

insular Italy was actually less rigorous than usual. In continental Italy the snowfall both in the mountains and plains during the early months of 1921 was very light, and this coupled with the almost entire absence of rain in the autumn caused the Alpine streams at the end of the year to fall lower than had ever been remembered. Perhaps the most interesting feature in the geographical distribution of the drought, as concerns the four countries named, is the general intensification from England in the N.W. to Italy in the S.E.—that is from a more oceanic to a more continental regimen of climate. (See article in *NATURE* on "Climatic Continentality and Oceanity," April 21, p. 549.) It is known that both excesses and deficiencies of rainfall with respect to the average are normally more marked in continental than in maritime regions, and the reason is not difficult to understand when one reflects that rainfall is but a by-product of the circulation of the atmosphere and the changes of temperature, in the several strata, associated therewith. Hence, one would expect vicissitudes of rainfall to bear some relation to continentality, because all variations of temperature, seasonal, diurnal, or irregular, tend to be accentuated on land and damped out on sea.

In France and England the drought, which was essentially a summer one, commencing about February and terminating about November, was connected with a marked excess of barometric pressure over central Europe. There seems to be no doubt that the normal Mediterranean high pressure was in the summer of 1921 displaced northward, permitting secondary depressions to develop now and then over the Mediterranean Sea, with alleviation of the ordinary summer drought in that region as stated above. In England during the summer we were commonly located in the northern portion of the French anticyclone, with the usual westerly winds but without the usual moisture. More usually we lie farther towards the polar edge of the south-westerly winds, which are then associated with the convergent air-streams of barometric depressions; but evidence has been adduced ("British Rainfall, 1921") that in 1921 there was a greater preponderance of divergent air-currents.

It is important that students endeavouring to understand something of the origin of rainfall in England should co-ordinate the more distant point of view of the physical geographer who associates our rainfall with the abundant moisture supplied to the south-westerly winds by the warm Atlantic Drift, with the more immediate point of view of the meteorologist who relates it to the incidence of barometric depressions, that is, of convergent and ascending air. Students, too, accustomed to think of the proverbial dryness of east winds in Great Britain, are often greatly puzzled by the persistent rain we not infrequently experience with wind from that quarter. There is no discrepancy, however; for in many cases of rain with east wind on the northern side of a depression, the moisture is supplied by an Atlantic current above the drier easterly current through which the rain is falling.

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University and Educational Intelligence.

LONDON.—An attractive series of free public lectures during the Michaelmas term has been arranged at King's College. Prof. A. Dendy is giving nine lectures on Wednesdays, commencing October 17, on the biological foundations of society; Mr. R. Aitken, five lectures on the geography of Spain and typical Spanish institutions, on Thursdays, commencing November 1; Prof. H. Wildon Carr, four lectures on

the Hegelian philosophy and the economics of Karl Marx, on Tuesdays, commencing October 9; and Miss Hilda D. Oakeley, three lectures on the roots of early Greek philosophy, on Tuesdays, commencing November 27. In addition, Prof. R. J. S. McDowall, of Edinburgh, is giving an inaugural lecture in the Department of Physiology on the position of physiology in science and medicine on October 4, and Prof. W. T. Gordon is giving the Swiney lectures (12) on geology on Mondays, Wednesdays, and Fridays, commencing November 19, taking as his subject "Gem Minerals and their Uses in Art and Industry." The lecture hour in every case is 5.30 P.M.

At University College, the list of public lectures includes the following: introductory lecture by Sir Flinders Petrie on religious life in Egypt, on October 4 at 2.30 P.M.; three lectures on the new Babylonian creation and flood stories, by Dr. T. G. Pinches, beginning on October 4; an introductory lecture by Prof. C. Spearman on psychology as transfigured behaviourism; and a course of lectures by Prof. J. A. Fleming on ionic and thermionic valves, beginning on October 24. Single lectures are to be given by Miss Margaret Murray, on primitive religion, on October 5; by Prof. G. Dawes Hicks, on the philosophy of Bernard Bosanquet, on October 8; by Mr. Morris Ginsberg, on the sociological work of the late Dr. W. H. R. Rivers, by Mr. A. H. Barker, on the heating equipment of a small house, and by Miss I. C. Ward, on the application of phonetics to the curing of speech defects, at various times on October 10; and an inaugural lecture by Prof. A. V. Hill, on the present tendencies and future compass of physiological science, on October 16. Particulars of the lectures and courses should be obtained from the Secretary of University College.

A COURSE of six lectures on the bearing of psychoanalysis upon sociological problems has been arranged by the Sociological Society, Leplay House, 65 Belgrave Road, Victoria, S.W.1. The lectures are to be given on Tuesdays, and commence on October 9 with an introductory lecture by Dr. Ernest Jones. Succeeding lectures will deal with man as an individual, the family, politics, education, and vocation. Half-price tickets are available for a limited number of students.

A SERIES of "Celebrations," arranged by Dr. F. H. Hayward, Inspector of Schools, of 87 Benthall Road, London, N.16, will be held during the winter on certain Saturday evenings (6 o'clock) at the Birkbeck Theatre, Birkbeck College, Fetter Lane, E.C. Four of these in particular may be of interest to readers of *NATURE*, namely: Two homage celebrations, "The Geologist," December 1, and "The Scientist" (in general), March 1, 1924, and two memorial celebrations, "Leonardo da Vinci," January 12, 1924, and "Goethe," February 9, 1924. All these four have a predominant scientific interest. Though we understand that Dr. Hayward has found it difficult to discover music and poetry that can be effectively employed in the glorification of science and its devotees, he has discovered some, and he thinks that the main purpose of the celebrations will be achieved, namely, the creation of emotional associations in connexion with the history and the methods of science. Recent studies in psychology and sociology have pointed to the conclusion that knowledge and reason are more closely related to instinct and emotion than was formerly believed. Without an emotional basis, they cannot flourish or even receive adequate recognition among the mass of mankind. Hence the importance of Dr. Hayward's attempt to employ "mass" methods and other devices.

Suggestions and criticisms are invited. Mozart's "Magic Flute" will supply some items of music, especially on March 1. Admission will be free, without ticket.

SECONDARY education in the United States in 1921 and 1922 is reviewed in Bulletin, 1923, No. 12, of the Bureau of Education, Washington. The outstanding achievement within the past few years has been an extension downwards of the secondary school system in many parts of the United States, especially in cities. Typically, the extension has taken the form of substituting for the normal sequence of 4 years of high school work following 8 years (ages 6 to 14) of elementary schooling, a system sometimes described as the 6-3-3, meaning 6 years (ages 6 to 12) of elementary schooling followed by 6 years of secondary school work divided into two administrative units of 3 years each, namely, the junior high school and the senior high school units. Essentially the change implies that the passage from the elementary to the secondary type of curriculum should synchronise with the commencement of the physical changes of adolescence. It is generally agreed in America that at this stage the pupil needs in his studies change, variety, and human interest rather than completeness and logical arrangement, and that consequently in place of the traditional seventh and eighth grade courses there should be a general survey of the chief departments of knowledge: "English literature, general social science, general mathematics, general science, foreign languages for those who desire them, music, art, physical education, and the practical arts." This holds good both for those who are to leave school at 15 and for those who are to pass on to the senior high school.

A STATISTICAL survey of education in the United States is given in Bulletin No. 16 of 1923 of the Federal Bureau. It shows the following total enrolments in 1919-20 (in thousands): kindergarten 511, elementary 20,383, secondary 2430, university, college, and professional school 462, teachers' college and normal school 163; grand total 23,950, being 22·7 per cent. of the total population. Included in the above are the following enrolments in private, that is non-state, institutions: kindergarten 30, elementary 1486, secondary 229, university etc. 281, teacher-training 14. The estimated cost of all this education, except private elementary and private secondary, is 1301 million dollars, or, in dollars per head: elementary 39, secondary 127, university, college, and professional 460, teachers' college 131, other normal schools 189. The figures are exclusive of city evening, private commercial, nurse-training, and Indian and Alaskan schools. Enrolments in these amounted to 587, 336, 55, and 32 thousands respectively. Gifts and bequests to education in 1920 reached the unprecedented total of 67 million dollars, the highest previous record being 37 million in 1916. The extent to which women teachers have taken the place of men during the past 40 years in elementary and secondary schools is strikingly shown in a table in another Bulletin, No. 29 of 1922, giving the percentage of men teachers in 1880 and at the end of each subsequent quinquennium up to 1920: 43, 37, 35, 33, 30, 24, 21, 20, 14. The average annual salaries in dollars of all teachers, men and women, in the same years are given as 195, 224, 252, 286, 325, 386, 485, 543, 871, but the last figure includes supervisors and non-teaching principals. During the past 50 years the ratio of pupils in secondary schools, compared with the total enrolment in elementary and secondary schools combined, increased from 1·2 to 10·2 per cent.

Societies and Academies.

LONDON.

Institute of Metals (Manchester Meeting), September 10.—Sir Henry Fowler: The use of non-ferrous metals in engineering (Autumn Lecture). Of the non-ferrous metals used by engineers, the one which has been in longest use is copper, and it is at present the one most closely associated with engineering work. The uses to which its comparatively simple alloys with tin and zinc can be put are endless. The next in importance is tin, which, alloyed with copper, lead, and antimony, gives us those white metals which are used to make bearings in machines. Aluminium is still most generally used in connexion with aeronautics.

September 11.—E. A. Bolton: The cause of red stains on sheet brass. The stains occur through reactions of copper oxides in the scale formed during annealing and in the pickling medium. Cupric oxide, contrary to the usual opinion, is as harmful as cuprous oxide. The presence of these oxides may be due to careless washing after pickling, resulting in the presence of acid and salts during annealing, the presence of iron in the brass or upon its surface, the use of impure rolling oils, etc. The main cause of the oxidation of the copper is the use of old-fashioned annealing furnaces in which the flames impinge directly upon the brass. Possible remedies for the red-stain trouble are suggested.—H. W. Brownson: Brinell hardness numbers. Brinell numbers for non-ferrous metals should be expressed in figures that are comparable. This could be done if balls and loads are used for which the ratio L/D^2 (the load in kilograms divided by the square of the ball diameter in millimetres) is constant. Some one ratio for L/D^2 should always be used for one class of alloys; for the copper alloys with Brinell hardness numbers from about 40 to 200, the choice should rest between the ratio 5 as standardised in the United States or the ratio 10 which is favoured in some quarters in Great Britain.—A. H. Munday and John Cartland: Stereotyping. Stereotyping is generally regarded by printers as almost a trade secret. The process was invented by a practical metallurgist, William Ged, an Edinburgh goldsmith, in 1750. Stereotyping was traced from the plaster-of-Paris process to the use of papier-mâché flong, and from the simple stereo plates for flat-bed machines to the elaborate requirements of the modern newspaper. A high degree of accuracy is demanded in the mechanical and metallurgical details in order to produce the good results which are a commonplace to everyone.—J. D. Hannah and E. L. Rhead: Crystallisation effect on galvanised iron sheets. Manufacturers of galvanised iron and steel goods always seek to produce a zinc-covered surface having large characteristic spangles. Small spangles or lack of spangles is disliked. The metal—iron or steel—has practically no influence on the result if the temperatures are satisfactorily maintained. Pure zinc does not yield large spangles, and too high a temperature interferes by producing large quantities of a zinc-iron compound which crystallises in needles on the metal. The presence of tin or aluminium does not produce the desired result, but lead is effective. The separation of the impure zinc into conjugate solutions, lead-rich and zinc-rich, at the dipping temperature, and the method of subsequent crystallisation, may be the causes of these effects.—R. C. Reader: Effects of rate of cooling on the density and composition of metals and alloys. The densities of pure metals, and of alloys which solidify at a constant temperature, are not affected by the rate at which they solidify.