

AN INCIDENT IN THE CHOLERA EPIDEMIC
AT ALTONA.

THE third contribution by Dr. Koch last year to the subject of cholera appears in the *Zeitschrift für Hygiene*, vol. xv. part 1. It covers no less than seventy-six pages, and is entitled "Die Cholera in Deutschland während des Winters 1892 bis 1893." As the title implies, it is an elaborate essay giving a most lucid and remarkably interesting exposition of the rise and course pursued by the several epidemics of cholera which visited Hamburg, Altona, and Nietleben near Halle, respectively. Several figures serve to illustrate the descriptions of sites, buildings, &c., referred to in the text.

From a bacteriological point of view, perhaps the most interesting part of the paper is that which relates to the disease in Altona, and in which an account is given of the successful elucidation of a remarkable outburst of cholera which occurred in a restricted area of that town, and which in many respects recalls the incidents of the now classical cholera explosion which took place in 1854 in connection with the Broad-street pump in London.

In a district of Altona, rejoicing in the suggestive name of "der lange Jammer," and inhabited by about 270 persons, cholera made its appearance on January 21, 1893, and in a week nine cases had occurred, of which seven ended fatally. Strange to say, in the neighbourhood and, indeed, for some distance around this centre, no other cases of cholera were recorded at all, thus pointing very clearly to some local cause as responsible for the outbreak. A searching investigation was at once instituted, resulting in the discovery that the infected houses were not connected with the Altona water-supply, but dependent for their water upon a well in their midst. The ordinary town water-supply was in fact regarded as an article of luxury and an extravagance which the humble inhabitants of "der lange Jammer" were too poor to indulge in. In May, 1892, a systematic investigation had, it appears, been made of all the wells in Altona, and ninety-two out of 366 had been condemned as unfit for use. This particular well was, however, amongst those which had been passed, as its construction appeared to be satisfactory, and its surroundings sufficiently protected to remove all fear of contamination. During the severe frost, however, there can be no doubt that surface water, unable to get away by the usual channels, gained access to the well, for when the courts of the surrounding houses were washed down with strong carbolic it was noticed that the well-water acquired a smell of this material. Thus the possibility of its contamination with choleraic matters was established, and on January 26 the well was closed. After this date only four more cases of cholera occurred, the last one recorded being on February 1, and all of these might have been contracted prior to the closing of the well, and are therefore still attributable to the use of this water.

The bacteriological examination of the water was taken in hand on January 31, and on this day large numbers of cholera bacilli were revealed by the usual special methods employed. A sample of the water collected on January 31 was preserved for further investigation, and was kept in a room having a temperature of 3-5° C.: in this sample cholera bacilli were found on the 2nd, 3rd, and 17th February respectively, showing that under the particular circumstances the bacilli were able to maintain their vitality for eighteen days in the water; on the other hand, in samples of water collected later directly from the well itself no cholera bacteria could be detected. It is to be presumed, therefore, that as no further cases of cholera occurred in the adjacent houses after February 1, no fresh bacilli found their way into the well, and those cholera bacilli which were proved to be present on January 31, must

have either become altogether extinct or have been so much reduced in number as to defy detection.

The incident is instructive, if only in demonstrating the folly of presuming that a well with flagrantly unsanitary environment may be regarded as safe for drinking purposes, just because its past history happens to be untarnished by any observed connection with an outbreak of zymotic disease. But another point which I consider is very clearly brought out by the case in question, is the uncertainty which attaches to the actual discovery of the cholera or, indeed, of other pathogenic bacteria in water, even under such peculiarly favourable conditions as were present in the case of the Altona well. Had the examination of this water been delayed only for a few days, the search for cholera bacilli would have been absolutely fruitless, and the direct bacteriological evidence entirely wanting. Chance, in this particular instance, decided otherwise, and a very satisfactory confirmation of a most probable hypothesis was obtained.

Nevertheless, it is very apparent that however important bacteriological evidence may be in determining the hygienic value of water purification processes, and as I have so often pointed out, it is in this matter the only competent referee; on the other hand, in the matter of the actual detection of disease organisms in any given water, its usefulness is of a much more restricted character.

There is undoubtedly a tendency at the present time to regard the detection of pathogenic bacteria as the most important object of bacteriological water examination. It is, however, surely a matter of far greater moment to anticipate and be forearmed against evil by ascertaining whether the principal conditions, such as purity of source, efficiency of subsidence, filtration, &c. attaching to a given water-supply are such as to reduce to a minimum the danger of its disseminating zymotic disease, than to wait for the actual discovery of pathogenic bacteria, and only then to be led to see the necessity of, as it were, locking the stable-door after the horse has been stolen!

The failure to discover the typhoid bacillus in the Worthing water-supply is another instance in point, and in the majority of cases the task of tracing the connection between an outbreak of disease and an infected water-supply must obviously still be performed without the direct support of the bacteriological detection of the zymotic poison.

PERCY FRANKLAND.

NOTES.

THE foundation of the Bakerian Lecture, to be delivered to-day at the Royal Society by Prof. Thorpe, F.R.S., and Mr. J. W. Rodger, although not so ancient as that of the Croonian, is yet of respectable antiquity. Established during the presidency of Sir John Pringle, the predecessor of Sir Joseph Banks, it has its origin in the bequest, in 1774, by Henry Baker, antiquary, naturalist, and Fellow of the Society, of the sum of one hundred pounds, the interest of which is directed to be applied for an oration, or discourse, to be spoken or read yearly by a Fellow on some subject in natural history or experimental philosophy. The forfeiture of the bequest is contingent on the lecture failing to be delivered in any one year. The founder of this lecture was himself a man of considerable parts, and, besides being the author of numerous memoirs in the *Philosophical Transactions* published two treatises on the microscope, and some poetical works. He was elected into the Royal Society in 1740, and in 1744 was awarded the Copley medal. He married the youngest daughter of Daniel De Foe. The first lecture under the bequest was given in 1775 by Mr. Peter Woulfe, the subject being "Experiments made in order to ascertain the nature of some

mineral substances, and in particular to see how far the acids of sea-salt and of vitriol contribute to mineralise metallic and other substances."

It is now arranged that the Croonian Lecture of the Royal Society will be delivered by Prof. Ramon y Cajal, on Thursday, March 8; not March 1, as announced in our issue of December 21.

WE understand that the U.S. Bureau of Weights and Measures has recently decided to use the metre and kilogram as fundamental standards, and, from the fifth day of next April, to consider the yard and pound as derivatives from the metrical standards. This decision practically means the adoption of the metrical system by the United States.

It has been decided to hold the autumn meeting of the Iron and Steel Institute at Brussels, from September 2 to 7.

M. L. GUIGNARD has been elected president of the Botanical Society of France for the present year.

M. AIMÉ GIRARD has been elected a member of the Rural Economy section of the Paris Academy of Sciences, in succession to the late M. Chambrelent.

M. ALBOFF, who has been collecting for the past six months in the Caucasian Alps, for the Boissier Herbarium, has returned with large collections.

A BOTANICAL garden has been established in the mountains near Grenoble, at an altitude of 1875 m., under the direction of Prof. P. Lachmann.

DR. E. BARONI, of Florence, is preparing a monograph of the genus *Atriplex*, and would be obliged by specimens or memoirs from any botanists who have worked at the genus.

THE *Journal of St. Petersburg* states that the Russian Technical Society has decided on the organisation at St. Petersburg of an exhibition of gold ores and of precious metals and stones.

THE Council of the Sanitary Institute have accepted an invitation, received from the Lord Mayor and citizens of Liverpool, to hold their next congress and exhibition in that city in the autumn of this year.

MR. WILLIAM GARTON, of Woolston, Southampton, has presented a sum of five hundred pounds to the Council of the Hartley Institution towards the cost of the new engineering laboratory, which is about to be added to that institution.

THE fine engineering laboratory belonging to the Purdue University, Lafayette, Indiana, and which has cost some £35,000 to build and equip, has been completely destroyed by fire. The building was only completed on January 19 last, and was burnt four days afterwards.

WE learn from the *North British Agriculturist* that the Lancashire County Council have decided to take over a farm at Penwortham, at an annual rental of £400, on a lease terminable at five, ten, or fifteen years, for the purposes of agricultural experiment and instruction.

SIR H. TRUEMAN WOOD has been elected president of the Photographic Society of Great Britain.

THE 1894 Camera Club Photographic Conference will be held in the theatre of the Society of Arts, on Monday and Tuesday, April 23 and 24, under the presidency of Capt. W. de W. Abney. The members' annual exhibition of photographs will be commenced at the club on the first day of the conference.

ACCORDING to the *British Medical Journal*, the Hungarian Government has established a bacteriological institute at Buda-Pesth for the purpose of giving facilities for the study of infectious diseases from the scientific point of view; for the employment of bacteriological methods for the combating of such diseases; for general bacteriological researches; and for supplying information on bacteriological questions to public authorities and private inquirers.

AN interesting experiment, that of the cultivation of tea, is shortly to be tried in Russia (says the *Board of Trade Journal*). The Czar, under the guidance of experts, has given his consent to a proposal for the cultivation of this plant in the western limits of the Caucasus, where the temperature is much the same as that under which the plant grows in China.

THE death is announced of Prof. E. Weyr, at the age of forty-six. He was known especially for his contributions to modern geometry.

THE *Athenaeum* announces the death of Prof. J. von Dümichen, the Egyptologist, at Strasburg, on February 7. He was born in 1833 at Weissholz, in Silesia, and pursued his Egyptological studies under Lepsius and Brugsch. In 1862 he made his first journey into Egypt, Nubia, and the Soudan, returning in 1865. At the foundation of the German University in Alsace, Dümichen was nominated to the chair of Egyptology. In 1875-76 he spent a great time in Egypt in order to complete the researches begun during his earlier journeys. He was the author of numerous works on the geography, inscriptions, architecture, and history of ancient Egypt.

THE anniversary meeting of the Geological Society was held at Burlington House, on Friday, February 16, when the medals and funds were awarded as follows:—The Wollaston Medal to Geheimrath Professor K. A. von Zittel; the Murchison Medal to Mr. W. T. Aveline; the Lyell Medal to Prof. J. Milne, F.R.S.; the balance of the proceeds of the Wollaston Fund to Mr. A. Strahan; that of the Murchison Fund to Mr. G. Barrow; that of the Lyell Fund to Mr. W. Hill; and a portion of the proceeds of the Barlow-Jameson Fund to Mr. C. Davison. The following is a list of the officers and council elected at the meeting for the ensuing year:—President: H. Woodward, F.R.S. Vice-Presidents: Prof. A. H. Green, F.R.S., Dr. G. J. Hinde, Prof. J. W. Judd, F.R.S., R. Lydekker. Secretaries: J. E. Marr, F.R.S., J. J. H. Teall, F.R.S. Foreign Secretary: J. W. Hulke, F.R.S. Treasurer: Prof. T. Wiltshire. Council: H. Bauerman, Dr. W. T. Blanford, F.R.S., Sir John Evans, F.R.S., Prof. A. H. Green, F.R.S., Dr. J. W. Gregory, Alfred Harker, Dr. G. J. Hinde, T. V. Holmes, W. H. Hudleston, F.R.S., J. W. Hulke, F.R.S., Prof. J. W. Judd, F.R.S., Prof. C. Lapworth, F.R.S., R. Lydekker, Lieut.-General C. A. McMahon, J. E. Marr, F.R.S., H. W. Monckton, Clement Reid, F. Rutley, J. J. H. Teall, F.R.S., Prof. T. Wiltshire, Rev. H. H. Winwood, Dr. H. Woodward, F.R.S., H. B. Woodward.

ON Saturday, February 24, at four o'clock, a meeting will be held in Queen Elizabeth's Lodge, Chingford, Epping Forest, in support of a proposed Epping Forest free local museum. For many years the idea of a museum to illustrate the natural history, history, archæology, &c. of the forest has been in the minds of residents of the district, and the Queen Elizabeth's Lodge seems to be admirably suited to contain a collection of the kind indicated. The Council of the Essex Field Club have expressed their willingness to undertake the gathering together of specimens, and the curatorship and scientific superintendence of the collections, as a branch of their central museum at Chelmsford. The specimens and exhibits which it is proposed to place in the museum would include

such as the following:—(a) Specimens of the natural history and geology of the forest district—the quadrupeds, birds, fishes, reptiles, insects, trees, wild flowers, fungi, fossils, &c. (b) Instructive preparations to illustrate the variety of form colour, structure, habits, transformations, and development, &c., of the above, with examples of galls and other plant disease and injuries. (c) The antiquities of the forest districts; illustrations of the camps, and other earthworks; prehistoric implements and other remains, &c. (d) Plans, maps, photographs, pictures, models, &c. relating to the district; illustrations of the history of the forest, and its scenic beauties; the architectural and archæological features of the district, &c. (e) A small collection of books—guides, histories, manuals of natural history, &c.—useful to those wishing to learn something about the district before taking rambles therein. A local museum of the kind proposed would be a source of interest and utility to all lovers of nature, and might be made of considerable educational value.

IN the early part of this week a very severe frost set in over the midland, eastern, and southern parts of England, accompanied by piercing easterly winds; the night minima in the shade fell to 16° at Loughborough, and to about 25° at Shields; while in London the temperature on the grass was as low as 14° , and fog occurred over the inland parts of England. These conditions were due to an area of high atmospheric pressure which lay over Denmark, the Netherlands, and south of Scandinavia, where the barometer readings were as high as $30\cdot6$ inches, with lower readings further south. But our extreme north and west coasts were under the influence of low pressure areas, and a south-westerly gale was blowing at Stornoway on Monday evening; consequently the temperature in these parts was higher.

IN Dr. Wild's *Annalen des Physikalischen Central Observatoriums* for 1892, just received, it is recorded that at Werchojansk, Lat. $67^{\circ} 34' N.$, Long. $133^{\circ} 51' E.$, the temperature fell in February to $-69^{\circ}\cdot8 C.$ or $-94^{\circ}\cdot6 F.$ This is absolutely the lowest temperature of the air hitherto observed anywhere on the surface of the earth.

IN *Ciel et Terre* of the 1st inst. M. A. Lancaster contributes an interesting paper "On the commencement and end of winter," as determined by the first and last occurrence of snow and frost at Brussels. He gives tables showing these dates for sixty-one years, from 1832-3 to 1893-4 (the data for the first and last of these years being incomplete). On an average, the first frost occurs about November 10, and the first snow about five days later, while the first frost of much intensity (below $20^{\circ} F.$) occurs about six weeks afterwards. At times these phenomena occur much earlier or later; the first frost occurred in 1864-5 and in 1881-2 on October 5, while in 1877-8 no frost occurred until December 10. The last frost occurs, on an average, about April 4; in 1885-6 there was a frost as late as May 1, while in 1835-6 the thermometer did not fall below 32° after February 24. The fall of snow is much more irregular; it fell seventeen times in May, and once in June (in the year 1866). A paper of a similar nature was published for Sweden in 1880, by M. Hildebrandsson.

THE practice of spraying fruits with certain mineral compounds, such as salts of copper and arsenic, to destroy insects and fungi, has called out discussion in regard to the ripened fruit after such spraying, and its fitness for food. The first condition for intelligent discussion of any subject is to know the facts in the case, so experiments have been made on the matter at the State Agriculture College, Michigan, and *Bulletin* No. 101 contains the results. In these experiments, extending over two years, the minerals used in spraying the fruits were found in appreciable quantities in every instance, though the amount was small in all

cases except when the spraying had been purposely excessive. The question naturally arises whether the sprayed salts merely adhere to the surface or penetrate the substance of the fruit. Experiments made to test this showed that while most of the copper salts, in the case of a solution containing copper sulphate, adhered to the surface of pears sprayed with the solution, a portion found its way into the body of the fruit. Dr R. C. Kedzie, who has made the analyses, remarks that the use of poisons in horticulture is largely in excess of the amount required for a fungicide. One-half or even one-third of the amount usually employed would probably give as good results. To be on the safe side, no fruits should be sprayed with solutions of mineral salts during the period of ripening, for though the amount found in a single pound of fruit may be very small, repeated doses of the poison might produce slow poisoning.

THE new theory of light-sensation devised by Christine L. Franklin, and intended to avoid the difficulties involved in the acceptance of the two chief theories in the field at present, known as Helmholtz's and Hering's theory respectively, is expounded in the last two numbers of *Mind*. While the Young-Helmholtz theory supposes that the judgment picks out of a mixture of colours all the even red-green-blue sensations, and deceives itself into thinking them to be a new sensation called white, the new theory assumes an independent retinal process as ground for the latter sensation, therein agreeing with Hering's theory. But while Hering supposes that some parts of the spectrum produce construction, and others destruction of the tissue of the retina, Miss Franklin considers that the sensations of the black-grey-white series must be regarded as the fundamental ones, and attributed to the dissociation of certain molecules, which she provisionally calls the grey molecules. The atoms thus dissociated have different periods of vibration, and in the more highly developed visual organs—those capable of colour-sensations—these colour-atoms differ in behaviour according to the wave-length of the light beating upon them. Thus some atoms would only be torn off by red light, and would give rise to the sensation of red. The prevalence of such colour molecules would coincide with the predominance of the structures known as cones in the fovea of the retina, while the "rods" are endowed chiefly with grey molecules. This is simply translating into the language of the theory the well-known fact that the colour sense is chiefly confined to the centre of vision, as anybody may prove by looking at a coloured object through the corner of the eye. This distribution, says Miss Franklin, offers a perfect analogy with that of the organs of hearing. In the ear we have a very simple apparatus for hearing noise only, and also a highly differentiated structure for the discrimination of notes of various pitches.

IN 1881 M. Blondlot gave the results of some experiments he had made on the velocity of propagation of Hertzian waves. The velocity was determined by calculating the period of the electrical vibrations from the dimensions of the resonator, and measuring experimentally the wave-length. The results obtained, while they indicated that the velocity is always approximately that of the propagation of light, showed that as the wave-length increased the velocity diminished. In a note, communicated at a recent meeting of the Académie des Sciences (Paris) (*Comptes Rendus*, No. 6, 1894), M. Mascart has shown that a more accurate calculation of the frequency gives a remarkable agreement between the different experiments. In this note the author gives the formula for the self-induction of a rectangle of wire, and applies it to the reduction of M. Blondlot's observations. He finds that the values obtained for the velocity of propagation show no systematic variation with the wave-length within the limits of observation, that is, between wave-lengths of 9 and 35 metres. The mean of all the experiments gives the value $303,200$ kilometres per second

as the velocity, while, if the results obtained with one of the resonators which M. Blondlot thinks are less trustworthy are omitted, the mean becomes 302,850 kilometres per second, the maximum variation obtained from this mean amounting to 2.5 per cent. The author also points out that it is interesting to note that the mean value of the velocity of propagation of electro-magnetic waves obtained is about one per cent. higher than the velocity of light. The difference he considers to be due to the fact that the calculated value of the self-induction is too small, for the radius of the wire is an important factor, which may be estimated too large, either owing to errors in measurement or to the fact that the current in the wire is not exclusively confined to the external surface of the wire (as the formula employed supposes), but penetrates some distance into the wire. The employment of wires of larger section, he thinks, might perhaps lead to a better result.

WITH reference to some recent experiments on the railway between Beuzeville and Havre, the *Electrician* says:—"When, about three years ago, a scheme was announced for building a locomotive on which a high-speed engine was to drive a three-phase alternator, which was in turn to drive motors, it met with a little ridicule, and the two sets of tests which have been recently made on the Chemin de Fer l'Ouest at Havre have raised a smile, but only where the reasons of this roundabout system have not been understood. The two chief difficulties in obtaining higher speeds than from 70 to 80 miles an hour with ordinary express locomotives are want of balance and want of space. The impossibility of avoiding the superfluous vertical action of balance weights on an ordinary single-wheel locomotive is alone sufficient to reduce adhesion, and to allow slip at speeds a little over 80 miles an hour. All these difficulties are reduced, if not avoided, in the Heilmann locomotive, though not without the introduction of others, and it remains to be seen how the balance of advantage works out."

MR. H. WORK DODD has investigated the question as to a relationship between epilepsy and errors of refraction in the eye, and the current number of *Brain* (part lxiv.) contains his results. He has examined the eyes of one hundred cases of true epilepsy, and compared the refractions with those of apparently normal eyes. It appears that of simple hypermetropia there were twenty-eight cases per cent. less in the epileptic than in the apparently normal class. Of astigmatism of all kinds, there were twenty-six cases per cent. more in the epileptic division than in the normal one. These and other differences lead Mr. Dodd to conclude that, given a certain condition of instability of the nervous system: (1) errors of refraction may excite epilepsy; (2) the correction of the errors of refraction will, in combination with other treatment, in many cases cure or relieve the epileptic condition; and (3) that in some cases, when the refraction error has been corrected, the epilepsy will continue, generally in a modified form, in consequence of other irritation, even though the error of refraction may have been the exciting cause of the fits in the first instance. Mr. Dodd is strongly of opinion that in every case of epilepsy—in addition to general treatment and the investigation of other organs—the eyes should be carefully examined under a mydiatic with a view of correcting any error of refraction that may exist by the use of proper spectacles.

THE bacterial contents of ice from various sources has been very exhaustively investigated, but only a few experiments have been made on the vitality of particular micro-organisms in artificially frozen ice produced by means of freezing mixtures. Prudden exposed various bacteria to 24° of cold, and amongst these the typhoid bacillus was found still present in large numbers after 103 days of continuous exposure to this low temperature; if, however, the freezing was interrupted during

the twenty-four hours by three separate thawings, they were entirely destroyed at the end of three days. Prudden also showed very clearly that the resistance of an organism depends upon its initial vitality, for whereas the *staphylococcus pyogenes aureus* taken from a fresh agar cultivation was present in very large numbers at the end of sixty-six days, if an old and half dried-up agar culture was used for the original infection, none were found after seven days. Renk (*Fortschritte der Med.* No 10, 1893) has quite recently examined the behaviour of the cholera organism in ice artificially prepared from sterilised river Saale water, and finds that five days uninterrupted exposure to a temperature of from -0.5 to -7° C. is sufficient to entirely destroy these bacilli; but contrary to Prudden's experience, he found that if the freezing was interrupted, which took place when the vessels containing the organisms were removed for examination, a longer time (6-7 days) was necessary for their annihilation. When unsterilised Saale water was used, the cholera organisms disappeared at the end of three days, and the ordinary water bacteria present were reduced in 24 hours from 1,483,000 to 62,445 per c.c. whilst after three days only 4480 were found. Prudden's experiments with the typhoid bacillus, together with those on the cholera organism, indicate how important it is that ice for consumption should only be prepared from sterilised water, or from water the source of which is altogether beyond suspicion of contamination.

THE Société d'Encouragement pour l'Industrie Nationale has issued its *Annuaire* for 1894.

WITH the present year the bi-monthly cryptogamic journal, *Helwigia*, published at Dresden, and edited by Prof. G. Hieronymus, commences the publication of a periodical synopsis of cryptogamic literature.

WE have received a copy of "Bourne's Handy Assurance Directory" for 1894. The work appears for the first time under the imprimatur of Mr. William Schooling, who will doubtless sustain the reputation for accuracy earned for it by the late editor, Mr. William Bourne.

DR. M. BARATTA has prepared a series of maps showing the topographical distribution of earthquakes in Italy for each year from 1887 to 1891. The maps, which originally appeared in the *Annali dell'Ufficio Centrale di Meteorologia e Geodinamica*, should be of great interest to seismologists.

THE second volume of Sir David Salomons' "Electric Light Installations," dealing with apparatus, engines, motors, governors, switches, meters, &c. will be shortly issued in Messrs. Whittakers' "Specialists' Series." The third and concluding volume is now in the press, and will deal with the application of electricity.

MR. W. THYNNE LYNN'S "Celestial Motions" (Edward Stanford) has reached the eighth edition. The first edition of this useful little book was published ten years ago. Another little treatise by the same author, "Remarkable Comets," has just passed into a second edition. Both books have been revised and brought up to date.

AN important report on the Ainu of Yezo, Japan, prepared for the U.S. National Museum, by Mr. Romyn Hitchcock, has been received. It is profusely illustrated from photographs taken by the author, and contains a mass of detail concerning the remnant of a once numerous people in Yezo and on the islands Kumashiri and Zeterof.

MESSRS. BLISS, SANDS, AND FOSTER announce that they have made arrangements with the editor of "A Son of the Marshes," and with Prof. Boulger, for the joint production of

twelve monthly volumes to be entitled "The Country, Month by Month." Mr. Lockwood Kipling has supplied a design for the cover. The first number will appear on March 1, and will be descriptive of that month.

A NEW work is announced by Mr. Leland, bearing upon his favourite subject—practical education. The manual deals with elementary metal work, including bent iron, repoussé, cut metal, and easy silver work. It is written primarily for manual training classes in elementary and preparatory schools, but will probably be found interesting to any one who has a mechanical bent. Mr. Karl Krall has revised the work while passing through the press. The publishers are Messrs. Whittaker and Co.

THE first part of the new journal, *Novitates Zoologicae* has been issued. It is a large 8vo, with 266 pages and four coloured plates, while six others are deferred, to appear in part ii. An excellent memoir, by Dr. Forsyth Major, on the small lemurs of Madagascar (*Microcebus*, &c.), commences the work; then follow articles by Mr. Rothschild (on a new pigeon, and on some new sphinx-moths), and by his two assistants, Dr. E. Hartert and Dr. K. Jordan, on various birds and insects. The organ of the Tring Museum has made a good start, and promises to be of great interest to zoologists.

LOVERS of nature will be glad to know that the supposed dissolution of our old contemporary, *Science Gossip*, after nearly thirty years' prosperity, proves to be only a case of suspended animation, and that its familiar face will again be seen in public after the 25th inst. In future *Science Gossip* will be under the editorship of Mr. John T. Carrington and Mr. Edward Step. The character of the paper as a medium between amateur naturalists, and for the recording of observations, will be fully maintained; at the same time, it is intended to give it a higher educational value by enlisting the aid of the leading men in every department of natural science. Messrs. Simpkin, Marshall, and Co. will in future be the publishers.

IN our issue of November 9, 1893, we gave a description of some Hindoo dwarfs photographed by Colonel A. T. Fraser. Dr. A. E. Grant afterwards suggested that the dwarfs were afflicted with the disease known as pseudo-hypertrophic paralysis. Colonel A. T. Fraser writes to us, however, as follows:—"On observing Dr. A. E. Grant's letter in NATURE for January 4, I lost no time in sending him a copy of the dwarfs' photograph, to which his reply states—"It is evident they are true dwarfs, and not subjects of the disease I alluded to. Their heads and trunks appear to be of normal size, whilst their limbs are stunted and deformed."

UNDER the title, "Climates of the United States," Dr. Charles Denison has prepared a revised edition, in a condensed form, of his annual and seasonal climatic charts of the United States. The book is published by the W. T. Keener Co., Chicago. It consists of twelve charts and eleven tables representing the climatic statistics of different sections of the United States. The annual rainfall and temperature are shown on one chart, the former by means of broken lines, and the latter by the usual isothermals. A chart is devoted to the illustration of annual cloudiness, and one to regimal elevations. Upon the four charts exhibiting the isothermal lines for the four seasons of the year, a number of arrows of three different kinds are drawn, showing not only the directions of the prevailing winds, but also the directions of winds likely to be followed by rain or snow, and the directions of those that usually herald fine weather. The average atmosphere humidities during different seasons of the year are clearly shown in eight degrees of colour. Altogether the book presents in a handy form a mass of climatological information.

THE late Prof. Hertz could have no more permanent monument than that afforded by his work on the propagation of electric energy through space, reviewed in these columns on October 5, 1893. An English edition of the collected papers contained in that volume has recently been published by Messrs. Macmillan and Co., under the title "Electric Waves." Prof. D. E. Jones is the translator, and he had the advantage of Dr. Hertz's supervision and advice while the book was passing through the press. In a preface, Lord Kelvin briefly describes the development of the idea as to action at a distance, and concludes by pointing out that "absolutely nothing has hitherto been done for gravity either by experiment or observation towards deciding between Newton and Bernoulli, as to the question of its propagation through a medium, and up to the present time we have no light, even so much as to point a way for investigation in that direction." Lord Kelvin also calls attention to the experimental work on electromagnetic waves done previous to the publication of Hertz's researches, but which do not detract in the least from their merit. The English reading public will doubtless fully appreciate Prof. Jones' translation of one of the most important works of this century.

THE polymeric modifications of acetic aldehyde form the subject of an interesting and important communication by Messrs. Orndorff and White to the January issue of the *American Chemical Journal*. These remarkable substances, paraldehyde and metaldehyde, have furnished the theme of many investigations, but their nature and their relation to common aldehyde has not hitherto been definitely established. In the older treatises upon organic chemistry, no less than five different polymeric forms of aldehyde are mentioned, but the researches of Kekulé and Zincke resulted in the existence of only two being established, the liquid paraldehyde and the solid metaldehyde. It was shown that carefully purified aldehyde suffers no change on heating or cooling, or on being kept for a length of time, and that polymerisation is always connected with the presence of certain substances, such as hydrochloric and sulphuric acids or carbonyl chloride. In most cases both forms are simultaneously produced, a low temperature, particularly below 0°, favouring the formation of metaldehyde, and a higher temperature being more favourable to the production of paraldehyde. The vapour density of paraldehyde was further shown to correspond to the triple formula $(C_2H_4O)_3$, and it was assumed that three molecules of ordinary aldehyde unite to form the closed chain compound, paraldehyde. The constitution thus arrived at for the liquid polymer of aldehyde has since received remarkable confirmation from the spectrometric work of Brühl, who found that the molecular refraction of paraldehyde corresponded to that calculated upon the assumption of the triple formula. Metaldehyde only differs from paraldehyde in its physical properties; chemically, the two compounds behave precisely alike. The vapour density of metaldehyde cannot be directly determined owing to its partial dissociation into ordinary aldehyde when heated, hence its formula has not hitherto been definitely known. Hanriot and Economides succeeded, however, in determining its density by introducing a correction for the amount of ordinary aldehyde produced, and their results indicated that the formula of this solid polymer was the same as that of the liquid paraldehyde. Orndorff and White have here taken up the subject, and show that determinations of molecular weight by Raoult's method, using phenol and thymol as solvents, point irresistibly to the same conclusion, the molecular weight found being always in the neighbourhood of 132, corresponding to three times 44, the molecular weight of aldehyde. They have also repeated and extended the vapour density determinations of the former observers, and have definitely settled the fact that paraldehyde and metaldehyde are isomers, both possessing the molecular composition

(C_2H_4O)₃. They further show that metaldehyde is by no means so stable as has been supposed; it decomposes completely in a few days' time, the products of decomposition being paraldehyde and a new polymer, tetraldehyde (C_2H_4O)₄. The latter substance, whose composition has been definitely established by vapour density and cryoscopic determinations, is a solid of similar appearance and properties to metaldehyde. It is finally shown that paraldehyde and metaldehyde are in all probability stereo-isomers, like maleic and fumaric acids, the more stable paraldehyde corresponding to the fumaroid or so-called "cis-trans" form, and the less stable metaldehyde to the maleinoid or "cis" form.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*, ♂) from India, presented by Mr. James Carter; two Vulpine Phalangers (*Phalangista vulpina*, ♂ ♀) from Australia, presented respectively by Mrs. Percy Morton and Mr. W. Hughes; two Garden Dormice (*Myoxus quercinus*) European, presented by Dr. R. B. Sharpe; a Goshawk (*Astur palumbarius*) European, presented by Mr. Duncan Parker; a Jackdaw (*Corvus monedula*) British, presented by Mrs. Dixon Brown; two Striped Hyænas (*Hyæna striata*) from North Africa, a Mitred Guinea Fowl (*Numida mitrata*) from Madagascar, deposited.

OUR ASTRONOMICAL COLUMN.

SUN-SPOTS AND MAGNETIC DISTURBANCES.—The *Memoirs* of the Società degli Spettroscopisti Italiani (vol. xxii. p. 189) contains a paper by Dr. L. Palazzo on the magnetic disturbances of August 1893, considered in relation to the extent of solar spots. When the very large spot, or rather group of spots, was passing the central meridian on August 6 and 7 of last year, the bifilar magnetometer of the Roman College Observatory was considerably disturbed. On August 18, that is, when the spots were again near the plane of the central meridian, but on the other side of the sun, all three magnetic elements suffered a disturbance. Another magnetic storm was recorded at the Marine Observatory of Pola on August 12 and 13. Dr. Palazzo has collected all the facts connected with these three disturbances, and discusses them with the idea of determining the relation, if any, between them and sun-spots. From the paper it appears that the magnetic perturbation of August 6 commenced at 4.7 hours, when the double spot was about $15^{\circ}4$ from the central meridian. The middle point of the pair passed the central meridian at 8.5 hours on the following day. It would be interesting to know whether the sun was under observation at any place east of Rome at a time corresponding to that given for the commencement of the brusque magnetic disturbance described by Dr. Palazzo, and if so, whether any strange phenomenon was observed. The disturbances of August 12 preceded by about twelve hours the transit of the largest spot visible upon the sun at the time. On August 18, however, no spot could be seen near the central meridian when the magnetic needles were recording a perturbation, while neither when the double-spot again appeared on the sun's limb, nor when it passed the central meridian on September 2, did the magnetic needles flutter. We have, therefore, spots without disturbances, and disturbances without spots, thus indicating that there is no connection between the phenomena. Prof. Ricco's discussion of the relation between solar spots and disturbances of terrestrial magnetism (*Mem. degli Spettrosc.* vol. xxi. p. 153, 1892) led him to believe that magnetic disturbances occur, on the average, about 45.4 hours after the transit of spots over the central meridian of the sun. M. Marchand (*Comptes Rendus*, 1887, p. 133) showed that such disturbances occurred when groups of spots or faculæ were near the centre of the sun's disc, and Dr. Veeder has given evidence to prove that the appearance of spots on the sun's eastern edge is the signal for magnetic fluctuations. Dr. Palazzo, however, believes that the position with respect to the earth of the solar region disturbed is really unimportant.

STONYHURST COLLEGE OBSERVATORY.—Father Sidgreaves' report on the meteorological, magnetic, and solar observations

made at Stonyhurst College Observatory during 1893 has been issued. We extract from it the chief points of astronomical interest.

The ordinary work of the solar chromosphere was practically suspended during the year on account of the anticipated dismounting of the telescope for the erection of the Father Perry Memorial. But the sun-spot drawings have been continued, and were carried on with the six-inch objective which was mounted on the equatorial during the absence of parts of the eight-inch telescope. The new objective, with its mountings, was erected on November 6. It has a clear aperture of $14\frac{1}{2}$ inches, and was worked by Sir Howard Grubb, of Dublin. It is valued at £650, and constitutes the substantial tribute to the memory of the late Father Perry, raised by the generosity of his many friends.

The large grating spectrograph has been employed upon the solar spots and faculæ with the result that 175 photographs were obtained of spot-spectra in the green-yellow region, and ninety-two plates of faculæ-reversals of the H and K lines.

The night-work with the equatorial has been confined to stellar photographic spectra. In May, it was decided to make use of every opportunity upon the variable star β Lyræ; and as the exposures upon this were necessarily long, and there were many failures, other stars were let alone. Out of the whole number of exposures forty-five plates of β Lyræ proved to be available for careful measurements, and the results are published in the December number of the Monthly Notices of the Royal Astronomical Society.

THE "ANNUAIRE" OF THE BUREAU DES LONGITUDES.—A copy of the *Annuaire* of the Bureau des Longitudes, for the present year, has been received. Every year sees an increase in the quantity of matter compressed into that veritable *vade mecum*. To the present volume has been added notes by Prof. Cornu on the physical aspect of the sun, solar spectroscopy, and the spectra of comets and nebulae. The descriptive note on stellar spectra, begun in the 1893 issue, is completed, and an account is given of recent observations of β Lyræ, and the spectrum of Nova Aurigæ. The articles include one by Prof. Poincaré, on light and electricity, according to Maxwell and Hertz; another, on the origin and use of the compass, by Contre-Amiral Fleuriais; and a third, in which Dr. Janssen describes four days of observation on the summit of Mont Blanc. Altogether, the 1894 *Annuaire* adds to the reputation gained by its predecessors; it is a volume which no astronomer can afford to be without, and which every student of physical science will find useful.

THE SPECTRUM OF NOVA NORMÆ.—A telegram received at Kiel on February 15 announces that Nova Normæ was observed by Prof. Campbell at the Lick Observatory on February 13, and found to have fallen to magnitude 9.5 (*Astr. Nachr.* 3211). The spectrum was seen to consist of four bright lines of the same relative intensity and position as those shown by Nova Aurigæ in August, 1892 (see NATURE, vol. lxviii. p. 524). Like this new star, therefore, Nova Normæ has descended to the condition of a planetary nebula.

THE SMITHSONIAN INSTITUTION REPORT.

THE report of Prof. S. P. Langley, Secretary of the Smithsonian Institution, for the year ending June 30, 1893, has just been published. Its contents refer, not only to the Smithsonian Institution, but also to the work of the U.S. National Museum, the Bureau of Ethnology, the Bureau of International Exchange, the Zoological Park, and the Astro-Physical Observatory. To do justice to the many and various operations of all these sections is impossible within the limits of space at our disposal, but some idea of the work may be obtained from the following abstract:—

Research.

It appears to be an essential portion of the original scheme of the government of the Smithsonian Institution that the secretary should be expected to advance knowledge, in letters, or in science, by personal research. Prof. Langley has continued the traditions of the Institution and the usage of former secretaries by contributing to the objects stated, as far as his increasing administrative duties would permit. During 1893 he continued the researches, of which a portion was published in 1891, in a