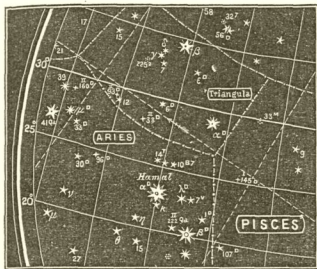


marking double, triple, and multiple stars, binaries (known or suspected), variables, Messier's nebulae, Sir W. Herschel's classification of his nebulae, and so on.

All stars in the B.A. Catalogue down to the sixth magnitude inclusive are to be introduced, besides all the objects in the Bedford Catalogue, Messier's nebulae, about 100 variables, red stars, and other objects of interest (in all about 1,500 objects). The scale of the maps is to be that of a 20-inch globe, and each map will be rather more than thirteen inches in diameter.

Mr. Proctor's series of gnomonic maps, in which the sphere is divided into the same set of pentagons, which



are arranged into two sets of six (namely, five northern equatorial maps around the north polar map, and five southern pentagons similarly arranged around the south polar map) will be added as index maps. As in these maps the constellation figures (coloured) are introduced, all necessity of adding these figures to the large maps is avoided, and so the clearness of the maps is much increased.

A letter-press introduction, with a list of star-names, will add to the completeness of the maps. Mr. Brothers, of Manchester, will photo-lithograph the maps if it should appear from the receipt (by him) of a sufficient number of names as subscribers, that the scheme is approved of by astronomers. He will supply to subscribers a specimen of Map 2, which alone is yet completed.

## LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his Correspondents.]

### Personal Equation of Astronomical Observers

CAN any of your readers inform me whether an attempt has hitherto been made to determine the absolute Personal Equation of Astronomical Observers? The most important of all astronomical observations consists in noting the time of passage of a star across the wires of a transit instrument; but it is found that no two observers exactly agree in the time assigned to the passage. From peculiar habit or bodily constitution some observers almost invariably register the passage of a star a fraction of a second before other observers. From the Introduction to the volumes of Greenwich Observations, we learn that it is the practice at the national Observatory to compare the observations of the junior observers with those of the principal observer, and to assume that the latter is correct. All the observations are thus brought into consistency with each other; but it is not known, I believe, whether all the time observations may not be a fraction of a second too soon or too late.

Cannot this question be determined experimentally in a very simple manner? Imagine an artificial star, formed by a minute

electric spark, placed at a considerable distance, say three miles, and made to move across the field of a transit instrument at a rate not very different from the average apparent rate of stars observed (say nine inches per second); very simple mechanism might be devised to register upon the chronograph of the observatory the exact moment at which the star is absolutely upon each of the cross wires of the telescope. At the same time the observer, whose error is to be determined, should endeavour to record in the ordinary way the passage of the star, and the difference of time, as shown on the chronograph, would give the required error. Every observer might thus be put through a kind of exercise, which would inevitably show the degree of his proficiency, or detect any change in his habits of observation.

I need hardly say, that however small may be the remaining personal error unallowed for in the Greenwich observations, the time may come when the determination of some most important astronomical question may depend upon that quantity. And though those observations may at any one time be rendered perfectly consistent *inter se*, by reference to one observer's result, yet they cannot be strictly comparable with the observations of other observatories, or those of the same observatory at distant periods of time, because the one same observer would not be present to give the assumed standard. It might be of considerable importance, therefore, to establish a mechanical criterion of the accuracy of time observations which could be appealed to at any observatory, and at any future time. I have not been able to learn that such an experiment has hitherto been tried.

J.

### The Fertilisation of Winter-flowering Plants

WILL you permit me to add a few words to Mr. Bennett's letter, published at p. 58 of your last number? I did not cover up the *Lamium* with a bell-glass, but with what is called by ladies, "net." During the last twenty years I have followed this plan, and have fertilised thousands of flowers thus covered up, but have never perceived that their fertility was in the least injured. I make this statement in case anyone should be induced to use a bell-glass, which I believe to be injurious from the moisture of the contained air. Nevertheless, I have occasionally placed flowers, which grew high up, within small wide-mouthed bottles, and have obtained good seed from them. With respect to the *Vinca*, I suppose that Mr. Bennett intended to express that pollen had actually fallen, without the aid of insects, on the stigmatic surface, and had emitted tubes. As far as the mere opening of the anthers in the bud is concerned, I feel convinced from repeated observations that this is a most fallacious indication of self-fertilisation. As Mr. Bennett asks about the fertilisation of Grasses, I may add that Signor Delpino, of Florence, will soon publish some novel and very curious observations on this subject, of which he has given me an account in a letter, and which I am glad to say are far from being opposed to the very general law that distinct individual plants must be occasionally crossed.

CHARLES DARWIN

Down, Beckenham, Kent, Nov. 13

### Elimination of Alcohol

ALLOW me to remark on a statement made in one of the chemical notes of last week's NATURE.

A new test for alcohol discovered by M. Lieben is there described, and its alleged value in solving an important physiological problem is dwelt upon. Now the real course of events has been as follows:—Since the year 1860, when MM. Lallemand, Duroy, and Perrin published their researches on alcohol and anaesthetics, the old belief in the combustion of alcohol within the organism has been almost entirely upset; and it was supposed that this substance was entirely eliminated without change. Dr. Anstie was, I believe, the first who publicly criticised the conclusions of these physiologists, and showed, by a number of experiments, that a small proportion only of the alcohol introduced is excreted by the kidneys. [See Dr. Anstie, "Stimulants and Narcotics," Macmillan, 1864; also further researches recorded in his Lectures on Acute Diseases at the College of Physicians, *Lancet*, 1867, vol. ii.]

The question was next taken up by Dr. Thudichum, who estimated the amount of alcohol excreted by a number of men after they had taken a considerable quantity of wine, and proved it to be only one-half per cent. of the total amount swallowed. Finally, the writer of this, during 1866 and 1867, made numerous experiments in the same direction. In these, not only was it shown that alcohol can be detected in the urine secreted during