Taunton College School was still called the Free Grammar School.

In 1864, Queen Victoria appointed Lord Taunton as chairman of a Public Schools Inquiry Commission. At this time Lord Taunton was also president of the Board of Governors of King's. He called Tuckwell to give evidence before the Commission concerning the teaching of physical science at his school. In giving evidence, Tuckwell satisfied the Commissioners that a scientific education gave his pupils inestimable advantages in later life.

Tuckwell met with much adverse comment, and although he may not have realized it, his chief obstacle to teaching science in his school was that, in order to move the school to its present premises, a joint-stock company with a governing body had been formed. No longer was Tuckwell free, as he had been under the former constitution of the governing body. Under the old system, the headmaster had received an endowment, which was not accompanied by any sort of restrictions or obligations as regards his teaching or conduct. The duties of the trustees had been to appoint a headmaster, not to maintain the school. His governors grew to dislike this arrangement, with the College School "with a classical side trying to lead in the new science teaching". They disliked as headmaster "a pioneer in the teaching of science and a brilliant exponent of it against the old specialisation in classics". In the face of this, Tuckwell resigned at the end of 1877.

In 1880 the school was acquired by the Woodard Corporation and from that date until recently no startling advance was made; science teaching was continued, but no new facilities were introduced to keep pace with the rapidly expanding school.

However, in the late 1930's it was decided to build a new science block; plans were drawn up; materials ordered and work was due to start in October 1939; but the project had to be temporarily postponed. It was, however, necessary to have additional laboratory space of some description, and so a temporary wooden laboratory was erected, Tuckwell's old laboratory then being given over to the teaching of biology. This new laboratory served its purpose admirably, and in 1943 another of these laboratories was acquired, this being used for the teaching of physics.

After the War, a memorial fund was opened, and in 1947 it was decided that the war memorial and science block should be incorporated in the one building. In 1955, Tuckwell's old laboratory was pulled down to make way for the erection of the new block. When the building was started, £8,000 had been given to the fund, and £20,000 had been lent, by relatives of the bereaved and by friends of the school.

When first designed, the block was intended to consist of two chemistry and two physics laboratories only. However, in 1956 the Industrial Fund for the Advancement of Scientific Education in Schools gave the school a grant of £10,000, and so made it possible to extend the block to include two preparation rooms and a science library, and to fit the laboratories with modern equipment and apparatus. It is interesting to notice the difference in the floor space of laboratories; the new block has a total floor space of 6,000 sq. ft. as compared with the 300 sq. ft. of Tuckwell's old laboratory. The only reminder of the great pioneer who did so much for King's is a plaque set in the wall of the new block, approximately over the site of Tuckwell's laboratory.

GENETICAL HAZARDS OF RADIATIONS*

A YEAR ago I reviewed in *Nature* a report on the biological dangers of nuclear and applied radiations which had been prepared by the Medical Research Council and published by the Government. I concluded with an urgent appeal for an easily readable digest of this important document. However, no such help has been given to the public, which is getting more and more anxious to understand the position. Instead of this, there has been a plethora of statements by scientists which, unfortunately, has probably contributed more to the confusion than to the enlightenment of the public. For the technically trained reader it is easy to see that all these statements agree on certain fundamental facts and conclusions, but the emphasis is placed in such different ways that the general reader may well feel it is more or less a matter of choice or philosophy whether ionizing radiations are considered dangerous or not. Much of this confusion could be dispelled if a recent popular lecture by Dr. Warren Weaver, of the Rockefeller Institute, could be made available to the broadest possible public at the lowest possible costs.

In ten lucidly written pages, Dr. Weaver makes the reader acquainted with the indispensable scientific background to the problem of radiation hazards. He limits himself almost entirely to genetical hazards; the dangers to the immediately exposed persons are scarcely considered. It is true that this leaves out of consideration just those effects—like bone cancer caused by strontium-90 or leukæmia caused by diagnostic X-rays—which at the moment cause most concern. But these are also the dangers which can be most easily understood by the lay person, whereas the much more subtle and yet in no way less real genetical dangers are not easily appreciated. It is the great virtue of Dr. Weaver's lecture that it states quite clearly and unequivocally those basic facts of radiation-induced mutation about which there is general agreement. He summarizes them in a paragraph which seems so important to me that I should like to quote it in full: "First of all, the change produced by mutation is practically always a change for the worse. Second, the amount of mutation varies directly with the amount of radiation. Third, there is no minimum amount of radiation which is genetically safe—all radiation is genetically bad. A little radiation is a little bad, and a lot is a lot bad. Fourth, once exposed to some radiation, this never 'wears off'; this is to say, the genetically important number of mutations depends on the total dose that one accumulates from his own conception up to the time of conception of his last child. Fifth, the radiation that is important genetically is only that which reaches the gonads—that is to say, the male testicles and the female ovaries. Sixth, what counts from the point of view of society as a whole is the total number of mutated genes. Thus a small radiation dose to a large number of persons is, sociogenetically speaking, equivalent to a large dose to a few".

Finally, there is an excellent brief discussion of the reason why, in the face of this generally accepted situation, scientists yet differ among themselves in

* "Radiations and the Genetic Threat." By Warren Weaver. *Franklin Inst.*, **263**, No. 4 (April 1957).

their assessment of radiation hazards. This is only in part due to our lack of knowledge concerning the number of mutations which a given dose of radiation produces in man; in fact, the estimates of this quantity vary surprisingly little between scientists in Britain and in the United States. The main causes of divergent opinions are the personal attitudes to two problems: one temporal and the other numerical. The temporal: how large is our responsibility towards future, still unborn, generations of mankind? The numerical: granted that a certain dose of radiation is sure to cause the death of a few thousand babies in the next generation, do we need to worry about this when these deaths, for which we carry the responsibility, form only a very small proportion of 'natural' deaths? The answers to these questions cannot be dictated by the scientist; they have to be given by everyone according to his reason and moral standards. All the scientist can do is to put the facts before the public, and this has been done most ably in Dr. Weaver's lecture.

C. Auerbach

[1] Auerbach, C., *Nature*, **178**, 453 (1956).

INSTITUTE OF PHYSICS

REPORT FOR 1956

THE thirty-seventh annual report of the Board of the Institute of Physics covering the work of the Institute during 1956 was presented to the annual general meeting of the Institute, which was held on July 12 at Oxford during the Institute's third convention. During the year under review the Board met six times and its various standing committees ten times. The membership and examinations committee dealt with 752 applications for election or transfer to the various grades of membership, and the interviews panel met three times and interviewed eleven candidates. Representatives of the committee visited four technical colleges which had applied for recognition by the Institute. The committee is now also responsible for giving advice on educational matters, and two panels have been set up—one to consider the revision of the lists of recognized qualifications for membership, and the other to submit a report to the Board on suggested means of stimulating entry to the profession of physics.

The total membership of the Institute rose during 1956 by 385 to 5,531, with the greatest increase in the associateship (203) and the graduateship (104) grades of membership. The graduateship examination was held during June 11–15, and written papers were taken both at the Institute's rooms in London and at three provincial centres. Seven of the forty-five candidates who presented themselves for examination satisfied the examiners. For the final examinations for National Certificates in Applied Physics the numbers of candidates were 424 for the ordinary level and 152 for the higher certificate, compared with 309 and 82, respectively, in 1955. The Board agreed to accept the diploma in physics of the Northern Polytechnic, London, as giving complete exemption from the Institute's academic requirements for graduateship membership. Five such diplomas had been accepted during 1955, three of which were to be awarded on satisfactory completion of sandwich courses. In co-operation with the London and Home Counties Regional Advisory Council for Higher Technological Education a conference on "Degree and Diploma Courses in Applied Physics" was arranged and held at the Institution of Electrical Engineers, London, during November 15–16. More than half the 160 who attended were senior representatives of industry or government service. The proceedings of the conference, including the discussion, have since been published, both in the Institute's *Bulletin* (8, 47, 86, 119, 166; 1957), and separately in booklet form. ("The Education of Physicists in Universities and Colleges of Technology": Institute of Physics, London. 1957. 6*s*.)

The increase in circulation of the Institute's two journals, *The Journal of Scientific Instruments* and *The British Journal of Applied Physics*, to libraries and non-members was about double that of the past few years, and the effect on the circulation of the new requirement that members pay for their own copies was less than anticipated. The revenue from advertisements showed a satisfactory increase. Details of the numbers of contributions submitted and published, together with the extents of the journals, are given in the annual report. The average delay between the first receipt and publication of a manuscript remained about six months. Supplement No. 5 of *The British Journal of Applied Physics*, containing the proceedings of the conference on "The Physics of Nuclear Reactors", held in London during July 3–6, was published in November.

The *Bulletin*, which has been expanded and presented in an entirely new and improved format during 1956, is now the only periodical of the Institute to which all members are entitled without extra payment, and its development is considered by the Board as an important part of the publication policy of the Institute. The twelve monthly issues comprised 344 pages containing twenty-three articles; news of the activities of the Institute's branches and groups; thirty-six book reviews; and the titles and abstracts of the principal contents of the Institute's two journals.

The Institute continues to be represented on many joint bodies and committees, including the Parliamentary and Scientific Committee, committees of the Royal Society and the British Standards Institution, and several national, regional and other scientific and technological advisory councils. Extracts from the reports of the Institute's representatives are given in the annual report. The number and nature of the inquiries addressed to the Institute concerning professional matters were much the same as in previous years. A fourth in the annual series of surveys of salaries and emoluments of members of the Institute was made in October and a report on the survey was published in the January issue of the *Bulletin* (8, 19; 1957). The annual inquiry concerning the type of posts taken up by new graduates in physics was extended in the case of 1955 graduates to include those with M.Sc. and Ph.D. degrees. A similar inquiry is being made in respect of 1956 and 1957 graduates, and it is hoped to publish a report, with comments, which will cover the results of these inquiries.

Details of the activities of the specialist groups and of the branches of the Institute, both home and overseas, are listed in the report. The Australian branch consists of 419 members and separate divisions in the various states of the Commonwealth. Under the auspices of the New South Wales division a conference on contemporary optics was held in Sydney