

LETTERS

your ignorance of how bad it was in 1848"? That's *too* unconventional.

LEON LEDERMAN
University of Chicago
Chicago, Illinois

9/91

Chernobyl News Reliability Revisited

Jovan Jovanovich (December 1990, page 91) attacks the credibility of William Sweet's news story "Chernobyl Aftermath to be Assessed by International Expert Team" (July 1990, page 62). There are four specific points that I would like to raise with Jovanovich:

▷ He states: "Thanks to *glasnost*, the Soviet mass (nonprofessional) media abound today with all kinds of information... much of it is highly suspect." Is Jovanovich suggesting that for the past 70 years the professional (KGB controlled) media in the Soviet Union were highly reliable? Surely, it is now obvious to the whole world that the "nonprofessional" reports of concentration camps, genocide and starvation were far more reliable than the official denials of the Bolshevik bureaucracy.

▷ Jovanovich notes that the governments of Byelorussia and the Ukraine have reported that several million inhabitants live in contaminated areas and then suggests that because these republics "have strong independence movements," they "are exaggerating Chernobyl's consequences to further their political aims." He also notices that "it is mainly (only?) Byelorussian and Ukrainian government officials making these statements, while Soviet (federal) officials and professionals are not."

First of all, I agree that the "professionals" in the Moscow bureaucracy have been ignoring and downplaying the consequences of the Chernobyl disaster for the past five years. Any last vestige of credibility of the Soviet nuclear bureaucracy was shattered by the 27 April 1988 death of Valerii Legasov, who, as a leading proponent of nuclear energy, had been the main Soviet spokesperson at the International Atomic Energy Agency meeting in Vienna in August 1986. Realizing that he was fighting a losing battle to bring responsibility and restraint to the Soviet nuclear program, he committed suicide after writing a stinging condemnation of the bureaucracy and of the basic failure of the industry to learn the lessons of Chernobyl.

Second, all 15 republics of the Soviet Union have declared their sovereignty or independence. All fa-

vor a dissolution of the Bolshevik empire as it now exists. And the inept handling of the Chernobyl disaster by the central authorities has been a major impetus to these movements. The people are fully aware that the central authorities never have been and never will be concerned with their welfare.

Finally, let me assure Jovanovich that of the hundreds of visitors from the Ukraine, Byelorussia and the Baltic republics who have passed through Montreal during the past five years, none have expressed approval of the handling of the crisis by the central authorities to me or to others in the Ukrainian community here with whom I am in contact. Many of those visitors have expressed grave concerns: "They tell us nothing" or "We don't believe what they tell us anymore." Their fears may be misplaced or exaggerated, but nonetheless, their fears are real.

▷ Jovanovich is correct in believing that the IAEA report assessing the Chernobyl situation will be received with skepticism throughout the world. For example, the World Health Organization, which is contributing to this report, has recently made the absurd recommendation that an international center for radiation-induced health problems among the victims of the Chernobyl nuclear disaster be located in Obninsk near Moscow, rather than near the region of contamination in the Ukraine and Byelorussia. Such a recommendation can only further compromise the credibility of the IAEA. Radiation victims in Byelorussia and the Ukraine will view it as another cynical attempt by the Moscow bureaucracy to seize control of the situation and prevent them from obtaining the medical treatment they require.

▷ Jovanovich is also correct in suggesting that the physics of the Chernobyl nuclear explosion has not been adequately studied. The initial knee-jerk reaction of the nuclear establishment in the West was to label the RBMK-1000 reactor design unsafe and to claim that such an explosion could not occur in Western-designed reactors. The official Soviet report on the accident at the 25-29 August 1986 IAEA meeting in Vienna clearly blamed the accident on operator error. Thereafter, Western scientists simply accepted the boundary conditions supplied by the Soviets and repeated their calculations indicating that the explosion occurred 4 seconds after the AZ-5 scram button was pushed at 1:26:40 hours on 26 April 1986 in an attempt to shut down the

continued on page 129

Superconducting Magnets

Cryogenic Instrumentation



Nb, Sn Magnets
High Fields - High Quality
LOW Price!
Call for FREE Consultation!

- Superconducting Magnets
- Dewars
- Magnet Support Stands
- Vapor Cooled Current Leads
- Power Supplies
- Power Supply Programmers
- Energy Absorbers
- Computer Interfacing
- Helium Level Meters
- Helium Level Sensors
- Helium Level Controllers
- Helium Level Dipsticks
- Cryogenic Level Meters
- Cryogenic Level Sensors
- Cryogenic Level Controllers
- Cryothermometers

Call, Fax or Write:

American Magnetics Inc.
P.O. Box 2509
Oak Ridge, TN 37831-2509

Phone: 615-482-1056

Fax: 615-482-5472

Telex: 557-592

Circle number 16 on Reader Service Card

continued from page 15

reactor. Discrepancies with eyewitness testimony indicating the emission of two flares preceding the explosion and the existence of two or more explosions were simply ignored. Unfortunately, all debriefings of plant personnel and interviews of eyewitnesses remain classified, so that it is not possible to ascertain the validity of the accident scenario presented by the Soviets. Declassification of this material as well as transcripts of the July 1987 trial at which six plant personnel were convicted of responsibility for the accident is absolutely necessary.

The most glaring discrepancies have been noted by Grigorii Medvedev in his 106-page article in *Novy Mir*, June 1989 (in Russian), as well as his recent English-language book *The Truth About Chernobyl* (Basic Books, 1991). Particularly disconcerting is his assertion that the explosion occurred at least 18 seconds after the AZ-5 button was pushed. If such was indeed the case then all previous neutronic calculations cannot possibly be an accurate description of the explosion.

In conclusion, by trivializing the consequences of Chernobyl, Jovanovich performs a disservice to both the nuclear industry and humanity as a whole.

WILLIAM W. ZUZAK

INRS—Energie

3/91

Varennes, Quebec, Canada

JOVANOVIĆ REPLIES: Before replying to the four specific points in William W. Zuzak's letter, I would like to make two general comments.

In the Bernal Lecture given at the Royal Society in 1976, Peter L. Kapitza said: "The future of civilization depends on whether existing governments are able to provide solutions to global problems.... But, for this, problems must be expressed clearly and convincingly and widely discussed. This can be done mainly by scientists, since they can talk with sufficient authority on the possible solution of global problems for the benefit of mankind. Thus we should not stand aside from the solution of such problems but realize their connection with our scientific work."

The second point I would like to make is that the world is not black and white, but has all shades of gray. The Soviet Communist system has not been all black either.

Now I shall comment on Zuzak's four points:

▷ Zuzak should not put the concentration camps of the Stalin era into the same bag with physical contamination that will be around for a long

time and that could be measured by anybody with relatively simple equipment, nor should he compare the past activities of the KGB with the postaccident activities of Soviet authorities.

As far as the media are concerned, I would like to say that, yes, in many cases, the government-controlled *Pravda* has been more reliable, at least as far as Chernobyl is concerned, than *The New York Times*, *The Economist* or the "liberal," *glasnost*-encouraged *Moscow News*. Here are some examples: On 23 September 1986 *The New York Times* carried a report claiming that "the nuclear disaster at Chernobyl emitted as much long-term radiation to the world's air, topsoil and water as all the nuclear tests and bombs ever exploded." On 30 January 1988 *The Economist* carried a report suggesting that 40 000 people in the northwestern US died during the summer of 1986 as a result of drinking milk contaminated by iodine-131 to the level of about 1 becquerel per liter. (Remember that we are all radioactive to the level of about 100 Bq/kg). Both reports were written by reporters, not scientists, and both were grossly wrong—in fact, pure nonsense. But they have been re-reported and quoted all over the world.

On 15 October 1989, *Moscow News* carried a report of a round table discussion entitled "The Big Lie." Soviet scientists and government officials were sharply attacked in that article. Unfortunately, these attacks were based on some grossly incorrect information. I wrote a long letter to *Moscow News* about the inaccuracies. *Moscow News* did not print my letter. (Two-thirds of my letter were later printed elsewhere.¹ I have been told that the whole letter was translated into Russian and printed in *Chernobylskii Vestnik* a few months ago, but I have not had an opportunity to see it in print.)

In contrast, I came across several lengthy articles in Soviet newspapers in which top Soviet scientists such as L. A. Ilyin and Y. A. Israel give first-class explanations about the Chernobyl fallout and consequences.² I have no reason to doubt that these accounts are basically correct. In fact, the recent study by the International Chernobyl Project, coordinated by the International Atomic Energy Agency [see *PHYSICS TODAY*, August, page 20], confirmed that the Soviet scientists were not lying. (This does not mean that much information has not been held back, but what was published officially was basically correct.)

How could it be that *Pravda* was

Soviet Physics DOKLADY

A translation of the physics sections of *Doklady Akademii Nauk SSSR*, the Proceedings of the USSR Academy of Sciences. All-science journal offering four-page reports of recent research in physics and borderline subjects.

Monthly. \$880 Domestic
\$895 Can/Mex/Cent. &
S. America/Carrib
\$905 Eur/Asia/Africa/Oceania

Soviet Physics USPEKHI

A translation of *Uspekhi Fizicheskikh Nauk*. Offers reviews of recent developments comparable in scope and treatment to those carried in *Reviews of Modern Physics*. Also contains reports on scientific meetings within the Soviet Union, book reviews, and personalia.

Monthly. \$720 Domestic
\$730 Can/Mex/Cent. &
S. America/Carrib
\$740 Eur/Asia/Africa/Oceania

Please address orders and inquiries to Marketing Services

American Institute of Physics
335 East 45 Street
New York, N.Y. 10017

SOVIET JOURNAL OF QUANTUM ELECTRONICS

A translation of *Kvantovaya Elektronika* (Moscow)

Experimental and theoretical work on quantum electronics and its applications in science and technology: lasers, interaction of coherent radiation with matter, holography, nonlinear optics, and related topics.

Monthly.

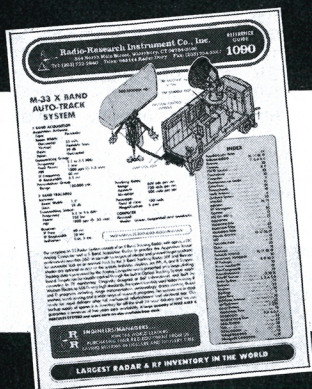
\$1550 Domestic
\$1565 Can/Mex/Cent. &
S. America/Carrib
\$1580 Eur/Asia/Africa/Oceania

Orders and inquiries should be sent to:

AMERICAN INSTITUTE
OF PHYSICS
MARKETING SERVICES
335 East 45 Street
New York, NY 10017

LARGEST RADAR & RF INVENTORY IN THE WORLD!

SEND FOR FREE 24 PAGE CATALOG



- **RADAR & RF SOURCES:** 150 MHz to 35 GHz.
- **ANTENNA MOUNTS:** Autotrack, Search, X-Y, Nike Herc, Ajax, Capacity 50 to 20,000 lbs. Dishes to 60 ft.
- **RADAR INDICATORS**
- **PULSE MODULATORS**
- **HIGH VOLTAGE POWER SUPPLIES**
- **TUBES & WAVEGUIDE**

NETWORK ANALYZER
5-18 GHz. Computer controlled HP8542B

60" DISH & PEDESTAL AVAILABLE

RADIO RESEARCH INSTRUMENT CO., INC.

584 N. MAIN ST. WATERBURY, CT 06704
203-753-5840 FAX: 203-754-2567

Circle number 92 on Reader Service Card

FORTRAN

"FTN77/386 is simply the best FORTRAN compiler on *any* platform, *anywhere* - and believe me, I've tried them all." (available for 386 or 486, DOS or Unix)

"I saw INTERACTER as a graphics library for PC, Unix and VAX, but now I use it for menus, input screens and system access too. We can build great user interfaces - **portably**."

"We started with 150,000 lines of vintage FORTRAN... SPAG translated it to beautifully structured Fortran 77 which worked first time. The whole operation took less than 2 man days; we estimated 6 man *months* without SPAG. **That's what I call productivity!**"

STOP PRESS The *plusFORT* toolkit (which includes SPAG) has been greatly enhanced. New features include a global static analyser, standardisation of declarations, automatic clutter removal, variable renaming and many more.

Call today for a free demo diskette featuring these (and other) products.

If you use FORTRAN, you MUST check this one out.

Polyhedron Software Ltd.
Linden House, 93 High Street, Tel. (+44) 865-300579
Standlake, WITNEY, OX8 7RH, Fax (+44) 865-300232
United Kingdom, Compuserve 100013,461
US TOLL-FREE FAX 1-800-777-5519

Circle number 93 on Reader Service Card

more reliable than *The New York Times*? My explanation is that Kapitza's words quoted above express the attitude of many Soviet scientists. Perhaps our top scientists should also write reports for *The New York Times* and not just for *Physical Review Letters*!

▷ Zuzak says that we "agree that the 'professionals'... have been ignoring... the consequences of the Chernobyl disaster." I think he should speak for himself only. In fact, the report of the International Chernobyl Project contradicts Zuzak in his interpretations of the aftermath of the Chernobyl accident.

▷ I do not see anything "absurd" in locating an international center for radiation-induced health problems in Obninsk. There is a first-class scientific and professional infrastructure in Obninsk. Surely it is more important to have good computers and programmers at hand than to be close to the heavily contaminated areas.

▷ I have discussed the physics of the Chernobyl explosion already³ and do not have much to add, except that I was told by a Soviet legal expert that the court records of the Chernobyl trial are not classified and could be made available for inspection and study upon request. I do not know if that is indeed correct.

I disagree that I have been "trivializing" the consequences of the accident. From the very beginning, I have been trying to understand the accident, put it into proper perspective by comparing it with negative effects of other technologies and explain whatever I learned about it to laymen⁴ (I take Kapitza's words seriously) and to physicists.³

In conclusion, I would say that Chernobyl was the most misinterpreted accident in the world. Thus I believe that we physicists should make a sincere effort to understand it, not to misinterpret it.

References

1. J. V. Jovanovich, Bull. Can. Radiat. Protection Assoc. 12(1), 26 (January 1991).
2. "Diagnosis After Chernobyl" (interview with L. A. Ilyin, Evening Kiev, 6 February 1988, p. 2; Y. A. Israel, Pravda, 20 March 1989, p. 4; "Chernobyl-90," Pravda, 17 April 1990, p. 4; "Panorama of Special Zone," Pravda, 26 April 1991, p. 2 (all in Russian)).
3. J. V. Jovanovich, Phys. in Canada, March 1991, p. 69; July 1991, p. 116.
4. J. V. Jovanovich, Winnipeg Free Press, 15 May 1986, p. 7; and ten more articles in this and other newspapers.

JOVAN JOVANOVIĆ
University of Manitoba

7/91

Winnipeg, Manitoba, Canada

Radon: History Notes from the Underground

We take exception to Harvey M. Sachs's statement, in his December 1989 letter (page 13) on Anthony V. Nero Jr's article "Earth, Air, Radon and Home" (April 1989, page 32) that "geologists built on the serendipitous discovery of predominant external sources" of radon.

The relationship between radon (^{222}Rn), a daughter in the ^{238}U series, and the geology of bedrock (or soils derived therefrom) has long been known. For example, Lord Rayleigh,¹ in 1906-07, and Harold Jeffreys,² in 1927, detailed the close linkage of ^{238}U , ^{235}U , ^{232}Th and their daughter products with granitic crustal rocks. By 1964 workers had studied the distribution of radioactivity (including that from ^{222}Rn) in rocks and soils,³ and very few major breakthroughs have occurred since then. The uranium in granites is typically concentrated in accessory minerals (zircon, monazite or allanite). The distribution of these minerals determines to a considerable extent the concentrations of ^{238}U -series radionuclides, heat flow⁴ and ^{222}Rn emanation to groundwater and soil air. The association of high concentrations of secondarily enriched uranium with reduced zones in sedimentary rocks has also been exhaustively studied in connection with the exploitation of the Colorado plateau area for fissionable uranium.⁵ The immobilization of uranium by organic matter in conditions like those in the shallow part of the Earth's crust is also exemplified by the common high concentrations of uranium in coal, black organic-rich shales and even at the bases of peat deposits.

Concentrations of ^{222}Rn were known to be high in Maine due to pioneering work by Werner N. Grune and his colleagues⁶ in 1960 and by Donald C. Hoxie⁷ in 1966. This knowledge enabled several of us to characterize the natural distribution of ^{222}Rn in groundwaters in Maine, explicitly linking geology, hydrology, health and ^{222}Rn air quality.⁸ These studies predate those published by the so-called Princeton group, which Sachs cites as the probable first studies linking geology and ^{222}Rn .

In fact, our studies are also not the earliest. Moreover, much of the work on the relationships among house structure, source strengths and ^{222}Rn concentrations in air predates that cited by Sachs as early (first?). Sachs writes that he hopes Nero "will recall that not all the pioneers are at Lawrence Berkeley Laboratory,"