measurements of fifty pairs of twins from nine to fifteen years old in six mental traits, and their bearing upon the comparative importance of heredity and environment as causes of human differences in intellectual achievement.

FIVE new volumes—Nos. 146 to 150 inclusive—of Ostwald's "Klassiker der exakten Wissenschaften" have been received from the publisher—Mr. W. Engelmann, Leipzig. No. 146 is a paper by Lagrange (1768), translated from the French and edited by Herr E. Netto, the title being "Über die Lösung der unbestimmten Probleme zweiten Grades." J. B. Listing's "Beitrag zur physiologischen Optik," edited by Prof. O. Schwarz, forms No. 147 of the series; and a lecture delivered at Vienna by E. Hering in 1870, "Über das Gedächtnis als eine allgemeine Funktion der organisierten Materie," constitutes No. 148. Under the title "Tastsinn und Gemeingefühl," an article contributed by Dr. E. H. Weber in 1846 to R. Wagner's "Handwörterbuch der Physiologie" is reprinted with notes by Herr E. Hering. Of particular interest is the reprint (No. 150), edited by Herr A. von Oettingen, of Fraunhofer's paper entitled "Bestimmung des Brechungs- und Farbenzerstreuungs-Vermögens verschiedener Glasarten, in bezug auf die Vervollkommnung achromatischer Fernröhre." This volume contains a plate showing Fraunhofer lines in the solar spectrum, and a picture of the statue of Fraunhofer at Munich.

OUR ASTRONOMICAL COLUMN.

COMET 1905c (GIACOBINI).—Observing at Sunderland on December 22, 1905, Mr. Backhouse estimated that the magnitude of comet 1905c was approximately 8·3, at 18h. 40m. G.M.T., the observation being made in faint twilight; its diameter he found to be $5\frac{1}{2}'$.

As this comet now rises but about an hour before sunrise, and the apparent distance from the sun is decreasing, it will be scarcely possible for further observations to be made before February, when the comet should again become visible, possibly to the naked eye, in the evening sky.

EPHEMERIS FOR HOLMES'S COMET (1892 III., 1899 II.).—The following search-ephemeris for Holmes's comet is published by Herr H. J. Zwiers in No. 4063 of the *Astronomische Nachrichten*:—

1906		α (app.) *oh. G.M.T.* h. m. s.	δ (app.) ° ′ ″
January	11	21 5 39	−18 59 53
,,	13	21 9 45	−18 30 19
,,	15	21 13 51	−18 0 25
,,	17	21 17 57	−17 30 13
,,	21	21 26 7	−16 28 55
,,	25	21 34 15	−15 26 26
,,	29	21 42 21	−14 22 49

In referring to the ephemeris for comet 1892 V. in these columns last week, that object was designated, by mistake, Holmes's comet. Both bodies were discovered at about the same time, and their periods are very similar, but comet 1892 V. is the faint one discovered by Prof. Barnard, by photography, on October 12, 1892, and was not seen on its return in 1899. A report that it has been detected at the La Plata Observatory is as yet not confirmed.

On the other hand, Holmes's comet was bright enough in 1892 to be observed with the naked eye, and, owing to its eccentric fluctuations in brightness, was described by Prof. Barnard as certainly the most remarkable comet he had ever seen, taking everything into consideration. During an interval of fourteen minutes its diameter, as observed with the 36-inch refractor, increased from 43″·4 to 47″·9, and the comet became perceptibly brighter whilst under observation. This comet was first seen on its return in 1899 by Prof. Perrine on June 10 of that year. According to the above ephemeris, the comet should set about ninety minutes after sunset on January 11, but probably its low declination will make it a difficult object to find.

PHOTOGRAPHS OF THE SOLAR GRANULATIONS.—Using the astrographic telescope of the Pulkowa Observatory, Prof. Hansky has obtained some exceedingly interesting photographs of the solar granulations and spots on a large scale. The solar image at the focus of the instrument has a diameter of 3 cm., and by the use of an achromatic double concave lens was enlarged up to 54 cm. (about 21 inches).

The negatives thus obtained were photographically intensified by repeated copying, and details of the granulations became visible. Portions of the strengthened images were then enlarged to such a scale that the solar diameter would be equal to 6 metres (*i.e.* nearly 20 feet).

Copies of the sections thus enlarged are reproduced in the bulletin issued by Prof. Hansky, and on comparing two which were taken with an interval of twenty-five seconds it is seen that the granulations have undergone but little change, although relative movement and changes in brightness are discernible. Photographs taken with an interval of one minute show great changes, and after three minutes only one or two of the granules are recognisable.

The dimensions of the granules vary considerably; the smallest measured had a diameter of about 670 km., the largest about 2000 km.

Prof. Hansky intends to prosecute this research further, and hopes thereby to solve several questions regarding the periodic appearance of granules, the effects of their movements on spots and faculæ, &c.

THE ORBIT OF ξ URSÆ MAJORIS.—On many grounds the determination of the correct orbit of the double star ξ Ursæ Majoris is of great interest and importance, and for this reason M. N. E. Nörlund, of Copenhagen, has made a very careful re-investigation of the available data and measurements. About eighteen orbits have been computed previously.

The results of this investigation are given in No. 4064 of the *Astronomische Nachrichten*, and the places computed from the elements obtained are compared with those obtained by many different observers.

For the period M. Nörlund obtains 59·8096 ± 0·06 years, for the time of periastron 1815·957, for the distance $a = 2''\cdot5128$, and for the eccentricity of the orbit $e = 0\cdot4108$.

THE INTERNATIONAL FISHERY INVESTIGATIONS.[1]

THE first of the reports referred to below is the first report of the British North Sea Investigations Committee on the International Fisheries Investigations. From time to time during the last three years in which the investigations have been in progress, the International Council has issued the "Bulletin des Resultats," in which are contained the results of the hydrographical and plankton investigations carried out on the periodic cruises; and also the series of "Publications de Circonstance," containing the results of incidental investigations carried out by the various naturalists on the staffs of the different committees. Quite recently, too, the council has issued the third volume of "Rapports et Procès-Verbaux," containing a *résumé* of the results obtained up to the present time. The present volume is, however, the first report which deals exclusively with the results obtained by the British vessels. It is a report to the Fishery Board for Scotland on part of the investigations made by the Scottish staff.

The first three papers in the report, written by Messrs. Helland-Hansen and Robertson, deal with the hydrography of the Færöe-Shetland channel and the adjacent sea regions—the area investigated by the Scottish vessels, H.M.S. *Jackal* and the *Goldseeker*. The principal Scottish line of hydrographical stations extends from the Shetlands to the Færöe Islands, and it is along this line that the changes taking place in the constitution of the sea-water can most easily be observed. It has long been known that the water in this region may be derived from various

[1] "Report on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters, 1902–3." Edited by D'Arcy W. Thompson. Pp. vii+618. [Cd. 2612.] (London: H.M. Stationery Office, 1905.) Price 8*s.* 9*d.* net.

"Report on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters, 1902–3." Report No. 2 (Southern Area). Edited by Dr. E. J. Allen. Pp. ix+377. [Cd. 2670.] (London: H.M. Stationery Office, 1905.) Price 8*s.* 9*d.* net.