important part—of the fabric of modern society. It must not be dropped from the election manifestos, but given a sober place in them. In this sense it is a virtue that in Britain the manifestos make less of science and technology in 1966 than they did in 1964.

## RATE FOR THE JOB

THE American Institute of Physics is uncommonly well informed about the jobs its members do, and about the salaries they are paid. The latest batch of figures, made public in *Physics Today* for January, will as usual comfort those struggling for a Ph.D. with the knowledge that their efforts (if successful) are likely to add something like 5,000 dollars to an annual salary in industrial research and development. In 1964 the median starting salary for Ph.D. physicists in industry appears to have been 12,600 dollars, compared with 8,800 dollars for those starting with a master's degree and 7,500 dollars straight after graduation. The initial value of a Ph.D. seems to be equivalent to ten years of plodding up the promotion ladder, and this advantage appears to persist throughout a physicist's career. Whatever his length of service, a Ph.D. can expect to earn 4,000 dollars more each year in industrial research in the United States than somebody less qualified. But the same industrial jobs are curiously unprogressive. The median salary of those with a Ph.D. and twenty years experience (in 1964) was a mere 18,200 dollars, or not quite half as much again as the salary paid to raw recruits. To do better than this, a man must move into what the American Institute of Physics calls "management and administration", which brings an extra 6,000 dollars or so a year to those with long experience. By contrast, academic life offers a lower starting salary but faster promotion; after twenty years, the median salary of academics is 16,600 dollars, or roughly 90 per cent of the comparable salary in industry.

The sociology of physics described by these statistics will allow students to know what to expect. The more mercenary young people may even be tempted to let their academic interests be guided by the knowledge that fluid physics and solid-state physics carried the highest salaries in 1964, and that work on fundamental particles was the most impoverished specialty of all except for theoretical physics. But there are other inferences to be made. High starting salaries and slow promotions reflect the competition for young people leaving universities and the comparative rapidity with which their bargaining power diminishes with age. The profession of physics has something in common with professional football, where a man must reckon that his earning power will disappear altogether by forty. This suggests that university departments might deliberately set out to provide their students with the means of moving out of research into administration half-way through an industrial career, possibly by coupling academic instruction with more deliberate training in the techniques of management and administration. Something like a union of the Massachusetts Institute of Technology and the Harvard Business School might be a fruitful innovation. Meanwhile potential immigrants to the United States will note that starting salaries in physics will not maintain a second car except where the other costs of living are exceptionally low. And physicists sticking to their last should not expect to move into the Waldorf-Astoria for what are called the sunset years.

## PEACEFUL USES OF ATOMIC ENERGY

### Proceedings of the Third International Conference on the Peaceful Uses of Atomic Energy

Held in Geneva, August 31–September 9, 1964. Vol. 1: Progress in Atomic Energy. Pp. xxxii+477. (New York: United Nations, 1965.) 12.50 dollars.

THE record of the first International Conference on the Peaceful Uses of Atomic Energy, 1955, was published in sixteen volumes; the record of the 1958 Conference grew to forty volumes and many who went to Geneva that year felt that a useful limit had, in fact, been exceeded; six years elapsed before the third Conference, held under the presidency of Prof. Emelyanov, and this 1964 meeting was confined almost entirely to nuclear reactor technology, which has nearly grown to manhood in the 25 years since fission was discovered. The record of the conference has shrunk once more to sixteen volumes embracing 750 papers. In addition to reactor technology, review papers were given on the application of radioactive tracer elements and of large radiation sources to the physical and life sciences. These brought the reactor specialists up to date in the wider applications of atomic energy, and the session on fusion research recounted the progress of this "promise of the twenty-first century" since it received its copious baptism in the 1958 Conference.

The first volume of the *Proceedings of the Third International Conference on the Peaceful Uses of Atomic Energy* embraces the opening and closing addresses, economic studies of the world's needs for energy and the extent to which these might be supplied by nuclear power, some papers on nuclear projects which have been handled on an international collaborative basis, a very important group of papers on technical and economic aspects of reactors, and finally an evening lecture delivered by Prof. Seaborg, in which he summarized the Conference.

As the president said in his opening remarks, "The question to-day is not whether nuclear fission can be regarded as a practical source of power, the question to-day is how to extract this energy as cheaply as possible, and increase its importance in the energy balance sheet". We have proved reserves of uranium for several hundreds of years, and if we go on using organic fuels for power generation, the chemical industry will soon be deprived of this most important source of raw material (his countryman, Mendelejeff, also said this very strongly in 1876, but then there was no alternative fuel in sight). How soon the organic fuels will run out cannot accurately be stated, but a century seems to be the upper limit of time. How cheaply nuclear power can be produced on a very large scale is the subject of several papers.

The British and Canadian reactors have been characterized by high capital costs and low fuel costs, the American by lower capital costs and higher fuel costs, so the former have been particularly affected by the upward swing in interest rates in recent years. Capital costs of all reactors have fallen dramatically with increase in unit size. It has also been found possible to up-rate many reactors, and fuel costs have fallen, with the overall result that new British and American reactors are becoming competitive with modern coal stations. Within a year of the end of the Geneva Conference, the commercial form of the *AGR* Reactor offered to the Central Electricity Generating Board for base-load operation gives the appearance of producing electric power more cheaply than could be produced by coal stations built at the pithead to operate about 1970, while even in 1964 the American 600-MW reactor to be built at Oyster Creek also appeared to be—on rather favourable calculations—cheaper than a coal station at that site. It is interesting to read that in the United States "whether nuclear reactor break-through in costs will be permanent depends as much on actions of competing fuels as on improvements