

EDUCATION

Astronomy to Turn Tide ?

PROPERLY taught astronomy courses may offer the best hope of stemming or even reversing the drift away from scientific subjects at all levels of education. At a meeting of the Royal Astronomical Society, held last week, a group of senior astronomers under the chairmanship of Professor D. McNally discussed ways in which astronomy can and should be taught, in schools and at both undergraduate and postgraduate level in universities. Professor A. J. Meadows, of Leicester University, emphasized the different approach required for teaching general astronomy courses rather than those aimed specifically at the few students intending to take up a professional career in the subject. Many of the participants at this meeting could not, however, agree with Meadows's suggestion that below graduate level no one could honestly be called an astronomer—if only because of the prospect of losing potential astronomers to other more specialized disciplines. It was felt that even introductory courses should be honoured with the title "astronomy".

But there was a much more general agreement on the value of astronomy as a subject for the non-science specialist, or for the specialist in another branch of science who may become a teacher. In schools, particularly, there is no doubt that astronomy can be a most attractive subject for students who otherwise profess no interest in science; this has encouraged the introduction of an astronomy O-level, and the prospect of an astronomy A-level. The professional astronomers were not, however, happy about this prospect, feeling that the introduction of astronomy and astrophysics to the mathematics and physics curricula, as in Nuffield physics, offers a better chance of attracting students through astronomy to science in general. Unfortunately, as Professor Roger Tayler of Sussex University was quick to point out, there are very few suitable books for the teaching of astronomy at this level, and many existing popular astronomy books perpetuate errors which later have to be unlearned.

Perhaps the most immediately interesting news came from Glasgow University, where it is once again being demonstrated that the Scottish educational system is at least one step ahead of the rest of Britain. Professor P. A. Sweet reported that the decline of popularity of science courses in Glasgow has resulted in the introduction of large amounts of astronomy to the undergraduate courses, and that this move has so far met with considerable success. The Scottish system, which

requires four years' training for an honours degree, provides more flexibility in first year teaching, enabling all students, in both Arts and Science faculties, to attend the same introductory classes. But the greatest success in astronomy teaching at Glasgow has come over the past year, with the introduction of a course training future professional astronomers and making ingenious use of laboratory simulation of observations, developed largely by Dr D. Clarke. By taking the pressure off of valuable observatory time, these laboratory experiments, using star simulators, have made it possible for the number of students to be greatly increased.

In general, it seems that practical astronomy courses of the kind available in Glasgow, or the option of "selected topics" covering certain theoretical aspects of astrophysics in depth during the final year of undergraduate courses in physics and mathematics, such as are now available in Cambridge and at Sussex, are meeting with an enthusiastic response from students. At a time when science in general is losing its attraction, yet we require an ever-growing number of trained scientists to run our technological civilization, this development should surely receive more widespread attention and support. It is debatable whether or not the Department of Education and Science will take notice of unsolicited advice, even from so august a body as the Royal Astronomical Society; but the time is surely ripe for an approach to be made, and if this does not come from the government then it must be the responsibility of the RAS to initiate proceedings which may have a profound impact on our educational system.

COMMUNICATIONS SATELLITES

Symphonie and Intelsat

Paris, April

ON the heels of the announcement that more than 2,000 man-made objects are in orbit round the Earth and that another 2,700 have fallen back and disintegrated, the Franco-German Symphonie communications satellite project is in full swing. Technically, all is ready. Symphonie recently got the green light from General Aubinière, Director-general of the French Space Research Organization CNES, Dr Mayer of the West German space unit and a representative of CIFAS, the Franco-German industrial consortium for Symphonie. The contract will cost France £12,210,000 and West Germany £14,157,000. Two operational models of the satellite are due for delivery on June 19 and October 30, 1973, to the

French and Germans respectively. The prime contractors will be Aérospatiale of France (at Les Mureaux) and Messerschmidt-Boelkow Blohm (at Munich).

The two governments signed the original Symphonie agreement on June 6, 1967. The idea derived from the earlier German Olympia and French Saros concepts, adapted in March 1969 to new objectives. The recent agreement ensures that the project will be carried through to the construction and launching of two Symphonie satellites in about two years time. Although strictly a Franco-German initiative, the project could have an important influence in Europe and elsewhere.

With the American Intelsat programme probably more than adequate to meet German and French needs, it is a question to know why Symphonie was thought to be necessary. Paris and Bonn have both expressed a preference for a measure of European independence in satellite communications, chiefly because of their concern about the possibility of foreign monopoly control over television programmes. Thus Symphonie's first real mission will be the preservation of at least limited European freedom in this domain. As opposed to satellites with world-wide coverage such as those of the Intelsat series, Symphonie will retain a more regional characteristic, basing itself on a number of smaller stations of modest antennae capacity. This feature should prove to be attractive to countries with relatively low density telephone networks, especially in Africa and the Middle East. It remains, however, to convince such countries that participation in the commercial exploitation of Symphonie will be economically sound. In some cases this may not be easy; the Ivory Coast, Senegal, Cameroon and Madagascar have already subscribed to Intelsat.

There will also be the problem of persuading Comsat, the American organization which is the manager of Intelsat, that Symphonie will be compatible with Intelsat. To that end, the French and Germans are trying to have Symphonie accepted as part of a regional broadcasting service for television as well as the precursor of the telephone distribution system for the African continent.

Regardless of how Symphonie is finally used, launching in 1973 will be from Kourou in Guyana using Europa II boosters. The satellites will be in the geostationary orbit and will handle primarily telephone circuits beamed toward a Euro-African zone and, secondarily, television circuits to and from North and South America. Should one of the two Symphonie communications packages break down, the other could immediately be used in its place.