

research and scholarly achievement in every division of learning represented in the organisation of the university; and in recognition of the need for further and more exact knowledge in science and in the applications of science to the affairs of modern life." The Institute will be controlled by an executive board including heads of the faculties of Lehigh University, and it is hoped to afford training in research methods to the staff of the University and the Institute, to graduate students of the former, and to special investigators. The New Jersey Zinc Company has already founded a research fellowship in science and technology in the new Institute. Bulletins or reports on the progress made in problems attacked will be issued from time to time.

MESSRS. Dulau and Co., Ltd., 34 Margaret Street, W.1, have just circulated their Catalogue No. 119, giving the titles of some 1400 second-hand books and serials relating to astronomy, dialling, meteorology, aviation, physics and chemistry, mathematics and mechanics, and fen drainage, which they have for sale.

THE Cambridge University Press announce for early publication "A History of British Earth-

quakes," by Dr. C. Davison, the aim of which is to record all known British earthquakes, to trace the zones in which crust-changes have recently occurred and in which the faults are yet alive, and to discover some of the laws that rule the growth of faults.

THE Cantor Lectures on "Colloid Chemistry," which were given by Dr. E. K. Rideal at the beginning of the year, have been published in three recent numbers of the Journal of the Royal Society of Arts (Oct. 17, 24, and 31). Dr. Rideal's review included such topics as adsorption, methods of preparation, stability of sols, emulsions, soaps, etc., practical applications of the features discussed being frequently given.

THE Oxford University Press will publish at the beginning of December a limited edition of "The History of Aeronautics in Great Britain from the earliest period to the latter half of the Nineteenth Century," by J. E. Hodgson. The work will include chapters on the development of international aeronautics, an annotated list of papers read before the Aeronautical (now the Royal Aeronautical) Society between 1866-93, and a selected bibliography.

Our Astronomical Column.

A STUDY OF STELLAR MOTIONS.—The *Scientific Monthly* for November contains an interesting analysis of stellar velocities by Dr. Gustaf Strömberg. He forms *velocity surfaces* for different groups of stars by imagining the bodies forming a group to start from a common point at the same instant; then after moving each with their proper speed for the selected unit of time, the curve or surface drawn through them gives a graphic representation of the velocity distribution.

These surfaces in most cases are considerably elongated not only in sections perpendicular to the galactic plane (which we might foresee *a priori*) but in the galactic plane itself. This is so far in accord with Schwarzschild's ellipsoidal hypothesis, but a considerable deviation from such a symmetrical form is found, which is especially notable when stars of high velocity, more than 100 km./sec., are examined. They are found to be practically all moving towards one hemisphere. A similar want of symmetry is found in many other distant objects.

The author gives a tentative explanation, supposing that some fundamental system of reference exists in space, and that high velocities relatively to it are far more rare than small velocities. He gives an illustration; supposing a ship moving rapidly through the air, then various classes of objects on deck are variously affected by the strong draught produced, some moving with the ship, others keeping their position in the air, while others have intermediate motions. If several ships are postulated, a close resemblance to the observed stellar motions would arise. The paper closes with some discussion on the bearings of these results on Einstein's general theory of relativity.

MARTIAN PHOTOGRAPHY.—Two very interesting series of Martian photographs are reproduced and discussed in the October number of Publications of the Astronomical Society of the Pacific. The first, by W. H. Wright, deals with photographs taken with the Crossley reflector at the Lick Observatory in light of three different wave-lengths, (1) ultra-violet, (2) yellow, and (3) infra-red. (1) shows no detail on

the disc except the polar cap, and gives a distinctly larger image than the others; (2) agrees with the visual aspect of the planet; (3) shows the dusky regions in an accentuated manner, the polar cap being small and faint. (1) is thought to give a picture of the Martian atmosphere, extending 120 miles above the limb (this is supported by some recent observations of the occultation of Mars, a glow being seen for a few seconds after the disappearance of the disc). It is concluded that the polar cap is mainly an atmospheric phenomenon, but that there is probably a less conspicuous surface cap below it. The darkness of the dusky areas in (3) indicates that their radiations are mainly in the blue and green, agreeing with their visual aspect. Terrestrial landscapes taken from Mt. Hamilton with (1) and (3) show that the distant landscape is wholly blotted out in (1) by the atmospheric veil, while it is clearly visible in (3).

The second series was made by Prof. E. C. Slipher at Flagstaff, with the 24-inch refractor and the 40-inch reflector. The tests with light of different wave-lengths are in full accord with those of Mr. Wright. The pictures are grouped in a manner to bring out the seasonal changes, the dusky areas darkening in the late spring and fading in the autumn; this is in full accord with the vegetation hypothesis. On the whole, these markings and the polar cap have repeated the cycle of change recorded in 1909, the region Deucalion being, however, fainter this year.

Search was made, without success, for the chlorophyll bands in the spectrum of the dusky areas. It is noted that it is much more difficult to detect these in reflected light than in transmitted light.

Prof. R. Trumpler also publishes some simultaneous drawings and photographs made with the 36-inch Lick refractor. The drawings show numerous canals, including some in the dusky areas; traces of several of these can be seen in the photographic reproductions, and the original negatives are stated to show many more. The polar cap had some dark bands across it, and detached white patches at its edges. A small white spot is shown in the middle of Auroræ Sinus not very far from "Dawes Ice Island."