

In discussing the relation of special type stars to the Galaxy, one of the chief facts that made itself at once apparent was that "Helium" stars were not indiscriminately scattered over the heavens like the solar or other type stars, but were more thickly concentrated in the two zones north and south of the galactic equator. In addition, among many other outcomes of this survey was the discovery of oxygen in the spectrum of β Crucis, and in the helium stars generally.

The energy and stamina displayed by McClean in all his work will be best understood when it is mentioned that he employed no assistants. In his laboratory he was the sole operator, and in the observatory at night every manipulation was accomplished by his own hands. To quote the words of the president of the Royal Astronomical Society when presenting him with the gold medal, ". . . it was his eye that measured the lines, and his was the pen that worked out the calculations. Need I add more to prove that what Mr. McClean's hand had found to do he did with all his might?"

Turning now from this very brief and incomplete summary of McClean's scientific work, reference must be made to his generosity in presenting munificent gifts for the advancement of astronomy. Being a worker himself, he was in a position to know in what direction monetary aid could be best employed. As the founder of the Isaac Newton studentships at Cambridge University, requiring an endowment of 15,000*l.*, he rendered a service to astronomical science which it would be hard to overestimate, and the results that will accrue from it will, we hope, be a fitting memorial to his name.

Not content with providing in this way the means by which the study of astronomy will be encouraged, he presented the Cape Observatory, ten years ago, with a large telescope, fittings, and dome, with all the latest improvements, to accomplish work which otherwise would have been delayed possibly for many years. He saw at once the field that was open and the advance that was possible if the southern heavens were surveyed by a prismatic camera of large dimensions, and he took this opportunity to supply the necessary means.

The fact that Sir David Gill in his recent report for the year 1903 writes, "The Zeiss prism is a very perfect and transparent piece of glass, and I have no doubt that its performance will do credit to the fame of its makers. The observatory is indebted to Mr. McClean for this splendid gift, as also for the costly alterations to the spectroscope," shows that McClean's original gift has been greatly increased. As the inauguration of the "Victoria" telescope forms an epoch in the history of the Cape Observatory, may the results obtained with it play a like rôle in the advancement of stellar spectroscopy for the southern hemisphere.

McClean was elected a fellow of the Royal Society in 1895; the university of Glasgow conferred on him the honorary degree of LL.D., while, as previously mentioned, he obtained the gold medal of the Royal Astronomical Society.

In 1865 he married Ellen, the daughter of Mr. John Greg, of Escowbeck, Lancaster, who now mourns with her three sons and two daughters his loss. They are not, however, alone in their grief, for his death is deeply felt by a large circle of friends, among whom are many astronomical colleagues who will miss his familiar face.

The funeral, which took place on Friday last, was attended by representatives from many societies and institutions, among which may be mentioned the Cambridge University, the Royal Society, the Royal

Astronomical Society, the British Association, the Institution of Civil Engineers, Greenwich Observatory, Solar Physics Observatory, and the Cambridge University Observatory.

W. J. S. L.

NOTES.

THE seventieth birthday of Prof. G. H. Quincke, the doyen of German physicists, will be celebrated at Heidelberg on Saturday next, November 19. Prof. Quincke's laboratory formed the subject of a contribution to our series of scientific centres in NATURE of April 24, 1902, and his portrait was reproduced in the article. Reference was then made to the admirable manner in which the laboratories at Heidelberg are arranged, and the many ingenious devices to be found in them, as well as to some of the investigations carried on. It is therefore unnecessary to attempt to describe again the results of Prof. Quincke's uninterrupted work in physical research for nearly half a century. Among Prof. Quincke's many pupils have been Prof. Lenard (Kiel), Prof. Braun (Strassburg), Prof. W. König (Greifswald), Profs. Elster and Geitel (Wolfenbüttel), the late Prof. Willard Gibbs, Prof. Michelson, Dr. J. T. Bottomley, F.R.S., Dr. J. McCrae (Glasgow), &c.; a complete list would include many other English and American students. To celebrate the occasion of Prof. Quincke's seventieth birthday, a committee, with Prof. Kohlrausch (Berlin) as president and Dr. R. H. Weber (Heidelberg) as secretary, has arranged for the presentation of a large and handsome album containing the autograph photographs of many of the leading physicists of all nationalities and of Prof. Quincke's former pupils. A convincing testimony of the high value set on Prof. Quincke's work in this country is supplied not only by the lists of universities and learned societies which have conferred their honours on him, but also by the fact that among the English physicists and personal friends who have contributed photographs are Lord Kelvin, Lord Rayleigh, Sir W. Huggins, Sir W. Ramsay, Sir H. E. Roscoe, Sir N. Lockyer, Sir W. H. Preece, Prof. J. J. Thomson, Sir A. Rücker, Prof. J. Larmor, Prof. J. A. Ewing, Mr. C. V. Boys, Sir O. Lodge, Prof. J. H. Poynting, Prof. G. Carey Foster, Prof. A. Schuster, Dr. W. N. Shaw, Prof. J. Perry, Prof. R. B. Clifton, Prof. J. G. MacGregor, Prof. J. T. Joly, Prof. G. H. Darwin, Prof. W. G. Adams, Prof. W. M. Hicks, Prof. H. Stroud, Prof. A. P. Chattock, Prof. A. S. Herschel, and many others.

THE American Consul at Bermuda describes in a United States Consular Report the steps which have been taken to establish there a biological station which will be to North America what the Naples station is to Europe. For several years American naturalists have carried on investigations of the natural history of the Bermudas and the surrounding sea, and have made efforts to establish a biological station in these islands. Upon the advice of the Royal Society, our Government has given its assent to the project. The Colonial Government has expressed its willingness to purchase the land and erect the building, and grants toward equipment and support of tables have been made by the Royal Society and the Carnegie Institution. Harvard University and New York University, in connection with the Bermuda Natural History Society, have already commenced work in a temporary laboratory close to what will be the permanent quarters of the station, and the United States Government has been asked to give generous support to the station. America has already founded a tropical botanical laboratory in buildings of the Government of Jamaica at

Cinchona, and has now secured a biological station, so that it appears as if the Americans are rapidly getting the control of the scientific interests of our western tropical possessions. While we cannot but admire the interest shown in the establishment of these stations by universities and colleges in the United States, it is impossible not to regret the apathy with which our home and colonial Governments regard such matters. Surely it is the duty of the State to encourage the pursuit and cultivation of natural knowledge throughout the Empire, and to realise the richness of its possessions in material for scientific study as well as in precious minerals. It is a reproach to our nation that a biological station has not been established by us in the Bermudas; for now, instead of American investigators carrying on their work in a British station, we have to face the fact that, though the station will be on British soil, it will belong to the United States, and our own countrymen will be guests in it. So far as the interests of science are concerned, probably this does not matter; for, as Mr. Balfour wrote a few days ago to the translator of his British Association address, community of aim "binds together the scientific men throughout the world into one international brotherhood." But it should be evident to some of our ministers, at least to Mr. Balfour, who has often expressed sympathy with scientific progress, that it cannot be to the advantage of the State for another nation to accept responsibilities which belong to us. Mr. Balfour is gratified at the success of the translation of his address into German, but apparently he does not consider that the interest shown in scientific matters in Germany is due to the active and practical part played by the State in helping scientific education and research. What we want here and in all parts of the Empire is more practical help of the kind given by the United States and Germany to save us from the future regret of lost opportunities.

REUTER'S Agency states that a long report has been received from the members of the expedition of the Liverpool School of Tropical Medicine now investigating sleeping sickness in the Congo. Complete observations have been made on the spread and distribution of sleeping sickness along the Congo River for a distance of nearly 1000 miles between Stanley Pool and Stanley Falls. From Leopoldville to Bumba cases of sleeping sickness were present in every town visited, and a large percentage of the population harboured trypanosomes. From Basoko to the falls only imported cases were met with, with two exceptions, and trypanosomes were not found among the general population. Observation seems to show that enlarged cervical glands are an early sign of the disease, recognisable before trypanosomes make their appearance in the general circulation, and in a little fluid withdrawn from a gland with a hypodermic needle trypanosomes may be detected. Tsetse flies were incessantly present up to Basoko, the species being *Glossina palpalis*, after which they became infrequent, their distribution thus corresponding with that of sleeping sickness.

MR. W. H. PICKERING, late chief of the inspecting staff for the Yorkshire and Lincolnshire mining districts, has been appointed Chief Inspector of Mines in India.

DR. CATTO has been awarded the Craggs prize of the London School of Tropical Medicine for his discovery of a new *schistosomum* parasite of man. The Craggs prize, of the value of 50*l.*, was founded some years ago by Sir John Craggs, and is awarded annually in October to that student of the London School who is considered to have carried out the best piece of research work, or made an important discovery, in tropical medicine during the preceding year.

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In a letter to the *Speaker* of November 5, Mr. J. A. Reid urges that educationists should consider the desirability of teaching children the principles of evolution in schools. In considering how the subject might be taught, Prof. W. K. Clifford remarked in 1878: "The teacher, knowing what is to come in the end, may so select the portions of various subjects which he teaches at an earlier stage that they shall supply in a later stage a means of understanding and estimating the evidence on some question of evolution."

THE inaugural meeting of the Association of Economic Biologists was held at Burlington House on Tuesday, November 8. Mr. F. V. Theobald occupied the chair, and in the course of his introductory remarks he detailed the steps taken by Mr. Walter E. Collinge to found the association. He hoped that the association would welcome all investigators in economic biology, whether agricultural, medical, or commercial. The relationship between biology and agriculture was apparent to all, but only recently had the importance of its relationships with medicine and commerce been realised. Membership of the association will be confined to workers in economic biology. The following officers have been elected for 1904-5:—president, Mr. Fred V. Theobald; vice-president, Mr. A. E. Shipley, F.R.S.; council, Prof. G. S. Boulger, Prof. A. H. R. Buller, Prof. Geo. H. Carpenter, Dr. Francis Marshall, Mr. Robert Newstead, Major Ronald Ross, F.R.S., Mr. Fraser Storey, Mr. Cecil Warburton; hon. treasurer, Mr. Herbert Stone; hon. secretary, Mr. Walter E. Collinge. The next meeting will be held at Birmingham in April, 1905.

ON December 4, 1804, Joseph Lebon, who is considered in France as the inventor of lighting-gas, was found murdered by an unknown hand in the Champs-Élysées, near the site where is now the Grand Palais. In memory of this sad tragedy, and to pay due honour to the celebrated inventor, the Compagnie Parisienne du Gaz has given a certain quantity of gas, free of charge, to the Aéro Club and Société française aéroienne. Ascents will accordingly be made on December 4 by members of these two societies. On December 5 an exhibition will be held in the Grand Palais by the Automobile Club.

AT a meeting of the Société astronomique de France held in Paris on November 2, M. Lippmann being in the chair, the Comte de la Baume-Pluvinel gave an address on the forthcoming total eclipse of the sun on August 30, 1905. He mentioned the intentions of American astronomers to send expeditions to Labrador, Spain, and Upper Egypt. After the address the society decided to appoint a committee for determining the part which France should take in observing the eclipse. It is fairly certain that the principal work of this committee will be concerned with observations in Algeria and Tunis, through which the line of totality passes. This eclipse was also commented upon at the last meeting of the St. Petersburg Scientific Aeronautic Congress, officially held in the rooms of the Imperial Academy of Sciences under the chairmanship of the Grand Duke Constantin Constantinovitch, president of the academy. Colonel Vives y Vich has announced that he will make an aeronautical ascent from Burgos on this occasion, for the purpose of ascertaining the part the clouds may possibly play in the apparent brightness and shade of the corona. In addition, the international committee of *ballons-sondes* has decided that atmospheric observations shall be made at the great altitudes of the various observatories connected with the institution during August 29, 30, and 31 for ascertaining the changes the eclipse may introduce in the prevailing winds and temperatures at different altitudes.

THE *Scientific American* of October 22 contains the portrait of a white raccoon-dog from northern Japan, in the New York Zoological Park, which is regarded as representing a new species, and is accordingly named *Nyctereutes albus*. The ordinary raccoon-dog of Japan and China is an animal closely allied to the true dogs, but with a marked superficial resemblance to a raccoon. If the New York specimen really indicates the existence of a white species of raccoon-dog, the fact will be of considerable zoological interest.

IN the second part of the Bergen Museum *Aarbo* for the current year Prof. G. O. Sars describes a small crustacean (*Paracartia grani*) recently discovered in the oyster-beds of western Norway which is of great interest from the point of view of distribution, since the only other known representative of the genus inhabits the Gulf of Guinea. The author considers that the creature reached Norway from the south during a warm period, and that it survives on the bays of the west coast owing to the circumstance that a superincumbent layer of fresh water renders the subjacent salt water unusually warm. The same explanation accounts for the prolific oyster-beds on this coast.

IN the November number of the *Century Magazine* Prof. H. F. Osborn publishes *in extenso* the lecture on the evolution of the horse in America which he delivered at the recent Cambridge meeting of the British Association. Omitting reference to that portion of the article devoted to the origin of the Equidæ generally, we may mention that the author regards North America as the ancestral home of the genus *Equus*, the American horses passing into South America by way of Panama, and into Asia by a land-bridge across Bering Strait about the early or middle portion of the Pliocene period, giving rise in the latter area to the Siwalik horses (which, by the way, are not later than older Pliocene age). Horses of all kinds died out both in North and in South America, according to the author's belief, before the European conquest. The American Miocene and Pliocene horses are considered to have been striped; but the splitting of *Equus* into the true horses, asses, and zebras probably took place in the Old World. Przewalski's horse of Mongolia is regarded as representing the ancestral stock of the ordinary horses of the Old World, the long manes and tails of the latter being probably due in part to domestication. On the other hand, the author accepts the view that the blood-horse may have had a different ancestry, although he does not refer to its suggested derivation from the Indian *Equus sivalensis*.

SOME interesting experiments in blasting tree butts with gellignite—a safety explosive—have recently been carried out at Lord Leigh's Stoneleigh Abbey Estate, near Kenilworth. The usual boring was made and filled with the explosive. An electric detonator was used which enabled the operator to retire under cover at a safe distance. The butts operated upon were of various sizes and species, but in each case the method was found to give satisfactory results. It is also claimed to combine efficiency with economy.

THE comparative age of the different elements of the flora of eastern North America forms the subject of a paper by Dr. J. W. Hashberger in the September issue of the *Proceedings of the Philadelphia Academy*. Most of the flora cannot be older than the close of the Glacial period, which, from the rate of cutting of the Niagara gorge, is estimated to have occurred not more than 15,000 years ago. Some of its elements may, however, be much older, since they may

be the descendants of boreal plants which flourished on unglaciated areas in the midst of the ice-sheet. Apart from these, there was firstly a wave of plant-life from the skirts of the ice-sheet. This was followed by a northern wave, many of the species of which, forming the bog-plants of the old Glacial lakes, soon occupied the tundra left by the ice; the conifers developed later, and restricted the bog-flora. Hence came the modern bog and swamp floras, while the existing Poconna flora is due to a third invasion.

THE work of the Forestry Bureau of the United States Department of Agriculture stretches far afield, and the forests of the Hawaiian Islands form the subject of one *Bulletin* by Mr. W. L. Hall, while Mr. W. L. Bray in another reviews the forest resources of Texas. The succession of the forests in Texas indicates that their distribution is primarily influenced by the amount of rainfall, and only secondarily by the nature of the soil. A remarkable instance of the spread of a successful type is furnished by the mesquite, *Prosopis glandulosa*, which has spread from the Rio Grande eastwards across the Rio Brazos, and northwards into the adjoining States of Oklahoma and Kansas. In the Hawaiian Islands a mesquite, although an alien, has established itself as a pure forest from sea-level to an elevation of several hundred feet, and is regarded as a valuable asset, because, in addition to the fuel and posts obtained from the wood, the pods furnish excellent food for stock.

IN view of the difficulties of obtaining zygospores of species of *Mucor* and allied genera, considerable importance attaches to a paper—"Sexual Reproduction of the *Mucorinæ*," by Mr. A. F. Blakeslee—which is published in the August number of the *Proceedings of the American Academy of Arts and Sciences*. The author found that the greater number of these fungi failed to produce zygospores in pure cultures, but some would do so when a mass of spores taken from an impure culture was sown together. This suggested that in the latter case zygospores were produced from different mycelia or plants, and eventually experiments demonstrated that two different strains, which may be regarded as a (+) and a (-), were required; thus two groups, the *heterothallic* and *homothallic*, are distinguished. Sporodinia is homothallic, *Phycomyces*, *Rhizopus*, and several species of *Mucor* are heterothallic. Differences of colour, luxuriance and duration of conjugating ability were noted, but the most interesting results obtained were incipient attempts at hybridisation by opposite strains of allied heterothallic forms.

WE learn from the *Standard* that, under the auspices of the Meteorological Council, a new observing station for London has just been established in St. James's Park. The station is situated in an open spot a few yards distant from the iron railings bordering on the Horse Guards Parade, and is equipped with a set of thermometers, mounted in a Stevenson screen, and two rain gauges—one of quite an ordinary kind, the other a self-registering gauge of the pattern designed by Mr. F. L. Halliwell, of Southport. Just within the park railings are placed two ornamental wooden frames, one containing, for the previous twenty-four hours, automatic records of bright sunshine, of rainfall, and of temperature, all made in Westminster; the other, copies of the latest weather charts and forecasts prepared at the Meteorological Office.

WE have received a copy of the results of the magnetical and meteorological observations made at the Royal Alfred Observatory, Mauritius, in the year 1901. The observatory has a complete equipment of instruments recording photo-

graphically the variations of the principal magnetic and meteorological elements and of earth movements, in addition to a self-registering "Beckley" rain gauge and other automatic apparatus. The tables, containing hourly and mean values, have been carefully prepared on the Greenwich pattern, and are, therefore, quite clear and convenient for reference. Mr. Claxton prints the results of an interesting investigation of the degree of accuracy of self-registering maximum and minimum thermometers. He finds that maximum thermometers read higher in a horizontal position than when inclined to the horizon; the excess may amount to 1° F. Also, that the indications of spirit minimum thermometers are untrustworthy, owing chiefly to evaporation of the spirit. They should be used in conjunction with an ordinary mercurial thermometer.

A PAPER on Britain's place in foreign markets is contributed to the *Economic Journal* for September by Prof. A. W. Flux. The author has had considerable difficulty in drawing up statistics owing to the great discrepancies which he finds in the returns from different countries. He, however, considers that the market for British goods in Germany, France, and the United States, though narrowed by the tariff policy of the third, is still of great importance, and is expansive in some degree except in the case of the United States. In all three cases, however, the trade done by other countries as a whole has grown faster than their trade with us.

DURING March, 1903, several excursions were made to the Phlegræan fields of Naples by Dr. G. de Lorenzo and Sir Archibald Geikie. At the suggestion of the latter the former has now published a short history of volcanic activity in this region (*Rendiconto* Naples Academy, May to July). Dr. de Lorenzo divides the volcanic formations into three periods, the first being represented by the pipernoid tufa of the Campagna and by conglomerate and breccia at Cuma, Camaldoli and Procida, the second by the yellow tufa of Posilipo, Nisida, Pozzuoli, Capodimonte, &c., and the trachitic masses of the Vomero, and the third period by the eruptions of the Solfatara, Monte Nuovo, the Lago d'Agnano and similar formations.

IN the *Rendiconto* of the Naples Academy for March and April, Prof. Orazio Rebuffat describes some interesting and simple experiments with radium salts. When a glass rod was rubbed with wool in the common way for producing electric sparks the author found that if the experiment was performed in a medium containing a radium salt a luminous glow followed the wool, and when the finger was brought near the excited glass a glow was again seen. By taking a vacuum tube and opening connection with a small tube containing a salt of radium, and then rubbing the outside of the glass tube with wool, a brilliant glow was seen within. By means of this experiment Prof. Rebuffat considers it possible to demonstrate the production of emanations from radium preparations of very feeble activity.

DR. R. VON LENDENFELD, of Prague, has published in *Globus*, lxxxv., 24, a discussion of the melting of glaciers in winter. The author considers that the earth's interior heat is incapable of accounting for any considerable part of the phenomenon; indeed, he only attributes about 3 per cent. to 6 per cent. of the result to this cause. Another cause which may account for a further 1 per cent. is the slow conduction of the summer heat to the interior. The main cause of the melting is attributed to the heating of the

ice by the work done in its descent. This work is converted into heat in overcoming friction, viscosity, and similar resistances, just as in Joule's classical experiments. A further increase in the internal melting during the winter is probably due to the pressure produced by the winter snows.

A SPECIAL report of the seventy-sixth meeting of the German Association of Naturalists and Physicians is contained in the number of the *Physikalische Zeitschrift* for October 20. The meeting was held at Breslau from September 18 to 24, and the physical papers include the following:—E. Hoppe, constitution of magnets; H. Hartl, lecture apparatus; C. Pulfrich, coast surveying, &c.; F. Müller, vacuum apparatus; C. Dieterici, energy of water and its vapour; W. Scheffer, stereoscopic problems; A. Köhler, photomicrography by ultra-violet light; J. Stark, mercury lamps of quartz glass; O. Lummer and P. Weiss, *n*-rays; W. Nernst, chemical equilibria at high temperatures; L. Grunmach, properties of emanium and liquid nitrous oxide; A. Wehnelt, negative ions from incandescent metallic oxides; O. Lummer, resolution of fine spectrum lines; W. Schmidt, models of wave motion; H. T. Simon, a phase-meter; M. Reinganum, molecular volumes of halogen salts; L. Graetz, radiations from hydrogen peroxide; J. Rosenthal, Sprengel pumps; W. Stern, tone-variators; K. Schreiber, explosion motors, also force, weight and mass; G. Bredig and F. Epstein, kinetics of adiabatic reactions; and E. Meyer, combustion engines. In addition a discussion took place on mathematical and scientific teaching in the higher schools, including addresses by K. Fricke, F. Klein, F. Merkel, and G. Leubuscher. In the general meetings papers were read on the Ice age by Messrs. Brückner, Meyer and Partsch, on the Antarctic expedition by Prof. Gazert, and on biological mechanics by Prof. Roux.

THE scientific methods which have characterised Japanese operations in the Far East are not the only results of the well developed system of education which the last thirty-five years has seen established in Japan. Some fifty years ago Japan was a hermit nation more than five centuries behind the times, to-day she constitutes a new and important factor in the problem of the distribution of the world's commerce. The story of the foreign commerce of Japan since the restoration of imperial authority in 1868 is told by Mr. Yukimasa Hattori in Nos. 9 and 10 of series xxii. of the *Johns Hopkins University Studies in Historical and Political Science*, copies of which have reached us. Mr. Hattori considers his subject under three headings: the volume of trade, the character of Japan's commerce, and the geographical distribution of trade. Two remarks towards the end of his paper will show the conclusions to which Mr. Hattori has come. "Japan must rely on industrial development rather than on agriculture, and must try to excel in the quality of the goods produced rather than in quantity." "Japan possesses all the advantages necessary to make her a great manufacturing country. Her people possess exceptional skill, and labour is relatively cheap; coal is abundant, and the raw material is easily obtainable either at home or in the neighbouring countries." Those readers who have followed the steps in Japan's development since 1868 will be prepared to agree with Mr. Hattori that his country is but "at the very beginning of beginnings" of what will yet be seen.

A SECOND edition of Mr. Drinkwater Butt's "Practical Retouching" has been published by Messrs. Iliffe and Sons Ltd., at 1s. net.

MESSRS. MACMILLAN AND CO., LTD., have in the press an English translation of Dr. Cohnheim's "Chemistry of the Proteids," prepared with the author's sanction from the second edition of that work by Dr. Gustav Mann, of the physiological laboratory at Oxford, and author of "Physiological Histology." Dr. Cohnheim's book, which, in its second edition, has been entirely re-modelled, deals with all recent advances made in analysing and synthesising proteids. Several special features have been introduced into the English translation, and some of the chapters have been re-written.

AN English edition of Prof. Weismann's "Evolution Theory," which has been translated, with the author's co-operation, from the second German edition (1904) by Prof. J. Arthur Thomson, of Aberdeen University, and his wife, will be published in two volumes by Mr. Edward Arnold toward the end of this month.

To commemorate the twenty-fifth anniversary of the founding of the firm of Burroughs, Wellcome and Co., Mr. Henry S. Wellcome is arranging an exhibition of historical objects in connection with the history of medicine, chemistry, pharmacy, and the allied sciences, the object being to illustrate the art and science of healing in all ages. The date of the opening of the exhibition is not yet fixed.

THE Cambridge University Press will publish very shortly in the Cambridge Biological Series "Morphology and Anthropology," by Mr. W. L. H. Duckworth. The volume will present a summary of the anatomical evidence bearing on the problem of man's place in nature. The Cambridge University Press has also in preparation "Studies from the Anthropological Laboratory in the University of Cambridge," by Mr. Duckworth.

THE November number of the *Popular Science Monthly* is devoted entirely to the St. Louis Congress of Arts and Science. The representative administrative board, it will be remembered, adopted the plan proposed by Prof. Münsterberg, of Harvard University, to hold one congress of the arts and sciences which should attempt to promote and demonstrate the unity of science. An appreciation of the work of this international congress, interspersed with portraits of representative men of science from various parts of the world, is contributed by Mr. W. H. Davis, of Lehigh University, one of the secretaries. A selection from the addresses given at the congress completes an interesting number of the magazine.

OUR ASTRONOMICAL COLUMN.

ENCKE'S COMET (1904 b).—A telegram from Prof. Max Wolf to the *Astronomische Nachrichten* (No. 3975) states that on October 28 the ephemeris published by M. Kaminsky in No. 3973 of that journal needed corrections of +11s. -2^m.4, and, further, that the magnitude of the comet was 12.5.

Visual observations have not, as yet, been fruitful. Prof. E. Millosevich vainly sought for this object on September 15 and October 5.

DESLANDRES'S FORMULA FOR THE LINES IN THE OXYGEN BAND SERIES.—Referring to a note on the results obtained by Mr. O. C. Lester concerning the oxygen bands in the solar spectrum, which appeared in these columns on October 20, Prof. Deslandres directs attention to the fact that a modification of his first formula (viz. $N = a + bn^2$), equivalent to that now proposed by Mr. Lester, was published by him in his original (*Comptes rendus*, August, 1886) and succeeding memoirs on this subject.

Mr. Lester's statement that the first law requires the modification which he proposes is obviously justified, but he appears to have omitted to study the original memoirs, and to have accepted the epitomised and generally known results as being complete. This does not, however, lessen the im-

portance of the valuable experimental results he obtained in measuring the old and new bands on his large dispersion photographs.

ANNUAL REPORT OF THE CAPE OBSERVATORY.—In the report of the Cape Observatory for 1903 Sir David Gill records several important additions to and modifications of the instrumental equipment.

The work of the new transit circle has been greatly facilitated, and the results improved by the adaptation of a Repsold automatic transitting device to the instrument.

The line-of-sight spectroscopy which is used in connection with the Victoria telescope has been re-modelled, and an extremely delicate thermostatic arrangement has been fitted so that the temperature of the prism box can be maintained constant, within ± 0.05 F., during a three or four hours' exposure.

In the astrophysical department several stellar spectra have been completely reduced in the region λ 4200 to λ 4580, and those of Canopus and Sirius have been discussed in connection with the corresponding terrestrial origins of their lines. The results of the line-of-sight work have been made more trustworthy by measuring only those lines which, on traversing either the thin or the thick ends of the prisms, show no relative displacement, and α Phoenicis has been shown to have a very large radial velocity. In December this star was apparently receding from us at the rate of 105 km. per second.

A large amount of routine work in connection with the maintenance of an efficient time service and the completion of the Cape zone for the astrographic chart was accomplished during the year. Important operations were also carried out in connection with the geodetic survey of South Africa, whilst the Government survey of the Transvaal and the Orange River Colony and the topographic survey of South Africa have been planned, the former having been commenced.

THE TRANSITION FROM PRIMARY TO SECONDARY SPECTRA.—Some very interesting experimental results, obtained with the idea of determining as definitely as possible the points at which, under various conditions, the primary is replaced by the secondary spectrum in gases, are published by Mr. P. G. Nutting in No. 2, vol. xx., of the *Astrophysical Journal*.

The general method was to determine what current capacity caused the above named change when either the wave-length, the pressure, the nature of the gas, the inductance or the resistance was altered, and this was called the "critical capacity."

Among other results the experiments showed that this critical capacity is a function of the wave-length, and that it increases slightly as the pressure decreases down to about 1 mm. of air, when it suddenly becomes infinite. All the elements tested have the same critical capacity for the same wave-length and pressure, although the critical point is more marked in some elements than in others. The introduction of inductance always relatively weakens the secondary and strengthens the primary spectrum, although no amount of inductance will completely annul the effects of capacity. Resistance acts similarly to inductance. The critical capacity of any vapour in a mixture of vapours was shown to be the same as when no other gases were present.

NEW BUILDINGS OF THE UNIVERSITY OF LIVERPOOL.

The George Holt Physics Laboratory.

THE George Holt Physics Laboratory, which was declared open by Lord Kelvin on November 12, will be valued by the University of Liverpool as a magnificent addition to its fabric, as well as a memorial to one of the wisest and most generous supporters of that college from which the university has been developed.

The laboratory covers an area of 9600 square feet, and has an average height of 55 feet. The architects are Messrs. Willink and Thicknesse, of Liverpool, with whom there is associated Prof. F. M. Simpson, now of University College, London. The external walls, which are very substantial, are built in best common brick with broad courses of red brick and dressings of Storeton stone. The base-