will be an increase of variety within populations for many generations, in the sense that many new combinations of genes will be produced. On the whole this can be regarded as a favourable development because it will increase the number of man's possible inborn reactions, whether physical or psychological, to his rapidly changing civilized environment" (*9*, p. 122).

Finally, from the 1951 UNESCO Statement on Race, signed by 14 eminent geneticists and anthropologists, I quote the following:

"Furthermore, so far as it has been possible to analyze them, the differences in physical structure which distinguish one major group from another give no support to popular notions of any general 'superiority' or 'inferiority' which are sometimes implied in referring to these groups" (p. 12).

"Studies within a single race have shown that both innate capacity and environmental opportunity determine the results of tests of intelligence and temperament, though their relative importance is disputed" (p. 13).

Should all the scientists, then, who subscribed to the 1951 Statement on Race, and also Skerlj, Comas, Medawar, Simpson, Penrose, Caspari, and others, be considered "little better than cranks"?

Indeed, *The Mankind Quarterly*'s attitude is so harmful that I hope the AAAS takes some action.

Note added in proof: While this letter was in press, the July–September 1961 issue of *The Mankind Quarterly* (**2**, No. 1) has appeared. In it the same extreme racial trend is followed. Among other papers, it contains a review by A. James Gregor of Comas's *Racial Myths*—a review which is full of totally unjustified personal attacks and insinuations of a political type, without basis and completely outside the framework of the problem under discussion.

SANTIAGO GENOVES
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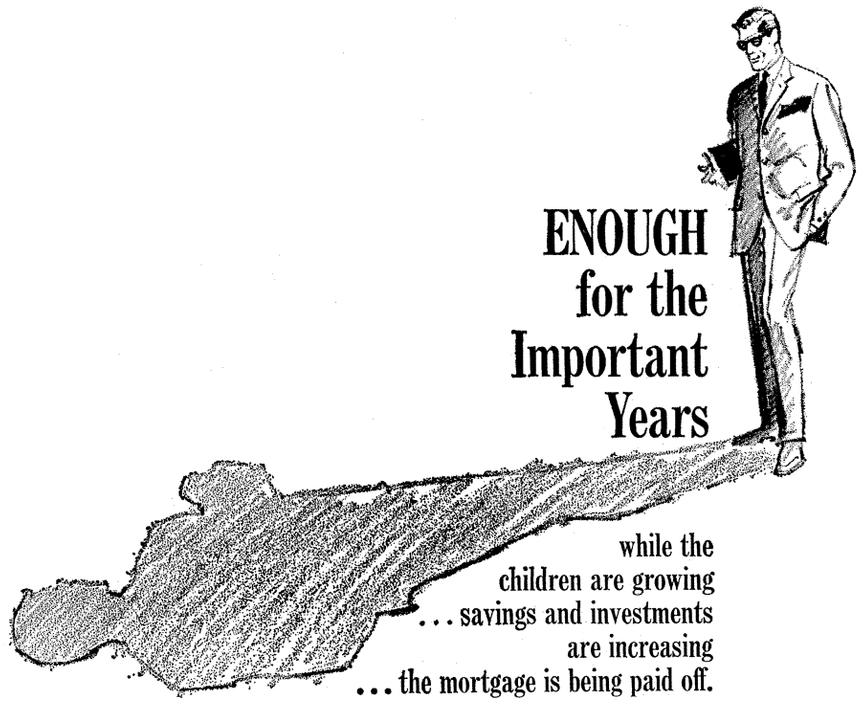
References and Notes

1. H. E. Garrett, *The Mankind Quarterly* **1**, No. 1, 15 (1960).
2. B. Skerlj, *Man* **60**, 172 (1960).
3. J. Comas, *Current Anthropol.* **2**, 303 (1961).
4. Another article by Garrett, "The equalitarian dogma," appeared in the April 1961 issue of *The Mankind Quarterly*. It was reproduced in *Perspectives in Biology and Medicine* [**4**, 480 (1961)] and in the *Negro Digest* [**12**, 38 (1961)]. It has been unfavorably commented on by M. J. Herskovits in the *Negro Digest* [**12**, 43 (1961)], and by G. A. Harrison in *Man* [**61**, 189 (1961)].
5. I cite two examples of action taken in the past. In 1951 the American Association of Physical Anthropologists and some 20 other learned societies formally condemned a measure adopted by the board of directors of the University of California as "violating the rights of academic freedom and tenure." In 1955 the same association declined to participate in the meeting of the AAAS in Atlanta, Georgia, because of racial discrimination in that state.
6. P. B. Medawar, *The Future of Man: The Reith Lectures, 1959* (Methuen, London, 1960), p. 54.
7. F. S. Hulse, *Human Biol.* **32**, 63 (1960).
8. E. Caspari, "Genetic basis of behavior," in *Behavior and Evolution*, A. Roe and G. G. Simpson, Eds. (Yale Univ. Press, New Haven, Conn., 1958), pp. 103–127.
9. L. S. Penrose, *Outline of Human Genetics* (Heineman, London, 1959).

The Scientist and World Affairs

The inference to be drawn from Florence Moog's comment on the present state of affairs [*Science* **134**, 797 (1961)] is that the world is no longer our business, as scientists, and we had best retreat to our cracked and yellowed ivory towers and leave the affairs of the world to those who are presumed to know more about them. I agree that we are perilously close now to "the flaming ramparts of the world, when the thundering regions of the sky will fall



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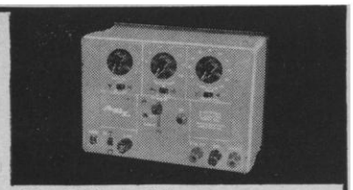

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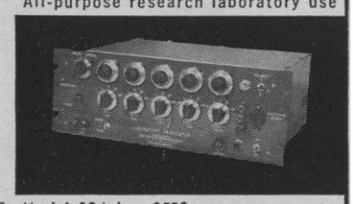

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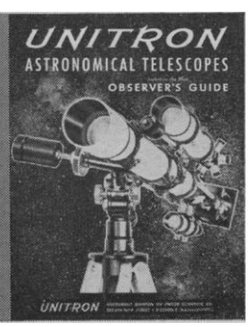

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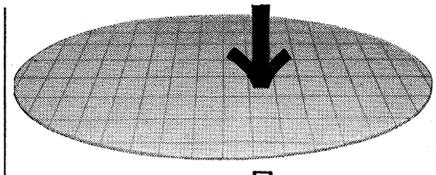

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upon us and the earth will slip beneath our feet," but this is no reason for starting a stampede to a nunnery—or monastery. Of course science, by itself, cannot claim to answer "the important questions," any more than art, religion, economics, or politics in themselves can solve the problems of the world. These terms are simply abstractions of what men do as their way of life.

Some years ago Moog took me to task because I obviously thought this was not the best of all possible worlds [*Am. Scientist* **35**, 541 (1947)] and defended "progress" (which, as is well known, I have always considered a snare and a delusion) with a ringing quotation from *Pippa Passes*. Now she seems willing to agree that it is indeed a bleak world, that perhaps, as I previously intimated, we are throwing a relentlessly dynamic ecosystem out of balance with our tamperings [*Am. Scientist* **35**, 395 (1947); **36**, 314, (1948)]. While I take small consolation in having been one of the first to take a dim view of the atomic age [*Science* **103**, 236 (1946)] I still think we should try to cultivate our gardens rather than retreat to them and watch the weeds take over. As scientists we are at least members of an international community and contributors to the only open synthesis mankind has so far devised. Theorems or gadgets will not save the world or answer its questions; if it is to be saved at all it will be through human consent and understanding, and we have a small duty, as scientists, toward that end. The world may be too much with us, late and soon, but even when cast overboard in mid-ocean a man will try to swim. Moog seems to be advising us to fold our arms and sink mutely to the bottom. Obviously, Browning is no longer her favorite poet. She might try Lucretius: "No night ever followed day, or dawn followed night, but has heard mingled with [children's] sickly wailings the lamentations that attend upon death and the black funeral."

JOEL W. HEDGPETH
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Aside from the assertion that Browning was ever my favorite poet, I am not in disagreement with most of what Hedgpeth has to say. His attitude toward the social responsibilities of scientists is not different from mine. My letter did not say, nor did I mean it to imply, that I think that scientists should turn their backs on the "affairs of the

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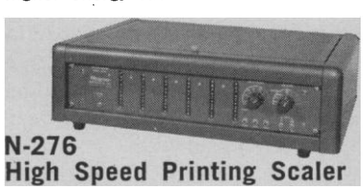

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world"; and I know from numerous kind comments I have received that other people did not read the letter that way.

Were I inclined to the ivory tower, surely I would not be a member in good standing of the American Civil Liberties Union, Americans for Democratic Action, the Congress of Racial Equality, the National Association for the Advancement of Colored People, and several similar organizations; I would not have helped to circulate the Pauling petition; nor would I have contributed much time, over the past 2 years, to the editing of the bulletin published by the Greater St. Louis Citizens' Committee for Nuclear Information. I think that Hedgpeth has developed a curious allergy that makes him break out into a rash of disagreement at the very sight of my name.

FLORENCE MOOG
Department of Zoology, Washington University, St. Louis, Missouri

Chemical Analysis by Mass Spectroscopy

In his very interesting article on the use of x-ray fluorescence analysis as a tool for chemical analysis in biology (*1*), Theodore Hall has included a table entitled "Capabilities of some methods for assay of chemical elements." Among these methods he lists mass spectroscopy. His Table 1 indicates that the minimum concentration detectable by this technique, "in the specimen fed to the device," is about 10^{-6} parts per million.

This statement, he says in his reference *31*, rests upon data given in a 1955 paper by M. G. Inghram (*2*). It is, however, a slight misinterpretation of Inghram's statement. It is the purpose of the present letter to make more clear the actual range of usefulness of mass spectroscopy. In brief, a sensitivity of one part in 10^{12} may well be attained in the near future, but it as yet has not even been approached by any commercial instrument. Nevertheless, present-day analytical mass spectrometers and spectrographs are indeed highly sensitive instruments; in fact, spark-source-equipped mass spectrographs are now pushing down into the one-part-per-billion (10^{-9}) region, in favorable cases. Some of the best electron-bombardment-source gas analysis instruments also approach this sensitivity. With a "tandem" instrument

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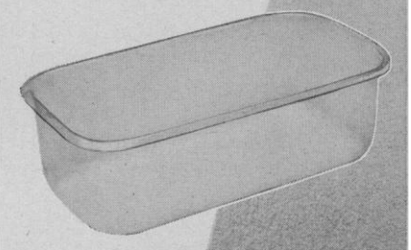

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