since the last list of Messrs. Nalder Bros. and Co. was published, a number of new instruments used for scientific instruction and research are included in the present catalogue.

A NEW impression of Sir Oliver Lodge's "Pioneers of Science," which originally appeared in 1893 (see NATURE, vol. xlvii. p. 268), has been published by Messrs. Macmillan and Co., Ltd. The book is an interesting narrative of the careers and investigations of great astronomers whose contributions are links in a chain of scientific history. Personal details give living interest to the work, and the essential points of progress are clearly displayed. But why has not Sir Oliver Lodge taken the opportunity which a new issue afforded him of substituting reproductions of astronomical photographs for the caricatures which appear as representations of star clusters and nebulæ? Figs. 43, 48, 80, 87, 89 and half a dozen others could easily have been superseded by pictures from photographs, instead of being left to irritate astronomers who know what beautiful illustrations are available and to mislead students who have not seen the objects depicted or photographs of them. Fig. 47, explaining the phases of the planet Venus, is upside down.

THE first part of the third volume of *Biometrika* has now been issued by the Cambridge University Press. In addition to miscellanea the following papers are published:—on the result of crossing Japanese waltzing mice with albino mice, by Mr. A. D. Darbishire; graduation of a sickness table by Makeham's hypothesis, by Mr. John Spencer; the measurements of 130 criminals, by Mr. G. B. Griffiths, with an introductory note by Dr. H. B. Donkin; a preliminary note on the protective value of colour in *Mantis religiosa*, by Mr. A. P. di Cesnola; a first study of the weight, variability, and correlation of the human viscera, with special reference to the healthy and diseased heart, by Mr. M. Greenwood, jun.; and a paper in Italian, "Sui Massimi delle Curve Dimorfiche," by Signor ∪a Fernando de Helguero.

IN the *Journal* of the Society of Chemical Industry for February 15 Messrs. R. S. Hutton and J. E. Petavel describe methods for the preparation and compression on a large scale of pure gases for experimental work. The experimental plant required for the production of large quantities of hydrogen, nitrogen, carbon monoxide and ethylene, at a rate of about 100 litres per hour, is illustrated by diagrams, and interesting facts concerning the compression and storage of these gases are communicated.

IN a communication to the *Journal of Physical Chemistry*, vol. vii. p. 557, Dr. J. W. Mellor points out that the theory that water is in many cases essential to chemical change is of much earlier date than is generally supposed. Mrs. Fulhame, in 1794, appears to have been the first to give a clear statement of the influence of water on chemical transformations, and her observations were published in a work entitled "An Essay on Combustion with a View to a New Art of Dyeing and Painting wherein the Phlogistic and Antiphlogistic Hypotheses are proved Erroneous." In many respects Mrs. Fulhame's theory accords with present-day views.

IT has been known for a considerable time that the products obtained in the electrolytic reduction of nitro-compounds depend upon the nature of the kathode plates. By the reduction of nitrobenzene in alkaline solution azoxybenzene is obtained with platinum and nickel kathodes, azobenzene with lead, tin and zinc kathodes, and by using kathodes of copper, aniline appears as the reduction product. In the current number of the *Zeitschrift für physikalische Chemie* Messrs. Löb and Moore show that the essential factor in determining the reduction is the kathode potential, and with a given kathode potential the same products are obtained in approximately constant proportions independent of the nature of the kathode material.

THE experimental determination of the density of fluorine, made by M. Henri Moissan shortly after the isolation of this element, gave the number 1·260, considerably lower than the figure required by the atomic weight of fluorine, 1·319, and on this account the suggestion has been put forward by Brauner that a certain proportion of free atoms was present in the gas, thus accounting for its remarkable chemical properties. In the current number of the *Comptes rendus* M. Moissan has again taken up this question, with minute precautions regarding the purity of the gas, the result of four experiments being 1·298, 1·319, 1·313, 1·312, or a mean of 1·31. The agreement between the experimental and theoretical figures is thus sufficiently close to disprove the existence of any considerable proportion of free atoms in the gas.

THE additions to the Zoological Society's Gardens during the past week include an Otter (*Lutra vulgaris*), British, presented by Mr. Radcliffe Saunders; a Red Fox (*Canis fulvus*) from North America, presented by Mr. E. W. Bishop; a Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*) from Moluccas, presented by Miss L. Newman; a Bateleur Eagle (*Helotarsus ecaudatus*) from Africa, presented by Dr. W. J. Ansorge; a Jardine's Parrot (*Poeocephalus gulielmi*) from West Africa, presented by Mr. A. Willoughby Osborne; a White-eared Bulbul (*Pycnonotus leucotis*) from North-west India, presented by Mr. G. Dendle; four Common Pheasants (*Phasianus colchicus*), British, presented by the Hon. Walter Rothschild, M.P.; a Hybrid Pheasant (between *Phasianus reevesi* and *Euplocamus nycthemerus*), presented by the Earl of Ducie; two Wharton's Fruit Pigeons (*Carpophaga whartoni*) from Christmas Island, two Yellow-eyed Babblers (*Chrysomma sinense*), two Sepoy Finches (*Haematospiza sipahi*), three Rose-coloured Pastors (*Pastor roseus*) from India, a Purple-capped Lory (*Lorius domicella*) from Moluccas, a Hybrid Duck (between *Metopiana peposaca* and *Fuligula rufina*), a Hybrid Duck (between *Aex sponsa* and *Dafila spinicauda*), European; five Tuatera Lizards (*Sphenodon punctatus*) from New Zealand, fourteen Alpine Newts (*Molge alpestris*), six Marbled Newts (*Molge marmorata*), European; a Red Newt (*Sperlepes rubra*), a Californian Newt (*Molge torosa*) from North America, deposited; three Japanese Pheasants (*Phasianus versicolor*) from Japan, three Bar-tailed Pheasants (*Phasianus reevesi*), two Amherst Pheasants (*Thaumalea amherstiae*), two Silver Pheasants (*Euplocamus nycthemerus*), two Manchurian Crossoptilons (*Crossoptilon mantchuricum*) from China, purchased.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN APRIL:—

April 5. 4h. Ceres in conjunction with moon. Ceres 1° 1′ S.
7. 10h. 38m. Minimum of Algol (β Persei).
10. 7h. 27m. Minimum of Algol (β Persei).
14. 5h. Jupiter in conjunction with Moon. Jupiter 0° 7′ N.
15. Venus. Illuminated portion of disc = 0·927, of Mars = 0·995.
17. 8h. Mercury 7° N.W. of the Moon.

19. Saturn. Major axis outer ring = 37″·74. Minor axis = 9″·05.
20-22. Epoch of April meteors (*Lyrids*, radiant 271° + 33°).
21. 8h. Mercury at greatest elongation east 20° 11′.
22. 22h. Venus in conjunction with Jupiter. Venus 0° 30′ S.
27. 12h. 20m. Minimum of Algol (β Persei).
30. 9h. 9m. Minimum of Algol (β Persei).
,, 18h. 32m. Transit (egress) of Jupiter's Sat. III. (Ganymede).

STANDARD VELOCITY STARS.—In a communication to No. 2, vol. xix., of the *Astrophysical Journal*, M. A. Belopolsky gives an account of the work which has been done at Pulkowa in connection with the international cooperative scheme for the determination of the radial velocities of certain standard stars.

The 36-inch refractor and a new Töpfer spectrograph, similar to the Potsdam IIIa. spectrograph, have been used, and the details of the methods employed and of the provisional results obtained, for six of the velocity stars, are given in the present paper. The results are not so good as might be expected, but it is hoped that better results will be attained during the next year's work. The spectrum of iron was used for comparison, and control spectrograms of the sun, Mars, Jupiter and Venus were obtained. The results for the first three are discussed in the present paper; those for Venus, which are much more comprehensive, are being reserved for a future communication.

OBSERVED MOTIONS IN THE NOVA PERSEI NEBULA.—Prof. J. M. Schaeberle, in a note to the *Astronomische Nachrichten* (No. 3935), points out the great importance of studying every possible condition which may affect the determination of the parallax of the nebula surrounding Nova Persei, for until the parallax is unquestionably known theories regarding the observed movements can only be of a highly speculative character. In determining the actual parallax only the "absolute" method is available, and Prof. Schaeberle suggests that one of the conditions affecting the results might possibly be a refraction of the rays by some interplanetary medium filling the solar system. He contends that it is only reasonable to suppose that a difference of some kind *may* exist between the space void of heated matter and that surrounding an attracting mass radiating both matter and heat. If any medium (either gaseous or ethereal), such as an extended solar atmosphere, does exist, then any light entering such a space would be refracted, and the hitherto determined negative parallaxes are simply the differences between this refraction and the true parallax, where the latter is less than the former; similarly in cases where the measures indicate no parallax the two may be equal and opposite. Thus if this refraction constant were only 1″ the recorded motions in the nebulosity surrounding Nova Persei would be readily explicable, for with a parallax of 1″ they are about equal in magnitude to those occasionally observed in solar work.

A NEW FORM OF EQUATORIAL MOUNTING.—A new form of equatorial mounting, for which the inventor, Herr A. F. Lindemann, of Darmstadt, claims many advantages, is described and illustrated by a diagram in No. 3935 of the *Astronomische Nachrichten*.

The light from the star is collected by an objective placed at the upper end of the polar axis, and by a system of mirrors is reflected down that axis. By suitable mechanism the movements in R.A. and declination are imparted to tubes inside the telescope (*i.e.* the polar axis), and hence to the reflectors, from clockwork of the usual form.

Among the many advantages claimed for this form of mounting are that the observer may remain comfortably seated in a room of uniform temperature, the instrument is very compact and perfectly balanced, the vibration effects are reduced to a minimum, and no large dome with costly mechanism for revolving it is required.

THE LEONID SHOWER OF 1903.—Further evidence that the Leonid shower of 1903 afforded a fairly rich display is given by the observations made at the Royal Observatory at Lisbon. During a watch of 3h. 28m. (15h. 14·7m. to 18h. 42·7m. G.M.T.) on November 15, Senor Campos Rodrigues counted 165 Leonids. At the maximum of the shower during the five minutes' interval from 16h. 46·7m. to 16h. 51·7m. 22 Leonids were counted (*Astronomische Nachrichten*, No. 3936).

THE INSTITUTION OF NAVAL ARCHITECTS.

THE annual general meeting of the Institution of Naval Architects was held last week in the theatre of the Society of Arts, the president, the Earl of Glasgow, occupying the chair. The meeting commenced on the morning of Wednesday, March 23, and was carried on during the two following days. There was on the agenda a list of fourteen papers to be read and discussed, and these, being all dealt with, made, together with the presidential address and other business, a very full programme for each day, possibly too full, considering the sittings did not commence until noon.

As president of the institution, Lord Glasgow yearly gives a general summary of the condition of the shipbuilding and marine engineering industries of the country in his address, which, though brief, contains a quantity of matter which well illustrates Huxley's apothegm as to the need of knowing a great deal to say a little well. His remarks on the future of the steam turbine, on the prospects of internal combustion engines, and on other matters of a like nature indicate that Lord Glasgow is more than a merely ornamental president.

The chief interest in the meeting was doubtless centered in Sir Edward Reed's paper on the two battleships recently purchased from the Chilian authorities by our own Admiralty. These two ships, now H.M.S. *Triumph* and *Swiftsure*—formerly the *Libertad* and the *Constitucion*—were designed by Sir Edward Reed in conjunction with officers of the Chilian Navy. The debates in Parliament, in which the designs of these vessels were compared with those of battleships of the Royal Navy, raised considerable feeling, and the personal element, which always attracts interest, was not absent. It cannot be said, however, that either the paper or the discussion did much to advance the science of warship design. Sir Edward Reed maintained the superiority of his own designs, whilst Sir William White, who was the chief speaker in the discussion, upheld the superior advantages of the ships for which he was responsible. At present the efficiency of designs for warships is an open question upon which critics may hold conflicting opinions without fear of them being proved erroneous, and this position is likely to continue until practical evidence is obtained by the test of actual warfare. Beyond this, however, it is seldom—in fact one may say never—that particulars sufficient for a full comparison of different ships are made public, and it is for these reasons that the controversies in warship design are so barren.

A paper by Lord Brassey which followed, and dealt with the problem of merchant cruisers and steamship subsidies, pointed out the need that would arise in case of war for more scouts than the navy at present possesses, and advocated the use of merchant vessels for this purpose. Here naval opinion was divided, one authority, Admiral Fitzgerald, maintaining that it would be better policy to devote any money available to the building of regular warships rather than to paying subsidies, whilst another admiral, Sir Edmund Fremantle, said that if he had to send a vessel at full speed across the ocean he would select an Atlantic liner, as our cruisers would not be able to maintain so high a speed for so long a period as the mercantile vessel. The question of portable armour, to be shipped in case of war on merchant vessels, was also brought forward, but this was fully discussed by Prof. Biles at a meeting of the institution held just ten years ago.

On the second day of the meeting Sir William White read a paper in which he advocated the establishment of an experimental tank for testing ships' forms by means of models, on the system instituted by the late William Froude at Torquay. At the Glasgow meeting of the institution held in 1901, Mr. Yarrow brought forward a motion proposing that a tank should be established under the auspices of the institution. As a result efforts were made to raise the necessary funds, but although some ship-building firms promised handsome subscriptions, the proposal was not well