Africa: a retrospect and prospect, by Mr. C. M. Stewart; close binary systems, by Dr. Alex. W. Roberts; determination of mean temperature, etc., from observations made at second-order stations on the Table Land, by Mr. J. R. Sutton; some recent work on the discharge of electricity from heated bodies, by Professor J. C. Beattie.

In Section B, (1) on the occurrence of an epidemic among the domesticated animals in Mauritius in which Trypanosomata were found in the blood; (2) note on the correlation of several diseases occurring among animals in South Africa; (3) on the production of a malarial form of South African horse sickness, by Dr. Alex. Edington; the minerals of some South African granites, by Mr. F. P. Mennell; on the classification of the Theriodonts and their allies, by Dr. R. Broom; (1) some morphological and biological observations on the genus *Anacampseros;* (2) on some stone implements in the Albany Museum, by Dr. S. Schonland.

In Section C, some aspects of South African forestry, by Mr. D. E. Hutchins; dry crushing of ore preparatory to the extraction of gold, by Mr. Franklin White; sewage disposal in Cape Colony, by Mr. J. Edward Fitt.

In Section D, the library system of South Africa in comparison with those of England and America, by Mr. Bertram L. Dyer; iteration as a factor in language, by Professor W. Ritchie; common sense and examination, by Mr. P. A. Barnett; Cape Dutch, by Professor W. S. Logeman; how we get knowledge through our senses, by Rev. Dr. F. C. Kolbe.

The example set by the British Association of arranging for receptions and other social functions to lighten the intellectual fare provided was followed at Cape Town, and the excursions, conversazioni, etc., were well attended and much appreciated.

SCIENTIFIC NOTES AND NEWS.

THE University of Pennsylvania has conferred its Doctorate of Laws on Dr. Charles D. Walcott, director of the U. S. Geological Survey, and on Dr. F. P. Venable, now president and formerly professor of chemistry at the University of North Carolina. The university has conferred its doctorate of science on Colonel William Gorgas, U.S.A.

COLUMBIA UNIVERSITY has conferred the degree of Doctor of Science on Dr. J. J. Thomson, Cavendish professor of physics at Cambridge University, and on Mr. Peter Cooper Hewitt, known for his researches and inventions in electrical science.

OXFORD UNIVERSITY will confer its Doctorate of Science on M. Henri Poincaré, professor of mechanics at Paris, and on Mr. M. H. N. Story-Maskelyne, formerly professor of mineralogy in the university.

BY a vote of the Corporation of Harvard College a bronze tablet has been placed in the Museum of Comparative Zoology under the portrait of Dr. Alexander Agassiz. The tablet bears this inscription: 'Alexander Agassiz. This memorial of his great services to science and the University, given by his friends, is placed here by special vote of the President and Fellows and Board of Overseers.'

THE Albert Medal of the Society of Arts, London, for the year 1903, has been awarded to Sir Charles Augustus Hartley, K.C.M.G., in recognition of his services, extending over forty-four years, as engineer to the International Commission of the Danube, which have resulted in the opening up of the navigation of that river to ships of all nations, and of his similar services, extending over twenty years, as British commissioner on the International Technical Commission of the Suez Canal.

A CHAPTER of the scientific society of the Sigma Xi has recently been organized at the University of Michigan with Professor J. P. McMurrich as president.

ACCORDING to the *American Geologist* Mr. Bailey Willis has accepted the position of leader of the Carnegie Geological Expedition to China, which has as its object the investigation of the Cambrian of that country. He will be assisted by Mr. Eliot Blackwelder, of the University of Chicago. Mr. Willis expects to leave Washington in July, to attend the International Congress of Geologists at Vienna, and to go to China *via* Siberia. Dr. H. Foster Bain has accepted an appointment as geologist on the United States Geological Survey, and during Mr. Bailey Willis's absence in China will be acting editor of geologic folios. He is to take up the study of

the lead and zinc deposits of the Mississippi valley, and during the coming summer will make special investigations concerning the deposits in southern and northwestern Illinois.

General A. W. Greeley, chief of the U. S. Signal Service Office, has returned to the United States after attending the International Telegraphers' Conference in London.

Professor F. E. Lloyd, of Teachers College, Columbia University, left June 13, by the Steamer *Caribee* for the island of Dominica, where, in the company of Mrs. Lloyd, he will spend the summer in the study of the flora. The expedition is being conducted under the auspices of the New York Botanical Garden. The systematic collections will become a part of the garden herbarium. Professor Lloyd has received a grant of $200 from the Esther Herrman research fund of the Scientific Alliance of New York, to aid him in the collection of tropical Rubiaceae to be used in the furtherance of his researches in the embryology of that order.

Professor and Mrs. Robert H. Richards, of the Massachusetts Institute of Technology, left Boston on June 14 to make a tour of inspection of the principal centers of the mechanical preparation of low grade ores on the Pacific coast.

Professor John C. Merriam, of the University of California, has returned to Berkeley from the fossil beds in Idaho.

Mr. George G. MacCurdy, curator of the anthropological collections of the Peabody Museum, of Yale University, has sailed for Europe, where he will make purchases for the museum.

Messrs. A. F. Blakeslee and J. R. Johnston, of the Graduate School of Harvard University, will spend the summer vacation on Trinidad island for the purpose of collecting botanical specimens for the university.

Silas P. Beebe, M.S., who has been engaged in research work in the laboratory of physiological chemistry in the Sheffield Scientific School of Yale University, has been appointed physiological chemist in connection with the Huntington Fund for Cancer Research in the Loomis Laboratory, New York.

Dr. John Gifford, of the New York State College of Forestry, has tendered his resignation as assistant professor of forestry. He will leave in a few days to investigate the reservation in Porto Rico for the Bureau of Forestry.

Mr. Albert Kingsbury, professor of applied mechanics, at the Worcester Polytechnic Institute, has resigned in order to accept a position as mechanical engineer with the Westinghouse Electrical and Manufacturing Company of Pittsburgh.

Leo F. Rettger, Ph.D., instructor in bacteriology in the Sheffield Scientific School of Yale University, sailed for Europe on June 10. He will spend some time at Strasburg studying bacteriology and bacteriological chemistry.

The Geological Society, London, has made the first award of the proceeds of the fund founded by the late Mr. Daniel Pidgeon, F.G.S., to Dr. Ernest Willington Skeates, of the Royal College of Science.

A committee of eminent chemists has been formed to erect a monument at Heidelberg in memory of Robert Bunsen. It is intended that the contribution shall be international and may be sent to the treasurer, Herr A. Rodrian, Heidelberg.

A portrait of Dr. David Little, formerly lecturer of ophthalmology in Owens College, Manchester, was unveiled on May 27.

Dr. A. A. Common, F.R.S., president of the Royal Astronomical Society in 1895, well-known for his important researches in astronomy, especially in connection with reflecting telescopes, died on June 2, at the age of sixty-two years.

The famous paleontological collection of the Baron de Bayet, of Brussels, Belgium, has been purchased by Mr. Andrew Carnegie and presented by him to the Carnegie Museum at Pittsburgh. It is a vast collection, exceedingly rich in reptilia, fishes, invertebrates and plants from almost all the classic localities in Europe. There is a splendid series of Rhamphorhynchus, Teleosaurus, Ichthyosaurus, Pterodactylus, Mosasaurus and

other colossal reptiles. The collection of Chelonians is large. There are five skeletons of *Crocodilus vicentinus* from Italy. A thousand species of fossil fishes are represented, among them a splendid assemblage of specimens from the old red sandstone of Scotland. There is a splendid collection of fossil insects from Solenhofen, and a number of magnificent slabs showing the palm trees of Monte Bolca. One slab has upon it the stem, roots and seven leaves of a dwarf palm. There has been hitherto no representative collection of the fossils of Europe on this side of the Atlantic, and the acquisition of this splendid and very costly collection at one stroke puts the section of paleontology of the Carnegie Museum in a position to make it a point of central attraction to American students, who may desire to institute comparisons between the extinct fauna and flora of Europe and America.

THE exhibition room on the second floor of the Peabody Museum, Harvard University, formerly used for the Semitic collections, has been fitted with ethnological collections, mostly relating to the Indian tribes along the west coast of America.

THE British Anatomical Society will hold its summer meeting this year at University College, Liverpool, on June 19 and 20.

A MEETING of the council of the International Association of Academies was held during the first week of this month, at the rooms of the Royal Society, that society being the directing academy of the association for the three years' period ending with 1904. *Nature* states that the meeting was attended by delegates from nearly all the principal learned academies of Europe, who discussed several matters of importance to international science and philosophy, preparatory to the meeting of the general assembly which is to be held in London next year. Representatives of both sections of the association, the natural science section and the history and philosophy section, attend the council. In connection with the meeting of the council there was a meeting of a special committee appointed to deal with a proposal for the establishment of an international organization for the investigation of the anatomy of the brain. The foreign delegates were received by the president and fellows of the Royal Society at Burlington House on June 3.

THE International Congress for applied chemistry was formally opened on June 3. We learn from notices in *Nature* and the *Times* that Geheimrath Professor Dr. Otto Witt presided, and there was a large gathering of leading authorities on chemistry from all parts of the world. Speeches were delivered by Count Posadowsky, Imperial Secretary of State for the Interior, and Dr. Studt, Prussian minister of education. They referred to the enormous importance of applied chemistry both for industry and agriculture, and instanced among other achievements the development of the production of beetroot sugar. Dr. Studt stated that in Germany alone chemical industries created products to the value of more than one milliard of marks. Among the foreign delegates who spoke were Professor Moissan, president of the Paris Chemical Society, Professor Tilden, of the Royal College of Science of London, Professor Ludwig, from Vienna, and Professor Jakobkin, from St. Petersburg. About 2,200 members were present. The Congress was divided into eleven sections and three subsections. The German Electrochemical Society, which last year adopted the name of German Bunsen Society for Applied Physical Chemistry, also held its annual meeting at Berlin during the week, and took charge of the electrochemical section. There were 350 papers and reports on the program.

THE Civil Service Commission will hold a competitive examination during the summer or fall to fill a position as assistant chemist in the Geological Survey, salary $1,200. No applicants who are unable to do independent research work in mineralogy and crystallography will be considered. Ability to do independent chemical research work, while desired, is not an essential condition, although a good knowledge of analytical chemistry is demanded. For information as to dates and places for holding the examination and sub-

jects to be covered applicants should address the Civil Service Commission at Washington. It is probable that another position as assistant chemist will be open to competition in the Geological Survey during the summer. The position is one paying $1,800 per annum. Only a fair knowledge of mineralogy will be required of applicants for it, but they must be men of experience, well versed in chemical analysis, and able to do independent work on problems relating to geology. The examination in this latter case will not be of the usual kind, but the markings will be based on education and technical experience, a thesis of a thousand words and published work. As the filling of this position is not yet in the hands of the Civil Service Commission, inquiries and addresses should be sent to the director of the Geological Survey, at Washington.

THERE will be a civil service examination on July 29 and 30 to fill positions of assistant engineers and hydrographers in the U. S. Geological Survey at a salary of $60 a month.

Nature states that the twenty-first congress of the Sanitary Institute will be held at Bradford on July 6–11. The inaugural address to the congress will be delivered by the president, the Right Hon. the Earl Stamford. Numerous sectional meetings will be held, the sections with their presidents being as follows: (1) Sanitary science and preventive medicine, Professor T. Clifford Allbutt, F.R.S.; (2) engineering and architecture, Mr. Maurice Fitzmaurice, C.M.G.; (3) physics, chemistry and biology, Professor C. Hunter Stewart. On July 8 there will be conferences of those engaged in the various branches of practical sanitary science, and in the evening a *conversazione* and reception by the mayor of Bradford. The concluding day will be devoted to excursions.

THE report by Dr. Joseph Struthers to the United States Geological Survey on sulphur and pyrite in 1902 is now in press. The production of sulphur in the United States in 1902 was 8,336 short tons, valued at $220,560, as compared with 7,690 tons, valued at $223,430, in 1901, and 3,525 tons, valued at $88,100, in 1900. The production in 1902 was derived from Louisiana, Nevada and Utah, in the order of the importance of their output. Oregon and Idaho, which contributed to the output during 1901, reported no production for 1902. The quantities of sulphur produced in the United States during 1901 and 1902 are the largest annual outputs that have been recorded. Up to 1901 the production of domestic sulphur averaged less than one per cent. of the total consumption, an insignificant amount compared with the foreign imports, which amounted in 1902 to 174,939 long tons. The quantity of sulphur consumed in the United States from foreign and domestic sources, including the sulphur content of iron pyrite, which is used in the manufacture of sulphuric acid, amounted to 510,106 long tons. By far the greater part of the sulphur consumed in the United States is used in the manufacture of paper stock by the sulphite process. The production of pyrite in 1902 reached the largest annual output yet attained in the United States, 290,973 long tons, valued at $1,219,210, exceeding the previous record in 1901 of 234,825 long tons, valued at $1,024,449, by 23.9 per cent. in quantity and 19 per cent. in value. Of the total output, Virginia contributed nearly one-half, followed by Georgia and North Carolina, Colorado, Massachusetts, California, Indiana and Ohio, Missouri and New York, in the respective order of the quantities of output. In addition to the large increase in the production of pyrite in the United States during 1902, there was a very large increase in the quantity of pyrite imported, the statistics of imports for 1902 and 1901 being respectively 440,363 long tons ($1,650,852) and 403,706 long tons ($1,415,149). The increased use of pyrite for acid making has been due both to the development of the sulphite wood-pulp industry for manufacturing paper and to the increased domestic manufacture of superphosphates, consequent upon the increased production of phosphate rock from Florida and Tennessee.

AT a special meeting of the Physical Society, held in London, on June 8, with the president, Dr. R. T. Glazebrook in the chair, Professor E. Rutherford, of McGill Univer-

sity, Montreal, read a paper on 'Radio-active Processes.' According to the report in the London *Times* he pointed out that the radio-active bodies uranium, thorium and radium were continuously and apparently spontaneously giving off three distinct types of radiation. There were, first, the α rays, which were projected bodies, flights of positively charged material particles, which were prominent in causing conductivity in gases, were easily absorbed, moved with great velocity, and carried a large amount of energy. Secondly, there were the β rays, which were apparently the same as the cathode rays of ordinary vacuum tubes, though they traveled faster, and hence had very considerable penetrating powers. They were negatively charged. Thirdly, there were the γ rays, which appeared very similar to ordinary X-rays. In addition some of the substances gave off something else. Thorium oxide, for example, emitted an emanation which appeared to be matter in gaseous state, and could be carried along by air-streams, and radium gave a similar emanation, which differed from that of thorium in that its effects were far more persistent. These emanations behaved like radio-active gases; their diffusion could be measured, and they could be occluded in radio-active bodies, while the fact that they could be condensed by the cold of liquid air rendered them difficult of explanation except on the assumption that they consisted of material bodies. These emanations induced or excited radio-activity in every body in their neighborhood, and this excited activity, like that of the emanations, decayed at a constant rate. Apparently the emanations themselves could not be affected by any chemical treatment, but behaved like inert gases, wherein they differed from the excited activity which chemical treatment did affect. It had been found possible to separate from radio-active bodies a radio-active constituent; thus by a chemical method Crookes had removed all activity from uranium, and the lecturer and Mr. Soddy had found that the radio-active constituent, which might be called thorium X, could be separated from thorium. In time, however, the former lost its activity and the latter regained it. It seemed as if radio-active bodies were continually undergoing some change by which new substances were being produced; thus thorium from which all the thorium X had been removed would in a few weeks yield as much as before. The radiations had a close connection with chemical changes. It might be supposed that the atoms of the radio-active bodies were in a state of unstable equilibrium, and sent off positively charged bodies. But the thorium atom which had sent off such a positive body was chemically altered, and thorium X was equivalent to thorium *minus* the expelled body. The thorium X atom was also unstable, and in turn threw off another positive body, and so the process went on, the changes that occurred being measured by the activity of the preceding stage. The main radio-active processes threw off positive bodies, which were thus the most important, and negative electrons and cathode rays only appeared in the last stages. It was to expected that only a small number of α rays would be thrown off; these were quickly absorbed, and thus the radium was subject to bombardment by itself, with the result that it grew hot and maintained its temperature above that of its surroundings, as observed by Curie. The amount of energy given out was enormous; it might be calculated that a gram of radium during its life would give out enough to raise 500 tons a mile high. But there was no reason why such huge stores of energy should be thought to exist only in radio-active bodies; they might exist in every atom, although we had not yet happened to obtain any knowledge of their existence.

UNIVERSITY AND EDUCATIONAL NEWS.

PRESIDENT BUTLER announced at the commencement exercises of Columbia University that the trustees had decided to purchase the two blocks of land south of the present site of the university at a cost of $2,000,000. He also announced a gift of $300,000 from Mrs. Helen Hartley Jenkins and Mr. Marcellus Hartley Dodge, a member of the senior class,