

believe that there would be variations as the career in question was phrased as more or less intellectually demanding. While the attitude of today's high-school students may be said to prefigure the attitudes of the man in the street tomorrow, it is necessary also to recognize that these students have been exposed, rather more than their forebears, to articulate and concerted attempts to involve them in scientific careers, and so they may differ somewhat from their seniors today. The report is not in any sense designed to blame the high-school students but rather to focus attention on the one-sidedness of a picture of the scientific life which overemphasizes the gap between those who do and those who do not participate in it.

MARGARET MEAD  
RHODA METRAUX

New York, New York

### Grants Without Grind

An editorial in *Science* [125, 97 (18 Jan. 1957)] has helped to dispel ignorance among scientists about where and how to seek support for research. It has made me think of ways in which foundations, on their part, could improve their relations with research workers.

Years ago, that task would have been simple. The foundation would have endowed a university or a museum, which then would have hired a staff with tenure for life. That kind of security still works well in respect to basic research in many fields. But there is a greatly increased need today for the support of studies related to specific questions of current interest—a support that does not permit so-called “crash” programs to become “slap-dash” programs.

The amount of time and effort of research workers, and of research administrators, that is required to prepare requests for grants and fellowships has become appalling. At a recent conference of foreign medical educators, one of our European colleagues wondered why so large a proportion of the advance made in his field comes from European, rather than American, scientists, despite the greater funds available here. He hinted that this may be because “we in Europe are free from your kind of red tape.” While he and his colleagues pursue their studies, we spend our time preparing requests for funds—often repeatedly, because many of them are rejected. The unsuccessful applicant as a rule does not receive the benefit of the critical appraisal which the foundation's advisers may have spent many hours in preparing. One foundation reports that the average number of references is seven; it costs the time of seven scholars to write seven thoughtful letters. (If, occasionally, such letters are written carelessly, both the

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## 1 Liquid Scintillation Spectrometers

## 2 Automatic Fraction Collectors

## 3 Windowless and Flo-Window Counters

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Aqueous samples of various types may also be readily counted.

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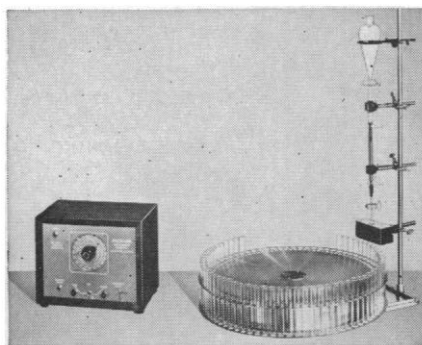
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### AUTOMATIC FRACTION COLLECTORS

For precise column chromatography.

Provides both time and drop counting. Can be furnished for time operation only at commensurately lower cost.

Drops from column fall directly into test tubes. There are no intermediate collecting vessels, glass arms, or funnels to cause mixing, contamination, evaporation, etc. This is important where accurate separations are required or where radioactive tracers are used.



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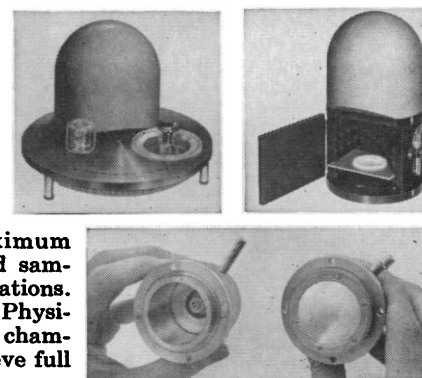
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applicant's and the foundation's time may be wasted.)

Yet another matter deserves attention. In one case our school received a personally written letter asking it to apply for a fellowship, only to learn afterwards that the foundation had thus addressed a hundred times as many people as it had fellowships available. In another instance we applied for funds from one agency, and when the request was rejected, the administrator of another chided us for not having simultaneously applied to his—on another set of forms. In spite of a reputation for liberality in this respect,

one national foundation refused to accept a duplicate of an application we had submitted to a federal agency and demanded 20 copies of an application in a different format.

We need a closer link, it seems to me, between foundations and research workers if the most important phase of research—the planning—is to be adequately supported. At the very least, granting agencies should pay the costs of duplication, circulation, and evaluation of applications and should accept the responsibility of telling unsuccessful applicants in detail why their projects are

rejected. Removing the secrecy which now prevails in this respect admittedly would add to the foundation's job, but to the benefit of science. Moreover, when the foundation executive believes that support for a particular study might more suitably come from another agency, he would render a real service, not alone to the applicant but to scientific progress, by so informing him.

Donors of funds know in a general way what they want of science. So does the public. One of the foundation's functions is to translate such felt purpose into effective scientific research. Scientists share this objective. To achieve this common end, should not the foundation inform the applicant more often than it now does of ways in which he could make his project acceptable? Far from interfering with freedom of research, this form of friendly collaboration would actually advance it by removing one of the frustrations which so often beset the path of the scientist.

GABRIEL W. LASKER

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College of Medicine

### Invisible Words—Invisible Evidence

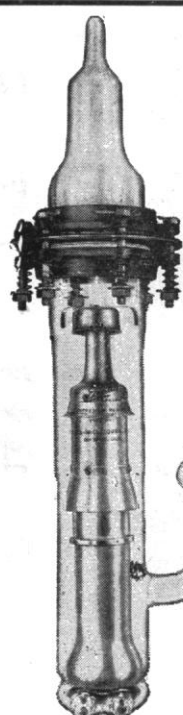
Your recent editorial [*Science* 126, 681 (11 Oct. 1957)] was as usual of timely interest, but it was inaccurate in one respect. The existence of subliminal perception is not as well established as you suggest.

The crux of the problem is the meaning of *limen* or *threshold* in this context. In psychophysical research, *thresholds* are usually defined as the least intensity, size, duration, position, and so on, of a physical stimulus (absolute threshold), or least change in one physical stimulus, or difference between stimuli (difference threshold), which will elicit verbal recognition as determined by the average of a series of measurements. The question is whether it has been demonstrated that physical stimuli below one of these thresholds can influence behavior. I have recently reviewed the considerable experimental work on this question and have arrived at the seemingly obvious conclusion that the demonstrations of the phenomenon are far from conclusive [*Perceptual and Motor Skills* 7, 29 (1957)].

Therefore it is yet to be proved that anyone could have his subconscious polluted by subliminal messages. Being a resident of the Cornhusker State, however, I'm all for it if it can be used to increase the sale of popcorn.

R. C. WILCOTT

Nebraska Psychiatric Institute,  
University of Nebraska College of  
Medicine, Omaha



## EIMAC Diffusion Pump

### TRIPLE-JET • AIR COOLED

The Eimac HV-1 Diffusion Pump is a fast, triple-jet, air-cooled vacuum pump of the oil-diffusion type. When used with a suitable mechanical forepump and Eimac type A oil it is capable of reaching an ultimate vacuum of  $4 \times 10^{-7}$  mm. of mercury.

Assembly of the pump is a simple operation, requiring no special tools or intricate adjustments. It can be completely disassembled for cleaning in five minutes or less.

The glass construction permits rapid inspection of conditions within the pump.

**PYREX GLASS BARREL**—Readily enables inspection of oil rings and internal operating conditions.

**SIMPLE CLEANING**—This factor is one of the most important to pump users. The "Eimac" can be disassembled in a matter of minutes without special tools. Normal cleaning procedure is 100% effective as there are no inaccessible areas. (With metal-barreled pumps inspection is difficult and effectiveness of cleaning can be determined only after pump has been returned to service.)

**NO REFRIGERANT**—The "EIMAC" is entirely air cooled with the cooling accomplished from the draft of a small fan.

**NO CHARCOAL TRAP**—The unique cold-baffle prevents entrance of oil vapor in the high-vacuum manifold.

**PIPE-FLANGE MOUNTING**—Both high-vac and forepump manifold connections match standard pipe flanges.

**110 VOLTS AC-DC**—No complicated electrical circuit is required as the heater operates on standard 110 volt power.

#### APPLICATIONS OF THE EIMAC PUMP

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Electronic vacuum tubes  
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Optical components  
**DISTILLATION OF VITAMINS**  
**OBTAIN OPERATING PRESSURE**  
of cyclotrons and Y-12  
**FREEZE-DRYING OF BIOLOGICALS**

#### OPERATIONAL DATA

Amount of Oil ..... 150 milliliters  
Forepump Capacity\* ..... 0.1 to 2.0 liters per second at 0.001 mm. of mercury, or less  
Forepressure (maximum) ..... 0.02 mm of mercury  
Baffle Temperature ..... 35°C. or lower  
Heater Voltage ..... 100 to 110 volts  
Heater Current (at 110 volts) ..... 1.7 amperes  
Speed, without baffle (approx.) ..... 67 liters per second at  $4 \times 10^{-4}$  to  $4 \times 10^{-6}$  mm Hg  
Speed, with baffle (approx.) ..... 32 liters per second at  $4 \times 10^{-4}$  to  $4 \times 10^{-6}$  mm Hg

#### MECHANICAL DATA

Ultimate Vacuum, at 25°C. (approx.) ..  $4 \times 10^{-7}$  mm Hg  
Casing ..... Pyrex Glass  
Chimney ..... 3 Jet, Aluminum  
Cooling ..... Air  
Mounting Position ..... Vertical, boiler down  
Net Weight ..... 11 pounds  
Shipping Weight ..... 16 pounds

\*A smaller forepump may be used, but this will reduce the pumping speed at the higher manifold pressures.

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