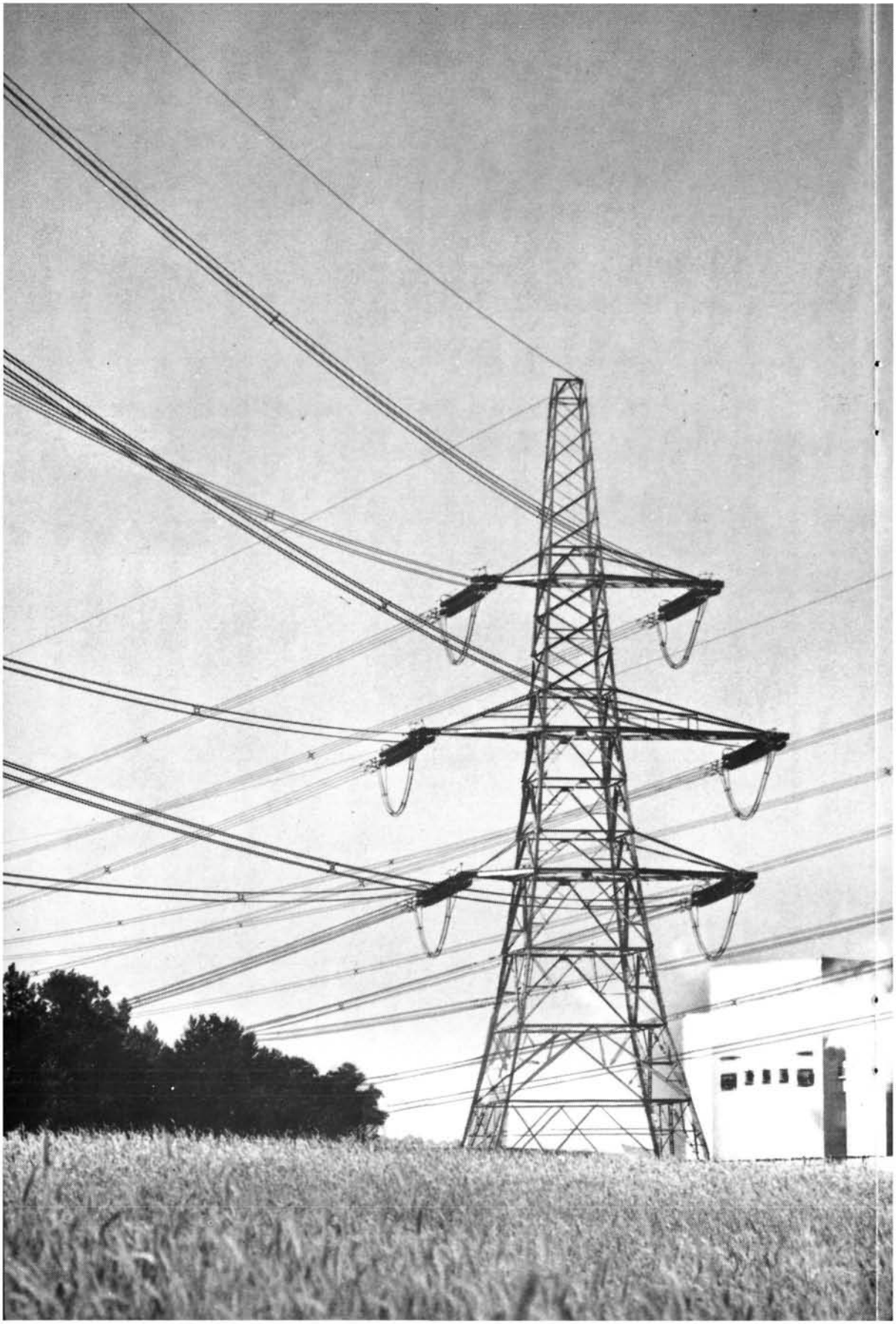
nuclear energy and the environment

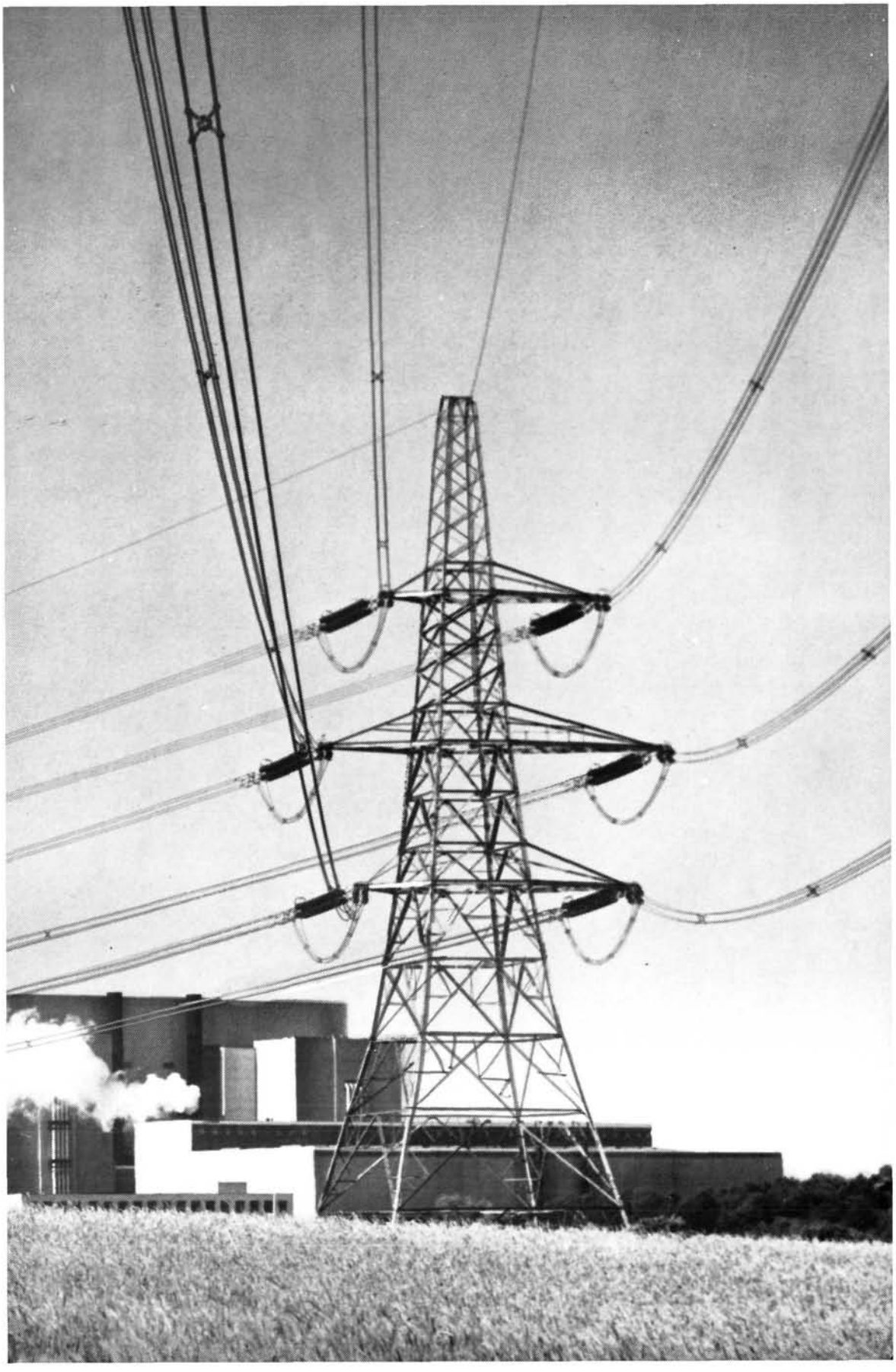
Despite a generally excellent history of protecting man and his environment against the harmful effects of radioactive and thermal contamination from the peaceful uses of nuclear energy, civilian nuclear programmes in many countries are beset by a doubting and, in some cases, highly critical reaction from some sections of the public. The genesis and evolution of public controversy over nuclear power were explored in a number of papers presented at general and technical sessions during the Fourth Geneva Conference, and were the subject of a panel discussion on one afternoon.

Speakers agreed generally that public reaction to the building of nuclear power stations had been favourable at first, but that since about 1969 there had been a mounting crescendo of objection in a number of countries. It was also recognised that the number of objectors in any particular case was comparatively small, but that the mass media tended to "blow up" their objections out of all proportion.

A World Health Organization paper presented at the technical session pointed out that the public health implications of the peaceful use of nuclear energy were particularly difficult to evaluate because of the small amounts of radioactivity in the environment due to such uses. Doses received by the human population were low, and were often masked by dosages resulting from naturally-occurring radioactive material and fallout from nuclear weapons testing; frequently they could be determined as upper limits only. In only a few cases had doses been actually determined, and in even fewer cases had they been published for a power reactor installation alone.

Photo next page:
"No accident has ever taken place at a nuclear power station which has affected adversely those living in the neighbourhood" — here, the Sizewell nuclear power station, generating 580 megawatts of electricity. Photo: UKAEA





The paper argued that the determination of the total dosage and the environmental effects of the peaceful use of nuclear energy required knowledge of the radioactive material released as a result of all operations of nuclear industry. In addition, knowledge was required of the form of the material released, its mode of travel, and the quantity actually ingested or inhaled by individuals. Obviously, these conditions could not be met in most cases. Consequently, a number of assumptions had to be made in order to calculate conservatively the expected dosage received by the world population. Since no two environmental situations were quite alike, nor were responses to perturbations in the normal environment, the results obtained in such calculations could not be assumed to fit any one site precisely. The major assumption made was that the dose was integrated for populations in entire regions and around plants to a distance at which the dose was less than 0.01 per cent of the maximum permissible.

Results of such computations, according to the WHO paper, showed that at the present time the peaceful use of nuclear energy had had little effect on the health of man and his environment. In the future, however, more effective removal and containment procedures would be necessary if human dosages were to be kept to acceptable levels.

Nevertheless, it is generally accepted that despite the great care which must be exercised in its use nuclear power has a crucial rôle in meeting the energy demands of the future. This point was made specifically in a paper presented by Dr. Clarence E. Larson, a Commissioner of the US Atomic Energy Commission, in which he pointed out that continued progress in solving social problems associated with urban societies throughout the world would be dependent in large part on the availability of electric power. For example, the paper noted, the internal combustion engine now accounted for more than half the air pollution in the United States. This pollution could be greatly reduced by imaginative use of electrically powered transportation systems.

The US paper indicated that public attitudes toward the environmental effects of nuclear power derived from a syndrome of concurrent and coincidental phenomena:

* the public's increasing demand for a greater voice in the choice of any activity that had an impact on property values, cultural or recreational interests, or health ;
* the visible effects and seemingly inexorable trends in the crowding of the population;
* a new, generally healthy consciousness of the fact that a clean environment can no longer be taken for granted;
* a growing awareness that the environment is everybody's problem but seemingly no one's sole responsibility;
* a recognition that environmental problems are global in character and are shared and affected by peoples everywhere ;
* a realization that 'blackouts' and 'brownouts' due to the inability of electrical supply networks to meet peak demands are not merely threats but realities;
* and a fear of radiation stemming from ignorance or misinformation on the part of some individuals.

Dr. Larson reminded participants that in the past 50 years the consumption of the world's stock of raw materials had been as great as

in all previously recorded history and said that although there was disagreement as to the actual amount of raw materials which remained "we must now begin to use them more wisely". He therefore found it ironic that environmental objections should delay the introduction of nuclear power stations.

The roots of dissension

Dr. P. Feuz, Secretary General of the Swiss Association for Atomic Energy, suggested in a paper at the general session that public objections to nuclear power stations lay on two distinct levels: a basic fear of health hazards from nuclear effluents (which included the fear of nuclear accidents); and on the general basis of environmental considerations — this latter relating to the whole station or complex including cooling towers, exhaust stacks, transmission lines and storage tanks.

Dr. Feuz suggested that compared with the opponents of nuclear power, who often made assertions of a sensational nature and thereby achieved sometimes easy success, the proponents, who handled the problem factually and objectively, had a relatively difficult task. In particular, the experts were often subjected to hard trials of patience, since doubt was continually being thrown upon their credibility. People tended to believe that any power source whose introduction to the public at large was the atom bomb must be dangerous, and that assurances to the contrary were attempts to delude them for suspect official reasons about which they knew nothing and concerning which they had no say.

It was generally agreed that a prime need was public education. During the panel discussion Dr. Emil Kunz, of the Institute of Radiation Hygiene, Prague, said it was the duty of the people responsible for nuclear activities to make sure that the public who might be affected by them knew both their advantages and their disadvantages. Dr. Guido Botta (Italy) agreed — but pointed out that it was extremely difficult to convey the right message to the public owing to that public's distrust of those who would be making the statements: the scientists, industrialists and governments involved.

Two statements highlighted the general feeling of the day's discussions. The Chairman of the morning general session, Sir John Hill (United Kingdom), said that the nuclear industry showed a very high degree of responsibility toward the needs for environmental protection, and so long as society was determined that power must come from somewhere, it was surely best that it should come from the cleanest source, nuclear energy. And later, during the panel discussion, Dr. M. Doucet (France) reminded his colleagues that no accident had ever taken place at a nuclear power station which had affected adversely those living in the neighbourhood.