G. Schiaparelli, and the result is a work of which the present is the first volume. It contains fifty-four of Brioschi's papers, of which forty were originally published during the period 1851-1857 in the *Annali di Scienze matematiche e fisiche* under the editorship of Barnaba Tortolini, and the remainder appeared in the *Annali di matematica pura ed applicata*, which formed a continuation of the previous journal, during the years 1858-1861. The last of the series is Brioschi's classical monograph on the theory of covariants and invariants of binary forms and their principal applications. The arrangement adopted has thus been to classify Brioschi's papers according to the journals in which they are published and not according to date or subject-matter.

The committee placed the principal work of editing the volumes in the hands of Profs. Beltrami and Cremona, and on the death of the former the task was continued by Prof. Valentino Cerruti, the papers in the present volume being revised in addition by Profs. Pascal, Gerbaldi, Loria, Pittarelli, Reina and Tonelli. To these names must be added those of Profs. Bianchi and Capelli in connection with the revision of material for succeeding volumes.

A photogravure portrait of Brioschi forms a frontispiece, and a short history of his life will appear at the end of the complete work, forming a lasting monument to the great Italian mathematician.

Webster's International Dictionary of the English Language. To which is now added a Supplement of 25,000 Words and Phrases. Edited by W. T. Harris, Ph.D., LL.D., Editor-in-Chief. (London: George Bell and Sons.) Price 2 guineas net.

No more convincing proof of the extent to which the English language has been enriched as a result of the wonderful activity in scientific circles during recent years could be found than this new edition of the world-renowned "Webster." The supplement, which distinguishes this from the last edition of the dictionary, is largely composed of scientific terms and technical expressions which have come into existence during the last decade. It is only necessary to glance down a list of the names of the men of science who have assisted Dr. Harris in the preparation of this substantial addendum to satisfy oneself that the definitions will prove clear, accurate and complete. Repeated tests have shown that such anticipations are well founded, a conclusion that will not seem surprising when it is stated that among the assistants on whose services the Editor-in-Chief has been able to rely are such scientific experts as Prof. E. S. Dana, Prof. G. K. Gilbert, Dr. E. S. Holden, Dr. T. C. Mendenhall, Prof. E. L. Nichols, Prof. I. Remsen, Prof. A. E. Verrill, Prof. L. F. Ward, and many others of equal authority. The dictionary will continue to merit the confidence with which it has long been regarded.

Education and Empire. Addresses on certain Topics of the Day. By Richard Burdon Haldane, M.P., LL.D., K.C. Pp. xvi + 195. (London: John Murray.) Price 5s. net.

In the first two addresses in this volume Mr. Haldane is concerned entirely with educational problems, and in both of them pleads in a convincing manner for more earnest attention to the great need of increased facilities for higher technical instruction and for scientific research in this country. The comparisons which are here instituted between what is done in the United Kingdom and in Germany and the United States of North America in the matter of providing technical colleges and laboratories for scientific research should, if anything will, explain to our manufacturers and merchants the reason for the phenomenal success of our trade rivals.

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LETTERS TO THE EDITOR.

(The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.)

Mr. Marconi's Results in Day and Night Wireless Telegraphy.

I CAN assure Prof. Joly that his explanation (p. 199) will not do.

The observed effect, which if confirmed is very interesting, seems to me to be due to the conductivity, and consequent partial opacity, of air, under the influence of ultra-violet solar radiation.

No doubt electrons must be given off from matter (dust as well as other matter) in the solar beams; and the presence of these will convert the atmosphere into a feeble conductor. Conducting power in the sea-water surface assists and guides the waves, retaining them in two dimensions after the same fashion as a telegraph wire retains them in one; but conductivity in the dielectric itself will tend to dissipate and enfeeble the waves, by a process of reflection resulting in some amount of distortion.

OLIVER LODGE.

June 27.

Kinetic Theory of Planetary Atmospheres.

IN the *Astrophysical Journal* for November, 1901, is printed a paper of mine in the first part of which a method is proposed for determining the mean temperatures of the atmospheres of the planets and those of their surfaces. In the second part of the paper an attempt was made with the use of these temperatures to determine the composition of the atmospheres of the planets by the "empiric" method proposed by Dr. Johnstone Stoney and based on the supposition that helium escapes from the earth's atmosphere. The most probable velocity of the molecules of helium is 1093 metres per second at 15° C. (the mean temperature of the earth's surface), and the velocity sufficient to overcome the earth's attraction is 11,170 metres per second. Hence it has been inferred that a gas escapes from the surface of the planet, if the most probable velocity of its molecules is 10.22 times less than that required to overcome the planet's attraction.

Prof. G. H. Bryan (*NATURE*, No. 1698, p. 54) has remarked that according to his and Mr. Cook's calculations, founded on the kinetic theory of gases, helium cannot escape to any sensible extent from the earth's atmosphere by the motion of its molecules among themselves. But the assumption that helium cannot be retained by the earth's attraction is arbitrary. It is possible that helium exists in our atmosphere in only a very small quantity, because it is contained in the interplanetary medium in very insignificant proportions; its escaping, if it occurs, is effected, perhaps, by ordinary diffusion. We know several substances, as thorium, osmium, &c., which are very rare minerals, though their atomic weight is great. It is possible, moreover, that even hydrogen can be retained by the earth; it seems to be confirmed by the observations of M. Gautier (*Bulletin de la Soc. chim. de Paris*, December 5, 1900, p. 884) and Lord Rayleigh (*Phil. Mag.*, vol. iii., pp. 416-422, 1902), who have found free hydrogen in atmospheric air.

Assuming the last supposition, we must substitute for the number 10.22 some other less than 7.42 ($=\frac{11,170}{1505}$, where 1505 is the most probable molecular velocity of hydrogen at 15° C.), for instance, 7, 6, or 5, in order that an appreciable number of molecules may attain the speed sufficient to carry them to infinity; and consequently table iii. in my paper must be changed correspondingly.

E. ROGOVSKY.

The Coloured Sunsets.

THE recent fine weather has enabled one to observe the sunsets and after-glows under very favourable circumstances, and the most striking feature observed was the predominance of the beautiful salmon-colour tinge, which became most intense when the after-glow was brightest.

Practically none of the sunsets observed were strikingly red,

but the yellow, purple and pinkish tinges were most general. The sunsets of the 22nd and 26th and the sunrises of the 27th, 28th and 29th were those which showed the salmon tint to the greatest advantage.

In a letter to *NATURE* of last week, Mr. Krohn recorded some remarkable sunsets at Madeira, while a *Daily Mail* correspondent at Bombay (June 29) writes:—"The extraordinary red sunsets which have been witnessed for several days past are believed to be due to Martinique dust in the upper atmosphere."

There is little doubt, therefore, that the dust is on the move, being carried by the upper air currents, and perhaps we may yet observe more brilliant effects.

WILLIAM J. S. LOCKYER.

Solar Physics Observatory, June 30.

As one of the first, in your pages, to call attention to the import of the sunset glows in 1883, I have additional interest in noting the recurrence of similar glows during the past few days. On three nights, at least, they have been more marked than any seen by me since the eighties.

I observed the glow first on June 26, at Croydon, but it was noted at Street, Somerset, on the 24th (Tuesday last). I was there from the 27th to 29th, and saw glows each evening. On the 27th it was brighter, though less widely spread, than at Croydon on the 26th. But at Street, on the 26th, I am informed by my cousin, Mr. Joseph Clark, that it was brighter than on the 27th.

The following resemblances to the glows in 1883 may be noted:—

(a) The distinct interval between the sunset itself, with illuminated lower clouds, and the glow. The latter began 20 to 30 minutes after sunset.

(b) The detachment from the horizon.

(c) The shade, pink, ranging from salmon tinges (26th, due perhaps to London smoke-haze) to almost purple.

(d) The clear interval between a "glow" and "after-glow" about half an hour after sunset (noted on 28th and 29th).

(e) The "after-glow" growing as brilliant as the glow. Indeed, on the 29th it was more brilliant, and alone attracted attention from the ordinary observer.

(f) The strong and prolonged "counter glow" above the earth-shadow (specially noted on 28th, up to 8.50, or half an hour after sunset).

(g) The prolonged ruddiness along the horizon, signs still remaining on 29th at 11 o'clock.

On June 26 (Croydon) the glow arose to at least 75° ; otherwise 55° or so was the extreme limit. So far the pink glows have not been observed later than about 9.10, or, say, 50 minutes after sunset. In brilliancy they cannot compare with those of 1883, but perhaps with the glows two years later.

June 30.

J. EDMUND CLARK.

The Halos of May 1, 8 and 22.

SINCE the publication in *NATURE* of the letters on these three phenomena, my attention has been directed by Prof. S. P. Thompson to the "Memoire sur les Halos," by M. A. Bravais. The first of the above three halos, recorded by Prof. E. E. Barnard, is apparently new, unless the radius of one of the two circles was in reality considerably smaller than that of the other; if this was the case (which from the account seems scarcely likely) this halo might be part of the halo depicted on Plate iii. Fig. 98, and described on pp. 87, 88 and following, and of which Bravais says that the different parts are by no means always visible together.

There is no doubt that the halo described by me is substantially the same as that depicted on Plate iii. Fig. 101, though it will be seen that mine has a cusp not previously described, whilst one of the mock suns given by Bravais is altogether wanting.

Lastly, the halo described by Prof. Grenville A. J. Cole will be found in the same work (Plate iii. Fig. 101), where it is interesting to note that only one parheliion is drawn, and that is the one given by Prof. Cole on the left of the horizontal diameter of the smaller circle.

T. C. PORTER.

Eton, Bucks, June 30.

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Matter and Motion in Space.

MR. WILLIAM STANLEY, an American philosopher and engineer, said a few days ago that the grandest words ever uttered by any man on this planet were spoken by Lord Kelvin when he said that if all the matter in the universe were reduced to its ultimate atoms and equally divided through all space, the disturbance caused by the beating of the wing of one mosquito would bring about everything that we find in the material universe to-day. I have written to Lord Kelvin asking him where I can find some account of this, but he denies that he ever said anything of the kind. However, as Mr. Stanley declares that it appeared in *NATURE*, perhaps you can put me in the way of getting a copy of the paper which contains this remarkable utterance, which, by the way, is quite true, and if Lord Kelvin did not say it, I only have to say that he might well have been the author.

HIRAM S. MAXIM.

18 Queen's Gate Place, London, S.W., June 25.

A Method of Treating Parallels.

MAY I venture to suggest through your columns a method of dealing with the theory of parallels which seems to me to possess some advantages?

Since a philosophically rigid proof of their properties may be regarded as out of the question in the present state of our knowledge, the only desideratum in laying the foundation of this important section of geometry is an axiom the truth of which shall be apparent to the mind of a beginner.

I propose that the following should be adopted, as being the property of parallels which is most prominent in matters of ordinary life, and hence to those who have not made a special study of geometry the most obvious:—"A straight line which is perpendicular to one of two parallel straight lines is perpendicular to the other."

The more general property, that parallels are equally inclined to any straight line which cuts them, follows immediately:—

Let AB and CD be two parallels met by a third line at E and F. Bisect EF at G, and draw GH perpendicular to AB and produce HG to meet CD at K. Then HK is perpendicular to AB and CD.

Then in the two triangles GEH, GFK,

angle EHG = FKG (right angles),

angle EGH = FGK (I. 15),

EG = GF (construction).

$\therefore$ HEG = KFG (I. 26).

Hartley College, Southampton.

S. W. RICHARDSON.

THE FIRST FRUITS OF THE GERMAN ANTARCTIC EXPEDITION.

THE protracted voyage of the *Gauss* from the Elbe to Cape Town excited some anxiety at the time, and called forth a few comments unfavourable to the sailing power of the ship. It appears, however, that the delay was due mainly to the fact that many days were spent in carrying on oceanographical and magnetic work, although the change of programme which led to the abandonment of a visit to Ascension shows that the duration of the passage did to some extent exceed anticipations. The *Gauss*, we may recall, left the Elbe on August 15, 1901, passed the Lizard on the 20th, called at St. Vincent in the Cape Verde Islands on September 11, and reached Cape Town on November 23. The work done in various branches of science was discussed in a preliminary manner on board, and an account of it was issued in March in a paper of