

A. or $m\mu$ in Electron Microscopy?

It has become customary to express measurements made by the electron microscope in A. units. I have analysed this custom by examination of Vol. 12 of *Experimental Cell Research* (1957). Nine of the papers are concerned with electron microscopy. A. units are mentioned twice in theoretical considerations concerned with the minimum determinable thickness of a layer of osmium, and they are also used as ordinates in graphs. These uses of the units are here disregarded, because they are not actual measurements. (The use of A. units in reports of X-ray analysis is also disregarded.) With these exceptions, I find 129 measurements recorded in A. units in reports of work in electron microscopy. The last digit of 117 of these is 0; of ten, 5; of two (both in the same paper), 7.

It is clear that the last digit is not significant, and indeed this follows from theoretical considerations. It would be unreasonable to express all measurements made with the light microscope in 'decimicrons', but a better case could be made for this than for the use of the angstrom as the standard unit in electron microscopy. Actually, we have just the right denomination for electron microscopy in the millimicron ($m\mu$). If we used this unit (as a few authors do), the last digit would be significant (though the tissues of organisms would necessarily have changed in dimensions before being measured).

It is a remarkable fact, not recognized by the inventors of the metric system, that the human mind jumps naturally in thousands. Thus we write 2,654,396, not 2,65,43,96 or 265,4396. Similarly, no denominations between millimetre and micron have been found necessary. The decimetre is seldom used, and the centimetre only gained popularity because it was arbitrarily chosen as the unit of length in the C.G.S. system. The really useful measurements of length are the kilometre, metre, millimetre, and micron; and the millimicron is the logical continuation of the series.

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Dec. 8.

Reorganization of Microbiological Research in Britain

I WRITE to report the views of the Council of the Institute of Biology on the leading article in *Nature* of January 3 which dealt with the reorganization of industrial microbiological research in Britain. The article was informative but did not, it is felt, bring out the fundamental points at issue.

The proposals to strengthen microbiology in the stations of the Department of Scientific and Industrial Research concerned with particular technologies and to support fundamental microbiological research within university departments are in themselves admirable. But the most urgent need in industrial microbiological research is for work that bridges the gap between fundamental university research and its applications in diverse technologies. Such work, basic research undertaken with the needs of technology in mind, is carried out in other fields by the National Physical and National Chemical Laboratories within the Department of Scientific and Industrial Research and elsewhere by the stations

and university research units controlled by the Medical and Agricultural Research Councils. The Microbiology Group at Teddington was the only group in Britain doing work of this character in industrial microbiology.

The Research Council of the Department of Scientific and Industrial Research has now abandoned responsibility for microbiological research of this character, despite the acknowledged success of the Teddington unit. Its decisions make no provision for a research unit on general industrial microbiology within the Department of Scientific and Industrial Research. It should be clearly understood that university units similar to the Medical or Agricultural Research Council's research units at universities are *not* contemplated and that the research grants to be made available to university departments will be of the same character as existed before these decisions were made.

All parties that have made representations against these decisions, including the late Advisory Committee on Microbiology, the Institution of Professional Civil Servants and ourselves, have emphasized that the research needed in this field is of a long-term character; sometimes, as with the methane-producing bacteria, very long term. It requires a research centre—a government laboratory or university unit of some size—which will provide a career for mature scientists experienced in the needs of technology as well as pure microbiology. Short-term grants to support postgraduate students on isolated projects in university departments will be totally inadequate, though they would be a valuable supplement to work of such a research centre.

What, in fact, will happen if the decisions of the Research Council of the Department of Scientific and Industrial Research are carried out? The present research group at Teddington—small but important because of its collective strength—will disappear, and in our view little if any of its work will be continued elsewhere in Great Britain. The real value of its work has been appreciated by British industry and by microbiologists all over the world. The National Collection of Industrial Bacteria, a world-famous collection of high repute, will be removed to the Torry Research Station in Aberdeen, which houses a collection of marine bacteria excellent in itself but comparable neither in scope, reputation nor size. The Research Council will have antagonized the whole world of microbiology, both by its decisions and by its cavalier treatment of the late Advisory Committee on Microbiology; one may well ask how the Department of Scientific and Industrial Research can expect in the foreseeable future to recruit any reputable microbiologists. The Corrosion Group at Teddington will be strengthened; a few university departments will receive grants for isolated items of research, but these could be made available in any event.

It is hoped that something can be done to establish a small national laboratory for industrial microbiology to continue the work which has been carried out by the Microbiology Group and to initiate new investigations likely to have significance for industrial processes. Is there not a case for an expert committee, nominated perhaps by the Royal Society, to advise the Research Council on this matter?

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