Electrolysis of Potassium Iodide.

THE following form of this experiment differs from that producing blue iodide of starch usually given in text books, and as I am not aware of it being known it may be of interest to those engaged in teaching the subject to which it belongs.

Into a U-tube pour a solution of the salt coloured with red (slightly acid) litmus solution, then, on introducing the electrodes (carbon for the anode) and passing a current, the solution in the anode limb is turned brown, due to the solution of I in KI, while at the kathode the liquid turns blue from the liberation of potassium.

This form of the experiment is very pretty, and is suitable for large classes.

For small classes the poles of a battery may be drawn over red litmus paper moistened with KI solution.

It is well to exhibit the action of iodine and potassium (potash) upon separate portions of the red solution before conducting the experiment. E. F. MONDY.

Dacca College, Bengal, July 24.

Spherical Eggs.

WILL you allow me to thank Profs. Greenhill and Liveing for their notes in reply to mine on the question of the packing of spherical eggs. The chief drawback of life in New Zealand is the inaccessibility of works of reference, such as those mentioned by Prof. Greenhill. W. STEADMAN ALDIS.

Auckland, New Zealand, July 11.

ANOTHER PHOTOGRAPHIC SURVEY OF THE HEAVENS.

WE gather from two circulars received from Prof. Pickering that another photographic map of the heavens is to be made, in addition to that arranged for at the Paris Conferences. The first circular runs as follows:—

It is proposed to establish an Astronomical Observatory on one of the mountains of Southern California, under climatic conditions probably superior to those at any similar institution now existing, with possibly one or two exceptions. It is therefore extremely important to increase these natural advantages by a plan of work and form of instrument which shall give results such as cannot be obtained elsewhere. Moreover, in California the interest in astronomy is wide-spread. There are many persons of large means who might be willing to make an important contribution to science if they could be sure that the promised results would be attained. The plan detailed below provides for a telescope with which stars could be studied that would be beyond the reach of any other instrument. The amount of material accumulated would be far greater than that obtained by telescopes of the usual form. A satisfactory test of the work could be made before a large part of the money had been expended. No great delay would probably arise, so that the donor could soon see the results arising from his gift. When money is given to erect a building without sufficiently endowing it, the value of the gift is greatly diminished if the name of the donor is attached to the building. This objection does not hold in the present case, since a large part of the expenditure is for current work. On the other hand, the donor's name would always be honourably associated, not only with the instrument, but with the work done with it. As in the case of the Henry Draper Memorial, it is believed that by such a living reminder a patron of science will be more widely known and appreciated than by a much larger expenditure for a building or fund.

Photography is rapidly changing the older methods of astronomical study. It gives an accurate representation of many objects at the same time; and, since copies may easily be made, it permits the results to be studied at leisure at any place and time. In a recent paper before the National Academy of Sciences, the writer recommended the construction of a large photographic telescope of the form described below. The lens should be like that used by photographers rather than like that of an astronomical telescope, and should consist of two achromatic lenses. Its aperture should be 24 inches, and its focal length 11 feet, thus giving images of objects on a scale of 1 millimetre to a minute of arc. Its great advantages would be the large region covered by a single photograph, since 5° square could be represented by it upon a plate 12 inches square. This is six or eight times the area covered by a telescopic objective. The time required to photograph a given portion of the sky would be reduced in this proportion. Such a lens, if mounted in a favourable location and kept constantly at work, would add more to our knowledge of the stars than could be obtained by a large number of telescopes of the usual kind. A telescope of this form, but of one-third its size, is now in use at Cambridge, and illustrates the advantages and amount of work which can be obtained by such an instrument. 3186 photographs have been taken with it, and from them a catalogue of 28,000 spectra of 11,000 stars has been prepared; also a catalogue of 1200 stars near the equator as standards of brightness, and a catalogue of 1000 stars within 1° of the Pole, where the most extensive existing catalogues only contain about forty stars. A search for new nebulæ was made on a small number of these plates covering about 1/250 of the entire sky. Eighteen nebulæ were already known to exist in this region. Twelve new ones were found upon the plates. These results are derived from a small portion of the entire series of plates, and much additional material will be extracted from them. The large telescope should first be used in making a map of the entire sky. All the stars north of – 30° can be advantageously photographed in the latitude of Southern California. This region, covering three-quarters of the sky, has an area of 30,000 square degrees. If each plate covered 25 square degrees, 1200 plates would be required. There are about 3600 hours of darkness in a year. Allowing one-half for clouds and moonlight, and one-third of the remainder for imperfect plates, the whole work could be done in one year, allowing an exposure of an hour to each plate. Perhaps longer exposures would be found advisable, and two years should be assigned to this work. An equal time should be spent in repeating the work, since it is essential that every part of the sky should appear on at least two plates, to verify all supposed discoveries. By using a prism to cover the lens the spectra of all the stars may be taken in the same way and in the same time. When this work is completed, it should be repeated, since we ought to have a complete map of the sky at intervals of about five or ten years in order to detect changes. Moreover, the improvement in photographic processes would perhaps be so great that a second series of plates would be desirable. The recent applications of erythrosin and other coal-tar products to photographic plates render them much more sensitive to red and yellow light. The difficulty of photographing satellites, asteroids, comets, nebulæ, and red variable stars may therefore be diminished.

The telescope should be mounted in a place having the best possible climatic conditions, preferably on a mountain where the air is as clear and steady as possible. No work need be done there except taking the photographs and developing them. Accordingly, the work might be done by a single observer; but, to avoid interruptions due to illness or accident, at least two would be required. Since their duties would be a routine requiring only ordinary skill, such services would not be expensive.

The results would take the form of a series of glass photographs about a foot square, each of which would depict all the stars visible in a part of the sky 5° square. Glass positives could be made from these by direct printing, and copies could be furnished for about a dollar