Irish Academy, vol. xxxi., part 7, price 1s. 6d.). Reference is made for further details to the memoir recently published by the Geological Survey of Ireland; but the present account shows especially how the district was influenced by the ice of glacial times, and an excellent series of illustrations has been included, most of which were hitherto unpublished. The map of Clew Bay and its numerous partially-drowned drumlins will interest those who have entered Boston harbour from the sea. The large coloured geological map is repeated, by arrangement with the Controller of the Stationery Office, from the Geological Survey memoir.

WE have frequently taken occasion to refute some of the long-lived popular fallacies relating to the weather. The *Scientific American* of October 24 refers to a statement in a recent London weekly journal that "it is one of the extraordinary things of warfare that a big battle invariably produces rain." Our American contemporary has no difficulty in refuting the "particularly fatuous fallacy" that a battle could have any appreciable effect on the temperature or humidity of the air, upon which conditions rainfall depends. He points out that rainfall may follow battles for various reasons, *e.g.* meteorological records in northern France show an average of about 157 rain-days per annum, according to which rain might possibly fall about every other day. Recent literature upon the subject is abundant and conclusive; as one instance we may refer to an interesting and instructive article by Prof. Cleveland Abbe in the United States *Popular Science Monthly* of January, 1911, which shows by laboratory experiments that the firing of cannon or dynamite to produce rain cannot possibly succeed. We may also mention a pertinent communication to *Symons's Meteorological Magazine* of March, 1911, in which Mr. F. Gaster (formerly of the Meteorological Office) pointed out that at Shoeburyness, where great guns are fired almost daily, the average rainfall is probably the smallest in the United Kingdom.

THE Committee of the Institution of Civil Engineers, which has been making inquiries as to the best course of training for engineers, mentions in its report that one firm considered technically trained men of "no use for dividend earning." Mr. F. M. Denton, in a letter in the *Electrician* of November 6, points out that this prejudice against technical college-trained men on the part of engineering firms has cost us very dearly in the past, much of our best trade, and more new trade we should have liked, having gone to our rivals. The hope of regaining and retaining this trade in the future is, he considers, elusive unless manufacturers are prepared to recognise that a technical training permits a man to see further than he would otherwise do, and that research carried out by such men has been responsible for practically all the advance in heavy electrical engineering in recent years. We cannot as a nation content ourselves with merely making and selling what others have developed, but must provide our own army of research, and lead instead of following.

IN the *Comptes rendus* for November 3 M. G. Lippmann directs attention to the possibility of applying the Hughes induction balance to military surgery. This invention, it is remarked, appears to-day to be totally forgotten. It consists of a battery, two small induction coils, a contact-breaker, and a telephone, the connections being crossed in the primary circuit so that the induced electromotive forces are in contrary directions. The coils can then be adjusted so that no sound is heard in the telephone in the secondary circuit. On the approach of a metallic mass to one of the bobbins, a sound is heard in the telephone. If the metal is magnetic, as is the case with a fragment of shell or a German bullet, the effect is more marked; French and German bullets can in this way be distinguished. M. Lippmann thinks the apparatus should be useful in military surgery, as it is easily made in numbers, simple to use, portable, and cheap.

ALUMINIUM is now employed to a greater or less extent in almost all engineering and allied trades, but it is doubtful if the full extent and variety of its applications are generally recognised. About 60,000 tons of the material are produced every year. *Engineering* for November 13 points out that there is no reason why the foundry of a general engineering shop should not produce aluminium castings in the same way that it now produces those of the copper alloys. Probably the reason for the neglected use of aluminium is that the average engineer is not practised in the manipulation of this metal. A quite definite case can be made out for the employment of aluminium for low-tension electric cables, particularly those of large section. There are a number of important installations in existence, *e.g.* the Paris General Omnibus Company has 650 tons of aluminium cables, yet on the whole the material does not occupy the position which might be expected. There is little doubt that in many cases copper cables are now being installed where important saving might be made by employing aluminium.

OUR ASTRONOMICAL COLUMN.

COMET 1914*d* (LUNT).—The comet discovered by Dr. Lunt at the Cape Observatory is travelling northward, and the elements and ephemeris (the *Observatory*, November) have been calculated by Drs. Hough and Halm, and these are as follows:—

Elements.

$T = .914$ August 4·91638 G.M.T.
$\omega = 269^\circ\ 53'\cdot6'$
$\Omega = 0^\circ\ 22'\cdot5'$ } 1914·0
$i = 77^\circ\ 53'\cdot3'$
$\log q = 9\cdot85024$

Ephemeris for Greenwich Midnight.

	R.A.	Decl.
	h. m. s.	° ′
Nov. 18 ...	21 51 8 ...	+8 27
22 ...	53 20 ...	9 13
26 ...	55 41 ...	9 56
30 ...	21 58 21 ...	10 38

It is stated that the corrections to the above on October 11 were −20s, +7′, and on October 17 −25s., +11′.

SERIES LINES IN SPARK SPECTRA.—In the issue of this journal for April 9 of the present year (vol. xciii., p. 145) a summary was given of the Bakerian lecture delivered by Prof. Fowler on April 2 on series lines in spark spectra. Attention is directed to the fact that this lecture is now published in the *Philisophical Transactions* of the Royal Society (Series A, vol. ccxiv., pp. 225–66), and is accompanied by some excellent reproductions from photographs of the spectrum of the magnesium arc *in vacuo*, the various series of arc and enhanced lines being clearly indicated.

A BRILLIANT FIREBALL.—Mr. W. F. Denning writes: "On November 11, at 11.13 p.m., a magnificent meteor was seen from near Purley, Surrey, Stowmarket, Hornsey, and other places. It looked like an unusually large ball from a Roman candle firework, and moved very slowly in the north-east sky, occupying about 6 sec. in an extended course. It was not a Leonid, but apparently from a radiant near α Lyræ in the north-west. The meteor illumined the sky vividly for several seconds, and was evidently rather near the earth's surface. From a preliminary discussion of the few descriptions already to hand it appears that the object fell from a height of fifty to thirty-two miles, and its velocity was about eleven miles a second. There is no known shower near Vega at the middle of November, but certain large meteors appear to be isolated. Some of the observers supposed it to have been one of the regular November meteors, but its direction was different and its speed altogether too slow for it to have been a Leonid."

MEASURED PARALLAXES SUMMARISED.—A reprint from the *Astronomische Nachrichten*, No. 4754, has been received, and it contains a communication on measured parallaxes summarised by Mr. O. R. Walkey. The author states that in view of the inherent uncertainty of all measured parallaxes, it does not seem profitable to enter into a detailed discussion of the individual results, but instead the results are summarised in a series of tables of distance and consequent luminosities and cross-motions speeds according to the spectral type. The tables given represent 521 stellar systems, not counting the sun. The first three tables do not include the Hyades group, which consists mainly of first-type stars; these are dealt with in a fourth table according to their component spectral classes. The investigation is one that is the result of a large amount of labour, and the essence of the work lies in the tables, which will no doubt be carefully scrutinised by those to whom the subject is of special interest.

REPORT OF THE PARIS OBSERVATORY FOR 1913.—Like all other large observatories situated in or near towns, the work of the Paris Observatory is being severely handicapped by the presence of disadvantageous observing conditions such as smoke, night glare, etc. The report for the year 1913 gives a good idea of the great number of branches of work undertaken, but in the different summaries of the recent progress there is an underlying tone of regret that much cannot be done and much that is done is not as satisfactory as it might have been owing to the present observing conditions. Monsieur Baillaud, the director, opens his report with a reference to the deplorable conditions of the actual situation and to the indispensability of the creation of a branch establishment which he advocated two years ago. With regard to the meridian work, the north and south horizons have been shut out by seven-storey buildings, and he points out how the work of the equatorials is restricted by the haze and fog in the lower strata of the atmosphere of Paris. Comet Delavan was estimated as of the eleventh magnitude at Besançon, Bordeaux, and Lyon, while at Paris it appeared of magnitude 13. Regular photometric work, so important for the undertaking of the Carte du Ciel, is described as impossible, and in the astrophysical department the quality of the stellar images projected on the slit exercises unfortunately a very great influence on the determinations of radial velocity. Numerous other references to other branches of work effected are given, making a clear case for the necessity for an out-station. For the present, no steps can be taken, but it is hoped that in the near future Monsieur Baillaud's appeal will be considered and carried out. The annual report takes the same form as in previous years, and the work of the several departments during the past year is described in the various sections.

THE FUNCTION OF THE EARTH IN RADIO-TELEGRAPHY.

A LECTURE on the above subject was delivered on Friday evening, November 13, by Dr. J. A. Fleming, to the members of the Wireless Society of London, at the Institution of Electrical Engineers. Dr. Fleming said that the present period of enforced inactivity for all loyal radio-telegraphists, except those engaged at the seat of war, offered an opportunity to re-consider some of the purely scientific questions involved in the art. He proposed therefore to discuss the function of the earth in radio-telegraphy. Apart from the disputed question whether the aerial wires should preferably be earthed at the base or connected to an insulated balancing capacity, it was well known that the nature of the soil or surface between the transmitting and receiving stations had a great effect on the signal strength. This effect depended much upon the wave-length. Thus Dr. L. W. Austin had shown that the ground to the north and north-east of Newport, Rhode Island, U.S.A., exercised a powerful absorption on radio-telegraphic waves of about 1000 metres wave-length. Experiments made between Brant Rock wireless station and a U.S. cruiser *Birmingham*, lying at Newport, showed that whereas electric waves of 3750 metres wave-length suffered little or no absorption in travelling over the 45 miles other than that due to the normal space decrease of energy, waves 1000 metres in length lost 95 per cent. of their signalling energy in passing over the same district.

Dr. Fleming first gave a brief mathematical discussion showing the manner in which the gradual penetration of an alternating current into a conductor can be explained. It is well known that high frequency electric currents are confined to a thin skin or layer of the surface of metallic wires. In the case of copper this skin has a thickness of about 0·25 mm. for currents of a frequency of one million. In the case of iron the skin for the same frequency is about 0·02 mm.

An elegant experiment was shown by Dr. Fleming with his cymometer to illustrate this surface flow of high-frequency currents. An oscillation circuit was arranged in which high-frequency currents were generated, and these were detected by placing alongside a cymometer having a Neon vacuum tube as a detector of secondary oscillations in its circuit. In the primary oscillation circuit were inserted successively small spirals of copper, brass, iron, and galvanised iron; all having the same size and same number of turns. The oscillations in the cymometer circuit were indicated by the brilliant glow of the Neon tube. When the iron spiral was inserted the Neon tube did not glow, because of the damping of the oscillations caused by the energy absorbed to magnetise the iron.