

limited almost entirely to the earth-moon system) which should be noted by all serious students of astronautics. First, although computers use seven-figure tables, probably only five figures are trustworthy, because the co-ordinates of the sun and planets are doubtful beyond five decimal places in astronomical units, and in consequence of this considerable errors in miles or kilometres are inevitable in many of the calculations. The second possible source of error arises from the fact that the movements of the bodies in our solar system may not be amenable to accurate treatment by the old classical mechanics. Porter gives a number of instances where important factors have been more or less ignored in the computations. For example, some have asserted that it would be economical to send a space ship to the neutral point between the earth and the moon, this point being about 24,000 miles from the moon, and then to allow it to fall relatively slowly towards the moon. But, as Porter points out, the attraction of the sun is nearly double that of the earth or the moon at the neutral point, and this would control the ship, which would then describe an orbit about the sun. Even if the supposed possibilities regarding the neutral point are completely excluded from consideration, difficulties of a serious nature would arise in other ways.

If it is decided to travel to the moon in an elliptical orbit, the speed of approach to the moon will be so high that a large amount of fuel must be used in braking (in the paper some figures are given on this matter) and, instead of travelling in an elliptical orbit for nearly five days to reach the moon, it would be as efficient to travel in a parabolic orbit which would require a little more than two days. Another difficulty arises if a ship is perturbed by some other body because, though there may be a small increase in the acceleration, nevertheless when this has ceased the velocity increase remains and the effect on the distances can be very great. All this demands that the initial conditions of velocity, distance, and angle of projection of the ship should be accurately determined; but even with the greatest accuracy, occasions will arise when pre-computed orbits will require modification. How such modifications could be computed during flight may present serious problems to future interplanetary navigators.

#### Temperature of the Chromosphere

A PAPER by Shotaro Miyamoto on the "Kinetic Theory of the Chromosphere" (*Pub. Astro. Soc. Japan*, 3, No. 2 (1951), and also *Contrib. Inst. Astrophys., Kyoto Univ.*, No. 17) examines all the available data regarding the temperature of about 30,000° C. of the corona, and points out the difficulties of accepting this high temperature. Redman derived it from the contour observation of the chromosphere emission lines at the eclipse of October 1, 1940 (his results appearing in *Mon. Not. Roy. Astro. Soc.*, 102, 140; 1942); but Miyamoto gives a number of reasons for disagreeing with these results. He does not, however, attempt to complete the low-temperature hypothesis, but refers to the paper by Woolley and Allen on "Ultra-Violet Emission from the Chromosphere" (*Mon. Not. Roy. Astro. Soc.*, 110, 358; 1950), which appeared after he had written his paper. Miyamoto claims that they are in general agreement with his low-temperature hypothesis, and, while admitting the anomalous excitation of the chromosphere as an observational fact, he does not accept this as necessarily implying a high kinetic temperature.

#### Journal of the Madras Institute of Technology

THE Madras Institute of Technology, which is situated at Chromepet, fourteen miles from Madras, was founded in July 1949, and now the first number of its *Journal* has appeared (1, No. 1; August 1952. Rs. 4, 8s. or 1 dollar per issue; Rs. 8, 16s. or 2 dollars a year), edited by the professor of applied mathematics in the Institute, Dr. A. Narasinga Rao. The Institute was started with a gift of Rs. 500,000 from Sri C. Rajam, a grant of Rs. 500,000 from the Madras State Government and a number of smaller gifts from various organizations and persons. It deals with education and research (pure, applied and sponsored) in the physical sciences, engineering and technology, and until now it appears to have concentrated mainly on the educational side—and rightly so; but the time is fast approaching when the research activities will play an equally important, if not the major, part in the life of the Institute, and it is therefore fitting that the *Journal* should be started, wherein the fruits of new knowledge can be published. The Institute offers courses extending over three years, during the first year of which the students follow for the most part a general course in the basic sciences (mathematics, physics and chemistry) and basic engineering subjects. After that they specialize in one of the four faculties, which are as follows (numbers of second- and third-year students in each faculty being shown in brackets): aeronautical engineering (10, 24), automobile engineering (24, 23), electronics (28, 18), and instrument technology (8, 7). After a short description and faculty notes on the activities of the Institute, the main part of the first number of the *Journal* is devoted to articles as follows: "Aeronautical Science To-day", by Dr. W. Repenthin, head of the Faculty of Engineering of the Institute; "Numerical Calculations in Electrical Engineering and Electronics: Part 1, Calculation of Determinants", by Prof. R. Filipowsky, head of the Electronics Faculty of the Institute; "Oxidation of Hydrocarbons", by Dr. S. V. Anantakrishnan, visiting professor of chemistry in the Institute; "Note on a Method of Transient Analysis", by K. K. Clarke, of the Electrical Engineering Department, University of Ceylon; "On the Kalidasa Effect", by Dr. A. Narasinga Rao; "Introduction to the Giorgi System of Units", by Dr. R. Wallauschek, head of the Faculty of Instrument Technology in the Institute; "Patent: its Law and Practice", by Prof. V. Subramanian, visiting professor of the Institute; and "On a Method of measuring very Small Time Intervals", by A. Suszkin, laboratory research engineer in the Institute. A number of short notes completes the issue.

#### Fusarium Contamination of Grain

THE prevalence and taxonomy of *Fusarium* species in cereal seed in Canada is considered in detail in a recent paper by W. L. Gordon, of the Dominion Laboratory of Plant Pathology, Winnipeg (*Canad. J. Bot.*, 30, No. 2, 209; 1952). In all, of about four thousand seed samples of wheat, barley and oats which have been examined (a hundred kernels per sample), the statistics show considerably heavier infections in Eastern than in Western samples. A total of sixteen species and varieties of *Fusarium*, classified in nine sections of the genus, was isolated. (The classification used is that of Wollenweber and Reinking, but some sections have been extensively revised in conformity with the views of Snyder and