

Administration which, through the Coast and Geodetic Survey, has had difficulties in sustaining it at the high level seismologists have come to expect. Could it be that this loss of interest is a sign that the WWSSN is now obsolete as far as nuclear tests are concerned? If so, it follows that the classified network must be doing at least as well. Perhaps it can already discriminate down to 10 kT in granite? Or even better? The United States can, of course, hold on to this information, which may be the answer to all verification problems, as long as it is politically expedient to do so. But if the Arms Control and Disarmament Agency can tell the world that it strongly supports an adequately verified test ban when the Nuclear Safeguards Subcommittee is promising more testing programmes, nobody can really know where the United States stands. It is no wonder that many seismologists who have given Vela Uniform many years of hard work are now studying the inner core, developing moonquake seismometers or studying the characteristics of earthquakes on mid-ocean ridges.

STUDENT TROUBLES

Sit-in at Chicago

from a Special Correspondent

Chicago, February 3

A SMALL number of students at the University of Chicago has been looking for an opportunity to confront the administration, particularly since the new president, Edward Levi, came into office. In September there was a walk-out and a sit-in over fair treatment for cafeteria workers which came to nothing. These were followed by vigorous protests about student housing, which became linked with urban renewal and the university's role in the development of neighbouring residential areas. Housing was an issue because Chicago, in common with many other universities, had anticipated a larger toll from the draft than was in fact exacted. The administration did its best in an impossible situation, with wholesale bookings of hotel rooms.

The present sit-in appears to have been triggered by the university's notice to Dr Marlene Dixon, an assistant professor with a joint appointment in the Department of Sociology and on the Committee of Human Development, that her three-year contract would not be renewed on September 30, 1969. This notice was given on December 15. Similar notices were of course given to other assistant professors. Assistant professors are normally employed on a three-year contract which may be renewed for a further three years, after which the question of promotion to associate professor with tenure arises. Renewal is by no means automatic, and reasons for not renewing a contract are naturally not disclosed. Nonetheless, on January 9, an *ad hoc* group of students called the Committee of 85 demanded that Dr Dixon be re-appointed and that students be given an equal vote on decisions to hire or fire faculty.

The dean of the Division of Social Sciences, D. Gale Johnson, responded on January 13 by calling an open meeting for the 17th to discuss problems of appointments. He made it clear that individual faculty

appointments could not be discussed, but he asked that a faculty committee be set up to review his decision not to reappoint Dr Dixon. This committee is now sitting and will report early next week. On the 23rd the Committee of 85 turned its demands into an ultimatum, saying that militant action would be taken if they were not met by January 29. Occupation of the administration building started on the 30th.

It was plain from the beginning that the university would avoid physical confrontation at all costs and would resort only in dire extremity to an injunction which might have to be enforced by city police. However, the situation is beginning to take on more of the elements of fantasy with, for example, threats to take over more buildings and demands that 51 per cent of the faculty be women and that one-third of the student intake should be negro or "third world"—that is, from Puerto Rican or other minority groups.

The vast majority of the 8,600 students and the 1,100 faculty is united in opposition to the sit-in, although many feel that it has provided a needed stimulus for open discussion of issues that were previously ignored. The University of Chicago, however, has a very liberal administration which—to this observer at any rate—seems to have been making every reasonable effort to listen to student opinion and to play a constructive part in the city, particularly in its attempts to advance the education of members of minority groups. It has initiated programmes to find talented children at an early age and to prepare them for a university education. It has eschewed the more histrionic but inevitably hopeless gesture of admitting numbers of students who cannot cope with the course material offered. This has been tried at other universities but has always been a dismal failure. It seems that the sit-in, which is led by a small number of students and which has never attracted more than 250 at once, is symptomatic of the general malaise particularly evident in universities with large schools devoted to the social sciences. What is certain is that no university would agree to sharing between the faculty and the students responsibility for recruiting and dismissing staff. At Chicago, only tenured faculty with a long term interest in the university can vote on such issues, although the opinions of junior faculty and of students are canvassed.

SATELLITES

Another Look at the Ionosphere

ISIS-A, launched from NASA's Western Test Range on January 30, is one of the most heavily instrumented ionosphere probes ever launched. It is also Canada's third satellite, following the two Alouettes into orbit. The Defence Research Board will be hoping that it will be just as successful, although it is a much more complicated package than either of its predecessors. It carries eleven experiments, from the Defence Research Telecommunications Establishment at Ottawa, NASA, the National Research Council of Canada, the US Air Force Cambridge Laboratories, the University of Western Ontario and the US Southwest Center for Advanced Studies. The satellite has gone into an elliptical orbit with an inclination of 88.5° and a period of just over two hours; at apogee, the satellite is 3,522 kilometres from the Earth, and at

perigee 574 kilometres. The satellite itself is roughly a sphere in shape, with a diameter of 50 inches and a height of 41 inches; it weighs 525 pounds. It was put together by RCA Victor of Montreal, one of the companies bidding for the contract to build Canada's own domestic communications satellite.

The experiments carried by ISIS-A resemble in many ways those carried by Alouette II. But the increase in sophistication and power of the experiments has made it a much more elaborate satellite. One new feature is a spin and attitude system designed both to control the spin of the satellite in space and its attitude relative to the Sun and the Earth. ISIS-A is also provided with a data storage system on board, and 11,000 solar cells which should provide five hours a day of full operation under minimum Sun conditions after a year in orbit. The most notable feature of the satellite is the antennae which will be extended to their full length—240 ft from tip to tip—on command in orbit. On Alouette II, the bending of the antennae caused the spin of the satellite to decline too rapidly, but on ISIS-A this will be prevented by the provision of a magnetic torquing device which is capable of controlling spin rate to between 1 and 3 r.p.m.

The four experiments carried for the Defence Research Telecommunications Establishment include two ionospheric probes, a radio noise experiment, and a special radio receiver for measuring the very low frequency signals generated by lightning flashes and other natural phenomena. The artificial generation of these phenomena will also be attempted by a generator carried in the satellite. NASA has provided one experiment—an electrostatic probe to measure the

temperature and number of electrons near the satellite—and the NRC has fitted in a detector for very energetic particles. The USAF Cambridge laboratories experiments set out to detect and identify the types of charged particles near to the satellite, and to measure their temperature and density. The University of Western Ontario has simply installed a radio beacon whose signals to the Earth will give information about the irregularities in the ionosphere, and the US Southwest Center for Advanced Studies has a detector for low energy particles.

From this catalogue, it is clear that the information gathered by the satellite is likely to be a further aid in understanding the ionosphere, though it would be a surprise if it turned up anything very new. Ionosphere probes have become something of a glut on the market, and very often the information they provide is scarcely worth the expense involved—in this case, \$13 million for the Canadian side of the project. It is, however, fair to add that the Alouette satellites have been useful, and that the three satellites built in Canada (and particularly ISIS-A) have put Canadian industry into the right frame of mind for the serious business of launching the communications satellite.

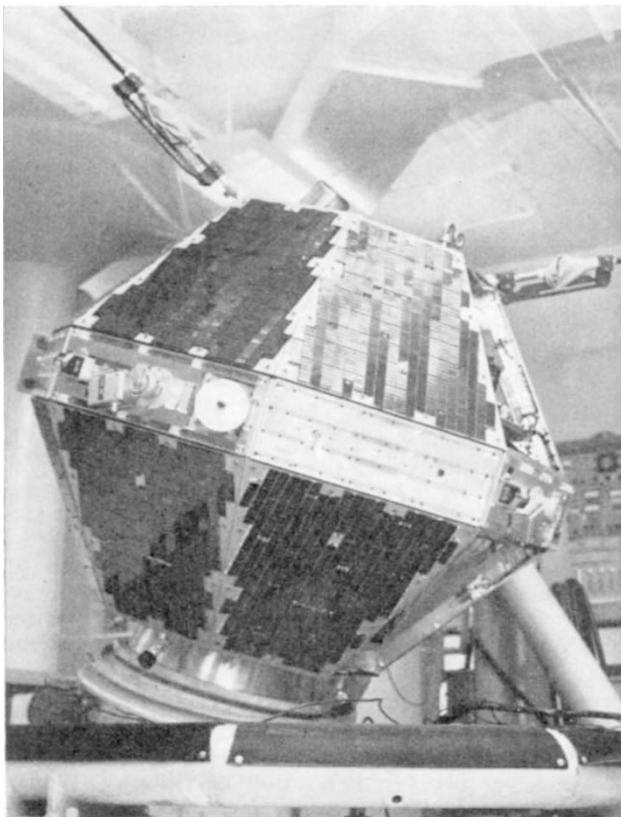
RESEARCH FINANCING

Boom and No Boom

“THIS is a year of watershed”, says Dr Caryl Haskins in his presidential report for 1967–68 on the Carnegie Institution of Washington. The watershed is, of course, the sharp levelling off of United States Government support for science which, as the past 3 years have proved, is no transitory phenomenon. Between 1953 and 1964, federal spending on research and development rose from \$3,500 million to \$14,600 million and the scientific community generally assumed that the boom would continue indefinitely. But the bubble burst in 1965, since when the modest increases in federal allocations for research and development have been cancelled by inflation. In effect, federal support for research and development has barely increased since 1965.

Dr Haskins argues that the only way to avoid the inevitable disruption that follows violent swings from over-financing to under-financing is to fix a basic floor for federal support. This floor should be exceeded where possible, but only cut under the gravest of circumstances. He says that, during the coming years, “we should concentrate less on trying to determine realistic ceilings for our research expenditures and give more thought to how we might provide assured floors to our support of research”. This would remove one of the most traumatic features of the current cutback, which is not so much the magnitude but the suddenness and unexpectedness of events. As one example, Dr Haskins cites a survey of 119 university physics departments, made recently by the American Institute of Physics, which revealed that 16 per cent of the senior staff had lost all federal support for their research in 1967–68 and that, this year, the proportion may be as high as 21 per cent. According to Dr Haskins, “such indicators, it is evident, are but icebergs’ tips, visible hints of possibly greater problems ahead”.

His answer is to suggest that the Federal Government should, for the future, set 0.7 per cent of the



The ISIS-A satellite.