

tions, as the volume covers more than 300 pages, and is illustrated with numerous plates. The memoirs deal with Halley's comet during its last return; observations of the major planets; Nova Lacertæ; the earthquake in the Gulf of Corinth on May 30, 1909; and, finally, with the study of seismic disturbances in Greece during the years 1909-11. The second portion of the volume deals with observations for the same period, and these include equatorial and meridional observations, meteorological observations made at the observatory and at departmental stations, and, lastly, a catalogue of earthquakes observed in Greece during the same year.

FREQUENCY OF PROMINENCES ON EASTERN AND WESTERN LIMBS OF THE SUN.—Mr. Evershed has examined statistically a mass of very complete material of prominence observations, both visual and photographic, to inquire into the question as to whether one limb is more prolific than the other (Kodaikanal Observatory Bulletin No. 28). In his examination he has gone thoroughly into the question of the methods of observation for both kinds of records in order to make certain that the results were in no way affected by any kind of systematic bias in favour of one limb over the other.

The result of the inquiry is that there is a distinct predominance of frequency at the eastern limb. Briefly summarised, the different records led him to the following conclusions. The Kodaikanal observations for 1904-11 displayed as regards numbers for each year a nearly constant excess of east over west, the average percentage of east being 52.70. The Kenley and Catania series for 1894-1905 exhibited also an eastern excess averaging 50.8 per cent of the whole number recorded; for the period 1906-11 the Catania observations displayed an eastern excess of 54.26 per cent. At Kodaikanal during 1905-11 the larger prominences showed a smaller eastern excess than the smaller prominences, the percentages being 51.16 and 53.60 respectively. In the case of profile areas of prominences a small average excess of eastern areas is observed. The eastern excess as regards numbers is about the same for prominences in equatorial regions up to 30.5° lat. as for those in higher latitudes.

Mr. Evershed directs attention to a slight evidence of planetary action similar in effect to that of the earth in the case of Venus only among the major planets, and also to an annual periodicity in the eastern predominance with maxima in January and August and minima in April and November. In a supplementary note he points out that metallic prominences and those showing displacements of the hydrogen lines show a much greater preponderance of east over west, the percentages in these cases being 59.9 and 57 respectively. As all the observations were made visually there is the possibility of bias in favour of the eastern limb.

EVENING EDUCATIONAL WORK IN LONDON.¹

A VERY valuable and interesting survey of the progress of technical, scientific, and commercial education in evening classes in the London polytechnics, technical institutes, and continuation schools has recently been presented to the Education Committee of the London County Council by Mr. R. Blair, the education officer of the council.

The provision now made of instruction in evening classes in London is of remarkable range and extent.

¹ Report on Eight Years of Technical Education and Continuation Schools (mostly evening work). Presented to the Education Committee on December 11, 1912, and ordered to be printed. London County Council Education Committee: P. S. King & Sons. Price 2s. 6d.

It comprises tuition, at almost nominal fees, in all stages of science, technology, arts and crafts, commercial subjects, economics, and literature, in well-equipped institutions from qualified teachers. The London evening student has now far greater educational facilities open to him than are offered in even the most progressive provincial towns, especially in the matter of securing university recognition for his work, if of a sufficiently high standard.

Some idea of the magnitude, the complexity and the importance of the educational work carried on in evening classes in London is given in the following numbers taken from the report:—

The approximate number of evening students enrolled in 1910-11 was as follows (p. 60):—

(1) In the polytechnics	25,000
(2) In technical institutes and schools of art maintained by the L.C.C.	10,000
(3) In commercial centres	30,000
(4) In ordinary evening schools	100,000
(5) In other institutions, settlements, &c. (estimated)	30,000
	195,000

Deducting one-third of this number as "ineffective" students through irregular attendance, &c., it is clear that a large amount of intellectual and educational work is being steadily carried on, which must of necessity play an important part in the economic and social development of the people of London.

A curious fact is the increasing proportion of adult students, *i.e.* above twenty-one years of age, in attendance at evening classes. In 1910-11 the probable number of such students was 80,000, "more than twice the number of pupils of all kinds in all the public secondary schools of London."

The gross annual cost of maintenance of evening teaching in London may be approximately estimated at 400,000*l.*, of which about one-half is expended by the polytechnics and the technical schools.

Illustrations are given on p. 12 of the report of the direct value of the work of London technical institutions to the local industries, especially the Leathersellers' College at Bermondsey in its relation to tanning, the Northampton Institute at Clerkenwell to the optical industries, and the L.C.C. School of Photo-engraving and Lithography with respect to the "three-colour" process. In addition to their industrial and technical work, a considerable amount of purely scientific research emanates from the London polytechnics each year, an excellent account of this branch of their activities being given in pages 42 to 47 of the report.

In a memorandum by Mr. A. E. Briscoe (divisional inspector) upon the "Polytechnics and Technical Institutes," it is stated:—"A good deal of very uninformed criticism is directed against instruction in evening classes; it is often urged that such work cannot be effective; that attendance must be irregular; that students are frequently too tired physically and mentally to make the best use of the time available, and that they are also ill-prepared by their previous education. There is some truth in these contentions, but those who urge them . . . their views would be materially altered if they would but spend a week in a close inspection of the work that is actually done. . . . The first thing that would strike them would be the eagerness to learn. . . . The evening student has less time for study, but he makes more effective use of it. He has practical knowledge that forms an excellent basis. . . . In many institutions evening students are doing work in their subjects quite equal to that required for a university degree."

In finally summarising the position of evening education in London, Mr. Blair concludes with the following passage (p. 24):—"A large increase of students in higher institutions, a large extension of premises and improved equipment, a large increase all over in attendance hours per student . . . an increased representation of masters and workmen on advisory committees, with a corresponding increase in the interest of employers, and of expert criticism of work done, all support the view that the period 1904-12 has been characterised by great expansion in quantity and quality of work."

Since the publication of the report referred to above the education committee of the council has decided upon a comprehensive scheme of reorganisation of the evening continuation schools, which are in future to be termed "institutes" instead of "schools." The main features of the scheme are the specialisation of the functions of individual schools depending upon the social, educational, and industrial demands of the respective districts, the appointment of a number of "responsible masters" for evening work only, the increased provision of non-vocational education, and definite coordination with higher institutions, such as the polytechnics. It is mainly in respect to the last point that the organisation of London evening education has compared very unfavourably of recent years with the organisation in a number of provincial towns.

The junior technical institutes will be definitely linked up in future with the neighbouring polytechnic. The principal (or head of department) of the higher institution will have the right to visit the junior institute in an advisory capacity, and to offer advice upon the appointment of the staff and upon the framing of courses and syllabuses. Standing local committees will be formed consisting of the principal and heads of departments of the polytechnic and "responsible masters" of the junior institutes, in order to cement the relationship between the two types of institutions.

The new scheme as a whole is thoroughly sound, and, if carried out, as there is every reason to expect will be the case, it will undoubtedly have far-reaching, beneficial effects upon London education.

J. WILSON.

LAW OF THE PAY-STREAK IN PLACER DEPOSITS.¹

EXPLANATIONS of the eccentricities of the pay-streak in placer deposits have long been considered difficult to furnish. Geikie, Beck, Posepny, Locke, Lindgren, and many others have all discussed the subject and acknowledged the fact. Eight years' residence and study of placer phenomena in the Klondike gold-bearing region of Canada on the part of Mr. J. B. Tyrrell have enabled him to formulate a natural law respecting the location of the pay-streak, not only in the Klondike, but also in any placer region of the world.

An accurate knowledge of the structure and growth of a valley, comprising the different phases of its history in detail, always presents geological facts and deductions capable of broad and general application, and these are generally recognisable without great difficulty. After considering the nature and rate of erosion and sedimentation in a given valley under normal stream action, the formation of a V-shaped valley and its transformation into a U-shaped one, and the presence of flood-plains and terraces, the laws

governing the formation and position of the pay-streak in an alluvial plain in the bottom of a valley may be stated as follows:—

(1) It was formed in the bottom and at the mouth of the V-shaped valley which was the young representative of the present valley.

(2) It marks the position formerly occupied by the bottom of that V-shaped valley.

(3) The gold contained in it was washed out of the surrounding country and collected into approximately its present position before the gravel of the flood-plain (or terrace) was deposited over and around it.

The practical application of this discovery of identifying nature's way of hydraulic and storing the gold in the bottoms of the valleys must be welcome to all economic geologists and mining engineers.

Mr. Tyrrell holds that some 30,000,000*l.* of gold has been recovered to date from the Klondike region, and that an equal amount no doubt remains to be extracted. Some 900 ft. thick of rock-formations have been removed from the Klondike country, and 130 cubic miles of gravel scattered over the 800 square miles of placer deposits, making only one-hundredth of a pennyworth of gold per ton of original rock concentrated by nature.

H. M. A.

THE UPPER AIR DURING FÖHN.

DR. H. VON FICKER has made notable additions to our knowledge of Föhn by his contributions on this subject to the Transactions of the Vienna Academy. His researches showed that the Alpine Föhn is the local manifestation of an extensive phenomenon which is revealed almost simultaneously in places of the same altitude over a large region. In a paper in the *Sitzungsberichte* of the Vienna Academy, May, 1912, he describes observations on Föhn during three balloon ascents from Innsbruck in 1910 and 1911. It was found impossible to make ascents at the time of actual Föhn at the surface owing to the very gusty character of this wind. In one ascent only was the balloon over the mountains at the time of Föhn, and then it was the plaything of the vertical currents, which, however, were kind enough to spare the balloonists actual disaster. At one time the balloon was carried downwards 900 m. and up again 1100 m. in the course of five minutes, indicating vertical currents of five metres per second or more. Such information is clearly of importance to aviators, apart from its bearing on the elucidation of the meteorological phenomenon.

The general conclusions of von Ficker are that before the outbreak of Föhn at the surface, it is blowing over the cold air in the valleys and plains, the surface of separation between the two currents being frequently marked by strato-cumulus cloud. When the Föhn current crosses the ridges and valleys at right angles it descends on the lee side and ascends on the windward side, with a partial clearing of the cloud in the region of descending air. Föhn is usually dissipated by the coming of a north-west wind, the change probably being of the nature of a line-squall. The vertical temperature gradient during Föhn was usually less than the adiabatic gradient for dry air, except when the balloon was carried up and down in the vertical currents, but it was greater than the normal gradient. The change of wind direction with altitude was normal, the south-east wind of the lower layers changing to south and south-west winds at higher levels up to 3-4 km. The value of the discussion is enhanced by the results of ascents at Munich and observations at Zugspitze (3000 m.) which the author was able to incorporate by the courtesy of Dr. Schmauss, who is keenly enthusiastic about all upper-air investigation.

E. GOLD.

¹ "The Laws of the Pay-streak in Placer Deposits." By J. B. Tyrrell. Trans. Inst. Min. and Metallurgy, pp. 593-605. (London, 1912.)