Science and the Public

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THE EXISTING RELATIONS BETWEEN science and the public can still be summed up largely in the anecdote used by Lord Rayleigh at a similar occasion a decade ago. The great Australian transcontinental railway had been completed, and the first train was being dispatched at a gala ceremony. At the climactic moment, the passengers waved, the crowed cheered, the signal was given, and the locomotive proudly started off—leaving the train standing. Someone had forgotten to couple the engine to the cars.

True, in the interval the public has become far more aware of science and scientists of the public, thanks largely to the drama—or should I say tragedy?—of the atom bomb. But this awareness, on the public side, is in some ways even worse than indifference, for the people think of science more and more as a sort of black magic, threatening their traditions continually and likely to blow them up momentarily. Even at best, science to them is the creator of comfort-improving gadgets or of miracle drugs, never an objective attitude and a rational attack on problems. Yet it is the attitude and method of science which can save society, even more surely than some products of science can destroy it.

It is also true that in the past decade many scientists have accepted and struggled to perform their obligations to the greater community of which scientists are part. The American Association of Scientific Workers, the American Federation of Scientists, and particularly the Federation of Atomic Scientists—all groups concerned broadly with such ends—and increasingly the AAAS, have achieved some real results, and individual scientists have given unreservedly of their effort and influence. But, by and large, the scientists and technologists remain somnolently unaware of the world beyond their equations, spectrometers, microscopes, or oscillographs. A year ago, the grouped chemical societies of Chicago, in cooperation with the AAAS, arranged a first-rate symposium on the relations of government to science. A few handfuls of chemists came to listen. In November 1946, the Chicago Technical Societies Council, representing scientific engineering and technological societies with a membership of 21,000, staged a comparable panel on UNESCO and science, and only 200 of the tickets were taken by its members. Dr. Compton's story of his sister in India is still apposite. Annoyed with the endless requests of the native electrician for instructions, she burst out, "Why don't you use your common sense?" "Madam," he replied with grave courtesy, "Common sense is a rare gift of God. I have only a technical education."

The means to improvement are different in the two cases. Scientists need a broader educational base before ascending their towers of specialization, a base including not only some acquaintance with the wider problems of society but even a more vivid indoctrination with their own scientific method. This, however, leads into problems of higher education for the few, whereas this symposium is directed primarily to the problems of basic education for the many, and so to the other pole of the relationship.

The engine of science is running, but if it does not pull the public passengers with it, it will not long be stoked. The coupling must be closed by means of the media of mass communication. The technological devices for this are now abundantly available; their use and abuse will be the subject of the following speakers. I can be most useful, perhaps, in specifying further the present and the desirable relation between science and public.

First, what is the public entitled to, and what is it not entitled to, in the way of science news? It is not entitled to sensational, uncritical, and often partisan reports on results or conclusions which have not yet run the normal gamut of scientific testing. The validity of research findings should not be argued before the public as jury. The mass audience of magazine or newspaper, movie or radio, does not have, and cannot possibly have, the knowledge which entitles it to make a judgment—nor do the writers or producers, except in rare cases where they have themselves had extensive experience as active scientists. Only the collective and slowly accruing labors of the actual workers in a field can render a useful decision. (I do not say a true decision, for obvious reasons. "Useful" means that it leads to further theoretical understanding or to successful practical application.) This decision may be essentially unanimous, as when penicillin burst forth as a successful antibiotic, or may for a period involve two or several opposed positions, as in the running battle over the nature of cosmic rays. Of course, as evidence mounts, such disagreements resolve and a unanimous position is reached.

From the opening lecture presented at a round-table discussion on "Science and the Public," AAAS meeting, Boston, December 28, 1946.

Author's note: Names of specific writers, magazines, and newspapers, as well as a discussion of details of the Kenny publicity, have been deleted by the editors for publication.

Presumably the public is entitled to know of penicillin as soon as laboratory and clinical trials have convinced those working with it, as a group, that it has the virtues anticipated. Early publication may still cause great anguish to investigators flooded by appeals for unavailable material and to relatives believing their loved one is dying in the presence of succor, but it may also arouse great action and accelerate use and speed advance. Publicity is essential in health campaigns against tuberculosis, cancer, and the like. The public is also entitled to know, if interested, of the ray-particle debate about cosmic energy reaching our planet. This, at the lowest level, gives something to gape about; at a higher level—that is, with the arguments and evidence for each view presented—it can be highly educational and stimulating. At neither level, however, can the public do anything about it or become personally involved.

The case is quite different when the public *is* involved not merely as spectator or student but as actor or judge. When a popular monthly magazine published a glowing account of a foolproof treatment of ringworm, by a mixture of 50 per cent camphor and 50 per cent carbolic acid, it created an epidemic of severe skin burns and performed a disservice to everyone except possibly some financially low dermatologists. On what evidence were such claims publicized? Had the magazine or the author the scientific or moral right to decide that the claims of a particular experimenter were sound?

More recently, a well-known science writer on a metropolitan daily newspaper burst forth with starry-eyed accounts of Bogomolets' antiage, anticancer, antireticular serum. His stories were the first word I had of the ACS work, and, I must confess, though reasonably familiar with the area of knowledge involved, I was quite unable to tell from them what had actually been done or even what was the reasoning behind the work. This was unfortunate, since this particular writer had quoted categorically a sentence from my book, *Unresting cells*, published several years earlier, in which I summed up some biological evidence that the human life span might be as long as 150 years; and this mention flooded me with hundreds of letters begging for information or, mostly, for treatment.

Shortly thereafter I had an opportunity to talk at length with the associate director of Bogomolets' Institute and with the secretary general of the Soviet Academy of Medicine, both of whom assured me that there had been no significant trials of ACS on longevity or cancer, in man or animals, and that the public furor stirred up in this country (far more than in Russia) had done real damage. There was only some evidence that ACS accelerates the healing of bone fractures and chronic ulcers.

As a final example on this point I merely mention the publicity accorded Sister Kenny and her treatment for infantile paralysis. The most effective treatment of poliomyelitis will be determined by no popular vote or movie producer but by continued scientific investigation and clinical experience. Science, medicine, and the public alike suffer when any other approach is attempted. On the other hand, when answers have become clear, such motion pictures as those presenting the lives of the Curies, Ehrlich, and Pasteur offer invaluable vehicles for education of the public.

If we think of science as an exciting sport, as indeed it is, then the final score of each game is certainly for the public. So also is the inning-by-inning progress, provided it is clearly recognized by all as just a progress report and provided the reporter has some official or semi-official authority for his statements. Still better, if the public is taught some of the rules of the game, it can follow with excitement a play-by-play account. It must never be placed in the role of umpire. Also, it must learn to respect the expertness of the players. This last is a most critical point.

The egalitarian philosophy of America proclaims that all men are created equal, and, as the Irishman said, "One man is as good as another, or maybe a little bit better." In discarding the tradition of an aristocracy by birth we have thrown out the very notion of quality. Now, plainly, some men *are* far better than others, for given functions, by hereditary endowment or acquired experience, and the public recognizes this well enough where it is familiar with the situation. It knows that a special combination of endowment and training is needed to make a Joe Louis, a Babe Ruth, or even a Paderewski, and it would rightly scoff at a professor of sociology who pontificated about pugilism. But the reverse is not true. The public does not know sufficient about scientific evidence and procedure to recognize as ludicrous the anthropological antics of Bilbo, the biological blather of Irene Castle ex-McLaughlin, or the chemical confusion of most literary atom bombardiers. The public does not know its scientific A.B.C.'s—and it doesn't know that it doesn't know! Even at the height of scientist prestige, in a technological war, America alone drafted its science students. We cannot expect the layman to surmount his ignorance in technical matters, but we can expect him to recognize it. We must teach him the weight and value of a scientist's opinion where scientific evidence is involved. A democracy that does not respect expertness in the intellectual area, as it does in the sports arena, is bound for extinction in an age of technology!

Scientists, I have argued elsewhere, are the sense organs of the social organism which worry it forward along the path of evolution. They probe the environment and must help guide the response of the society. It is their responsibility to obtain valid information about the world and to help in its assimilation and application. The educators, whether of children or of the mass of adults, like the nervous system, must communicate such information, *in its proper relations*, to the whole of the

body politic. The public must nourish and protect and value its scientists and educators as the body biologic does its eyes and brain. Science must be supported financially and learning prized socially far more than they are if our society is to remain healthy.

Perhaps some of the serious dislocations originate just in the fact that education and research are, for the most part, dependent on public sources for their scant support, while communication is well nourished by the profits of business enterprise. What the enlightened editor of the Sunday magazine section of a great newspaper chain told me recently is illustrative. He said that the Sunday supplement was reforming, in that features would be truly educational rather than rankly sensational. He had convinced the publisher that this approach would actually increase circulation. "But if circulation falls?" I asked. "Well, of course, we must sell papers to make a profit."

Let me sum up. For a healthy democracy the following circular relations should hold: The public should be kept informed of the authoritative advances of science and, even more, should be instructed in the manner in which science achieves them. The public must be made aware of the dignity of expertness and the compulsion of facts. Only so can the state, and all states, act rationally in this era of great sociological interdependence and tremendous physical power. Only so will science receive the financial support and dignified position it must have for the good of the whole. The scientist must recognize his role as "mover and shaker of the world," must qualify himself to shoulder his consequent responsibilities, and must in reality shoulder them. Only so will science flourish and serve. Those who work with the mass media of communication must insist on ever better standards of reliability and significance in what they communicate—standards which guarantee the discharge of a public duty as well as accumulation of a private gain. Only so will they be allowed long to continue as private enterprises. Only so can the public learn what it must know to function as a democracy.

These objectives might be achieved in many ways: by certification of newsmen; by featuring science rather than treating it as spot news; by training in scientific journalism; by liberal education of scientists; by greater public service from scientific societies, such as sponsorship of syndicated science columns or publication of science magazines (the new one, *The Sciences*, should concern the AAAS); by approval or, more dangerous, condemnation by official scientific bodies, such as the AAAS, of public reports on scientific matters; by boards of scientific consultants for newspapers, radio, etc.; by government support of research and subsidy of mass media; by government agencies of communication, such as the OIC of our State Department; and by, potentially best of all, the operation of UNESCO.

There is much to say on the changing situation up to now—on the greatly improved performance and standards of science writers, fostered by their national association, who are now often as much frustrated as were the scientists earlier by the way in which the editorial desks handle their copy; on the growing interest of the public in science and of scientists in the public; on the shift of need from the mere reporting of science to the *good* reporting of science. But these are matters for careful discussion. What may be re-emphasized now is that science, communication media, and the public are inextricably bound to each other. They must not merely interact, but they must interact usefully. They are part of a whole society. For purely selfish reasons, each must minister to the needs of the others, for only so can it survive.