

the native industry carried on in Madras, Dr. Marsden points out that the difficulties are much more formidable, and he suggests that the first step towards improvement must be the provision of means for the production of indigo of good and uniform quality. One means to this end would be the replacement of small-scale manufacture in native-owned vats by larger-scale production in well-managed factories, the ryot selling his crop to the factory for manufacture into dyestuff. A possible alternative may be the elaboration of a simple process, capable of being used by the ryot, as the result of the researches now being carried on by Mr. Davis, coupled with some system of analytical control of the produce before shipment.

#### USES OF INVISIBLE LIGHT IN WARFARE.

PROF. R. W. WOOD, of Johns Hopkins University, Baltimore, gave to the Physical Society of London on March 14 a demonstration of the uses of invisible light in warfare. The first device shown was a signalling-lamp, consisting of a 6-volt electric lamp with a small curled-up filament at the focus of a lens of about 3 in. diameter and 12 in. focus. This gave a very narrow beam, only visible in the neighbourhood of the observation post to which the signals were directed. In order to direct the beam in the proper direction, an eyepiece was provided behind the filament. The instrument was thus converted into a telescope, of which the filament served as graticule. When directed so that the image of the observation post was covered by the filament, the lamp, when lit, threw a beam in the proper direction. In many circumstances the narrowness of the beam was sufficient to ensure secrecy; but sometimes it was not desirable to show any light whatever, and filters were employed to cut out the visible spectrum. By day a deep red filter, transmitting only the extreme red rays, was placed in front of the lamp. The light was invisible to an observer unless he was provided with a similar red screen to cut out the daylight, in which case he could see enough to read signals at six miles. By night a screen was used which transmitted only the ultra-violet rays. The observing telescope was provided with a fluorescent screen in its focal plane. The range with this was also about six miles. For naval convoy work lamps are required which radiate in all directions. Invisible lamps for this purpose were also designed. In these the radiator was a vertical Cooper-Hewitt mercury arc, surrounded by a chimney of the ultra-violet glass. This glass only transmits one of the mercury lines, viz.  $\lambda = 3660 \text{ \AA.U.}$ , which is quite beyond the visible spectrum. Nevertheless, the lamp is visible at close quarters, appearing of a violet colour, due to fluorescence of the retina. The lens of the eye is also fluorescent. This gives rise to an apparent haze, known as the "lavender fog," which appears to fill the whole field of view. Natural teeth also fluoresce quite brilliantly, but false teeth appear black.

Reverting to the use of the lamps at sea, they are picked up by means of a receiver consisting of a condensing lens in the focal plane of which is a barium-platino-cyanide screen the full diameter of the tube. An eyepiece is mounted on a metal strip across the end of the tube. When the fluorescent spot has once been found somewhere on the screen, it is readily brought to the central part and observed with the eyepiece. The range is about four miles, and the arrangement has proved invaluable for keeping the ships of a convoy together in their proper relative positions by night.

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#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—A course of eight lectures on "The Physiology of Muscular Exercise" will be given in the Physiological Department, St. Bartholomew's Hospital Medical School, West Smithfield, E.C.1, by Prof. F. A. Bainbridge on Wednesdays at 4.30 p.m., beginning on April 30. The course is intended for advanced students of the University and others interested in the subject. Admission is free, without ticket.

WE learn from *Science* that by the will of the late Mr. Morton F. Plant the Connecticut College for Women receives a bequest of 50,000*l.*

SIR ARTHUR NEWSHOLME has been offered the chair of public health at Johns Hopkins University, Baltimore, and it is understood that he will accept the offer for a year at least.

THE sixth election to Beit fellowships for scientific research will take place on or about July 15. Not more than three fellowships, of the value of 175*l.* per annum, will be awarded. Applications must be received on or before May 31. Forms of application and all information may be obtained, by letter only, addressed to the Rector, Imperial College, South Kensington, London S.W.7.

By the will of the late Mr. Charles Kerr Marr, the residue of his property, amounting apparently to more than 200,000*l.*, is left in trust for educational purposes, defined as follows:—"For granting prizes or rewards to persons who are or have been *bona-fide* residents in the borough of Troon, and who are or have been scholars in some public or elementary school; in or towards building or maintenance of any public school, elementary or otherwise, in Troon; in or towards the maintenance of exhibitions or scholarships tenable at any institution of education higher than elementary, as the trustees may determine, but no exhibition or scholarship shall be awarded to any person who shall not be or have been a *bona-fide* resident in Troon."

IN the issue for April 5 of the *Cologne Post*, a daily paper published at Cologne by the Army of the Rhine, is an article on the education of A iv, boys. The writer states that the boys of eighteen years of age who have been called to the colours recently have, in the majority of cases, proved to be vastly below the standard of education to be expected of boys of that age, as many as 5 per cent. of them being quite illiterate. He goes on to advocate the institution of a system of vocational education while the boys are with the Army of Occupation that will return these lads to their civil occupations each one with his studies completed and with his "apprenticeship" served. The curriculum and time-table of studies sketched in the article indicate a due appreciation of the difficulties of the problem and the possibility of overcoming them successfully.

THE *Cologne Post* of April 1 publishes an interesting account of the work of the 2nd Army Agricultural College at Bonn. The object of the college is to provide interesting and useful occupation for our troops during the period preceding demobilisation. Courses were commenced in January, 1919, since which time large numbers of soldiers, both officers and other ranks, have received short courses of agricultural instruction. At first the lectures were mainly theoretical, dealing with agricultural chemistry and botany, but this was soon altered, and at the present time the students not only have lectures on practical subjects—farm management, etc.—but are also