

atomic energy produced by the fission process. The teaching programme will dovetail with a research programme, which will include studies of atomic energy for medical and industrial as well as scientific purposes.

#### End of the Second Artificial Earth Satellite

It is reported from Moscow that Sputnik 2 (Satellite 1957 $\beta$ ), which was launched on November 3 with the dog 'Laika' on board, re-entered the denser layers of the Earth's atmosphere and disintegrated over the South Atlantic on the night of April 13-14. A large meteor, presumed to be the remains of the satellite just before it burnt out, was observed shortly after 01.50 G.M.T. on April 14 travelling from north-north-west to south-south-east from Barbados and by the Dutch tanker *Mitra* off the Virgin Islands. The artificial Earth satellite had remained in its orbit for 162 days and had executed about 2,370 revolutions of the Earth.

#### The Mathematical Association

At the annual general meeting of the Mathematical Association, held at Manchester during April 10-12, the president, Mr. W. J. Langford, headmaster of Battersea Grammar School, spoke on "Secondary School Mathematics: an International Survey". Mr. Langford's wide experience, and his work at the Geneva conference of the International Bureau of Education, enabled him to summarize a great deal of information about the aims and methods of mathematical teaching. He found general agreement that mathematics is essential not only as a foundation for scientific and technical studies but also as a primary source of cultural enrichment. Whereas methods in the United Kingdom are as up to date as anywhere in the world, British teachers are more frequently envied for their freedom from official instructions on methods and text-books, and for their dominating influence on the framing of syllabuses.

Mr. Langford also dealt with the serious shortage of qualified teachers of mathematics. He dismissed as useless the frequently repeated assertion that we must double the number of technologists by 1970, since neither teachers nor suitable students are available. He suggested the more realistic approach, first, of estimating the numbers of boys and girls who in 1960 would be coming out of the sixth forms capable of reading mathematics (1) for an honours degree, (2) as part of a general degree, (3) as a special subject for the teaching certificate. We must then assure the further education of these students, in both schools and colleges, by a proper deployment of the resources of these institutions and by extending systems of maintenance grants. Finally, we must make the fullest use of available qualified teachers and avoid the gross waste which occurs when teachers take up appointments in which their special qualifications are not used to full advantage; this must be done by control of appointments, not by direction of labour. These measures should guarantee the best use of available resources; but they will not of themselves suffice, unless we can ensure an adequate supply of competent young people enthusiastically determined to devote themselves to a life of teaching.

#### Scientific Arrogance

In the *Portsmouth Diocesan News* of March, the Bishop of Portsmouth comments on the reported attack on scientists in general by the Bishop of

Coventry, which was described as arrogant. This misinterpretation arises out of the reference in the sermon to some scientists who, "on the air speak as though they had the key to all knowledge and that God is now outmoded, as though he were the invention of the simple-minded". The Bishop of Portsmouth points out that scientists are sometimes quite falsely charged with views about religion which only some of them hold and which, in any event, they hold or reject as men and not as scientists. The word 'scientific' is often loosely attached to theories of the universe or points of view which are not scientific at all, even though they may be ways in which the results of scientific knowledge may be interpreted, and the tendency to regard all scientists engaged in nuclear research as rather sinister beings whose inventions may all too easily destroy the world is equally misleading. While the continually advancing new powers placed by scientific research and techniques within man's reach are the business of scientists, the way in which these powers are used is a religious and moral issue, in which all are involved, including the scientists themselves. It is not arrogant for the scientist to make known the results of his research and to give some idea of the possibilities which they place within man's reach, but humility as well as vision and judgment are called for when we consider how this knowledge may be rightly used and especially questions relating to the scientific techniques by which man can bring about changes in himself. The Bishop suggests, however, that those who preach and teach the Christian faith may be guilty of a different type of arrogance if they lack a sense of mystery and wonder. The person of Christ, he claims, leads us deeper into the mystery of truth and makes plain both the truth of God and the truth of man's nature.

#### Freedom in Research

DR. J. R. BAKER's address "Freedom in Research" before the Uganda Scientists' Club at Makerere College, Kampala, on August 6, 1957, has been reproduced as Occasional Pamphlet No. 17 by the Society for Freedom in Science (Oxford: University Museum, 1957). Dr. Baker reviews first the way in which the Society for Freedom in Science came into being to combat the idea that science existed solely for the material benefits it brings to mankind and that there is no distinction between science and technology. The members of the Society, he pointed out, were concerned to uphold two main principles. First, they believed that science had a value to society apart from the material advantages it might bestow, and secondly, they held that first-rate work in science could only be done if scientists were free to pursue their researches without control by any central authority. Dr. Baker did not suggest that a scientist should regard himself as free of all obligations to the community: it was his duty to address himself to the largest problems he was capable of tackling, but he could not tell whither the trail would lead and it was futile to guess how his discoveries might affect the community as a whole. Often the most important researches in science led to no specific practical advantage but formed a necessary foundation on which the practical now must stand. Nevertheless, the problems of technology were not the same as those of science, and it was a mistake to confuse science with technology and imagine that the same principles govern both. Each man must be clear as to his purpose and demand or submit to the conditions that made his work possible.