COMMENTARY

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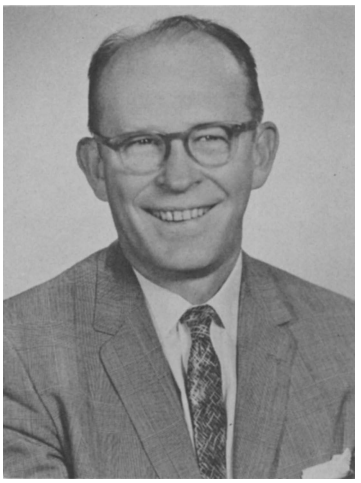
NEW APPLICATIONS FOR PLOWSHARE AND ITS FUTURE



It seems entirely likely that new applications as yet unthought of remain to be developed for Project Plowshare (the nonmilitary use of nuclear explosions), and this may prove to be one of the main factors determining Plowshare's future.

The recent years have shown increasing interest in Plowshare by the scientific community because it gives tremendously intense bursts of neutrons and gamma radiation. Several important but otherwise impossible experiments can be done only with these bursts, e.g., synthesis of certain transuranic elements and strange radiation chemical products where a mestastable product is hit again after being formed. We have learned in the case of the lasers what a world of new technology is opened by intense bursts of coherent light in the visible and near infrared wavelengths, and it seems entirely likely that a similar situation applies in the gamma-ray region. Neutron bursts already have proven their merit since this is one of the main ways in which the synthesis of some of the isotopes of the heavy elements has been accomplished.

We have followed with extreme interest the recently developed synthesis of diamond from graphite using chemical explosives. We have seen from this work that good yields with several percent conversion can be obtained with chemical explosives. So the question immediately arises, what about Plowshare chemistry? When a megabar pressure wave passes through a graphite slab something happens that makes as much as 10% of it into diamonds. Might not this effect be magnifiable if atomic explosions were used? It seems entirely reasonable that it should be so, and this serves to illustrate undiscovered possible new applications which may, when found, affect Plowshare's future. The strange high-pressure state of matter about which we know so little may be a chemical shortcut of great importance.

Considering the main factors and weighing them with a half-dozen lesser ones, such as the quickening interests in other countries, the possible influx of talented new recruits, the political tides of the future which might at any moment turn favorable instead of negative, etc., we conclude and predict:

1. Plowshare is a very worthwhile project.
2. Every effort should be made to push forward development work on it.
3. Vigorous new industrial collaboration arrangements along the lines of Project Gasbuggy for development of oil shale, tar sands, underground storage, and large earth-moving jobs will be made in keeping with present policy.
4. The scientific community will use the capability more widely than at present.
5. Important new uses will be found.
6. In the face of these conclusions, we find the project to be well worthwhile and fully deserving of the $100 to $200 million spent to date, and the level should be increased when large scale applications loom closer.