precipitation. The smallest crops of beets and cabbages are usually obtained in dry, warm years. The largest crops of clover and grass come in years with excessive precipitation and high temperatures.

RAINFALL AND FORESTS IN INDIA.

AN important publication on Indian forestry has recently been issued, in which certain conclusions as to the climatic influence of forests are set forth. The book is entitled 'Forestry in British India,' and is by Berthold Ribbentrop, late Inspector-General of Forests to the Government of India (Calcutta, 1900). From a recent review of this volume (*Nature*, April 18, pp. 597–601) it appears that while the author does not distinctly maintain that by afforestation the climate might be improved as far as to stop the recurrence of droughts, it is evident that he is rather inclined to that opinion. He does say that "in a warm climate the denudation of a country diminishes its moisture and consequently its fertility." The regulation of surface drainage by forests is clearly pointed out.

PERIODICITY OF SEVERE WINTERS IN ENGLAND.

IN the *Quarterly Journal of the Royal Meteorological Society* for April is a paper by A. E. Watson, entitled 'A Review of Past Severe Winters in England, with Deductions therefrom.' From an examination of the records of the severe winters of the last 300 years, the writer comes to the conclusion that such winters are most frequent in the years with the numbers 0–1 and 4–5. He is also of opinion that the severe winter in the middle of each decade is generally a late one (Jan.–Mar.), while that at the beginning or end of each decade is generally an early one (Nov.–Jan.).

NOTES.

IN 'Hints to Travelers, Scientific and General,' edited for the Council of the Royal Geographical Society by John Coles (8th edition, London, 1901), there is an article by Dr. H. R. Mill on 'Meteorology and Climate,' the object of which is to supply the traveler with instructions to enable him to make use of meteorological instruments, 'and to obtain evidences of the climate of the region which he is passing through by noticing the effects produced on the land, vegetation, etc.'

MCADIE, of San Francisco, contributes a fourth paper on 'Fog Studies on Mount Tamalpais' to the March number of the *Monthly Weather Review*. In this he considers the refraction of sound waves by fog surfaces and the dissipation of fog. Two excellent half-tones accompany the paper.

BEGINNING with 1901 the Royal Observatory of Belgium will issue an *Annuaire météorologique*. Hitherto the *Annuaire* has been concerned with both astronomical and meteorological matters, but in the future the astronomical and meteorological divisions of the Observatory will have separate annual publications. The *Annuaire météorologique* for 1901 contains, among other matters, a sketch of the history of meteorology in Belgium and a review of two old meteorological journals, by J. Vincent; tables of monthly and annual means of the principal meteorological elements at Brussels and at Uccle, based at the former station on observations from 1833 to 1890, and at the latter from 1891 to 1899; and a paper on 'Le Climat de l'Ardenne,' by Lancaster.

R. DEC. WARD.

COLUMBIA UNIVERSITY BIOLOGICAL LECTURES.

FOR some years it has been the custom in Columbia University to have an annual course of public lectures on some biological topic. This year's series, recently completed, consisted of seven lectures on the Protozoa by Dr. Gary N. Calkins, of Columbia University.

The Protozoa, on account of their unicellular character, are of great importance in relation to many questions of general biology and especially physiology. The seven lectures by Dr. Calkins treated not merely the structure of the Protozoa, but their physiology, relations to more complex forms and the economic importance of certain types. The first lecture was a general sketch of the various discoveries which have gradually led to the recognition of the true relationship of Protozoa to Metazoa. This was followed by lectures on the four main types of Protozoa, in which physiology and

ecology of each were discussed as well as the morphology. The lecture on Sporozoa, which included a résumé of the life history of the malaria germ and other disease-producing Protozoa, was of unusual popular interest. In the sixth lecture Dr. Calkins discussed the renewal of vitality through conjugation, and the relation of conjugation to sexual reproduction of the Metazoa. The last lecture was devoted to a study of the Protozoan as a physiological machine, and was based largely upon the experimental work of recent years which has thrown so much light on the so-called 'vital' phenomena.

A point worthy of mention in connection with Dr. Calkins's lectures, since it contributed not a little to the value of the series, was the mode of illustration. For this purpose the stereopticon with microscope attachment was used, and photographic lantern slides, stained preparations and living Protozoa were thrown on the screen. Living Protozoa have often been thus projected, but in this case the highly perfected apparatus used rendered possible their projection on an unusual scale. *Amœba proteus*, for example, appeared five feet long, *Paramœcium aurelia* nearly four feet, so that many structures, nuclei, contractile vacuoles, etc., became plainly visible to a large audience. The stereopticon method proved especially valuable in demonstrating to large audiences the various 'tropisms' the positive and negative reactions, of certain Protozoa to chemical, electrical and other stimuli. By means of a specially devised electrical apparatus the lecturer was enabled to focus the projecting microscope from the lecture table.

Though the subject was a very special one, the mode of presentation and illustration was such as to render it highly interesting to the non-specialist, as was clearly shown by the large attendance at all the lectures.

J. H. McG.

THE BRITISH NATIONAL PHYSICAL LABORATORY.

The Friday evening discourse at the Royal Institution, on May 24 was devoted to an account of the aims of the National Physical Laboratory, by Mr. R. T. Glazebrook, its principal. According to the London *Times*, Mr. Glazebrook remarked that the idea of a physical laboratory, in which problems bearing at once on science and industry might be solved, was comparatively new; perhaps the first was the Physikalisch-Technische Reichsanstalt, founded in Berlin by the joint labors of Werner von Siemens and von Helmholtz, during the years 1883–87. It was less than ten years ago that Dr. Lodge outlined the scheme of work for such an institution in England, and in 1895 the late Sir Douglas Galton called attention to the question. A petition to Lord Salisbury followed, and as a consequence a Treasury Committee with Lord Rayleigh in the chair was appointed to consider the desirability of establishing a national physical laboratory. This committee examined over 30 witnesses and then reported unanimously, 'That a public institution should be founded for standardizing and verifying instruments, for testing materials and for the determination of physical constants.' It was now realized at any rate by the more enlightened of our leaders of industry that science could help them. This fact, however, had been grasped by too few in England, though our rivals in Germany and America knew it well; and the first aim of the laboratory was to bring its truth home to all, to assist in promoting a union which was certainly necessary if England was to maintain her supremacy in trade and manufacture, to make the forces of science available for the nation, to break down by every possible means the barrier between theory and practice, and to point out plainly the plan which must be followed unless we were prepared to see our rivals take our place. The effect of the close connection between science and industry on German trade might be illustrated, if illustration were wanted, by the history of the aniline dye manufacture and artificial indigo, and by the German scientific apparatus industry, the growth of which had been expressly attributed to the influence of the Reichsanstalt. Mr. Glazebrook proceeded to describe the means at disposal for realizing the aims of the laboratory. It was to be located at Bushey-house, Teddington, Kew Observatory remaining as the