

lines of double width and with single-width spaces, that portion exposed behind each colour may be alternately isolated as the key-plate is shifted. This adjustment is done mechanically, identification marks indicating which colour record is exposed, and as contact prints cannot be obtained, an enlarging lantern is used. The prints may be obtained "in any one of a dozen different ways," but Mr. Williams prefers the bromoil process, inking up with the three necessary colours and superposing the prints by transferring the ink images to drawing-paper. The lines are not obtrusive in the resulting pictures, and, if desired, they can be obliterated by putting the image slightly out of focus when making the exposures for the prints. The method of making the screens is also described in the *Photographic Journal* for March.

In an address to the Franklin Institute, Philadelphia, which is reproduced in the *Journal* of the institute for January, Mr. H. Leffmann shows that the pioneer experiments in aviation carried out by the late Prof. S. P. Langley were complete enough to form the basis for modern practice. In May, 1896, Prof. Langley launched from a small island in the Potomac an unmanned aeroplane driven by a steam-engine which ascended to an altitude of 60 ft. or 70 ft., and travelled at about twenty miles per hour for eighty or ninety seconds before descending. With the help of a grant from the Government and the mechanical assistance of Mr. C. M. Manly, he constructed an internal-combustion engine of 18 b.h.p. weighing only 108 lb., and in 1903 Mr. Manly made an experimental flight on a machine driven by this engine. Through some accident not clearly understood, the flight came to a premature conclusion, and the pilot narrowly escaped drowning. Prof. Langley died in 1907 without making any further experiments, but in 1914 the machine of 1903 was flown successfully by Mr. G. H. Curtiss. When the engine was replaced by one of 80 h.p. a number of flights were made which demonstrated that the principles of the Langley machine were sound and practical.

THE *Cambridge University Press* is publishing for Dr. A. E. Shipley, Master of Christ's College, and Vice-Chancellor of the University of Cambridge, an account of the author's experiences during his recent visit to the United States of America. It will be entitled "The Voyage of a Vice-Chancellor." "The Furniture Beetle" is in preparation for appearance in the series of Economic Pamphlets of the British Museum (Natural History), and "The Danger of Disease from Fleas and Bugs" for appearance in the Museum's series of Economic Leaflets. Mr. W. Heinemann is about to publish "Psychology and Parenthood," by H. A. Bruce, who aims at presenting to parents particulars of the discoveries in child-nature obtained by psychologists and others. Messrs. Longmans and Co. announce a book which should be of interest to educationists, viz. "The Manchester Grammar School, 1515-1915: A Regional Survey of the Advancement of Learning since the Reformation." The author is Dr. A. A. Mumford.

OUR ASTRONOMICAL COLUMN.

OBSERVED CHANGES ON JUPITER.—Some remarkable alterations in the surface-markings of this planet have been observed recently. The bay or hollow in the south equatorial belt, which has been almost uninterruptedly visible since Schwabe figured it in September, 1831, appears to have disappeared. Mr. F. Sargent, of Bristol, using telescopes of $10\frac{1}{2}$ in. aperture (reflector) and 5 in. (Cook refractor), has been unable to see any distinct traces of the feature named during his very recent observations. It was an im-

portant marking as serving to show the position of the great red spot, which has been very faint during a long series of years. In 1901 a large dark mass made its appearance in the south tropical zone of Jupiter, and in about the same latitude as the red spot. This moved with greater speed than the latter, its rate of rotation being about 12 seconds less, and the marking had so greatly extended in longitude that in January and February of the present year it ranged over about 180° , or half the planet's circumference. This object seems also practically to have disappeared. Mr. Sargent saw the following end of it central on March 7 at 10h. 13m. in longitude 60.3° , but it was extremely faint, and regarded as near the vanishing point. Since that date observations have failed to reveal the object, though the disc has been carefully scanned at those times when it must have been presented to view had it continued visible.

DRAWINGS OF MARS.—*Popular Astronomy* for February contains an interesting series of comparative drawings made by five observers at the last opposition, according to a prearranged scheme organised by Prof. W. H. Pickering. On the whole, the accord of the different draughtsmen is satisfactory; thus of 131 canals appearing on the sketches, eighty-three are confirmed by at least one other observer. The Rev. T. E. R. Phillips noted that he could see nothing with the Greenwich 28-in. that was not visible in his own 8-in. Several observers mention the beautiful blue tint of Syrtis Major; the other maria tended to grey or brown.

THE GEGENSCHNITT OR COUNTERGLOW.—This phenomenon has a great fascination for Prof. Barnard, who in 1899 published his observations extending over sixteen years. Prof. Barnard made another series last autumn (which he states to be the best season to observe it), and gives the results in *Popular Astronomy* for February. As in the previous set, the longitude comes out exactly 180° from the sun, the latitude 0.3° N. The diurnal parallax appeared to be insensible. He favours the explanation that it is an atmospheric phenomenon, the earth's atmosphere acting as a spherical lens and concentrating the sun's light. He mentions two other explanations as possible: that of Evershed, that the earth has a tail like a comet; and that of Moulton, that there is an aggregation of meteoric bodies at the point opposite the sun describing periodic orbits under the combined action of sun and earth.

TYCHO BRAHE'S ORIGINAL OBSERVATIONS.—An article by Dr. J. L. E. Dreyer in *Scientia* for March states that the manuscript books in which Tycho's observations were entered night by night were sold to the King of Denmark, and are now in the Royal Library at Copenhagen. A contemporary fair copy of most of them is now in the Imperial Library at Vienna, and from this copy an edition was prepared by a Jesuit named Curtius in 1666. This is known to be very incomplete and incorrect, and a new edition is being prepared by Dr. Dreyer from the original observing books and from the copy at Vienna, which will form vols. x.-xiii. of the collected works of Tycho Brahe, now being printed at Copenhagen.

THE DEVELOPMENT OF AIRSHIP CONSTRUCTION.

AMONG the important papers read last week at the Institution of Naval Architects was one on airship construction by Mr. C. I. R. Campbell, who has been responsible at the Admiralty for the design of our airships. In British practice it is assumed for design purposes that the gas has a lift of 68 lb. per 1000