

Finally, when sitting alone in a very quiet room at night, I find that I can actually hear my heart-beats. The sound is very faint indeed and resembles gasping. It seems reasonable to suppose that it is caused by the movements conveyed to the malleus by the ear-drum as it enlarges at each surge of blood through the arteries. The effect may be slightly accentuated by resonance in the external auditory meatus.

These results may be of interest in considerations of the minimum perceptible energy in the auditory process¹. I am indebted for information to several scientific colleagues, and in particular to Dr. E. T. B. Francis, of the Department of Zoology.

ROBERT W. LAWSON

Department of Physics,
University, Sheffield 10.
Aug. 28.

¹ de Vries, H., *Nature*, **161**, 63 (1948).

"Freedom and Obligations"

THE leading article, "Freedom and Obligations", in *Nature* of October 2, p. 507, contains a criticism of a charter for men of science, drafted by the Committee on Science and its Social Relations at its meeting in Paris during June 15-16. As two of the persons responsible for this draft, we wish to make the following observations.

We certainly are aware that freedom and rights cannot be defined in an absolute way, and that any formulation of them will bear references to the circumstances among which we are living. We also know, all of us, that we have obligations to fulfil. But we are convinced that time and again particular aspects of freedom must be brought to the foreground, in order to make clear the way present trends are deviating from what once was considered as the ideal of science, namely, free and open discussion of all outcome of research, as the best safeguard that science may serve mankind as a whole.

In the discussion at our meeting we did not overlook the position of scientific workers in industry. We are of opinion, however, that the sentence in the article in *Nature*, "The freedom of publication and freedom to discuss his work with other men of science must in industry be subject to some limitations", is an expression of a situation accepted in a certain historical period, but cannot be considered as a rule to which science should be subjected as a matter of principle. We believe that industrial enterprises should be considered and managed as 'public utilities', and that the idea of competition in view of the commercial aspects of industry cannot remain, in the long run, a guiding principle for the development of human society. We have not gone so far as was suggested by Prof. A. V. Hill in an address delivered on February 17, 1946, when he suggested that it should be a duty of scientific workers to refuse to co-operate in tasks in which they, or their representatives, are not allowed a reasonable share or partnership in the responsibility of deciding on the purpose, policy or probable result of their work. Neither did we ask, in the charter we drafted, for information on every detailed purpose. But we think it indispensable in the present period that every scientific worker should know whether his work is intended directly to serve the public welfare, or whether it should serve profit motives or purposes of competition, or military purposes, in order that

he may realize in what position he finds himself with regard to his fellow citizens, and that he may consult his conscience in this respect.

It was mentioned at the meeting of our Committee that free discussion of work in progress cannot yet be always and everywhere allowed; but it was unanimously agreed that the charter should ask for publication of all results, and that freedom of discussion should be restricted as little as may be possible. We are well aware that in many enterprises such freedom will not be given at the present moment; nevertheless, we believe that it is necessary to remind scientific workers of what must be our goal and to stimulate fighting for this goal. We are afraid that otherwise the human mind—particularly in present circumstances—is too much apt to acquiesce in conditions which (to put it mildly) should be described as a return to the 'enlightened despotism' of the eighteenth century.

With regard to measures prescribed for scientific workers by Government institutions, we certainly do not profess disloyalty; but again we consider it a duty of scientific workers to have a clear idea of what is asked from them and for what purpose this is asked. We also believe that much open discussion is desirable and possible in connexion with the problem whether the present trends for enforcing secrecy do not go too far, and whether much of the present tension in the world would not have been reduced had not this unhappy trend for secrecy taken hold of it and stirred up fear and suspicion.

As regards the problem of loyalties overriding national loyalties, which is brought forward in the article in *Nature*, we do not wish to refer to political creeds which certainly are often misleading many people; but it may be remembered that the Roman Empire persecuted the early Christians likewise because they professed a higher loyalty than that to the State. Surely it will be accepted that both the idea that man has to consult his conscience in order to know his responsibility to God as his first duty, and the idea of a brotherhood extending over all national frontiers, have been a gain in the development of civilization. It may be true that international loyalty in the present world seems to have little force; but this should not prevent us from fighting for it in a domain of human activities which some time ago appeared to offer a unique ground for its development.

Scientific workers themselves must decide whether they will accept, as suggested in *Nature*, "the practice of the most advanced countries as a standard and as the most satisfactory solution to the problem"; we believe it to be important to point out clearly that there are aims reaching further, and that in the light of these aims the practice of the countries mentioned also may be critically analysed.

We realize that most of what has been brought forward here by us will not have the same weight for everybody; but we wanted to state that such problems as have been mentioned in the article in *Nature* had indeed been before us. We should like to add that we consider the article in *Nature* a valuable contribution to a discussion which we can only welcome, and it is to be hoped that it may call forward comments from various sides.

J. M. BURGERS (President)

M. FLORKIN (Secretary)

Commission pour la Science et ses
Relations Sociales,
Van Houtenstraat 1, Delft.