FASCICULES 1 and 2 of the *Bulletin des Séances de la Société français de Physique* for 1909 contain thirteen memoirs, several of which have already been noticed in these columns. Amongst those not previously dealt with may be mentioned that by M. G. Delvalez, on the Hall effect in liquids. According to the electronic theory of conduction of electricity, this effect should be extremely small, while experiment appeared to show that it was a million times greater than the theoretical value. M. Delvalez has succeeded in showing that these observed effects were due to the convection currents in the liquid, set up because it is a mobile conductor carrying current through a magnetic field. The motion generates an electromotive force, which has been measured as the Hall effect. By using an alternating electromotive force to produce his main current, and arranging to balance the Hall electromotive force against the fall of potential down an induction free resistance traversed by the main current, he has shown that the effect is very small, certainly less than one three-thousandth of the value previously observed.

THE use of platinum felt, as suggested by Monroe in 1888, in place of asbestos as a filtering medium is recommended by Mr. W. O. Snelling in a paper in the Journal of the American Chemical Society (vol. xxxi., pp. 456–461). In addition to its insolubility in almost all the ordinary chemical agents, it has the advantage of extraordinary porosity, combined with the power of retaining completely and easily such finely divided precipitates as barium sulphate and calcium oxalate; a series of tests showed that the filtration was six times more rapid than with an asbestos filter containing one-third the quantity of asbestos. The precipitate can be dissolved off, and the felt used again and again; moreover, a damaged filter can readily be patched by the adding of chloroplatinic acid and igniting. The use of the "Monroe crucible" for atomic-weight determinations is especially advocated. Another issue of the same journal contains a paper by Mr. J. T. Stoddard on rapid electro-analysis with stationary electrodes (*ibid.*, pp. 385–390), in which it is claimed that by using a kathode of gauze or of mercury, a stationary anode, and a heavy current, complete decomposition of the metal can be effected as rapidly as with a rotating electrode; under these conditions the liberation of gas, and the convection currents consequent on the heating of the liquid, appear to provide sufficiently for the agitation of the fluid without recourse to mechanical methods.

THE *Philippine Journal of Science* for March contains a third paper by Raymond F. Bacon on the Philippine terpenes and essential oils, and a paper by Mr. H. D. Gibbs on the oxidation of phenol. The latter author has taken advantage of the tropical sunshine to study the red coloration which is developed by phenol when exposed to air and light, and has carried out the investigation with remarkable care and thoroughness. He shows that the phenol becomes coloured in presence of oxygen, but not of hydrogen, nitrogen, and carbon dioxide. The action is caused by oxidation, quinol, quinone, catechol, and carbon dioxide being produced; the principal coloured compounds are probably quinone condensation products, the red colour being attributed to phenoquinone. The oxidation is not appreciable in the dark at room-temperatures, but becomes measurable at 100°, and fairly rapid at the boiling point of phenol. In sunlight the rate of coloration is rapid, and increases with the temperature; it is affected by the ultra-violet absorption of the glass, by atmospheric conditions, and by the altitude of the sun. Ozone is very reactive; it gives the same products as oxygen, and in addition glyoxylic acid has been detected. Anisol, the methyl ether of phenol, gives no coloration either by the action of ozone or of oxygen and sunlight.

MESSRS. E. B. ATKINSON AND CO., of Hull, forward us an improved pattern of Soxhlet's apparatus for the extraction of oils and fats. The new form is fitted with a glass stop-cock on the syphon tube. By regulating the overflow, the thimble can be kept full of the solvent during the extraction, instead of being alternately filled and emptied. Also, by closing the stop-cock at the end of an operation, the solvent can be retained in the upper part of the apparatus; this allows the flask containing the extracted fat to be almost freed from the solvent, so that it can be placed straightway in the drying-oven. A bulb on the upper part of the side-tube facilitates the passage of the vaporised solvent if liquid should collect there. The new pattern thus appears to have distinct advantages over the older form.

THE use of the Walschaerts valve gear on American locomotives has been greatly extended since its introduction into the States a few years ago. The advantages of this gear render it very suitable for the large engines employed in America, and its success has led to experiments with others of a similar type. Several railways are now trying the Pilliod motion, a gear made by the Pilliod Company of Chicago, and described in the *Engineer* for September 3. In this gear, as in the Walschaerts, the motion is derived partly from a return crank on the main crank-pin and partly from the crosshead. The moving parts are the same for any class of engine, and weigh about 1000 lb. There is no load on the reversing lever, which can be unlatched and moved in any condition with the regulator either open or closed. The motion is expected to effect a considerable saving in fuel and in maintenance and repairs. The release is late; thus with cut-off at 25 per cent. the release is at 85 per cent.; the Walschaerts gear, with a similar cut-off, releases at about 65 per cent. of the stroke. Special adaptability for high speeds is claimed.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN OCTOBER:—

Oct. 6. 11h. 59m. to 12h. 34m. Moon occults κ Geminorum (mag. 3·7).
8. 10h. 37m. Minimum of Algol (β Persei).
11. 7h. 26m. ,, ,,
12. 23h. Venus in conjunction with δ Scorpii (star 0° 7′ S.).
13. 6h. Saturn in opposition to the Sun.
17. 17h. Venus in conjunction with the Moon (Venus 2° 17′ S.).
18–24. Epoch of October meteoric shower (Orionids, Radiant 92° + 15°).
20. Saturn. Major axis of outer ring = 46·15″, Minor axis = 9·21″.
27. 8h. Saturn in conjunction with the Moon (Saturn 1° 17′ N.).
,, 19h. Mercury at greatest elongation west.
31. 9h. 8m. Minimum of Algol (β Persei).

OBSERVATIONS OF HALLEY'S COMET, 1909c.—Photographs showing Halley's comet were obtained at the Greenwich Observatory, with the 30-inch reflector, on September 9, two days before it was discovered by Prof. Wolf. Owing to the proximity of the moon the two exposures were limited to thirty minutes and twenty-five minutes respectively, and the very faint cometary images were not identified until after the receipt of the telegram announcing the discovery at Heidelberg. The positions determined gave corrections of +24s. and −4′ to the ephemeris published in No. 4330 of the *Astronomische Nachrichten*.

In a supplement to No. 4356 of the *Astronomische Nachrichten*, where the above observations are recorded,

Prof. Wolf states that the comet is already a fairly bright object, of about the sixteenth magnitude, appearing as a nebulous mass of 8″–10″ diameter having a central condensation.

Photographs were also secured by Mr. Knox Shaw at the Helwan Observatory on September 13 and 15, and by Dr. H. D. Curtis, with the Crossley reflector at the Lick Observatory, on September 12, 13, and 14.

ANOTHER LARGE SUN-SPOT.—During last week another large sun-spot was to be seen on the solar disc. It was first observed, at South Kensington, on September 18 near to the limb and a few degrees south of the sun's equator. Developments took place until on Saturday last, when just past the central meridian, it consisted of one large nucleus and several smaller ones, and was visible to the naked eye. It is perhaps worthy of note that a magnetic storm, of sufficient magnitude to interfere seriously with the transmission of telegrams, took place on Saturday.

OBSERVATIONS OF MARS.—In a telegram to the Kiel Centralstelle (Circular No. 112), Prof. Lowell announces that the Martian antarctic canals are disappearing, and that the general pallor of the various features continues. He also states that the Solis Lacus is double.

Regarding the naked-eye appearance of the planet, Mr. J. H. Elgie recently directed attention to the apparent nearness of Mars as compared with the neighbouring stars of Pegasus. He suggests that this sense of nearness might be due to the propinquity of a wooded ridge over which the planet was rising, the Pegasus stars being well above the ridge, and therefore beyond this influence. At the same time, the brilliant irradiation of the planet seems quite sufficient to account for a phenomenon which must appeal to anyone seeing the planet on a clear evening.

OBSERVATIONS OF SATURN.—A telegram from Prof. Lowell to the Kiel Centralstelle, published in Circular No. 113, announces that a dark medial streak has been observed on Saturn's equator, and that there is an appearance of lacings similar to those seen on Jupiter. Further, an intense white spot, in saturnian latitude 50° S., was detected by Mr. Slipher and transitted at 14h. 5m. (Washington time) on September 23.

THE FUTURE OF ASTRONOMY.—In an address delivered at the Case School of Applied Science, Cleveland (U.S.A.), in May, Prof. E. C. Pickering took as his subject the future development of astronomy, paying special attention to the methods whereby the limited financial resources and *personnel* may be used with the greatest advantage to the science. After a review of the several past epochs of astronomy, and some rather amusing remarks as to how monetary gifts are made and used at present, he outlined the general scheme, to which he has previously referred on various occasions, and the principle of which underlies the splendid organisation of resources built up at the Harvard College Observatory. The central feature of the scheme is one large, and perforce international, observatory employing, say, 200 or 300 assistants, and maintaining three stations. Of the latter, one would be in latitude about 30° N., and another the same distance south; western America is suggested as a suitable *locale* for the former, South Africa for the latter, and each would be selected wholly for its climatic conditions, which premises fairly great altitudes and desert regions. Each observing station would have instruments of the largest size, such as the 7-foot reflector previously suggested for South Africa, and would do practically no reductions or measuring. These would be carried out at the third station, situated where living and labour are cheap, where the photographs, &c., would be stored. Such an organisation would exist for the benefit of all serious astronomers; anyone wishing to engage on any piece of work would simply requisition the raw material, *e.g.* sets of special photographs, from the central bureau. If not in stock, the required photographs would be secured at the earliest convenient opportunity. By thus centralising and organising astronomical resources, Prof. Pickering claims that the science would benefit immensely, because the waste at present resulting from overlapping, or from being forced to use inadequate raw material, would thereby be eliminated (*Popular Science Monthly*, vol. lxxv., No. 2).

THE INSTITUTE OF METALS.

THE publication of the first volume of the Journal of the Institute of Metals marks the completion of a full year's work. The institute has been formed to advance and disseminate knowledge in connection with the manufacture and properties of the non-ferrous metals and alloys. The members are fortunate in having for first president Sir Wm. White, who delivered an excellent address, in the course of which he dealt in a very able manner as well with the delicate subject of "trade secrets" as with the important one of the relationships between manufacturers and users of metals, although his oft-reiterated special pleading for the National Physical Laboratory during the meetings must have been rather wearying to the other important workers represented.

The paper by Mr. J. T. Milton, chief engineer of Lloyd's, on some points of interest concerning copper and copper alloys, is mainly about troubles experienced by users, and is valuable for members of all types; but the statement on p. 68 that the temperature of pouring the white metal into bearings is left to the ordinary workman is not the case in at least one of the great Sheffield-Clyde firms, as for many years this has been done with the aid of a suitable pyrometer, and probably is so still. The paper drew a very long and good discussion, in which Prof. Gowland's remarks that ancient bronzes were very impure, so that their hardness could not be due to exceptional purity, and that by careful hammering modern bronzes can be made as hard as ancient, were of interest to those who are often being met by the statement that the method of hardening bronze tools is a lost art.

The mechanism of annealing in the case of certain copper alloys, by Messrs. G. D. Bengough and O. F. Hudson, is of a very theoretical nature as a whole, but gives several practical hints on the treatment of brass. Mr. J. T. W. Echevarri's paper, on aluminium and some of its uses, is most interesting, although his reasons for its efficacy in preventing blow-holes in steel (p. 130)—that it combines with the gases and produces an innocuous slag—would hardly be accepted. In the discussion the president remarked that not only had aluminium proved unsatisfactory for shipbuilding because of serious corrosion (p. 156), but that, though suitable aluminium alloys might yet be obtained, they had to be discovered. Notes on phosphor-bronze, by Mr. A. Philip, is thoroughly practical, and contains several tables of tests with corresponding analyses, with a full discussion as to the most suitable compositions and tests for different purposes.

In metallographic investigations of alloys Mr. W. Rosenhain gives a good critical summary of methods, but, unfortunately, attempts to bolster up the discredited differential method of taking cooling curves. On p. 213 he recommends that "the slowest possible rate of cooling should be adopted in cooling-curve experiments"; but long experience teaches that the rate of cooling must be chosen according to the nature of the alloy and the objects of the investigation. In Dr. Desch's paper, on inter-metallic compounds, surely the complicated "broken solidus curve MBNPQRESTUG" for an institute of metals might have been better chosen from a real example than an imaginary one, so that such members as waded through it all would have a reward of facts as well as principles. Dr. Shepherd in the discussion endeavoured to explain to the members what the present writer has tried to impress on several investigators, namely, that though a pyrometer be capable of great accuracy, it does not follow that the phenomena are observed to the same degree of accuracy, and also that though the phase rule is a guide, it must be remembered that it was deduced for ideal conditions, and takes no account of the time factor or of the rate of diffusion or viscosity. Dr. Shepherd favours the use of heating curves, but his remark that "in the case of transformations in the solid phase he had found no satisfactory results with cooling curves" must sound strange to investigators on steel—the pioneers in this type of work—the well-known Ar_1, Ar_2, Ar_3 being all points on cooling curves. For demonstration purposes cooling curves are generally taken because more convenient, but for a complete investigation both heating and cooling curves must be studied. Had this not been done, the important effect