My students have not asked me "whether the positive and negative parts of the axis of x are separated by a point, or by a space." Their difficulty does not appear to be with permanent statical conditions, but rather with the conditions involving change of motion, either of direction or change of rate; and since *rate*, in this discussion, involves motion, we fail to see the force of the question.

Professor Johnson expresses the opinion that the difficulty in the question, "Does the change in the rate of motion take place *at* an instant, or *during* an instant?" will disappear if 'during an interval' be substituted for 'during an instant.' We do not object to the substitution if it will relieve the difficulty, but to us it only enlarges it. It may be asked, How long is the interval? If ever so small, is the rate variable *during* the interval? If variable, the original question arises, and we wish to know if *change* involves *a part* of the interval; or, to adopt as nearly as possible the language of the professor, does change in the rate take place at 'a point' in the path, or during 'a space' of the path? If at 'a point,' is it not equivalent to asserting that a change takes place in no time? and if an interval is necessary, must it not be conceived as infinitesimal? Answers to these and similar questions may enable one to decide whether the fundamental conception of rates is more simple than that of the infinitesimal method. I do not question the soundness of the method of rates; and no avenue to the acquirement of knowledge should be closed to the student, even if all are not agreed that it is the 'fittest.'

DE VOLSON WOOD.

Hoboken, May 8.

THE NAUTICAL ALMANAC OFFICE.

THE conduct of the affairs of the office of the American ephemeris and Nautical almanac under the *régime* of the present superintendent, is worthy of special note in the progress of astronomy at home. Formerly this office did very little toward the collection and discussion of data for improving the tables of the celestial motions, expending nearly the whole of its annual appropriation by congress in the preparation of the Almanac and the Ephemeris from such tables as were afforded by the labors of astronomers everywhere, and, with few exceptions, not connected with the office itself. During the past seven years, however, not only has the efficiency of the office been greatly promoted by having nearly, if not quite, all the planetary ephemerides prepared by a single expert computer under the immediate direction of the office, and by a similar concentration of work and workers in other departments where formerly the computations were executed by individuals in different parts of the country not under the direct supervision of the superintendent, but the policy of the office with regard to the conduct of original investigation has been greatly modified; and, although the increase of the annual appropriation has been very slight, an immense amount of astronomical research has been completed and published; and, as we learn from the published papers and reports of the office, the work, now well progressed and projected for the future, is of a character even more important and extensive. The valuable series of 'Astronomical papers prepared for the use of the American ephemeris and Nautical almanac,' the third volume of which has just begun with the publication of Professor Newcomb's development of the perturbative function, has for its object a systematic determination of the constants of astronomy from the best existing data; a re-investigation of the theories of the celestial motions; and the preparation of tables, formulae, and precepts for the construction of ephemerides, as well as for other applications of the results. The papers already published in the second volume, and the six parts of the first volume completed some time ago, are such as conduce only to the object in view, and range over a vast field of astronomical inquiry, from the experimental determination of the velocity of light, to Gauss's method of computing secular perturbations. Among the more important works already well in hand, but as yet unpublished, are Mr. George W. Hill's development of the perturbations of Jupiter and Saturn according to the methods of Hansen, on which he has been engaged since 1877; a determination of the mass of Jupiter from the perturbations of Polyhymnia; a re-determination of the velocity of light by the phototachometer; as well as discussions of the older observations of the Sun, Mercury, Venus, the Moon, Mars, and the satellites of Jupiter, with a direct view to a reconstruction of the theories of the motions of these bodies.

Not among the least of the improvements inaugurated by the present superintendent of the office must be noted the material alterations in the form and arrangement of the contents of the American ephemeris, together with the extensive additions made for the first time to the volume for the year 1882; all of which conspire, on the adoption of the new and more accurate systems of planetary tables, to make the Ephemeris in most respects superior to the similar publications of the foreign governments. The administration of the office also gives good evidence that the practical applications of astronomy are kept well in mind; for within a brief period it has commenced the regular publication of the American coaster's nautical almanac, the initial volume of which is adapted to the present year, and which we shall shortly notice.