

metrical progression, and that the cessation of their growth is caused by the diminution of their food supply.

MR. H. G. WELLS'S scientific fantasy, the "Time Machine," which has been appearing as a serial in the *New Review*, will be published in volume form, by Messrs. Heinemann, in the course of a few days.

MR. GISEBERT KAPP has arranged with Messrs. Whittaker and Co. for a translation from the German of his new work on the "Alternate Current Transformer." The volume will be published in the "Specialists' Series" in the autumn.

THE papers on the relation of diseases of the spinal cord to the distribution and lesions of the spinal blood-vessels, recently contributed by Dr. R. T. Williamson to the *Medical Chronicle*, have been reprinted and published in book form by Mr. H. K. Lewis.

THIS week's new editions include Prof. T. Preston's philosophical "Theory of Light," published by Messrs. Macmillan. More than one hundred pages of new matter have been added, a valuable addition being an account of Prof. Newcomb's experiments to determine the velocity of light. The second edition has appeared of the late Prof. Cayley's "Elementary Treatise on Elliptic Functions" (Macmillan), the first edition of which was published in 1876. Another second edition, received during the past week, is "A First Book of Electricity and Magnetism," by Mr. W. Perren Maycock. This book, now greatly enlarged, is published by Messrs. Whittaker and Co.

THE Deutsche Seewarte, which, with the year 1894, has completed its twentieth year of useful activity, has just issued the seventeenth volume of *Aus dem Archiv*. This work, which has contained many elaborate and valuable discussions in meteorology, navigation, and nautical astronomy, is now devoted more especially to discussions of practical utility to seamen. Among the articles of more general scientific interest may be mentioned one by Dr. Grossmann, on the application of Bessel's formula in meteorology, and one by Dr. Maurer, on the application of graphical methods in meteorology and physics generally; the latter investigation may possibly lead to the substitution of this method for the use of tables in some of the problems of nautical astronomy.

THE additions to the Zoological Society's Gardens during the past week include six Hairy-footed Jerboas (*Dipus hirtipes*), two Lesser Egyptian Gerbilles (*Gerbillus ægyptius*), two Lybian Zorillas (*Ictonyx tybica*), two Grey Monitors (*Varanus griseus*), two Egyptian Mastigures (*Uromastix spinipes*), three Egyptian Geckos (*Tarentola annularis*), a Common Chameleon (*Chamaeleon vulgaris*), seven Common Skinks (*Scincus officinalis*), two Cerastes Vipers (*Vipera cerastes*), two Diademed Snakes (*Zamenis diadema*), from Egypt, presented by Dr. John Anderson, F.R.S.; a Grysbok (*Neotragus melanotis*, ♀), from South Africa, presented by Mr. J. E. Matcham; a Wapiti Deer (*Cervus canadensis*, ♀), a Japanese Deer (*Cervus sika*, ♀), a Burchell's Zebra (*Equus burchelli*, ♂), two Polar Hares (*Lepus glacialis*), born in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

MERCURY AND VENUS.—The planet Mercury is now an evening star, and will be favourably placed for observation until towards the end of June. The greatest elongation will occur on June 4 at 13h., when the planet will transit about 1h. 42m. after the sun; the declination will then be nearly 25° north, and the apparent diameter a little over 8". Jupiter will be in close proximity to Mercury during the present period of its visibility, so that observers not employing telescopes must be careful to discriminate between the two; at the elongation, Mercury will precede Jupiter by about 8m. in R.A., and will be about 1½

degrees farther north. The two planets will be in actual conjunction on June 8 at 4h., Mercury being 0° 47' N. of Jupiter.

Venus, also, is most favourably situated for observation at the present time, and the great brilliance of the planet in the western sky after sunset cannot fail to attract the attention of the most indifferent. It will not, however, reach maximum brightness until August 13. The greatest eastern elongation will occur on July 11, and the apparent diameter will increase from 16" on June 1 to 59' at the inferior conjunction on September 18.

THE TOTAL SOLAR ECLIPSE OF 1898 JANUARY 21-22.—In addition to the eclipse of the sun which will take place on August 8, 1896, and for which we understand preparations are already well in hand, there will be another important solar eclipse before the end of the present century. This will occur on January 21-22, 1898, and the *Nautical Almanac Circular*, No. 16, gives local particulars of the same for that portion of the path of the shadow which lies across India. At Rajapur the duration will be 2m. 19s. and the altitude of the sun 53"; at Nagpur, 1m. 17.7s. with an altitude of 46"; and at a position south of Benares, 1m. 43.6s. with an altitude of 40°. Information as to the meteorological conditions prevailing at various points along the track of the eclipse during the latter part of January is being collected through the assistance of Mr. Eliot, Meteorological Reporter to the Government of India. It is proposed to publish this information early in 1897.

As the next sun-spot minimum is not due until the year 1900, observations of the phenomena of this eclipse will furnish information as to the solar conditions during the transition from maximum to minimum.

THE ASTRO-PHOTOGRAPHIC CHART.—The third part of the second volume of the *Bulletin* of the International Permanent Committee, gives an account of the present state of the great undertaking to prepare a photographic catalogue and chart of the heavens. The reports from the various participating observatories indicate in general a rapid advance towards the completion of the photographs which are intended to form the basis of the catalogue; four of the eighteen observatories have already completed the zones allotted to them, and it is expected that at least eight more will reach this stage by next spring. Systematic work at the South American observatories has been seriously interfered with by political events; but it is satisfactory to learn that the Australian and Cape of Good Hope astronomers are prepared to come to their assistance. An immense number of catalogue plates with short exposures has been taken with the various instruments, no less than 753 having been taken at Paris, and 1562 at the Cape. The measurement of the catalogue plates is also in a forward state at several of the observatories, but the reductions have scarcely been commenced.

For the chart itself, not one-third of the requisite photographs have yet been obtained, but the progress of this part of the work is necessarily slow, in consequence of the long exposures required.

Dr. Gill proposes that the Committee should meet in 1896, to reconsider the various questions left open at the former conference, among which one of the most important relates to the scale of magnitudes to be adopted.

Four important memoirs also form part of the present report. Prof. Turner and M. Prosper Henry discuss different methods of reducing the plates, M. Trépiéd gives his experience and views as to the determination of magnitudes, and M. Donner discusses the various corrections for instrumental errors.

AWARD OF THE WATSON MEDAL.—On the recommendation of the Board of Trustees of the Watson Fund, the U.S. National Academy of Sciences last year unanimously awarded the Watson medal to Dr. S. C. Chandler, for his investigations relative to variable stars, his work in connection with the variation of terrestrial latitudes, and his researches on the laws of that variation. The recommendation was noted in these columns a year ago, and a description of the founding of the award was given (*NATURE*, vol. 1. p. 157). The medal was presented to Dr. Chandler at the recent meeting of the National Academy, and *Science* for May 3 contains the report of the Trustees, setting forth the grounds upon which the award was made, and briefly stating the history of the investigation of changes of latitude. Dr. Chandler's work upon the subject began with observations made by him in 1884-85. His observations, continued uninterruptedly for thirteen months, revealed a progressive change of a pronounced periodical character in the

instrumental values of the latitude. Circumstances prevented him from carrying on the work until six years later, when he took up the problem again. The results then obtained are published in a series of eighteen papers in the *Astronomical Journal* (1891-94), exclusive of a series of five papers upon a topic closely related thereto, namely, the aberration-constant. These papers have been noted from time to time in this column, so it is unnecessary to do more than refer to them now.

In connection with variable stars, besides the incidental work of observation and discovery which Dr. Chandler has contributed to it, his work has involved the collection of all the data in astronomical history, their discussion, and the formulation of the elements of their light-variations into numerical laws. His important researches upon cometary orbits are also well known to astronomers.

#### A LECTURE EXPERIMENT.

A FURTHER description of the use of the electric furnace recently exhibited at the Royal Society, for the purpose of lecture demonstrations, may be useful, as pictures, some six feet across, of the interior of the furnace may readily be projected on the screen. This is effected by the aid of the device which has already been given in *NATURE* (p. 17, Fig. 2). The result is really very beautiful, though it can only be rendered in dull tones by the accompanying illustration (Figs. A, B). It may be well, therefore, to state briefly what is seen when the furnace is arranged for the melting of metallic chromium. Directly the current is passed, the picture reflected by the mirror, E (Fig. 2, *loc. cit.*), shows the interior of the furnace (Fig. A) like a dark crater, the dull red poles revealing the metallic lustre and grey shadows of the metal beneath them. A little later these poles become tipped with dazzling white, and, in the course of a few minutes, the temperature rises to about 2500° C. Such a temperature will keep chromium well melted, though a thousand degrees more may readily be attained in a furnace of this kind. Each pole is soon surrounded with a

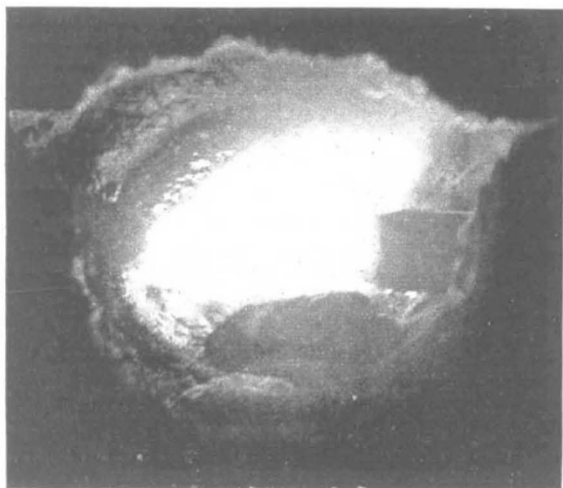


FIG. A.—This represents the interior of the furnace containing molten chromium as is seen either by reflection on a screen or by looking into the furnace from above, the eyes being suitably protected by deeply tinted glasses.

lambent halo of the green-blue hue of the sunset, the central band of the arc changing rapidly from peach-blossom to lavender and purple. The arc can then be lengthened, and as the poles are drawn further and further asunder, the irregular masses of chromium fuse in silver droplets, below an intense blue field of light, passing into green of lustrous emerald; then the last fragments of chromium melt into a shining lake, which reflects the glowing poles in a glory of green and gold shot with orange hues. Still a few minutes later, as the chromium burns, a shower of brilliant sparks of metal are projected from the furnace, amid the clouds of russet or brown vapours which wreath

the little crater; while if the current is broken, and the light dies out, you wish that Turner had painted the limpid tints, and that Ruskin might describe their loveliness.

The effect when either tungsten or silver replaces chromium is much the same, but, in the latter case, the glowing lake is more brilliant in its turbulent boiling, and blue vapours rise to be condensed in iridescent beads of distilled silver which stud the crater walls.

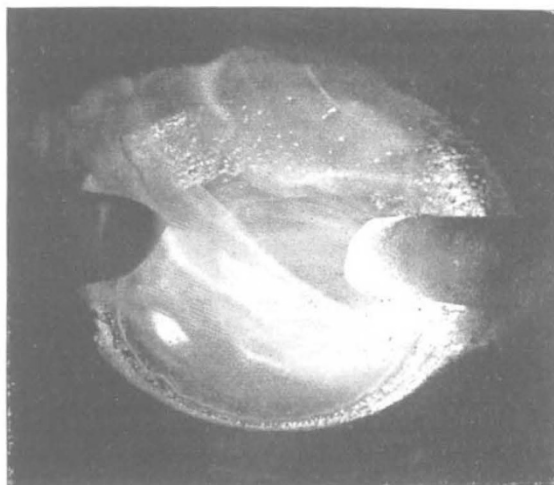


FIG. B.—In this case the arc was broken the instant before the photograph was taken. The furnace contained a bath of silver just at its boiling point. The reflection of the poles in the bath, the globules of distilled silver, and the drifting cloud of silver vapour, are well shown.

Such experiments will probably lend a new interest to the us of the arc in connection with astronomical metallurgy, for, as George Herbert said long ago—

“Stars have their storms even in a high degree,  
As well as we”;

and Lockyer has shown how important it is, in relation to such storms, to be able to study the disturbances in the various strata of the stellar or solar atmosphere. Layers of metallic vapour which differ widely in temperature can be more readily obtained by the use of the electrical furnace than when a fragment of metal is melted and volatilised by placing it in the arc, in a cavity of the lower carbon.

W. C. ROBERTS-AUSTEN.

#### THE LIFE-HISTORY OF THE CRUSTACEA IN EARLY PALÆOZOIC TIMES.

IN his recent anniversary address to the Geological Society, the President, Dr. Henry Woodward, F.R.S., after the usual distribution of medals and awards, the reading of obituaries of deceased Fellows, and some preliminary matters relating to the affairs of the Society, including the moot question of the introduction of ladies as visitors to the evening meetings, devoted the remainder of his address to a brief discussion of “Some Points in the Life-history of the Crustacea in Early Palæozoic Times.” Dr. Woodward continued as follows:—“Of the various groups of the Invertebrata whose ancestry extends into Palæozoic times, none possess a greater interest for the geologist than the Crustacea, whose existence is proved as far back as the Lower Cambrian rocks; while their near allies, the Arachnida, have been met with in strata as old as the Silurian.

“My earliest papers on the Eurypterida appeared in 1863 and 1864, and an account of *Stylonurus* and *Hemiaspis* was communicated to this Society in 1865, just thirty years ago. In that year (1865) I had the pleasure, with my friend and fellow-worker, the late J. W. Salter, F.G.S., of publishing a ‘Chart of Fossil Crustacea,’ in which an attempt was made to show the evolution in time of the various forms belonging to this class, graphically depicted on an engraved folding-sheet, with explanatory text. In it we pointed out that the main development of the crustacea in Palæozoic times consisted of the great groups of the Trilobita, the Eurypterida, the Xiphosura, the Phyllopora, and the