

of which marks it as one of exceptional interest. He describes it as a new variable star or nova, and its positions for two epochs were (1855), R.A. 22h. 56.3m., dec. $+58^{\circ} 52'$; (1900), 22h. 58.1+59 $^{\circ} 6.3'$. The long period of brightness of the star and rapid decline suggest, as he says, that "we may be dealing with the later stages in the history of a nova." Two charts taken on September 3, 1911, and August 25, 1913, exhibit marked changes in its magnitude. The same writer directs attention to some new nebulae in the region of I Cassiopeiæ. Dr. R. Furuhielm, of the Helsingfors Observatory, describes two new variables, both of which have amplitudes of at least three magnitudes. He proposes to continue to observe these objects to secure correct determinations of their periods.

WATTS'S INDEX OF SPECTRA.—Yet another series of appendices to this most valuable compilation of wavelength data has been commenced by the publication of Appendix V. This part begins with the spectrum of the electric spark in air and extends to that of chlorine. The additions include measures of the spectra of the elements Aldebaranium, Cassiopeiium, and Beryllium (band spectrum). Among spectra of compounds Olmsted's data for calcium hydride and Fowler's carbon oxide spectra find a place. Perhaps it is not too late to make the suggestion that the policy of giving, in the briefest possible manner, an indication of the contents of the papers referred to be extended to include all references in forthcoming appendices.

SECULAR DESICCATION OF THE EARTH.

ON Monday, December 8, Prof. J. W. Gregory read a paper before the Royal Geographical Society, entitled "Is the Earth Drying Up?" The question is naturally one to which a definite affirmative or negative answer cannot be given owing to the relatively short period during which exact scientific measurements of precipitation have been made. The evidence is principally archæological, botanical, and geological, supplemented for some countries by historic records of population. Prof. Gregory put before the society the views of different investigators, and subjected them to a critical examination, confining himself to changes in historical times, and making no pretence at dealing with the great changes of climate of geological epochs, other than to indicate the glaciers of north-west Europe as the probable cause of the moister Mediterranean climate of prehistoric times.

There are, roughly speaking, three forms of the desiccation theory. Prince Kropotkin maintains that there is a world-wide tendency towards drought. Prof. Ellsworth Huntington believes that the most important changes are pulsatory, the climate being now drier, now moister, but in the long run becoming generally drier. Mr. R. Thirlmere holds that the climate varies in great cycles, each of which may extend over 2000 years or more, and that we are at present in a cooling world. Prof. Gregory examined the evidence from different countries in its bearing on these theories, and showed the results of his examination on a map, from which it appears that there has probably been desiccation in historic times in Central Asia, Arabia, Mexico, and South America; increased precipitation in the United States of America, Greenland, Sweden, Roumania, and Nigeria, and no appreciable change in Palestine, northern Africa, China, Australia, and by the Caspian Sea. He deduces that, though there may be local variations, there is no progressive world-wide change to support the theory of a universal drought. *A priori* it might be affirmed that no appreciable universal change could occur without a corresponding considerable change in the dis-

tribution of land and water, or in the intensity of solar radiation. The changes in the former have been small in historic times, and though no direct evidence of solar intensity is available, the records of temperature and of plant life indicate that its fluctuations are probably confined to the short period variations found by the observers of the Smithsonian Astrophysical Observatory.

The strongest support for the desiccation theory is derived from Central Asia, where the evidence, though not conclusive, largely owing to the alternative explanation of blown sand, is sufficiently convincing to have won over the majority of the travellers who have visited that region.

E. G.

ASTRONOMY IN SOUTH AFRICA.

A VERY interesting address was given by Dr. A. W. Roberts, as president of the South African Association for the Advancement of Science, at Lourenço Marques on July 7. Dr. Roberts dwelt for the main part on the progress made in astronomy by South African workers during the past century, but he claims pardon for omissions when such a large scope of work has to be considered. He sums up the work of astronomical science in late years as circling round three great problems, namely the distance of the stars, the movements of the stars, and the structure and evolution of the stars. These three lines, he points out, all converge in one great question, namely the constitution, history, and cosmography of the universe as a whole. In reading his address, which is published in *The South African Journal of Science* (vol. x., No. 2, October) one is struck by the great part that has been played by astronomers in South Africa. To use the president's own words:—"It was at the Cape that a sounding line was first thrown across the stellar space. It was at the Cape that the idea of stellar photography was born, grew up, and reached maturity. It was at the Cape, or perhaps by the results obtained at the Cape, that the first vision was got of those wonderful streams of stars that sweep majestically through our universe. It was at the Cape that the classical distance of the sun was reached . . . that the first accurate parallax of the moon, and, later on, its weight, was determined . . . that the most refined measures of stellar distance have been secured." Dr. Roberts tells the story of how—twenty years ago—he had in purpose the determination of the position of the solar apex from the proper motions in Stone's catalogue. "I went," he said, "over my postulates with Gill, and was vehemently assured I was basing my equations on wrong premises. 'How do you know that the stars move haphazard?' he demanded. I did not know! 'They may be moving in streams; the whole universe may be a big whirlpool!'" The record of the past work of South Africa in astronomy is great, and a high standard has been set for the present and future astronomers there.

THE ORIGIN OF ARGENTINE HORSES.

IN the *Anales* of the Buenos Aires Museum for 1912 (vol. xii.) Señor Cardoso adduced evidence to show that the story of the origin of Argentine horses from Spanish horses imported by Don Pedro de Mendoza in 1535 or 1536 is a myth, and that the former are really descended from the Pleistocene *Equus relictus* and *E. curvidens*, and existed in the interior of the country at the time of the Spanish conquest. This opinion is disputed in the *Revue générale des Sciences* of October 15 by Dr. Trouessart, who points out that the statement of wild horses having been seen by Sebastian Cabot in 1531 is based on the figure of a

horse introduced by that navigator in a map of the world in the region now known as Argentina. This, it is urged, is no evidence at all, but merely an indication that the country was suitable for horses. Historical evidence is cited to prove that horses were unknown to the Indians of Mexico, Panama, Peru, and Brazil at the time of the visits of Columbus (1498 and 1502), and of the opening up of the country by his successors. It is then shown that there is a hiatus between the beds containing remains of *E. reitidens* and those with bones of modern horses, while it is argued that the ancient indigenous perissodactyles became extinct as the result of climatic and other physical changes. That the historical evidence in the case of the countries mentioned is decisive may be admitted, but the statements of Señor Cardoso with regard to the existence of large numbers of horses in Argentina in 1580 and the lack of fear of these animals exhibited by the Indians, as well as certain structural peculiarities alleged to be peculiar to Argentine horses and *E. reitidens*, are not referred to by Dr. Trouessart, who had not seen the original paper when writing his own article. A summary of Señor Cardoso's views will be found in *The Field* of July 20, 1912.

FRENCH HYDROLOGY.¹

THE operations of the French Hydrological Service in the Alps have been so often the subject of notice in these columns that the issue of a fresh volume (tome vi.), bringing the record of results down to the end of the year 1911 for the service in the southern region, does not appear to call for more than passing notice. As is customary, the volume, which is mainly devoted to numerical tables of discharges and other statistical information, commences with a brief description of certain special features in regard to methods of gauging and their adaptation to local conditions. This is followed by a chapter of explanatory remarks on the longitudinal sections and levels contained in the annexe—a case of forty-three plates.

Somewhat fresher ground is opened out by the first volume relating to operations of the same service in the Pyrenees, and detailing the results obtained in the basin of the Adour. In a brief, but very effective, *résumé* of the circumstances which preceded and led up to the establishment of the hydrological service in the south-west, M. Tavernier, who is in charge of this section of the work, records that the hydrology of the Pyrenees has been in the past the subject of greater research and more numerous observations than that of the Alps; and he adds that, while the material thus accumulated is fairly plentiful, it has brought with it the attendant difficulty of its evaluation and coordination, so as to admit of its utilisation in connection with future operations, which are naturally destined to be of a more precise and systematic character. He narrates, in seven successive subsections, the progress of investigation and the nature of the observations made before the inauguration of the departmental service of the Ministry of Agriculture, dating back to a period anterior to the year 1850, and including the records of certain services specially formed, from time to time, to study the phenomena of floods.

When he comes to discuss the relative merits of the regimen of the watershed of the Pyrenees and that of the Provençal Alps, he has some interesting remarks to make on the importance of lakes, which may be rendered as follows:—

The true wealth of the Pyrenees is to be found in close proximity to the summits, where numerous lakes

¹ Ministère de l'Agriculture: Direction générale des eaux et forêts. Service des grandes forces hydrauliques. (a) Région des Alpes: Compte rendu et résultats, Tome vi. et Annexe (nivellements), 1913. (b) Région du Sud-Ouest: Comptes rendus et résultats obtenus. Tomes 1 et 2, 1912.

exist, and where artificial reservoirs can be formed. It is quite otherwise in the Provençal Alps, where lakes are scarcely to be found, and where reservoir basins are rare. The lakes of the Pyrenees replace advantageously the glaciers of the Alps, since, in the former case, the outflow can be regulated to meet requirements, whereas the discharges arising from the melting of glaciers are intermittent and irregular, often proving a source of inconvenience because they cannot be controlled.

The second volume of this series is purely statistical and diagrammatic, and deals with the results obtained in the basin of the Garonne down to the end of 1910.

B. C.

ECONOMIC GEOLOGY OF PAPUA.¹

THE Commonwealth of Australia has begun the issue of "The Bulletin of the Territory of Papua," of which the first number consists of a valuable report by Mr. J. E. Carne, of the Geological Survey of New South Wales on the coal, petroleum, and copper ores of part of British New Guinea. Mr. Carne visited the district to the north of the Gulf of Papua in 1912 in order to investigate the value of the coal discovered on the Purari River near the northern foot of Mt. Favenc. The coal proved to be only a brown coal of Cainozoic age, and Mr. Carne regards it as of no present economic value. He visited the Vailala River to inspect a series of gas springs, of which the first was discovered by G. A. Thomas at Opa in 1911. Mr. Carne's samples from these gas springs have been analysed by Mr. Mingaye, who shows that they contain petroleum. The discharge of natural gas is in sufficient quantity to indicate the probable occurrence of considerable supplies of oil in the underlying beds, and Mr. Carne regards the geological conditions as so promising that he recommends the prospecting of the area by adequate boring.

In discussing the relations of this oilfield he gives a valuable summary of the present stage of development of the New Zealand oilfields, and the most recent information regarding the gas well at Roma, in Queensland, and of that at Grafton, in New South Wales. Mr. Carne also visited the Astrolabe copper field to the east-north-east of Port Moresby. Only three of the ore occurrences there were available for inspection at his visit, and mining in the field is at present dormant. Mr. Carne, however, regards the prospects of the field as encouraging, though no final opinion can be formed without further prospecting. His account of one or two of the mines indicate that there are considerable bodies of low-grade ores available. Mr. Carne's memoir contains full references to the earlier literature on the economic geology of the districts visited, and it forms a valuable contribution to the geology of New Guinea.

METEOROLOGY AND GEOPHYSICS AT THE BRITISH ASSOCIATION.

A MOST important contribution was made by Mr. J. I. Craig, who was unfortunately unable to be present at the meeting. The abnormal warmth of 1911 in Europe prompted Sir Edward Fry to ask in NATURE if the phenomenon was world-wide. Mr. Craig was able to reply for Egypt in the negative, inasmuch as the summer there had been cooler than usual, but he was struck by the definiteness of the opposition, and began to investigate the relation between temperatures in Egypt and south west England, based on values for the past thirty-four years. He found that the departures from the normal in the two

¹ J. E. Carne: Notes on the Occurrence of Coal, Petroleum, and Copper in Papua. Bulletin of the Territory of Papua, No. 1, 1913, viii. Pp. 116+xxix plates+3 sections+1 map.