ly to temperatures near 100°F. If this process is properly carried out, the animals die with no signs of distress, but the process carries no automatic safeguard against misapplication and ranks as another cooking art which must be executed with finesse. No valid physiological objections have been raised to this method of killing crustaceans, and it should be employed by those people who assume that lower animals feel pain and who are revolted by their violent reactions to boiling water.

GORDON GUNTER

Gulf Coast Research Laboratory, Ocean Springs, Mississippi

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- 1. A. G. Huntsman, J. Fisheries Research Board Can. 6, 476 (1946).
- 2. R. M. Bailey, Ecology 36, 526 (1955).

#### Studies of the Cuna Religion

Those who witnessed the "burning" of myself and my book Apples of Immortality from the Cuna Tree of Life [Science 134, 278 (1961)] will wonder why Stout wasted 73 lines of type rather than tell the editor that my little 68-page essay was so bad that it did not merit review. Possibly Stout was defending his 5 months' San Blas study (1940–41) against my eight trips to the Cuna tribe from 1950 to 1959.

Stout failed to mention that Apples of Immortality was merely a postscript to a 352-page study of the Cuna religion as compared with other primitive religions of the world, called Secrets of the Cuna Earthmother, in which striking parallels of sacred symbol, belief, and ritual are discussed.

There are those who do not take Stout's dim view of these studies.

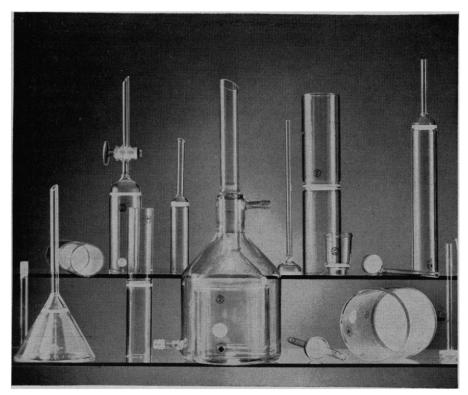
CLYDE KEELER

Milledgeville, Georgia

#### Support for Medical Research

While I appreciated the lively journalistic style of Robert Toth in "Science and the news" [Science 134, 822 (22 Sept. 1961)], the news item relative to the appropriations for the National Institutes of Health is so obviously slanted that I cannot help but feel it will give a false impression of the attitude of scientists in general toward the attempted solution of problems of illness.

The growth in funds for the National



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Institutes of Health has been carefully considered, and the Consultants' Committee headed by Boisfeuillet Jones referred to in the article is made up of men whose scientific integrity and objectivity is beyond question. It would be difficult, because of the Public Health Service's wise policy of wide consultation, to obtain as consultants men who had not already been consulted or who were not engaged in the solution of problems supported in part by the Public Health Service. Whether money for health comes from public sources or private sources, the essential point is that research looking toward better health is being supported.

In Toth's last paragraph he seems to imply that there have been no results from the research done. Many of the results of research available today or in the future will not be immediately applicable; some are already applicable, as witness vaccination against infantile paralysis, the promise of an effective vaccine against mumps, the thousands of people now living useful lives because of better understanding of the control of diabetes or the management of heart disease. Shall we say to the inmates of our many mental institutions that advances in mental health can be made only at a rate to be determined by some arbitrary figure?

Scientists all realize the grave responsibility that their fellow citizens place upon them by giving them funds with which to work.

SHIELDS WARREN

Cancer Research Institute, Boston, Massachusetts

The article "Congress presses funds on the National Institutes of Health" is a rather distorted and somewhat misleading interpretation of the background of increased federal support for medical research.

Toth makes quite a point of the percentage increases in contrasting this year's appropriations for the National Institutes of Health with appropriations a few years ago. He neglects to point out that federal support for medical research was practically nonexistent 15 years ago; all increases above a rock-bottom level naturally produce handsome growth percentages.

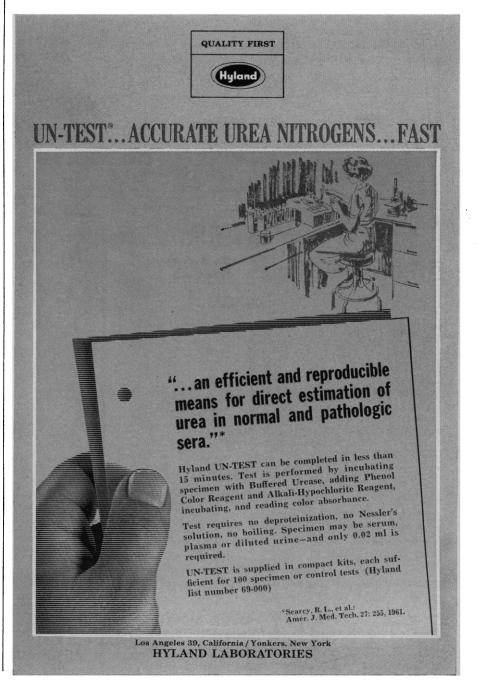
He fails to relate increases in federal medical research support to comparable programs in other areas of national concern. Support of our space program, for example, has jumped from practically zero a few years ago to close to \$2 billion in the current fiscal year,

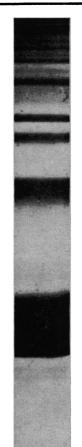
with predictions from our physical scientists that a few years from now Congress will be asked to appropriate \$6 billion annually for this program alone. If Toth applied his slide rule to these space appropriations, he would obtain astronomic percentage increases.

Furthermore, Toth does not relate expenditures for medical research to the total federal budget. Not only is medical research support far less than 1 percent of total appropriations but it is a small segment indeed of the \$9 billion which the federal government currently spends for research of all types.

It is also charged that there is a good deal of "force feeding" of medical re-

search by Congress with a consequent "regurgitation." The exact contrary is true. In each year that Congress increased the monies for medical research over the Administration budget, the critics cried out that the money could not, and would not, be spent properly. The record shows, however, that at the end of each of these fiscal years there was always a sizeable backlog of scientifically approved research and training projects which could not be supported because of lack of funds. Furthermore, the present rate of rejection of research grants denies support to more than half of all applications submitted to Bethesda.





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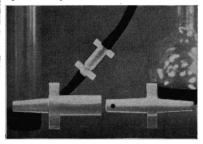
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Concluding his article, Toth asks us to produce "a golden egg or two." I will resist the obvious temptation to dwell on some of the less-than-golden eggs produced in the research programs of the Department of Defense and elsewhere in our government. We have spent hundreds of millions of dollars in developing planes which never flew and additional hundreds of millions for missiles which were later abandoned.

With a much smaller federal investment, medical research has produced many golden eggs over the last 15 years. Space does not permit a listing of most of these accomplishments, but a few should be cited here.

- 1) In the field of cancer, one of every three Americans is saved today as against one in every four a few years ago. This gain has been achieved largely through the national cancer chemotherapy program supported by the Congress. We now have 5-year cures against three types of cancer. This is the first time in history that this has occurred. Through the remarkable cancer compound screening program, we have produced more than a score of chemical agents which are effective in some degree against various forms of cancer.
- 2) In the field of cardiovascular diseases, which account for more deaths in our country than-all other diseases combined, more progress has been made in the past decade alone than in all the previous years of recorded history. This has been achieved largely through research supported by congressional appropriations. Heart disease is no longer regarded as a sentence of death. In less than a decade the prognosis in most forms of congenital heart disease has been converted from "hopeless" to "surgically curable." Similarly, aneurysms and occlusive lesions of the aorta and major arteries which were previously considered inevitably disabling or fatal conditions are now amenable to corrective surgical treatment. In the majority of patients hypertension can now be well controlled or cured. Over the past decade an impressive body of scientific knowledge has been developed concerning the etiology and treatment of arteri-
- 3) In the field of psychiatry, the Psychopharmacology Service Center of the National Institute of Mental Health is the prime source of support for research scientists who are developing more effective drugs against the various forms of mental illness. The remarkable reduction in the number of patients

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resident in our public mental hospitals is a direct consequence of this accelerated research.

4) In the field of neurology, research work at the National Institute of Neurological Diseases and Blindness led to the discovery of the cause of retrolental fibroplasia, the prime cause of blindness in infants for many years. It has been stated that the cost of the care for the thousands of children already blinded will be 100,000 times the cost of the medical research which led to successful prevention of the disease.

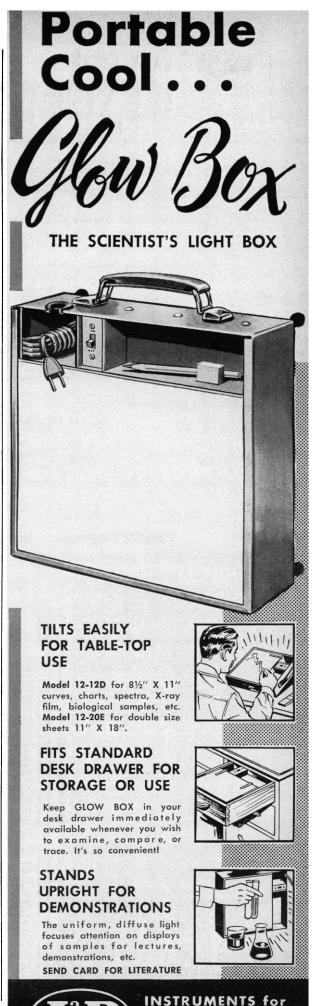
Day in and day out, week in and week out, there are reports of additional advances against many baffling diseases.

On 27 September, a few days after Toth's article appeared, the Surgeon General of the Public Health Service announced that isoniazid, a drug widely used to treat tuberculosis, was 80-percent effective in preventing the disease among more than 12,000 people directly exposed to newly discovered cases of tuberculosis. In man's ancient fight against tuberculosis no one ever before dared hope for this degree of prevention.

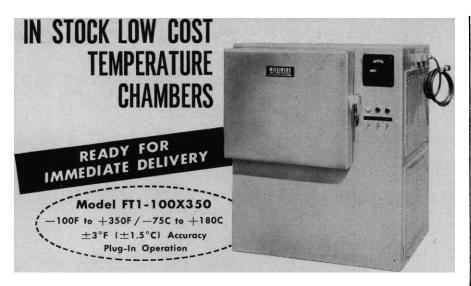
While Toth's article is heavy on statistics and percentages, it strangely omits any discussion of the truly staggering human disability resulting from unchecked disease. In World War II, for example, 5 million Americans in the prime of life were unable to join the fight to preserve this democracy because of pronounced physical and mental defects. Two diseases alone, heart disease and cancer, killed more Americans in 6 months of last year than were slain in all 4 years of World War II. Every minute at least two persons die from heart disease and cancer in the United States, and two-thirds of all Americans now living will eventually have these diseases.

It really gets down to a very simple question: What price human life? What price do we put upon a drug which arrests leukemia in a child and gives him, and his parents, a few more years of hope and happiness? What price do we put upon the discovery of a research breakthrough which prevents blindness in a child? What price do we put upon the heart surgery which restores a victim to productivity and to usefulness in our society?

We who are involved in medical research would be the first to admit that ours is a long-time effort with many heartbreaks and many disappointments



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along the way, but we are not defeatists -we gain strength from the support we have received, and we will persevere until we have unraveled the mysteries of the major illnesses of our time.

MICHAEL E. DE BAKEY College of Medicine, Baylor University, Houston, Texas

Congratulations to Toth for a succinct commentary dealing with Congress and the National Institutes of Health. I hope it will be read widely, both in and outside of Washington. Indeed, at least on one important count, Terry must have a unique bureaucratic responsibility.

One must agree that such governmental outlavs to the Institutes of Health are in a very real sense "investments in human capital," and one must therefore appreciate the obvious zeal Congress manifests in supporting such expenditures. However, a serious difficulty evolves here when one realizes that the United States is apparently handicapped by a shortage of "brains" at the moment (hence, the scourge of cancer and problems in space technology), rather than by inability to use what is available. Naturally, it is gratifying that we seemingly have few medical research projects of merit wanting for financial support, but our greatest need is for more highly trained scientists. For those who have run the gamut of a Ph.D. program, it is abundantly clear that more talent is not developed simply as a result of increased monetary outlay—the time element plays a vital role. In short, it appears most incongruous that these public-spirited representatives will consistently add to NIH appropriations in excess of budget requests (presumably made in terms of known need), while in the same hallowed halls essentially refusing to make more direct "investment" in people. How about a large sum for postgraduate grants (not loans) to pursue scientific studies? In light of some speculation it will pay off handsomely.

Finally, to carry examination of these inconsistencies a step further, one is compelled to comment on the utter folly of cutting down an already grossly inadequate Food and Drug Administration appropriation. If public health is of genuine concern in this "age of food additives, etc.," such an unenlightened maneuver is patent nonsense.

J. D. DEFOREST

Department of Economics, Denison University, Granville, Ohio

In an article purporting to review and criticize the budget history of the National Institutes of Health, Toth sees fit to refer to Representative John Fogarty as "a former bricklayer from Rhode Island" and to Senator Lister Hill as "son of a small-town doctor from Alabama." These otherwise irrelevant biographical details might have been introduced to reveal that in this land of opportunity modest origins need not preclude attainment of high position. It appears from the context of the article, however, that such was not Toth's intent. Rather have these facts been included to discredit the two eminent legislators and to disqualify them from holding valid opinions on matters of the federal support of biomedical research.

I believe that character assault such as this is entirely out of place in a scientific journal, whatever the practice of the New York Herald Tribune, which normally employs Toth, may be. It happens that Representative Fogarty and Senator Hill, as a result of many years' study of the problem, have become among the best informed nonscientists in matters of biomedical research. They have thought and acted creatively in this area, and whereas one may argue with the numbers in their budgets, no one can question their high motivation or the magnitude of the contribution which they have made to scientific research in this country. One wonders when Toth will become as well informed and whether he will ever make a like contribution. Perhaps he is not so fortunate as to have been a skilled bricklayer and was not blessed with a father who was a small-town doctor.

Editorial scrutiny of contributions to scientific journals is always irksome to authors. Editorial boards are not devoid of responsibilities, and among these is the obligation to delete irrelevant polemic. I believe that in the present instance the editors of *Science* have been remiss in their duty.

DEWITT STETTEN, Jr. 7504 Maple Avenue, Chevy Chase, Maryland

None of the letters of criticism challenge the facts in my news article. They were the basis of my conclusions. Others can draw their own.

Stetten's incredible charge of "character assault" requires more response. Certainly it was not my intent to "discredit" the legislators by those descrip-



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tions to which he so violently objects. I wanted only to add some dimension to the men within the context of portions of the article. Similar descriptions were included in profiles on the men in recent issues of Medical World News, profiles with which, I understand, both men were quite pleased. That on Fogarty (18 Aug. 1961) was headlined: "Onetime bricklayer becomes a key force behind the \$4 billion federal medicine and research programs." As science relies more and more on government money, the politicians themselves become factors in federal appropriations for science. In this respect it is noteworthy that De Bakey's letter to Science was released to the press by Fogarty's office shortly after it was written.

I wish to again credit the pioneering study of NIH appropriations made last year by Robert P. Clark of the Louisville Courier Journal while he was a Nieman fellow at Harvard University.

ROBERT C. TOTH

Washington Bureau, New York Herald Tribune, Washington, D.C.

#### Shelter and Survival

Please allow me to offer a brief rebuttal of the editorial on President Kennedy's fallout shelter program, an editorial titled "Better nothing than something?" [Science 134, 1955 (1961)].

The editorial discusses the President's contention that the proposed shelter program is meant to serve solely as survival insurance in case of an irrational or accidental nuclear attack on this nation and is not to be construed as an added element of our military deterrent power.

I personally support the President with some enthusiasm, but the fact that he said the words and himself believes the words does not make them true. He is flatly disputed by one of his most ardent supporters, who, insofar as the subject of civil defense is concerned, is much more knowledgeable than he is himself—Chet Holifield, congressman from California. Holifield heads the subcommittee which has been riding close herd on civil defense for the past decade, as recorded in volume after volume of expert testimony.

It is Holifield's well-buttressed judgment that shelters will definitely contribute very substantially to both the credibility and the actuality of weapons deterrence. And it is on this basis that he is pressing for an eventual expenditure of \$20 billion on a nationwide shelter system. The Kennedy proposal simply gets our feet in the water, and once that happens the logic of being committed to "survival by shelter" will soon take us into the deeper water of "more shelters, more survival," "bigger bombs? deeper digging!" "faster weapon-delivery time? full-time safety by full-time living, working, and sleeping underground!"

I do not say the President himself will push us into this deeper water, or will even approve of it. My feeling is that he would do just the opposite. But the Pentagon hasn't opened with the Herman Kahn civil-defense gambit with

any intention of stopping short of a checkmate to stifle the opponents of more arms and more bellicosity.

So the people of America have no simple choice between insurance and deterrence, as the editorial implies they have when it asks, "Is the distinction between insurance and deterrence really so hard to grasp?" The question can be answered easily and directly with a "No."

But this is the wrong question, and it is a misleading question because it carries the implication that civil defense really makes sense if people will just stop being confused about it. For my part, I do not blame anybody for con-



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