

that seems all too often to be directed against men of the highest intellectual caliber. An examination of the changing tone of political commentators in the press and over the radio suggests that we may be witnessing a more or less concerted attempt to discredit, or otherwise eliminate, all who oppose the narrow nationalism of the extreme right. Is it too much to say that in addition to the Cold War with the Kremlin we have on our hands a civil war of the mind in which the central issue is whether truth shall be permitted to emerge from a free discussion of evidence or a party line is to be maintained by the suppression of contrary opinion? This is a war for national sanity in which the life of science is at stake—and much more than that. It is a war in which scientists, with their strong bias towards objectivity and their need for freedom, can well play a useful part.

This is a poor time for scientists to lapse into conformism or political indifference. We cannot blame parents and taxpayers for their eagerness to bring the boys home after the surrender of Germany and Japan, or for their impatience with a war that requires us to pay continually in lives and resources merely to maintain a position in the hills of an Asian peninsula. We all tend to be victims of a shortsighted demand for quick, easy solutions of problems that have no such solutions. But

as professional scientists we should have a longer-range point of view: we should be patient enough and adult enough to carry on when the position demands it, whether we win spectacular victories or not. We have convictions. Let us continue to stand up for them.

But in this day of spreading suspicion it is perhaps necessary to face the fact that many scientists have felt it prudent to avoid all political entanglements. Join nothing, sign nothing, and you are pretty sure not to get into bad company! No sensible person will fail to give such considerations their due weight. But if we are so cowed that we cannot ally ourselves in the defense of science and scientific standards of truth, we invite the fate of the German scientists of the 1930's.

The *Bulletin* is ably edited and the Federation, within the limits of slender resources, is doing a fine job. They follow no party line and have a clean record of objectivity. Both need a wider base of support if they are to be continuously representative and secure. If you, Gentle Reader, should send in your dues and subscription, the news will not be telegraphed 'round the world and you are not likely to be rewarded with a Congressional Medal of Honor—but it would be a damned good thing to do just the same.

E. C. Kemble  
Harvard University

### Rare Earth Collection

FOR SEVERAL YEARS, the Iowa State College has had a contract with the Atomic Energy Commission to operate one of the Commission's laboratories, known as the Ames Laboratory. One phase of the authorized program (in which I have been very much interested personally) has been the study of the properties of the rare earth salts and metals, and the investigation of their possible uses in the atomic energy program. This program included developing methods for separating rare earths and producing the pure metals. The critical needs of the AEC for these materials for defense purposes have also been met. In preparing these materials for our own use, it has been found possible, with a little extra labor, to purify some additional quantities which we hope to make available for basic scientific research.

It has always been our policy to refer requests for such materials to industry, if it produces them in sufficient purity for the researches suggested. However, when these materials have been unavailable elsewhere, we have tried to supply them for important programs. Since our apparatus and equipment are designed for research purposes, our capacity is limited and the requests to date have far exceeded our supplies. However, recent improvements in our techniques have now made it possible for us to supply larger quantities of rare earths, and the AEC has granted us permission to set up a loan collection from which we will allocate the available material for important basic researches. We

intend to set aside, at this time, at least one kilogram each of  $\text{La}_2\text{O}_3$ ,  $\text{CeO}_2$ ,  $\text{Pr}_6\text{O}_{11}$ , and  $\text{Nd}_2\text{O}_3$ . These materials are better than 99.9% of the rare earth oxide indicated and in most cases other rare earths are undetected spectrographically. Some of this material will be put in metal form and, if shape is not important, can be supplied at the present time. We shall also set aside one kilogram each of  $\text{Sm}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{Yb}_2\text{O}_3$ , and  $\text{Er}_2\text{O}_3$ . These materials will come in two grades, both of which will be better than 99.9% except yttrium which will be better than 98%. We expect to have about 100 grams of each of these spectrographically free of other rare earths and with an over-all purity of 99.99%. Small amounts of metallic erbium and yttrium will also be available. While we have produced metallic samarium and ytterbium, it will probably be a year before these metals become generally available. In addition, we are setting aside 100 grams each of  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ , and  $\text{Lu}_2\text{O}_3$ . These materials are of better than 99.9% purity but may contain traces of neighboring rare earth elements. None of these will be available in metal form for some time. Gadolinium, at the moment, is in scarce supply. The demands have been very heavy and it will probably take us from six months to a year to replenish our stocks, but after that time we expect that a kilogram or so of oxide will be available and that the metal will also be available.

Terbium, europium, promethium, and scandium are not available at the present time.

The procedure for obtaining a loan is for the scientist to write a letter to the undersigned outlining the research program contemplated, stating the minimum quantities needed, the purity required and in what form the materials will likely be returned. These applications will be considered once a month and the available supplies allocated. These allocations will be based on the principle that the material should be divided in such a way as to result in the maximum of good basic research. The AEC has asked, as part of the loan agreement, that the borrowing university or research institution pay a service charge of \$5.00 to \$25.00—depending on the value of the materials—for the costs of administration, and that they guarantee the out-of-pocket costs if anything happens to the materials. A second condition of the loan is that the scientific information obtained be made promptly available to the Ames Laboratory and that the results be published for the general welfare of the country. A third condition is that the materials be returned as promptly as possible since there is certain to be a waiting list.

Once the allocation has been made, the applicant will be notified and the necessary forms sent to make delivery. It is recognized that in certain types of experiments, there are inevitably bound to be small losses. If these are less than 10% and are reasonable losses for the type of experiment involved, such losses will be considered part of the loan agreement. On the other hand, there are certain experiments where the material has to be used up, and, if these are important enough, we will try to make the materials available on an out-of-pocket cost basis, where the institution will be charged only the cost of producing them.

It should be mentioned that the granting of such requests for the elements samarium and below is much more likely than for the rare earths heavier than samarium, since these materials can be replaced with

much less labor than the heavier rare earths. Some of the scarcer heavy rare earth elements are very expensive to purify and may cost as much as a few hundred dollars a gram.

It is hoped that as time goes on the quantities in this loan collection will be increased, but in the meantime we would like the scientists to bear with us in that the requests will far exceed the supply and that it will be impossible to supply everyone promptly or even to fulfill many of the requests.

It would appear from the present indications that the rare earths are going to become important commercially in the near future on a much vaster scope than at present. A number of companies are at present producing particular rare earths in various grades of purity. We will send out, with each request, a list of companies which we know are producing rare earths and we urge that where their supplies are adequate the rare earths be obtained from them. We would be glad to add the names of any companies which have rare earths for sale to this list, if they so request. It should be emphasized, however, that this information is supplied solely for the benefit of the scientist and that we make no claims as to the purity or availability of the rare earths from any of these sources.

This loan collection at present is only available to American institutions which agree to make public their findings. If foreign requests are to be made, they will still have to be made through the Atomic Energy Commission in Washington although it is always wise to write us first to see if the materials are available.

Frank H. Spedding,  
Director, Institute for  
Atomic Research  
and Ames Laboratory  
Iowa State College

## Size of the Universe

**Y**OUR February issue (page 25) contained a report of a discovery that is causing much interest in the astronomical world just now; namely that the Universe is about twice as large as we formerly believed. It was a matter of some surprise to me to notice that your correspondent omitted all mention of the outstanding part that Dr. Walter Baade of the Mt. Wilson and Palomar Observatories has played in the making of this discovery.

For some time past it has been known that a discrepancy existed between the different methods that astronomers use for measuring distances. Just where this discrepancy lay was quite uncertain, however, until the work of Baade and Sandage established beyond all cavil that former estimates of the scale of the Universe were in error by a serious margin.

I mention this matter, because as acting secretary of the Commission for the study of extragalactic nebulae

I well remember how, as long ago as last September, Dr. Baade announced his results to the International Astronomical Union; and I well remember how his announcement was acclaimed by astronomers of all nationalities.

Fred Hoyle  
University of Cambridge, England

*The oversight was not intentional. It is of interest to note that on April 12th Dr. Baade reported that the Palomar results have been strikingly confirmed in a study of the southern sky by A. D. Thackeray of the Radcliffe Observatory at Pretoria, South Africa, who has found good evidence for the revised distance scale from observations of cluster-type variables in the Small Magellanic Cloud, an extragalactic nebula visible only in the southern hemisphere. Further corroboration has been provided by H. Mineur, director of the French Institute of Astrophysics, in a recent note to the French Academy.—Ed.*