Ungalia melanura*), a Black-spotted Snake (*Ungalia pardalis*), a Cuban Snake (*Liophis andreae*) from Cuba, deposited.

OUR ASTRONOMICAL COLUMN.

SPECTRUM OF COMET 1903 *c*.—Observations of the visual and photographic spectra of this comet were obtained at the Meudon Observatory, and were communicated to the Académie by M. Deslandres, whose communication appears in the *Comptes rendus* for August 17.

A spectrograph containing a 60° heavy flint glass prism was especially constructed for these observations, and was used in conjunction with the large double telescope. The faint light of the comet was concentrated from a wide slit by having the collimator of the spectroscope 55cm. long, whilst the focal length of the observing telescope or camera was only 12cm.

The spectrum generally is of the characteristic hydrocarbon type, but near to the nucleus of the comet it contains several extra faint lines; the brightest bands are those at λλ 3881, 4681, 4314 and 4052, their relative intensities being 10, 8, 7 and 7 respectively. The blue bands at λ 473 are separated into their several groups, thus affirming the presence of the hydrocarbon spectrum; this separation was also noticed in the spectrum of Rordame's comet (1893 *b*) obtained by Campbell at Lick in 1893, with which Deslandres's spectrum is practically identical.

M. Deslandres proceeds to note the similarities and differences of the cometary spectrum and the cyanogen spectrum as obtained in laboratory experiments, and suggests, as an explanation of the differences, that, although

the temperature of the comet is of the same order as the laboratory temperature, and high enough to produce incandescence, yet it is not sufficiently high to dissociate the compounds and thus produce the hydrogen and nitrogen spectra as obtained in the laboratory.

In the concluding portion of his communication M. Deslandres describes some experiments, similar to those by which he has obtained such excellent results in determining planetary rotations, whereby the differential movements of a comet's various parts may be determined from the inclination of its spectral lines to the lines of two comparison spectra photographed alongside the spectrum of the comet.

THE SPECTRUM OF NOVA GEMINORUM.—A telegram from Prof. Pickering, published in No. 3895 of the *Astronomische Nachrichten*, announces that the spectrum of Nova Geminorum was observed by Dr. H. D. Curtis at the Lick Observatory on August 17, and was seen to be of the nebular type which is characteristic of the spectra of declining temporary stars.

UNITED STATES NAVAL OBSERVATORY.—Vol. iii. (second series) of the United States Naval Observatory *Publications* has been received, and contains some 550 pages of useful observational details and results.

Part i. is devoted to observations of Eros made with the twenty-six inch equatorial and the Clark micrometer "No. ii," during 1900–1901, by Messrs. T. J. J. See and G. K. Lawton. After a description of the instrument, which has recently been supplied with an entirely new mounting by Messrs. Warner and Swasey, Dr. See proceeds to give details of the instrumental constants and their determination, and then gives the results of the individual observations for each night.

Assistant-astronomer King has used the nine-inch transit circle for observations of Eros and the reference stars suggested by the Conférence Astrographique Internationale of July, 1900, and, in part ii. of the report, gives the individual results of his observations.

Part iii. is a detailed description of the observations of 495 zodiacal stars made with the nine-inch transit circle by Prof. Eichelberger in accordance with Sir David Gill's catalogue of 2798 zodiacal stars which it was intended to observe, but in November, 1900, it was found that the pivots of the instrument were badly worn, and therefore the work is suspended until the necessary repairs have been effected.

In part iv. Mr. Updegraff gives a description, a photograph, and a diagrammatic sketch of the six-inch steel transit circle, and in a lengthy introduction gives minute details of the determination and reduction of the instrumental constants, followed by the separate observations of 130 comparison stars for the planets, including a large number of observations of reference stars for Eros. This section is concluded by two catalogues of stars and their positions, the first containing 139 zodiacal stars, and the second the Eros reference stars.

Part v. concludes this publication, and contains the individual observations made with the prime-vertical transit instrument from 1882 to 1884 by Lieutenants Ingersoll and Bowman and Ensign Taylor, all of the U.S.A. Navy.

THE WHITE SPOTS ON SATURN.—In the *Astronomische Nachrichten*, No. 3894, Senor J. Comas Solá, of Barcelona, publishes his observations of Barnard's white spot and the smaller white spots which have been recently observed on Saturn.

Using a six-inch equatorial, he easily observed Barnard's spot and several smaller ones. On June 26 the former crossed the central meridian at 13h. 19m. (G.M.T.), and was seen to be double, whilst in contact with it, and on the left side (reversed image) a small spot was observed. On July 1d. 13h. 55m. ± a feebler spot, which also appeared double, was observed to cross the central meridian in the same zone as the larger one. By July 20, when it crossed the meridian at 11h. 32m., the large spot was seen to be much feebler and apparently elongated, and on July 28 (time of transit = 11h. 15m.) it was yet feebler, and a rather difficult object for the six-inch.

Several other spots were observed, and their times of transit recorded, by Senor Solá, and, as a first approximation, he finds the rotation period of the planet to be 10h. 38·4m.

THE TEACHING OF PSYCHOLOGY IN UNIVERSITIES OF THE UNITED STATES.[1]

A TRUE estimate of the position of psychology in the curriculum of American universities can hardly be formed without a brief survey of the general system of education which prevails there. In earlier years, one need hardly say, the training was far narrower and less liberal than it is now. The candidate for the B.A. degree had his educational career as carefully prescribed for him as if he were still at school, and he had little or no opportunity to deviate from it. At the present day, the various universities of the United States offer every gradation between relatively elective and relatively non-elective systems of study. In most universities the undergraduate will find his course of work strictly defined during at least his first or freshman year. Little by little, however, the elective is gradually replacing the non-elective system. Quite recently, Harvard, for example, determined to allow a very considerable measure of optional subjects, from which the student has to make his choice from the moment he is admitted to the university.

The danger of such a system is increased by the absence of any special *ad hoc* examination for the B.A. degree. As a rule, this degree is conferred solely on the results of the terminal examinations held biannually, so that, unless proper precautions were taken, it would be possible for a student, after having passed his three or four years at college, to graduate on the basis of a superficial and very elementary knowledge of many subjects, and a detailed knowledge of none. This drawback American universities have largely succeeded in overcoming by a series of appropriate regulations concerning the relative number of elementary and advanced lectures at which attendance is required, and concerning the conditions of admission to advanced lectures. At Yale, for example, undergraduate studies are ranged under three heads:—(1) Languages and literature; (2) mathematics, physical and natural science; (3) philosophy, history and the social sciences. Every student is required to have attended advanced courses in at least one of these departments, and to show at least an elementary knowledge of subjects in the two other departments.

It will now be evident why subjects which in English universities are studied by the few are in America taken up by the many. Take Yale, for instance, with her department of philosophy, history and the social sciences. Every undergraduate has to show at least an elementary knowledge of some subject in this department, *i.e.* of philosophy, psychology, ethics, pedagogics, logic, ancient, mediæval and modern history, economics, politics or sociology. Large numbers of American students take a course of economics. At one university I was told that, on an average, every student takes two courses of economics during his undergraduate career. This fact may be ranged beside another, viz. that there are twenty-four professors, lecturers and instructors of political economy at Harvard.

So also it comes about that a great number of students take up psychology, either by itself or with allied subjects. 250 students, chiefly in their second or sophomore year, attend the year's course at Harvard, which is equally divided between the study of logic and the study of elementary psychology. At Yale a similar year's course on ethics and psychology was attended this year by 225 students. At Cornell the year's course on psychology, logic and ethics is attended by 200 students. Princeton goes so far as to make psychology a compulsory subject, without which the B.A. degree cannot be obtained. The popularity of psychology is also shown in that it is taught in the upper forms of some of the better schools.

Experimental work in the laboratory is only performed by students who intend to proceed further in psychology. Their number is a very small fraction—from one-tenth to one-fifteenth—of those who attend the preliminary course. At Columbia they are expected to have attended either a general course on experimental psychology or a special course, in which no less than eight lecturers take part, each being responsible for a few lectures in his own department of psychology, be it physiological, genetic, comparative,

[1] Paper read before the Psychological Society at Cambridge, July 25, by Dr. C. S. Myers.