

But one factor Mathews fails to stress—memory size and the length of the machine's internal word unit—strengthens the case for the large computer. Many practical research problems, especially in the social sciences, demand for their solution core storage capacities in excess of those commonly provided by small or medium machines. Larger computers are designed to operate efficiently with large memory arrays while optional hang-on units for smaller machines can create inefficiencies. Partitioning a large problem (involving either complex processing or large data sets) to make it fit on a small machine increases processing time. It also demands programming talent which, as Mathews notes, is in short supply. The successful implementation of time-sharing also demands large internal memories.

While smaller computers *can* offer savings for engineers and for student use in classes, the case for a proliferation of such machines in an organization of moderate to large size is weak, especially if the machines are disparate in size and come from different manufacturers. Most organizational users would, I think, find it more efficient to have the energies of the local programmers focused on maintaining and improving the services of a central large machine.

Finally, one can only say amen to Mathews' plea to keep old computers around until the natural processes of decay (of machine and of its users) permit graceful retirement.

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It is unfortunate that Mathews found it necessary to force the reader to indulge in a guessing game as to the actual identity of the computers mentioned. A table basically equivalent to his Table 1 for all commercially available computers would be a very useful addition to the annual *Guide to Scientific Instruments*. Numerous laboratories have already had to duplicate the work of gathering just such facts for the purpose of determining where to start in the search for the computer best meeting their needs. Of course any such table is bound to be incomplete (as Mathews has stressed) in its characterization of the machines. Anybody who has looked at the field can suggest alternative measures in place of those used

by Mathews. The great virtue of Mathews' presentation is that he oversimplifies the complex structure to a set of members which fit in one table easily. Once the most general features are located in such a table the procedures Mathews describes for gathering more details become usable. . . .

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Research and Education: IUBS Resolution

The International Union of Biological Sciences at their General Assembly in September 1967 passed unanimously the following resolution submitted by Paul Weiss (United States) and P. Chouard (France):

Considering that

1) The growing momentum of knowledge in the biological sciences and its fundamental bearing on human welfare and destiny calls for increasing efforts at further broadening and strengthening both basic and applied research in biology and its branches;

2) This task requires high-quality education of mounting numbers of qualified students in close contact with the sources and practitioners of advancing knowledge;

3) Emphasis on quality, rather than sheer proliferation, of both workers and publications seems of paramount importance for maximum efficiency in this progress;

The IUBS resolves,

1) That research and education be carried on in the closest possible association;

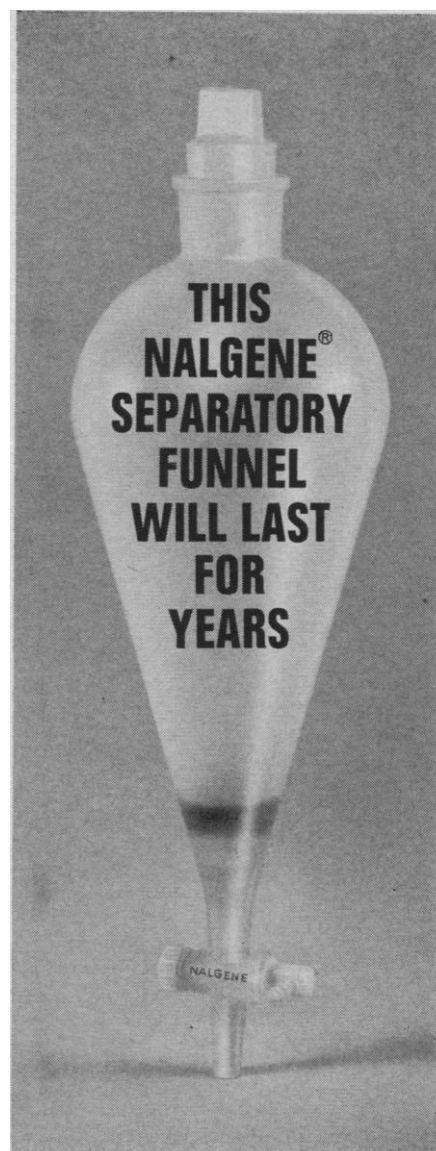
2) That trends toward divergence between the activities of advancing and of disseminating knowledge be vigorously counteracted;

3) That talented research workers be expected to take an active part in the educational process, and that the exemption of research workers from educational functions be made an exceptional dispensation for special cause, rather than a reward for excellence; and

4) That teachers be given opportunities for conducting research by time allowed from their full duties.

To this, F. W. G. Baker, secretary of the International Council of Scientific Unions, added the following postscript: "The possible effects on teachers and research workers throughout the world are eagerly awaited."

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