results of this Congress will be the further spread abroad of research into the plastic behaviour of structures.

There were many useful and fascinating papers of a more practical nature, notably that by H. Shirley Smith (London) on the influence of erection methods on the design of steel bridges, and one on thin-walled (light-gauge) structures in America by G. Winter (Ithaca, U.S.A.). The latter formed a link with the more theoretical papers, such as that by Ch. Massonnet (Belgium) on the buckling of webs. It was Winter who pointed out in the discussion that too much effort has always been expended on the consideration of the somewhat ill-defined point where buckling begins, whereas what is important to the engineer is not this point—since the member still continues to support its load—but the ultimate carrying capacity of the member. It appears, therefore, that it is not only in framed structures, where plasticity rules, that the engineer will turn in future to the new philosophy of design and will adopt the collapse condition as the criterion.

Much interest was shown in the two working sessions dealing with concrete and reinforced concrete structures, though no striking new work was reported. The vast and complex problem of the corrosion of reinforcement was discussed and, in view of the new philosophy of design mentioned above, the need was stressed for moving the emphasis in research from the behaviour of simple members to a consideration of the ultimate strength of continuous systems in reinforced and also in pre-stressed concrete.

In addition to the working sessions there were many social engagements and visits. Cambridge was in its most delightful mood, though the sun did not shine during the garden party given by the Master of Christ's College; the visitors certainly took away with them to London, where a further programme of visits and functions had been arranged, an impression of academic calm which might not survive a visit in October, when the seven thousand undergraduates and the 675 teachers are in residence.

SPACE TRAVEL

A PUBLICATION of the British Interplanetary Society, "The Artificial Satellite"*, edited by L. J. Carter, includes the proceedings of the Second International Congress on Astronautics, held in London last year (see *Nature*, 168, 733; 1951); a very full account is given and following this are six of the papers read at the Congress. The first of these, "The Artificial Satellite", by L. R. Shepherd, technical director of the British Interplanetary Society, emphasizes the necessity for setting up a project for the development of satellite vehicles under civilian control. He points out the immense advantages of such vehicles as scientific research stations and observatories, though of course from the astronautical point of view their real advantage would be found in their use as a springboard for interplanetary flight. The subject is very carefully discussed from various points of view, and the conclusion is reached that the most feasible project would be to have space stations circling the most important planets and satellites, ion rockets plying between the space stations, while normal rockets, either conventional or nuclear-powered, would operate between the planetary surfaces and the space stations. The importance of setting up a supply base on the moon at an early stage in the development is emphasized. Propellants and material would be manufactured there, and it would be very much easier to supply an earth-satellite station from the moon than from the earth.

Lyman Spitzer, jun., of Princeton University Observatory, has a paper "Interplanetary Travel between Satellite Orbits", which shows what we might expect from a rocket powered by nuclear energy.

Among other papers may be mentioned that on "Descent from Satellite Orbits using Aerodynamic Braking", by T. Nonweiler; "Meteor Hazards to Space-Stations", by Michael W. Ovenden; "Minimum Satellite Vehicles", by K. W. Gatland, A. M. Kunesch and A. E. Dixon; and "Establishing Contact between Orbiting Vehicles", by R. A. Smith. Summaries of eleven other papers presented by various societies in America and Europe are also published.

A recent issue of the *Journal of the British Interplanetary Society* (2, No. 3; May 1952) contains a number of papers which deal mainly with astronautics. D. Hurden contributes the first of these under the title, "The Design of Rocket Motors", which gives elaborate details for designing a liquid-fuel rocket motor. C. A. Cross has a paper with the title, "The Fundamental Basis of Power Generation in a Satellite Vehicle", which deals with artificial satellites. He suggests that probably the first of these will be small unmanned rockets, telemetering instrument readings to the earth; these may ultimately develop into unmanned bases for orbital refuelling which will lead to the exploration of some of the members of the solar system. As the various projects of such satellites require an electrical power source, and the transportation of material to them would be a formidable matter, the author examines the possibilities of utilizing the sun's radiant energy and shows that such a method is fundamentally sound and a practical proposition. Patrick A. Moore deals with a number of asteroids which have made comparatively close approaches to the earth in recent times and suggests that some of these may be used in astronautics as refuelling stations. In the United States this subject has recently been receiving serious consideration.

* The Artificial Satellite. (Proceedings of the Second International Congress on Astronautics, London 1951.) Edited by L. J. Carter. Pp. iv+74. (British Interplanetary Society, 12 Bessborough Gardens, London, S.W.1, 1952.) 5*s*. 6*d*.

THE MILITARY COLLEGE OF SCIENCE, SHRIVENHAM, WILTS

WITHIN the past few months, there have been announcements of two interesting innovations connected with the Military College of Science, Shrivenham. In July the War Office published details of the scheme, outlined by the Secretary of State for War in his speech on Army Estimates, for direct entry to the College.

This new scheme aims at increasing the number of Regular Army officers with scientific and engineering qualifications, a step rendered necessary because of the ever-growing complexity of modern weapons and methods of war. A candidate who is qualified to begin a course of study for a University of London (external) degree, on passing the Regular Commissions Board, will be called up for National Service in September and will spend a year in basic training, at an officer cadet school and as a National Service officer in an active unit, before joining the College. At Shrivenham he will become, for all intents and purposes, an undergraduate reading for a London