

particular mental characters than one of bad ancestry, and a very high state of efficiency is common only in dogs well bred from the Field Trials point of view. These particular mental potentialities are just as much inborn characters as the shape of the dog's head; they are modified by selection in precisely the same way, and are transmitted, with variations, from parents to offspring.

If the existence of heritable variations in each particular mental potentiality be accepted, the conclusion is practically unavoidable that, as Prof. Pearson has suggested, the majority of the lowest class of the population is inferior in capacity for intellectual development to the majority of the middle and upper classes. Favourable variations which are inherited must generally result in a rise, unfavourable in a fall in social position, and a fall to the lowest class means a high mortality among the offspring. Moreover, the upper and middle classes are subjected to continual selection. A known period of selection has changed the Jews from an extraordinarily militant, quarrelsome, and bloodthirsty race to an undoubtedly peaceful, and probably the most generally intellectual race in the world. Any individual amongst them who continued to react to violence by developing a violent temperament must certainly have been eliminated, while survival depended upon a high capacity for making other mental acquirements. The comparative brevity of the period during which selection lasted suggests that mental potentialities respond, if anything, more quickly to selection than do physical potentialities.

Glasgow, December 16.

CHARLES WALKER.

Theory of Complex Cartesian Coordinates.

A RECENT number of the Proceedings of the London Mathematical Society (vol. x., part iii.) contains a note of mine on a theory of complex Cartesian coordinates, in which the complex point $(a+di, b+ei, c+fi)$ is represented by the segment AB joining the real point (a, b, c) to the real point $(a+d, b+e, c+f)$. Since its publication I have learnt that the same theory has been discussed by Mr. Ellery W. Davis in the Nebraska University Studies (Lincoln, 1910).

I am writing now for two purposes. In the first place, I wish to express my regret that, not knowing of Mr. Davis's work, I made no reference to it in my paper. Secondly, the fact that two investigators have quite independently, and both after a study of v. Staudt, invented the same representation of complex points, affords a presumption that it is a natural one. Personally, I believe that many interesting facts will follow from further investigations in this field: it will never replace Staudt's projective theory, which is absolutely perfect so far as it goes, but it may help to make the comprehension of Staudt's work a little easier, and thus popularise one of the most splendid works of mathematical genius.

I may add that parts of Mr. Davis's paper were read before the American Mathematical Society (April and November, 1907; November, 1909) and the British Association (August, 1909). I gave a brief account of the theory myself to the Mathematical Association at a previous date; but really there is no question of priority in dispute. Probably Mr. Davis, like myself, has been in possession of the elements of the theory for a long time.

G. B. MATHEWS.

10 Menai View, Bangor, December 19.

Science and Literary Form.

THE gap between the terminology of commercial science and the ordinary amenities of language seems to be hopelessly widening. The following specimens are culled at random from the account of the exhibition of the Physical Society, contained in *The Times Engineering Supplement* of December 20:—"synchroscope," "decrometer," "lumeter." The word "speedometer" is now consecrated by text-books and even by legislation. All this gives one pause to think, when it is remembered how careful the early scientific pioneers in electrical developments (Kelvin, Maxwell, &c.) were to select suitable terms. The question even persists in obtruding itself, in what relation all this stands to the view that education can be based on a purely scientific training.

J. L.

Cambridge, December 20.

The Weather of 1911.

THE interesting question of Sir Edward Fry in *NATURE* of November 16 can be defined more precisely by the other question: Where did unusual precipitation occur in the

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European summer, 1911? I replied to this question, asked by the editor of *Ciel et Terre*, by pointing to the excessive rains of middle and northern China, Japan, and the Philippine Islands in the same summer, 1911. Indeed, the rains of Baguio (Luzon), July 14-17, established a record only comparable with the rains of Cherrapunji, June 12-16, 1874. Baguio received in four days 2239 mm.; Cherrapunji in five days 2598 mm. More comparisons may be found in the *Frankfurter Zeitung*, December 8, ii., and, I hope, at an early date in *Ciel et Terre*. Here I emphasise the connection of these rains, especially in Hondo and Luzon, with typhoons, proved clearly for the latter island in the preliminary communication of P. José Coronas, assistant director of the Manila Observatory: "Three typhoons, which caused heavy floods in Luzon."

In *NATURE* of April 11, 1907, p. 560, I published a paper, "Atmospheric Seesaw-phenomena and the Occurrence of Typhoon Storms." I applied afterwards the law there stated to the weather of the summer of 1907, being on the Atlantic side of the earth extremely cool, in a paper, "Klimaschwankungen und der thermisch-barometrische Ausgleich," in the *Meteorologische Zeitschrift*, 1909, vii., pp. 331-2. Indeed, the formation of tropical cyclones (typhoons) in that summer largely preponderated in the great Pacific focus of such storms. The same explanation as for the cool summer of 1907 can, strange to say, be employed for the dry and hot summer of 1911. A difference is only caused by the larger development of the Azores-maximum of aërial pressure in 1911. This development made the Pacific depressions arriving on the western side of Canada travel more northerly than usual, and therefore arrive in Europe on the more easterly coasts of Russia instead of, as in 1907, on the coasts of western and central Europe. To this also may be ascribed the occasional excesses to night frost in central Europe during June and August, 1911, July descending also to $+2^{\circ}$ C.

The development of the maximum was caused by a somewhat independent and contrary northerly precession of subtropical conditions over Europe and of tropical conditions over subtropical latitudes. These caused another strange phenomenon of aërial pressure in Europe and also in North America, namely, a retrograde motion of depressions similar to the first part of tracks of tropical cyclones, the phenomenon of "Zugstrasse VI.," as I designated it. I found this extremely rare phenomenon over Europe in May, June, and September, 1910, October and November, 1911, and over North America three times in August, 1911. Its occurrence in Europe coincided with well-developed "Hochwassers Tiefs." Conducting them quickly westwards, and preventing them from pouring out plainly their precipitations, it contributed to the relative dryness of October and November, 1911.

WILHELM KREBS.

Grossflottbek (Holstein), December 9.

Nature of Light emitted by Fireflies.

IN *NATURE* of November 23 (vol. lxxxviii., p. 111) there is a letter from Messrs. Singh and Maulik on the nature of the light of the firefly (*Luciola*), in which they report the penetration of opaque substances by the rays from these insects to such an extent as to affect a photographic plate. Their results are essentially similar to those reported by Muraoka (*Wiedemann's Ann. d. Chem. u. Physik*, 1896, vol. ccxcv., pp. 773-81; *Journ. Coll. Sci.*, Tokyo, 1897, vol. ix., pp. 129-39), an explanation of which has been given by Molisch ("Leuchtende Pflanzen," Jena, 1904; Report, Smithsonian Institution, Washington, D.C., 1905, pp. 351-62). The spectral structure of the light of Lampyridæ has been studied spectrophotographically by Ives and Coblentz (*Bulletin of the Bureau of Standards*, Washington, D.C., 1910, vol. vi., pp. 321-36), and also separately by Ives (*Physical Review*, 1910, vol. xxxi., pp. 637-51) and Coblentz (*Physikal. Zeitschrift*, 1911, vol. xii., pp. 917-20; also in *Canad. Entomol.*, 1911, vol. xliii., pp. 355-60).

Before attempting further work along this line Messrs. Singh and Maulik would do well to read the above papers, and to refer to Mangold's monograph "Die Produktion von Licht" (second half, vol. iii., Winterstein's "Handbuch der vergleichende Physiologie," Jena, 1910).

F. ALEX. McDERMOTT.

Industrial Research Laboratory, Pittsburg, Pa., U.S.A., December 11.