AT the Queen's Hall, Langham Place, to-morrow, February 5, the Prince of Wales will present the certificates to the winners of scholarships and exhibitions of the London County Council Technical Education Board.

THE Technical Instruction Committee of the Northumberland County Council have intimated that they would not be indisposed to make a grant to the Northumberland Sea Fisheries Committee, provided the latter will undertake to arrange for something definite in the direction of hatchery, or arrange some clearly-defined work of an educational value. The Sea Fisheries Committee are making inquiries with the object of devising and establishing experimental work in hatchery.

THE Durham County Council last week sanctioned the expenditure of no less a sum than £2254 for the erection of a "band-room" by the committee of the Earl's House Industrial School, which is under its control. Though it was rightly objected by one councillor that instrumental music was not legitimately a part of an industrial training, yet, following the lead of a member of Parliament present, the Council approved of the grant on the ground that band-playing "tends to elevate the boys, and make them better citizens."

IT is proposed that Staffordshire shall unite with Shropshire and Warwickshire in a scheme which shall provide advanced and elementary technical education, in colleges and schools specially adapted for the work, for the sons and daughters of farmers. The Staffordshire Committee are also to appoint a lecturer on pottery and porcelain, with the object of improving the ceramic industry of the northern part of the county, as well as appoint a lecturer and establish a metallurgical laboratory at Wednesbury in South Staffordshire.

PROBABLY the scholarships established by Sir Joseph Whitworth have been the means of bringing more talented young men to the front rank of engineers than any similar foundations. By a will just made known, it appears that the late Lady Whitworth recognised the advantages which scholarships offer to earnest students. She bequeathed such a sum as will provide a permanent income of £100 a year to be applied as "Lady Whitworth Scholarships" in connection with the public elementary school or schools established in Darley Dale, for the purpose of enabling scholars therein to maintain themselves at such schools wholly or partially, or to proceed to other place or places of higher education. The selection of scholars has always to be made according to merit, and not on the mere ground of poverty, or any considerations of private personal favour.

THE great Fayerweather Will contest has just been finally settled by the Court of Appeals of the State of New York, confirming the judgment of the Supreme Court, and dividing the residue of the estate, amounting to about 3,000,000 dols., equally among the following educational institutions, in addition to the following named bequests, which have already been divided among them under the ninth paragraph of the will:—Yale University, 300,000 dols.; Columbia and Cornell University, 200,000 dols. each; Bowdoin, Dartmouth, Williams, Amherst, Hamilton and Maryville College, Wesleyan, Lincoln and Hampton University, and the University of Virginia and of Rochester, 100,000 dols. each; Union Theological Seminary, Lafayette, Marietta, Adelbert, Wabash and Park College, 50,000 dols. each.

WE have received a copy of the scheme agreed to between the Leathersellers' Company and the Executive Committee of the City and Guilds of London Institute for the administration of a grant of £150 a year, offered by the Leathersellers' Company, to be applied to chemical research. It has been resolved that the fellowships shall be open to natural-born British subjects, who are (*a*) students of the Institute who have completed a full three years' course of instruction in the chemical department of the Central Technical College, or (*b*) candidates duly qualified in the methods of chemical research in its relation to manufactures, without restriction as to age or place of previous study, but preferably to class (*a*). Every fellowship will be tenable for part of a year or for one year, and may be renewed for a second or third year, but in no case can be held for a further period. Holders of fellowships must devote their whole time to the prosecution of research. The researches have to be carried out at the Central Technical College. Applications for fellowships must be made in writing to the Hon. Secretary of the Institute, at the Head Office, Gresham College, E.C., and must state the name of the proposed research and the qualifications of the candidate.

THE report of the Director of Technical Instruction to the County Council for the County Palatine of Lancaster for the year ending August 31, 1896, which is to be presented to the meeting of the Council on February 4, is of the most exhaustive nature. The amount which the Technical Instruction Committee resolved to distribute among the urban and rural districts of the county for the year was £24,225, being a decrease of £4285 on the sum distributed in the previous twelve months. Short accounts of the various conferences at which the Lancashire County Council have been represented throughout the year are given, and also full information respecting the scholarships awarded by the Council, and of all grants made in aid of the different branches of study throughout the county. Under the heading "Renewal of Scholarships," we notice that a Lancashire student at Cambridge, who was Second Wrangler in 1895, has been granted a special scholarship of £60 a year to enable him to complete the terms required for a Fellowship of his college, and to make it possible for him to compete for the Smith's Prizes. A series of useful tables showing the whole of the scholarships and exhibitions awarded, as well as the total number of students receiving instruction, makes it possible to compare the work of the session 1895 6 with that of previous years. It is interesting to note that the amount actually awarded for these purposes during the year under consideration more nearly approximated to that set aside for the purpose than in any previous session. The highest number of entries of students in all subjects was in the year 1893-4, when the total reached 58,534; with the exception of this particular year there has been a steady increase up to 1896, when the total was 54,719. The excellent report of the work of the County Council Farm at Hutton completes the history of a most satisfactory year's work.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 17, 1896.—"On the Effect of Pressure in the Surrounding Gas on the Temperature of the Crater of an Electric Arc. Correction of Results in former paper." By W. E. Wilson, F.R.S., and G. F. Fitzgerald, F.R.S. Received November 30, 1896.

This paper describes experiments made with the surrounding gas as air, oxygen, hydrogen, and carbon dioxide. It was found that with air and oxygen large quantities of NO_2 are formed at high pressures, and that observations of the radiation at these pressures is consequently impossible. The experiments described in the former paper were made with nitrogen, and there is every reason to believe that the remarkable diminution in radiation then observed was due to the nitrogen containing sufficient oxygen as an impurity to produce NO_2. Experiments with hydrogen showed that in this gas the arc is long and thin with a red line down its centre, giving the hydrogen lines not nearly so expanded as in a spark spectrum at the same pressure. Observation of the crater under high pressures of hydrogen was impossible, because (*a*) only a very short arc could be maintained, and (*b*) soot trees and a deposit of graphitic carbon all round the margin of the crater at high pressures completely hid it. The experiments in CO_2 were the most satisfactory, but, owing to a variety of difficulties, it was found impossible to decide with certainty whether the crater was hotter or colder at high pressures.

A thermodynamic investigation of the rise of temperature in the crater due to increased pressure, on the assumption that the vapour pressure then is the same as that of the surrounding atmosphere, and that the latent heat of carbon is 4000 calories, leads to the conclusion that the temperature of the crater should have risen 220° C. for each atmosphere added, and that the radiation would have doubled for an increase of four atmospheres. Such a large increase would have, almost certainly, been observable in our experiments. Another difficulty, in the way of supposing that the carbon vapour near the crater is at the pressure of the surrounding atmosphere, is pointed out, arising from the slow evaporation of the carbon. Mercury evaporates very rapidly when used as the positive pole of an arc, and there seems no sufficient reason why the much less dense carbon vapour, at a much higher temperature, should evaporate so very much more slowly.

January 21.—"On *Cheirostrobus*, a New Type of Fossil Cone from the Calciferous Sandstones." By D. H. Scott, F.R.S., Hon. Keeper of the Jodrell Laboratory, Royal Gardens, Kew.

The cone described was found at Pettycur, near Burntisland, Scotland, in 1883, by Mr. James Bennie, of Edinburgh. The horizon of the deposit in which it occurs is that of the Calciferous Sandstones, at the base of the Carboniferous Formation. The specimen is calcified, and its structure preserved with remarkable perfection, allowing of the investigation even of minute histological characters.

The author is indebted to Mr. R. Kidston for the loan of his original sections of the cone, and for the opportunity of having additional sections prepared from the same block. No other specimen of the actual fructification is at present known, but a fragment of stem, of which sections are preserved in the Williamson Collection (now at the British Museum) appears to be the peduncle of a specifically identical cone.

It is necessary to establish a new genus for the reception of this fossil; the generic name proposed is *Cheirostrobus*, intended to suggest the *palmate* division of the sporophyll lobes (χειρ, hand). The species may be appropriately named *Pettycurensis*, from the locality where the important deposit occurs, which has yielded this strobilus, and so many other valuable specimens of palæozoic vegetation. The diagnosis may provisionally run as follows:—

Cheirostrobus, gen. nov.

Cone consisting of a cylindrical axis, bearing numerous compound sporophylls, arranged in crowded many-membered verticils.

Sporophylls of successive verticils superposed.

Each sporophyll divided, nearly to its base, into an inferior and a superior lobe; lobes palmately subdivided into long segments, of which some (probably the inferior) are sterile, and others (probably the superior) fertile, each segment consisting of an elongated stalk bearing a terminal lamina.

Laminæ of sterile segments foliaceous; those of fertile segments (or sporangiophores) peltate.

Sporangia large, attached by their ends remote from the axis, to the peltate laminæ of the sporangiophores.

Sporangia on each sporangiophore, usually four.

Spores very numerous in each sporangium.

Wood of axis polyarch.

C. Pettycurensis, sp. nov.

Cone, 3—4 cm. in diameter, seated on a distinct peduncle. Sporophylls, twelve in each verticil.

Each sporophyll usually sexpartite, three segments belonging to the inferior, and three to the superior, lobe.

Sporangia densely crowded.

Spores about 0·065 mm. in diameter.

The new cone, though widely different from any forms of Vascular Cryptogams hitherto recorded, appears to have more in common with *Sphenophyllum*—until now a perfectly isolated group of palæozoic plants—than with any other known genus.

The sum of its characters justifies the suggestion that *Cheirostrobus* may be provisionally placed in the same *phylum*, or main division of Pteridophyta, with *Sphenophyllum*, though indications of possible affinities in other directions are not wanting, and will be discussed on another occasion.

Cheirostrobus, even more than *Sphenophyllum* itself, appears to combine Calamarian with Lycopodiaceous characters, and might reasonably be regarded as a highly specialised representative of an ancient group of plants lying at the common base of these two series.

Mathematical Society, January 14.—Prof. Elliott, F.R.S., President, in the chair.—Prof. Sylvester, F.R.S., spoke on the partition of an even number into two primes, and answered numerous questions.—Mr. J. J. Walker, F.R.S., gave a solution of a certain quadratic vector equation.—The titles of the following papers were read: "Supplementary Note on Matrices," Mr. J. Brill; "Some Properties of Bessel's Functions," Dr. Hobson, F.R.S.—Mr. T. I. Dewar exhibited, with the aid of stereoscopes, several diagrams of the algebraic catenary.

Zoological Society, January 19.—Dr. St. George Mivart, F.R.S., Vice-President, in the chair.—The Secretary exhibited a set of seven slightly enlarged photographs, illustrating the manner in which the rough-keeled snake (*Dasypeltis scabra*) swallows an egg. These had been taken from a living specimen in the Society's Gardens by Mr. R. F. Nesbit, by whom they had been presented to the Society. The specimen from which the photographs had been taken, measuring about 28 inches in length, was also exhibited.—The Secretary also exhibited a specimen of the Cerastes viper (*Cerastes cornutus*), which had been received in exchange from the Zoological Gardens, Ghizeh, Egypt, and had lately died in the Gardens. This was the specimen, with false horns made of hedgehog spines, which had been alluded to in the newspapers of the last few weeks. On examination it was found that one of the spines had been driven through the skull into the mouth of the snake, and this had probably caused its death.—Mr. Sclater exhibited a photograph of a young anteater (*Myrmecophaga jubata*) two days old, born in the Zoological Garden of Herr Adolf Nill at Stuttgart. Mr. Sclater remarked that this was the first instance, so far as he knew, of this animal having bred in captivity.—Lord Walsingham, F.R.S., read a paper entitled "A Revision of the West Indian Microlepidoptera, with Descriptions of New Species." This memoir gave a complete catalogue of all the species of Microlepidoptera known to occur in the West Indian Islands.—Mr. F. E. Beddard, F.R S., read some notes on the anatomy of the manatee (*Manatus inunguis*) lately living in the Society's Gardens.—Dr. Lindsay Johnson read a paper on the ophthalmoscopic appearances of the fundus oculi in the Primates. Dr. Johnson had for some considerable time past devoted himself to the careful examination of the eyes of animals, using the means commonly employed by oculists when examining the human eye. He had found that the back of the eye when viewed with the ophthalmoscope presented different appearances in various animals. He showed that the eye of the negro only differed from that of the European in colour, that the higher apes closely resembled man in having binocular vision, and alone had the so-called *macula lutea*, or yellow spot, which is the seat of acute vision. In the lemurs and galagos the back of the eye differed entirely from that of the true monkeys, showing no *macula*. The galagos, which are night animals, had instead of a red or brown fundus a brilliant golden-yellow background to the eye.—Mr. Lydekker described certain deer of the *Cervus sica* group, living in the Duke of Bedford's Menagerie at Woburn.—A communication was read from Mr. Guy A. K. Marshall, on the butterflies of the genus *Teracolus*. The geographical distribution of the genus was described, and seventy-two species were enumerated, two of which were described as new.

Entomological Society, January 20.—Sixty-fourth Annual Meeting.—Prof. R. Meldola, F.R.S., President, in the chair.—An abstract of the Treasurer's accounts, showing a balance in the Society's favour, having been read by one of the Auditors, the Secretary, Mr. H. Goss, read the Report of the Council. It was then announced that the following gentlemen had been elected as Officers and Council for 1897:—President, Mr. Roland Trimen, F.R.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Walter F. H. Blandford and Mr. Frederic Merrifield; Librarian, Mr. George C. Champion; and as other members of the Council, the Rev. Canon Fowler, Mr. Herbert Goss, Sir George F. Hampson, Bart., Herr Martin Jacoby, Prof. Meldola, F.R.S., Mr. Osbert Salvin, F.R.S., Mr. James W. Tutt, and Mr. G. H. Verrall. The President then delivered an address, and took for the subject, "The Utility of Specific Characters from the Point of View of the Darwinian Theory." His remarks had reference to the paper on this subject, read last June before the Linnean Society, by Dr. A. R. Wallace, and the subsequent discussion. Prof. Meldola pointed out that the question of "utility," as necessitated by the theory of natural selection, had hitherto been made to depend too exclusively upon external and visibly manifest utility, a restriction which he did not believe to be warranted by facts. He argued in favour of a connection of the nature of correlation between apparently trivial external characters and latent physiological characters of great importance to the welfare of the species. From this point of view it was contended that the diagnostic characters used for purposes of description did not truly represent the sum total of the characters which must be regarded as specific. The President concluded by referring to the losses by death during the year of several Fellows of the Society and other entomologists, special mention being made of Mr. A. S. Olliff, Mr. Edward Armitage, R.A., Mr. Peter Inchbald, Miss G. E. Ormerod, M. Auguste Sallé, Mr. Arthur Dowsett, Herr Julius Flohr, Mr. J. Chappell, and Dr. Morawitz.—A vote of thanks to the President was proposed by Lord Walsingham, F.R.S., seconded by Mr. Osbert Salvin, F.R.S., and carried. A vote of thanks to the officers was then

proposed by Prof. Poulton, F.R.S., seconded by Mr. R. Trimen, F.R.S., and carried. Prof. Meldola, Mr. McLachlan, and Mr. Goss replied, and the proceedings terminated.

Royal Meteorological Society, January 20.—Annual General Meeting.—Mr. E. Mawley, President, in the chair.—The Secretary read the Report of the Council, which showed that the Society had made steady progress during the past year, there being an increase of seventeen in the number of Fellows.—The President then delivered an address on shade temperatures, in which he stated that of all meteorological observations there were none approaching in importance those made of the temperature of the air, generally known as "shade temperature." Indeed, the first question invariably asked in regard to almost any climate was as to its temperature. Mr. Mawley traced the history of the different methods of exposing thermometers since the time that regular observations of the weather had been made in this country. For many years open screens were most favoured by meteorologists, that devised by Mr. J. Glaisher, F.R.S., and the late Astronomer Royal (Sir G. B. Airy) being the pattern principally used. In 1864 Mr. T. Stevenson invented an admirable form of closed screen with louvred sides, which was considered preferable to the open type of screen, and has now almost entirely superseded the Glaisher stand. In 1883 the Stevenson screen was considerably improved by a Committee of the Royal Meteorological Society. Mr. Mawley then described his own experiments at Croydon and Berkhamsted as regards this improved screen, known as the Royal Meteorological Society's pattern. He showed that the only two defects which had been attributed to this form of thermometer exposure were virtually non-existent, and therefore advised its general adoption both in this country and on the continent. Mr. Mawley had recently made observations in the Stevenson screen, and also in the screens used in France and Germany, and the conclusion he had come to was that the results obtained in the Stevenson screen were not only the nearest to the true air temperatures, but also more likely to be strictly comparable with temperatures taken in a similar screen, but with different surroundings elsewhere.

Linnean Society, January 21.—Mr. C. B. Clarke, Vice-President, in the chair.—Dr. John Lowe exhibited some fossil antlers of *Cervus elaphus* of unusually large size from Southern Fen, Cambridge. With these were also exhibited various fragments of implements and weapons which had been discovered in proximity, showing that the animal had lived contemporaneously with man.—Dr. H. O. Forbes referred to similar antlers of great size which had been discovered in Lancashire during the cutting of the Manchester Ship Canal, and which were preserved in the Liverpool Museum.—Mr. J. E. Harting showed drawings of large antlers found at Bourne End in 1894, during the construction of the new viaduct over the Thames, and at Boston, Lincolnshire, in 1895, by a man ploughing. It was remarkable that while the antlers of Red Deer at the present day showed a marked deterioration in size and weight when compared with those obtained in a fossil state in England, this was not the case with the Roe Deer. He had seen no fossil horns of the Roe which were superior in size to those of the same species procurable at the present time in Scotland. The reason for this had not been explained.—Mr. Horace Monckton exhibited specimens of a common freshwater mollusc, *Limnæa peregra*, collected by him at the Howietoun Ponds, Selkirkshire, showing a variation from the normal type in being more or less banded. Mr. B. B. Woodward exhibited a similar variation in shells of *Limnæa stagnalis*, wherein the banding was longitudinal—a peculiarity which had been recorded by Mr. T. D. Cockerell.—Sir James Maitland, Bart., gave the results of an analysis which had been made of the water at Howietoun and Craigend, with a view to determine the bearing it might have on the growth of fish and variation in the shells of the mollusca referred to.—The Secretary read a letter from Mr. J. Y. Johnson, of Funchal, Madeira, commenting upon Dr. D. Morris's exhibition (Nov. 5, 1896) of raphides composed of oxalate of lime in the bulbs of hyacinths, the handling of which had produced a form of eczema. Mr. Johnson mentioned a parallel case in *Richardia æthiopica*, a beautiful aroid known to gardeners as the Lily of the Nile. The laundresses at Funchal had tried to utilise the starch obtainable from the corms, but complained of the irritation in the hands produced by it, which, on examination, was found to result from the presence of numerous needle-shaped raphides, as in the case of the hyacinth-bulbs referred to.—Dr. G. Elliott Smith read a paper on the origin of the *Corpus callosum*: a comparative study of the hippocampal region of the cerebrum of marsupialia and certain cheiroptera.—On behalf of Dr. J. Gilchrist a paper was read on the minute structure of the nervous system of the mollusca.

EDINBURGH.

Royal Society, January 18.—Sir Arthur Mitchell in the chair.—Dr. John Murray read a paper on the Ocean Ranger Reef of the South-west Pacific. This was a reef which the ship *Ocean Ranger* had reported encountering in lat. 88° 44′ S., long. 157° 2′ E., and desired to have marked as dangerous to navigation. The *Penguin*, under Commander Balfour, was sent there, but could find no reef that would be dangerous. The very careful soundings which were then taken had an interest of another kind. They revealed the presence of a huge pinnacle reaching to within 837 fathoms of the surface, and sinking to 1800 or 1900 fathoms at the base. A coloured map and section, which showed that the pinnacle had a crag-and-tail shape, were submitted for inspection. At the highest point, the soundings showed 85 per cent. of calcium carbonate, and 65 per cent. at the lowest. From the nature of the fragments found in the soundings the rock was evidently of volcanic origin, and it was being disintegrated by the action of the sea.—Dr. Murray then read a paper on the physical conditions of the ocean to the east of the Australian continent. Of recent years great additions had been made to our knowledge of this part of the ocean, due to the careful surveys of Government ships. He had examined over 2000 soundings sent him from time to time by the hydrographer. After reviewing the physical and geographical features of this region, Dr. Murray said that the most interesting point was the reading of the deepest ocean sounding yet taken. Before this, 4600 fathoms had been found off the coast of Japan, and an American boat had gone some 70 fathoms better; but Captain Balfour had found a depth of 5155 fathoms east of the Kermadec Islands. The inference to be drawn from this and other data, taken together, was that we had here the remains of a continent that had sunk beneath the waves. Speaking next of the temperature of this part of the ocean, he said that the heated waters of the equator, and north of it, were driven by the prevailing wind to this part, where they formed a huge whirl like the Saragossa Sea. At 100 fathoms under the surface near the equator the highest temperature for the whole ocean was recorded; and all over, throughout the year, the temperature never fell below 70°; and hence Prof. Dana's condition for the formation of coral was fulfilled. There was more coral here than anywhere else. Speaking of Falcon Island, which at one time was several miles in extent and from 250 to 290 feet high, he remarked that in 1896 it was a black line upon the surface, surrounded by shoals. What had happened accorded with his own idea of coral-reef formation, which he had arrived at many years ago, and had since seen no occasion to change. The bottom temperature in the centre was 36° after 1500 fathoms. The water in the deep and wide gullies was colder than in the centre. Dr. Murray then briefly described the distrbution of products in this region. Calcium carbonate was the principal. At depths less than 100 fathoms it occurred in the percentage of 80 or 90, while it ranged between 50 and 70 for depths down to 2400 fathoms. Then it disappears very rapidly till 3000 fathoms is reached, and there is no trace of it in the lowest soundings. Further south there was more detrital matter, and it was more chalk-like in appearance. Nearly every kind of deposit was represented, though there was very little Regillarian ooze. The carbonate of lime disappeared at a less depth in extra-tropical regions than in tropical.—Dr. C. G. Knott made a brief note, introducing a second series of investigations into magnetic strains. He had set himself to discover how much of the changes already described was due to change of length and how much to change of width, and he exhibited graphs of the relations of these.—Prof. Tait read a paper on the physical properties of the electromagnetic medium. He developed the consequences of the hypothesis that the connection between the electric and magnetic vectors in Maxwell's equations may be due to the fact that they are not directly disturbances in the ether, but concomitants or results of the disturbance; just as the condensations and rarefactions of the air, which affect the drum of the ear, are concomitants of the displacements of the air.—Papers by Lord

Kelvin, on osmotic pressure against an ideal semi-permeable membrane, and on a differential method for measuring differences of density and of vapour pressure of solutions, were also read (see pp. 272–3).

DUBLIN.

Royal Dublin Society, December 16, 1896.—Mr. Thomas Preston in the chair.—The following papers were presented :—The geographical distribution of dragon-flies, by Mr. G. H. Carpenter.—A suggestion as to the origin of the canals of Mars, by Dr. J. Joly, F.R.S. The formation of the principal curved lines and double "canals" observed by Prof. Schiaparelli and Mr. Lowell is referred by the author to the disturbances of the crust of the planet produced by the gravitational attraction of small satellites in past times rotating close to the surface. It is shown that a satellite so small even as Phobos, if rotating some 50 or 60 miles above the surface, would produce very appreciable stresses in the surface crust of the planet. Integrating the horizontal component of the gravitational pull outwards from beneath the satellite, a ring of maximum stress defined as the base of a cone having the satellite at its summit and a semi-angle of 71°, is obtained. If the satellite is moving relatively to the surface of the planet, tangents to this circle in the direction of motion define parallel lines of probable rupture. There is also probable development of a central line of weakness vertically beneath the satellite's line of motion. These disturbances probably gave rise to mountain ranges—possibly of small altitude—which constitute the "double canals" and lines observed on the surface. Mountain ranges more readily explain the seasonal changes in visibility than any other hypothesis as to their nature. Satellites rotating so close to the surface will probably exist only for a score of years, or thereabouts, between such limits of distance as 70 to 50 miles, when, sinking deeper into the planet's atmosphere, their energy will be rapidly absorbed, and they will fall in; assuming as most probable that the day is longer than the month, or that the satellite's motion is retrograde. The intersection of the radius vector of the satellite with the surface of the planet will describe certain curves, the span of which upon the equator will depend upon the rates of relative angular velocity of planet and satellite. Given the span and rise, the curvature is completely defined. The curves upon Mr. Lowell's map, and those given by Prof. Schiaparelli, are apparently in close agreement with the theoretical curves. They are not great circles. It is shown that nodal points will give rise to centres of radiating lines. The location of Mars' orbit so close to the ring of asteroids—some of which are known to come within his mean distance from the sun—is considered to render *à priori* probable the assumption that Mars has throughout the past at intervals picked up satellites which, after describing a spiral path round him, ultimately fell in. Phobos is—according to lunar theory—probably in the way to do so at some future time. It is shown that a small solid satellite, even if composed of no stronger material than basalt, will be amply stable under the unbalanced gravitational and centrifugal forces to which it will be subject when close to Mars' surface.—An account of some experiments to determine the exact position from which the X-rays emanate in a focus tube was given by the Right Rev. Monsignor Molloy.

PARIS.

Academy of Sciences, January 25.—M. A. Chatin in the chair.—The President presented to M. Faye the medal struck on the occasion of the fiftieth anniversary of his nomination to the Academy, and gave a review of his contributions to Astronomy.—Verbal report on the contents of a sealed letter, opened at the request of the heirs of the late M. B. Heire; and relating to several questions in surgery, by M. le Dr. Guyon.—Note on a screwbrake, with vertical action on the rail, by M. G. Camps.—On two errata in the "Œures de Gauss," by M. Schering.—Photography of an extraordinary protuberance, by M. H. Deslandres. An account of a solar protuberance photographed at the Observatory of Paris on May 31, 1894, which attained the enormous height of 10′23″ of arc, or one-third of the solar diameter.—On the first integrals of dynamics and on the problem of *n* bodies, by M. P. Painlevé.—On the expansion of nickel steel, by M. C. E. Guillaume. By comparison with a platino-iridium bar, the expansion of which had been carefully studied, the expansion of nickel steels was found to be anomalous, in the sense that instead of following approximately the law of mixtures, the expansion was even higher than bronze. To further elucidate this point, the expansions of a series of nineteen bars were determined, in which the proportions of nickel varied from 0 to 100 per cent. The coefficient of expansion reaches a maximum at about 24 per cent. of nickel, and rapidly falls until a minimum is reached at 36 per cent. of nickel, after which it slowly increases until the original value is obtained.—Fluorescence of vitrified materials, under the action of the Röntgen rays, by M. Radignet. By the use of screens of glass (especially the glass from the manufactory of Saint-Gobain, called *crystal*), enamel, or porcelain instead of the usual ones of cardboard covered with fluorescent crystals, the images obtained are less brilliant, but more sharply defined.—On an absolute electrometer designed to measure small differences of potential, by MM. A. Perot and C. Fabry (see p. 327).—An optical apparatus by which objects cast or engraved can be seen in relief and in their normal position, by M. Ernest Moussard.—On the determination of the ratio of the two specific heats of acetylene, by MM. G. Maneuvrier and J. Fournier. The method of Clement and Desormes was used, the flask employed holding fifty litres. It was found that the acetylene obtained by the action of water upon calcium carbide was by no means pure, only 94 per cent. of it being absorbed by ammoniacal cuprous chloride. The system of purification adopted reduced this to less than 0·5 per cent., and the gas thus obtained was found to have lost its allicaceous odour, held up to the present to be one of its characteristic properties, although still possessing a strong penetrating odour. The value found for $\frac{C}{c}$ was 1·273.—The physical, physiological, and therapeutic effects of rapidly alternating currents, by M. Boisseau de Rocher.—Action of carbon monoxide and dioxide upon aluminium, by MM. Guntz and Masson. At a high temperature, in the presence of a little iodide or chloride of aluminuim, aluminium is readily burned in a current of either CO or CO_2. With the former the reaction is

$$6Al + 3CO = Al_2O_3 + C_3Al_4,$$

the aluminium carbide giving practically pure methane on boiling with water. Carbon dioxide gives the same product.—On the phosphides of chromium and of manganese, by M. A. Granger. By the action of phosphorus vapour upon the chlorides of chromium and manganese, the phosphides CrP and Mn_3P_2 were obtained.—Spectra of the metalloids in their fused salts, silicon, by M. A. de Gramont.—Influence of temperature upon the rotatory power, by M. P. A. Guye and Miss E. Aston.—On two isomeric triethylene-diphenylhydrazines, by M. H. Causse.—On a superior homologue of urea, by M. Oechsner de Coninck. The substance has the composition $C_4H_{10}N_2O$, and was obtained from the urine of a person suffering from alcoholism.—New researches on the embryonic nervous system of the Crustacea, by H. Nicholas de Zograf.—On the histology and microscopical anatomy of the encephalon in fishes, by M. Catois. The results obtained by the use of methylene-blue as a staining reagent are entirely confirmatory of the researches of R. Cajal.—On the biology of *Dendroctonus micans* (Ratz), by MM. A. Menegaux and J. Cochon.—On the pseudo-larval pairing of some *Sarcoptidæ*, parasitic in the domestic pigeon, by M. S. Jourdain. The species studied were *Pterolichus falciger*, *Dermoleichus asternalis*, and *Pterophagus strictus* (Mégnin).—Phenomena of autotomy observed in the goubs of *Monandroptera inuncans* and *Raphiderus scabrosus*, by M. Edmond Bordage.—On the gases given off in water by metallic carbides, by M. E. Maumené.

SYDNEY.

Royal Society of New South Wales, September 2, 1896.—Mr. J. H. Maiden, President, in the chair.—Papers read :—Note on recent determinations of the viscosity of water by the efflux method, by G. H. Knibbs—Current Papers, No. 2, by H. C. Russell, F.R.S.

October 7.—On the occurrence of precious stones in New South Wales, with a description of the deposits in which they are found, by Rev. J. Milne Curran. The Society's bronze medal and money prize of 25*l.* were awarded to the writer of this paper—On the constituents of the sap of the "silky oak" *Grevillea robusta*, R.Br., by Henry G. Smith.

November 4.—On sill structure and occurrence of fossils in eruptive rocks in New South Wales, by Prof. T. W. E. David.