of the observatory has been described already (April 23, p. 201) so it need not be summarised here.

The complexity of the relations which research associates and collaborators sustain to the institution is so great as to preclude any comprehensive explanation within the limits allotted to an annual administrative report. Their work embraces a wide range of subjects, and varies in its conduct from individual independence to intimate collaboration with the departments of research and with the division of publications. During the past year more than twenty distinct fields of research have been cultivated, and a total of more than one hundred investigators have contributed to the output. Summaries of the work of associates proceeding independently are given by them in the Year Book.

THE TOTAL ECLIPSE OF 1914 IN TURKEY AND PERSIA.

ON account of the unfavourable weather prognostications for the approaching total eclipse of the sun throughout the European countries traversed by the track of totality, it seems particularly desirable that stations should be occupied beyond the Black Sea, nearer the sunset limit of eclipse, in eastern Turkey and western Persia.

The central line of the eclipse passes very nearly through Baiburt and Bitlis, just a few miles to the west of Lake Van, in the former country. In Persia it passes through Kermanshah and Khorremabad, to the south-west of Teheran, and through a point about midway between Persepolis and Dehbid, and slightly to the north-east of Shiraz, only a few miles distant from Bushire, a port in the north-east of the Persian gulf.

The desert character of a large part of this region would indicate that the probability of a cloudless afternoon sky in August is very good. Most of this region traversed by the shadow is quite elevated, some of it being as much as five or six thousand feet above sea-level; and this would, in large measure, if not entirely, compensate for the lesser altitude of the afternoon sun at local totality. Throughout the Turkish region the approximate local time of totality is 3h. 50m. p.m., the duration of total eclipse being about 120s. Throughout the Persian region the time is about 4h. 50m., with totality shortened to about 105s. As very little of the European track has a likelihood of less than 50 per cent. of cloud, it seems highly desirable that some of the observers now contemplating European location should undertake the extra journey into Turkey, at least in order to diminish, if possible, the chances of entire failure of the eclipse, such as befell astronomers in 1887, and was nearly repeated in 1896.

The region of western Persia is not especially difficult to reach by way of Batum, at the east end of the Black Sea, thence through Tiflis to Baku on the Caspian, thence to Resht on the south-west coast of the Caspian, whence Kermanshah is easy by caravan through Kazbin; or, better, first to Teheran to receive Government authority and facilities. Most of the roads of Persia would permit the use of wheeled vehicles only with difficulty. Allow four weeks from London or Paris to Teheran, and two weeks thence to Kermanshah. Camping outfit and subsistence for the most part should be taken along, as only chicken, fruits, and similar edibles can be depended on for the last stage of this journey. Roads are in part built, in part old roads and trails. From Teheran the best route is to Kum, and thence to Sultanabad and Kermanshah; also Bourodjird, quite a large town with a telegraph station, and the chief city of Luristan. Summer clouds are said to be highly improbable. From Bushire to Shiraz and Persepolis is rather more than 100 miles by caravan, the particular drawback at this season being the intense heat, which renders travel exceedingly uncomfortable, except at night. There are telegraph lines traversing this region which would make it feasible for the eclipse observer arriving early in the field to check up his longitude as well as latitude, so as to make sure of being within a few miles of the line of central eclipse. Bushire is very accessible; the steamers of the British India Company are scheduled to sail from Bombay every Thursday; from Karachi every Saturday, and are due in Bushire on Wednesday. The Bombay steamers of the P. and O. are due to arrive at Bombay on Friday, and there is direct rail connection for Karachi, and while the British India steamers are scheduled to sail from Karachi on Thursday, if the English mails are late, the steamers will be held pending their arrival. Transportation from Karachi to Bushire is approximately 15*l*.

The Turkish region is very accessible from Trebizond. The eclipse is total at Trebizond itself, the line of exact centrality intersecting the coast a few miles west of Trebizond, about midway between that port and Tereboli. While at the coast towns themselves, including Plattana, Eskiefe, and Jaueboli, the chances of clear weather are not at all good, one can, by ascending the cliffs and entering the elevated tableland of the interior, select observing stations which apparently decrease in probable cloudiness, the farther inland one goes. Of course, there are no railways; but travelling so far as Erzerum, about 150 miles south-east of Trebizond, is not particularly arduous, because it is the first section of the early caravan route through Tabriz to Teheran. Wheeled vehicles are now possible so far as Erzerum, and packages of any size and weight required by the eclipse astronomer are not prohibited.

Probably the most detailed map of this region is Richard Kiepert's "Karte von Kleinasien," on a scale of 1 : 400,000, published in 1902 by Dietrich Reimer, Berlin. The sheets which should be consulted are AVI, Tirabzon, and BVI, Erzirum. Another good map is the "Map of Eastern Turkey-in-Asia, Syria, and West Persia," published by the Royal Geographical Society, 1910, and is accompanied by notes. Consult also "Zug des Zenophon bis zum Schwarzen Meere" (Karte ii.), Entworfen von E. v. Hoffmeister, accompanying "Durch Armenien und der Zug Zenophons" (1911) and "Wandkarte des Osmanischen Reiches," von W. v. Diest and Dr. M. Groll (Gea-Verlag, Berlin W. 35, 1911); scale 1 : 1,250,000.

Erzerum itself is within the belt of totality, though not far from the north-eastern edge of it, so that totality would not last more than a very few seconds there. Besides this, Erzerum is quite likely to be cloudy; and the same might be said of Bitlis itself, which is located in a sheltered valley. But about fifteen miles west of Bitlis begins the elevated tableland of Moush, which, according to the best information I have been able to secure from those resident in Bitlis, would probably be cloudless. At the time of the eclipse, this whole region rarely experiences any rain from the latter part of June until the middle of September. The atmosphere is very clear, being only a trifle cloudy during that season, and clear skies can be depended upon, although it is extremely hot.

Officers of the Turkish customs are not inclined to cause trouble over the baggage of travellers, and it is probable that the English and American Consuls would be able to get instruments passed without examination, especially if the observer brought a letter visèd by the Turkish Consul nearest his home.

It would be highly desirable, before leaving home,

to pack all parcels of instruments with especial reference to caravan travel, as otherwise repacking in Trebizond would be necessary and much delay occasioned. Two hundred pounds is too heavy, and it is better if no package exceed 150 lb., as a mule must carry two of them; the average load is about 300 lb. As a mule must have a perfectly balanced load, it is well to have the paraphernalia so divided that pairs of packages will be of the same weight. The nearer a parcel approaches a cube, the easier it is to handle, though moderately oblong packages are not particularly troublesome. Packing must, of course, be done much more thoroughly than for transit by railway and steamship, as the continued motion of a pack animal will cause screws and delicate parts of instruments to disconnect themselves. I have found nothing better for packing than granulated cork, such as Malaga grapes are packed in.

As before said, travel so far as Erzerum can be accomplished in fairly comfortable carriages, and even a rubber-tyred vehicle is possible. Baggage might go in a species of lumber wagon, or springless vehicle; but beyond Erzerum carriages would not go, except at great expense. From Trebizond to Erzerum eight days of travel should be allowed, by starting promptly every morning. From Erzerum to Bitlis would require eight or nine days; and before leaving either Trebizond or Erzerum, it is necessary to make the drivers or muleteers agree to arrive at the desired place on a certain day; then, in addition to this, the traveller must keep prodding them to see that they make their schedule. They much prefer to travel in the very early morning, starting from three to five o'clock. The journey from Erzerum to Bitlis cannot be called an easy one; but the country and its people are very interesting.

The eastern end of the plain of Moush is a day's journey from Bitlis on the route to Erzerum, and on this plain at this time of year the American residents of Bitlis usually spend two or three quiet and healthful months in camp.

To the west of Bitlis and far outside the path of totality, although in the same generally elevated region of Turkey, is Kharput, where records of cloudiness for the month of August have been kept for many years past. The average for five years gives 70 per cent. of the afternoon observations in August entirely cloudless, with not a single record of a sky totally overcast. Most of the cloudiness is of the order of 0·1 or 0·2, only occasionally an afternoon being largely overcast. These afternoon observations were taken at 2.30, and there is a slightly greater chance of cloudiness at 4.

For most of the foregoing information I am indebted to the Rev. Dr. Henry H. Riggs, of Kharput, Dr. Harrison A. Maynard, of Bitlis, Rev. Robert A. Stapleton and Dr. Edward P. Case, of Erzerum, and Rev. L. S. Crawford, of Trebizond. All are greatly interested in the coming eclipse, and are ready to assist in observing it so far as possible.

Prof. A. G. Sivaslian, of Anatolia College, Marsovan, will proceed eastward to the Trebizond region to observe the eclipse. He is an astronomer trained at the Northfield Observatory in Minnesota, and will be of great assistance to whatever party of observers he may join; also Prof. A. H. Joy, of the Syrian Protestant College at Beirut, is expecting to join the ranks of the eclipse observers, but he may go to the Crimea instead of Trebizond.

Of course, it is well known that Trebizond is very accessible. The easiest route from western Europe is *viâ* Marseilles, whence a weekly steamer of the Messagerie leaves for Trebizond without change at Constantinople or elsewhere. The same from Trieste also, by the Austrian Lloyd. From Paris the through rate by rail to Marseilles, and thence by steamer to Trebizond is about 14*l.* first class. From Constantinople steamers leave every Friday and Saturday, reaching Trebizond the following Tuesday and Wednesday mornings.

Fuller information regarding the Persian region can be obtained from the house of Messrs. Lynch Brothers in London, and concerning Armenia the standard work is by the late senior member of this firm, Mr. H. F. B. Lynch, recently published in two fine volumes by Longmans. DAVID TODD.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The completion of the third edition of The Golden Bough" has suggested to the many friends and admirers of Dr. J. G. Frazer that the present is a suitable time to offer him some token in recognition of his great services to learning. It is proposed that a Frazer Fund for Social Anthropology be established to make grants to travelling students of either sex, whether connected with a university or not, with a view of their investigating problems in the culture and social organisation of primitive peoples, a department of anthropology which Dr. Frazer has always been eager to promote. Contributions to the fund may be sent either direct to the secretary and treasurer, Mr. F. M. Cornford, Trinity College, Cambridge, or to the "Frazer Fund Account," Messrs. Barclay and Co., Mortlock's Bank, Cambridge.

LONDON.—Presentation Day on May 13 passed off without special incident. The Principal reported a slight falling off of examinees, particularly for matriculation. Of the 1807 candidates for degrees 900 were internal and 907 external; 1301 degrees and diplomas were granted, and the total number of internal students is now 4888. Sir Philip Magnus, M.P. for the University, in his speech after the presentation of graduates, suggested that a committee of the Senate should be appointed to consider without prejudice or bias the recommendations of the Royal Commission on University Education in London with the view of deciding which of them should be adopted with or without legislation.

MR. ALFRED E. CAMERON, Board of Agriculture scholar in entomology, of Manchester University, has taken up economic work in the United States, where he is temporarily attached to the entomological department of the New Jersey Agricultural Experiment Stations, New Brunswick, New Jersey.

MR. MALCOLM E. MACGREGOR, of Trinity College, Cambridge, has recently been appointed collaborator with the U.S. Bureau of Entomology, to join the Robert M. Thompson Pellagra Commission (formerly the Thompson-Macfadden Pellagra Commission), at Spartenburg, South Carolina, to study the possible rôle played by insects in the transmission of the disease.

WE learn from the Paris correspondent of the *Chemist and Druggist* that the council of the University of Paris has just decided to distribute 3600*l.*, being interest of a bequest by the late M. Loutreuil for the encouragement of scientific laboratories of French universities. The Chemical Institute of Nancy University is receiving 400*l.* for extension and enlargement, and Toulouse 800*l.* for the foundation of a similar establishment. Montpellier University will