

AMERICAN ASSOCIATION FOR
THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

ROBERT L. BOWMAN	WILLARD F. LIBBY
MELVIN CALVIN	GORDON J. F. MACDONALD
JOSEPH W. CHAMBERLAIN	EVERETT I. MENDELSON
FARRINGTON DANIELS	NEAL E. MILLER
JOHN T. EDSALL	JOHN R. PIERCE
DAVID R. GODDARD	COLIN S. PITTENDRIGH
EMIL HAURY	KENNETH S. PITZER
ALEXANDER HOLLAENDER	ALEXANDER RICH
ROBERT JASTROW	DEWITT STETTIN, JR.
EDWIN M. LERNER, II	EDWARD L. TATUM
CLARENCE M. ZENER	

Editorial Staff

Editor

PHILIP H. ABELSON

Publisher

DAEL WOLFE

Business Manager

HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES

Assistant Editors: ELLEN E. MURPHY, JOHN E. RINGLE

Assistant to the Editor: NANCY TEIMOURIAN

News and Comment: DANIEL S. GREENBERG, JOHN WALSH, ELINOR LANGER, MARION ZEIGER, ROSEMARY GALLI

Europe: VICTOR K. MCELHENY, Flat 3, 18 Kensington Court Place, London, W.8, England (Western 5360)

Book Reviews: SARAH S. DEES

Editorial Assistants: ISABELLA BOULDIN, ELEANORE BUTZ, BEN CARLIN, SYLVIA EBERHART, GRAYCE FINGER, NANCY HAMILTON, OLIVER HEATWOLE, ANNE HOLDSWORTH, MARCIA JODLBAUER, RUTH KINGERLEE, KATHERINE LIVINGSTON

Advertising Staff

Director

EARL J. SCHERAGO

Production Manager

RAYMONDE SALAMA

Sales: New York, N.Y., 11 W. 42 St. (212-PE-6-1858): RICHARD L. CHARLES, ROBERT S. BUGBEE
Scotch Plains, N.J., 12 Unami Lane (201-889-4873): C. RICHARD CALLIS

Chicago, Ill., 6 W. Ontario St. (312-DE-7-4973): HERBERT BURKLAND

Los Angeles 45, Calif., 8255 Beverly Blvd. (213-653-9817): WINN NANCE

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

Science, Technology, and the Gold Drain

On the surface, the gold drain is a problem largely for economists, bankers, and politicians. A closer look indicates a deep and complex relation to science and technology.

Were it not for the net contribution of research-intensive products to the balance of trade, much more of our gold would have been lost long since, or stringent controls would have been applied. For example, in the period January to September 1962,* the value of exports of synthetic fibers and goods made from them, and of chemicals and related products, reached the annual rate of \$1.9 billion, while the corresponding value of imports was \$0.5 billion. Other great contributors to our favorable balance of trade included industrial machinery, electrical apparatus, and aircraft. Altogether, research-intensive products were exported at the rate of \$10.5 billion, while the rate for corresponding imports was \$2.2 billion.

In 1964 our total exports exceeded imports by nearly \$7 billion. Yet there was a balance-of-payments deficit of over \$3 billion; part of this was manifested as gold drain, and part as increased liquid assets which foreigners hold in this country. Foreign aid, military expenditures abroad, and tourism are usually thought of as the major elements responsible for the balance-of-payments deficit, but outflow through these channels was overshadowed by a net outflow of about \$6 billion for U.S. private investments. The United States is continuing to increase its creditor position.

A large fraction of the capital that has gone abroad has been sent by industrial companies such as E. I. du Pont de Nemours, International Business Machines, and General Electric. These and scores of other large organizations have erected, usually through affiliates, numerous manufacturing installations that embody the most advanced technology and that produce research-intensive products. New plants are financed only in part by money from the United States. Earnings of existing facilities abroad are plowed back and used to build additional plants, and local capital also is employed. The vigor with which Americans are operating in Europe is one of the principal reasons for President de Gaulle's recent annoyance with our monetary and fiscal policies.

At present about 80 percent of the production of these European affiliates is consumed in the nations in which the plants are located. As yet, few of the products are exported to the United States, but it would be astonishing if these foreign plants did not eventually compete vigorously for a greater share of world trade. In addition to erecting plants, many of the companies have established research facilities abroad, staffing them largely with foreign scientists. Profits and technical knowledge already are flowing back to this country, and that flow will increase. Nevertheless, it is difficult to predict whether in the long run these foreign investments will serve the national interest.

Our ability to compete has diminished.† For instance, in 1953 our export price for steel plate was \$104 per metric ton; in 1961 it had risen to \$127. The corresponding prices for steel plate produced by the European Coal and Steel Community were \$115 in 1953 and \$99 in 1961. Our competitive position as world suppliers of research-intensive products has also weakened. This may be seen by comparing 1961 prices, using 1953 prices as an index of 100. For electrical machinery, the figures were: United States, 123; Germany, 109; Japan, 103. Some economists feel that our competitive ability has recovered somewhat. However, during the first 8 months of 1964, net imports of steel mill products were at an annual rate of 3 million tons; in 1961 the net was 1.2 million tons.

Ability to compete in the world market is fundamental to our economic well-being. In the arena of foreign trade our future success is by no means guaranteed.—PHILIP H. ABELSON

* H. B. Lary, *Problems of the United States as World Trader and Banker* (Princeton University Press, Princeton, N.J., 1963), p. 92. † B. Balassa, Ed., *Changing Patterns in Foreign Trade and Payments* (Norton, New York, 1964), p. 30.