

letters

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deflected, stopped, or identified by their charge. Calling a tandem a "molecular disintegrator" cannot hide the fact that it accomplishes the suppression by virtue of its high energy.

The long history of failure at low energy is in striking contrast to the quick successes of the seven groups that have now made sensitive measurements with multi-MeV machines. Litherland *et al* speculate that low-energy methods "could" or "would" work, but they never mention a specific low-energy technique. In fact the only alternative they suggest is a "small tandem accelerator"!

RICHARD A. MULLER
University of California
Berkeley, California

6/26/79

Straightening the record

I feel compelled to correct your footnote on electron monochromators in October (page 48). The 127° monochromator was originally conceived by Hughes and Rojansky¹ and then constructed by Hughes and McMillen.² Most papers subsequently published on this device were concerned with its refinements or the rehash of the original work. The group of workers at Laval University, being the most prolific publishers on this subject, have been mistakenly assumed by some to be its originator. I hope to put the record straight.

References

1. A. L. Hughes, V. Rojansky, *Phys. Rev.* **34**, 284 (1929).
2. A. L. Hughes, J. H. McMillen, *Phys. Rev.* **34**, 291 (1929).

MURRAY ARNOW
Zenith Radio Corporation
Melrose Park, Illinois

10/25/79

The Booth effect

High fluxes of D-T neutrons are of very great importance for the materials-testing program for fusion reactors and for use in the treatment of cancer. It is appropriate, therefore, that *PHYSICS TODAY* should have featured on its cover for April a photograph of a tritium-loaded metal target that produces sustained yields of D-T neutrons of exceptional intensity and stability under intense deuteron bombardment. But that is only part of a fascinating story.

More than ten years ago, Rex Booth of Livermore, the designer of the target, made the seminal observation¹ that a tritiated metal target bombarded by a mass-analyzed deuterium ion beam gave far larger total neutron output over its

useful life than when bombarded by an unanalyzed beam. This observation has proven to be the essential key to the attainment of levels of D-T neutron production now being attained, and which are of such great technical importance.

It is eminently appropriate that this observation should be designated the "Booth Effect."

The interpretation of this effect that is now generally accepted^{2,3} is that the projectile ions supplant target tritium at the end of their range, and that the target ions at the end of the relatively short-ranged diatomic ions coincide pretty nearly with the layer from which the atomic ions produce their peak yield from the 110-keV resonance of the D-T reaction. Eliminating the diatomic ions from the target area impinged by the atomic ions therefore eliminates the principal source of tritium depletion for the peak-yielding target layer excited by the atomic projectiles, and prolongs the target life by a factor of ten or more.

References

1. R. Booth, University of California Radiation Laboratory Report No. UCRL 70183, February 1967, and private communication.
2. R. Booth, H. H. Barschall, *Nucl. Inst. Meth.* **99**, 1 (1972).
3. J. H. Ormrod, *Can. J. Phys.* **52**, 1971 (1974).

LAWRENCE CRANBERG
Austin, Texas

9/21/79

Another vote for Esperanto

Attendance at the 17th General Assembly of the International Astronomical Union delayed my reaction to the Guest Comment (July, page 9) by B. A. Sherwood discussing the need for an international language.

The meeting however verified once more the correctness of the various points stressed by Sherwood and mainly the difficulties foreigners encounter with spoken English.

Originally French-speaking, I learned Esperanto when quite young and it has been a real window open onto the world (and not only to a restricted intelligentsia). As I am now mastering other languages, Esperanto is less important now; but I still use it as a working language with some astrophysicist colleagues (the papers are, however, published in English).

Although I am pessimistic on its future because of numerous unfounded prejudices and cultural "imperialism" of other languages, Esperanto has considerable advantages we should consider. Besides the ones already pointed out by Sherwood, I should like to add it is the most precise language I know, not only because of the extensive vocabulary, but also because of the many nuances it contains.

How efficiently it could be used for science, saving us the time we are compelled to spend in studying several foreign languages!

ANDRÉ HECK
IUE Observatory
Madrid

10/3/79

A legacy and a hope

A few weeks before his untimely death, Nathan Sanders Wall, a distinguished nuclear physicist from the University of Maryland, forwarded to the Committee of Concerned Scientists a letter pleading for action to help Soviet colleague Vladimir Kislik. The fact that this letter was directed to Wall reveals that even in the Ukraine his years of dedicated service to the cause of human rights is well known. Our Committee feels a special commitment to act on Sandy Wall's legacy to scientists to speak out on behalf of oppressed colleagues—particularly in the case of Vladimir Kislik.

We believe that the best way to effect this is to have our American colleagues read this letter for Kislik by a fellow scientist who was recently released from the Soviet Union.

Dear Dr. Wall,

I am writing to you at the request of my Kiev colleague Dr. Vladimir Samuilovich Kislik. Since all of his mail is opened by the KGB, and since I myself have now emigrated from the USSR, he asked me to write this letter to you.

At the present time Dr. Kislik's situation has significantly worsened. He has been summoned to the KGB a number of times in the course of 1979.

The essence of the matter is as follows: Although for the past six years he has not been permitted to work at his specialty, he has continued to publish the results of his activity in the international press. One of his recent works published abroad is on the evaporation of helium by irradiation of a certain type of construction steel. Naturally, both in the title of the article and in the article itself the specification number for this steel was mentioned. For a number of years this steel has not been on the secret list.

Earlier, when Dr. Kislik was still on the staff of the Nuclear Research Institute (NRI) of the Academy of Sciences of the Ukrainian SSR, he had intended to publish the results of this steel research. In accordance with Soviet regulations, he submitted the article for pre-publication clearance by an expert commission of the NRI. It was duly found to be free of classified material and was cleared for publication in the press. Dr. Kislik has a copy of this clearance decision signed

by the then Director of the NRI, Academician Pasechnik. Furthermore, articles written jointly by Votnova and others associated with the Kurchatov Institute of Atomic Energy and persons on the staff of the Atomic Reactors Institute in Melekes also mention the specification number of this steel. They were published in 1971 or 1972 in the magazine *Atomnaya Energiya* (Atomic Energy).

These facts, however, are deliberately ignored by the KGB.

V. S. Kislik has been officially informed that the steel he mentions in the article he published abroad is on the secret list, and that consequently in publishing an article about it in the open press, he compromised a state secret, and thus, committed an act qualifying as "treason" in the USSR. He was then shown the results of the expert examination made of his article by the Kurchatov Institute of Atomic Energy and the NRI. The conclusion in both cases was that "a state secret was compromised in the article of V. S. Kislik."

It is obvious that his case has been fabricated by the KGB with the object of punishing Dr. Kislik for his fight on behalf of the emigration of Jews from the USSR, and for the fact that for a number of years, he has not been afraid to stand in clear opposition to the Soviet regime.

Dr. Kislik's situation is extremely dangerous. The fact that the case against him is a malicious invention will not keep the KGB from wreaking its vengeance on him.

He himself, his acquaintances, his mail and his telephone are all under constant surveillance.

During his last session with the KGB, which took place in May of this year, Dr. Kislik was warned that if he persisted in his fight and continued to demonstrate his disloyalty, he would be prosecuted and convicted. If he changed his position, however, he would be allowed to leave the USSR as an emigrant before the beginning of the Olympic Games.

But he should neither bow to blackmail nor believe the promises of the KGB.

The sentence meted out in such cases in the USSR is a *minimum* of eight years at hard labor, which, in the conditions prevailing the camps, is tantamount to a sentence of death.

I beg you to use your influence to help V. S. Kislik.

Dr. Kislik showed me the letter in which you write that your University is doing work jointly with the Nuclear Research Institute of the Academy of Sciences and go on to ask Dr. Kislik's opinion of Prof. Nemets, the Director of the Institute.

Neither I nor Dr. Kislik would like

to judge the human and professional qualities of this man without substantiation. But you will be able to judge for yourself what sort of person Academician Nemets is from reading my letter. You will, perhaps, be interested to learn that the document setting forth the conclusions of the expert commission, which examined V. S. Kislik's article, was signed by Academician Nemets. This document falsely stated that the article "contained state secrets" and was one of the "proofs" of his guilt. Other examples of Academician Nemets' probity could be adduced.

It is both Dr. Kislik's opinion and my own that, however contradictory it may seem, considering Nemets' turnabout it may be possible for Dr. Kislik to leave the USSR.

Very truly yours,
Yakov Borodowsky (signed)

I am myself a physicist and have worked on the study of electrically active defects in high-purity semiconductors and on the nature of charge losses in semiconductor detectors of nuclear radiation. I worked in the NRI from 1970 to 1978. The last time I saw V. S. Kislik was two days before my emigration from the USSR on the 13th of June of this year.

The cited article is "The Kinetics of Helium Release for Irradiated Samples of Austenitic Steels," published in the *Journal of Nuclear Materials*, Vol. 66, 1978. The irony of the situation is that Kislik is being placed in the precarious position of being accused of anti-Soviet activity, *ex post facto*. A possible charge of treason confronts him.

As was so clearly stated in the letter, Kislik has been subjected to public rebuke and prevented from pursuing his research since 1973, when he first sought to leave the USSR. In spite of the official harassment and scientific isolation, he had remained determined to exercise his right to continue scientific work wherever he chooses, as guaranteed by the US Declaration of Human Rights and the Helsinki Final Act. Moreover Kislik's wife and child have already left the country in the hope that he would be granted the right to join them under the "reunification of families" provisions of the aforementioned documents. The prolonged anguish to which he has been subjected has aggravated his serious cardio-vascular problems.

We appeal to you to intercede for Kislik by writing to:

Academician Oleg Nemets
Nuclear Research Institute of the
Ukrainian Academy of Sciences
Kiev, Ukrainian SSR
USSR

Academician B. E. Paton, President

Ukrainian Academy of Sciences
Vladimirska 54
Kiev 252030 Ukrainian SSR
USSR

Minister Golovoshchenkov
Ministry of the Interior
15 Korolenko St.
Kiev, Ukrainian SSR
USSR

Words of encouragement to Kislik at Rusanovsky Bulvar 10/122, Kiev, Ukrainian SSR, USSR, would help him to maintain his morale as he continues efforts to be reunited with his family and resume his scientific career. We would like to be able to thank you for your help; please send copies of your correspondence to our headquarters, Committee of Concerned Scientists, 9 East 40th Street, New York, N.Y. 10016.

MAX GOTTESMAN
MARK KAC
JAMES LANGER

Committee of Concerned Scientists
New York, New York

Recovering indirect costs

The subject of indirect costs on research grants and contracts is a constant source of irritation to most university principal investigators and researchers. It is also a subject that is badly misunderstood by these same people. In a recent letter (June, page 13) Harold Zirin managed to put in a single communication almost all of the popularly believed, *but incorrect*, suppositions concerning indirect costs.

Several years ago I held notions similar to Zirin's. At that time I and some of my colleagues watched with concern our indirect-cost rate increase markedly year after year.

Our concern was so great that we did a survey of most of the other major research universities and discovered that our rate was the highest of them. We wrote a report to the administration of our university complaining about this. As a result, I was appointed by one of our vice-presidents to an *ad hoc* committee to study this subject. This is what I found:

► The total cost of a project consists of the sum of direct costs and indirect costs. The costs of any particular activity can be assigned to one or the other, but not both. The assignment is usually made on the basis of minimizing total costs.

► Direct costs are easy to understand. A research group needs a voltmeter; it is purchased and charged directly to the grant or contract.

► Indirect costs, or more accurately pooled costs, on the other hand are a little more difficult to understand, but not much. These are real costs that are incurred by the university related to the support of many different activities si-