

king, New York, 1970, page 44) and probably does not represent exact words spoken by Einstein. Einstein did make a similar, mild statement in 1954, in a footnote to an appendix in the fifth edition of *The Meaning of Relativity*.

We thank Larry Abbott for a most interesting correspondence.

## References

1. A. Einstein, Sitzungsber. Preuss. Akad. Wiss., 16 April 1931, p. 235.
2. A. Einstein, W. de Sitter, Proc. Natl. Acad. Sci. USA 18, 213 (1932).

SUZANNE LALOË  
Centre National de la Recherche  
Scientifique

JEAN-CLAUDE PECKER  
Collège de France  
Paris, France

9/89

## Four Reasons for Forsaking the SSC

The January 1990 Washington Reports section has several stories concerning the SSC now planned to be built in Texas. I suggest this project be canceled for the following reasons.

First, the physics community is doing a poor job of educating people about physics. The \$5 billion or more to be spent *initially* for the SSC should be spent on improving education for millions of students instead of building a research tool for the possible benefit of a few dozen researchers and for the economic benefit of Texas. In this time of greatly unbalanced national budgets, we can't do both, and the education of many is a far more important use of the funds at this time.

Second, if physics is such an international subject, and this facility will be used by scientists from all around the world, other countries should help pay for it.

Third, the news stories indicate the use of political muscle to put and keep the project in Texas, possible uncertainties in the design, and probable significant increases in the cost of the project. I for one have no confidence in the competence of the decision to put the project in Texas. I am sure it was "bought" by the most money and power in the White House and Congress, with little regard to national need. The Department of Energy, its predecessors and Congress have a miserable record for openness, honesty and competence.

Fourth, the physics community should remember that a project of this size is going to attract a crowd similar to the politicians, bankers

and promoters who have cost the citizens of the United States a \$100 billion tax bill through the financially irresponsible, incompetent and unethical operations of savings banks in Texas. This crowd will force the cost to rise significantly, the quality of construction to drop, or both. Whatever reputation the physics community has is going to go down as a result of this project.

TRUMAN HUNTER  
Oxford, Ohio

1/90

## Memories of the First Texas Symposium

In his engaging reminiscences about the first Texas Symposium on Relativistic Astrophysics (August 1989, page 46), Engelbert Schucking recalls how "[John] Wheeler's magic produced an expression of utter disbelief on the face of a most distinguished relativist." But Schucking did not expand on the nature of this magic nor explain the reason for the disbelief.

Wheeler felt that the gravitational collapse that was the center of attention at the meeting could not go on indefinitely. He proclaimed that in such a collapse, "matter will be crushed out of existence." When pressed to elaborate, he suggested that the matter would be radiated away. This remark produced a strong reaction from those who objected to violations of baryon conservation. But Wheeler remained calm and repeated his extraordinarily prescient claim. For me, his remark was the most remarkable feature of that memorable conference.

EDWARD A. SPIEGEL  
Columbia University  
New York, New York

9/89

The high point of the first Texas relativistic astrophysics meeting occurred as Harlan Smith finished his talk on the variability of the quasar 3C273. Jesse Greenstein, the next speaker, slowly walked to the front of the room, climbed the one step to the platform, turned to face the audience and said dramatically, "If 3C273 is varying in brightness, I'll eat my hat!" Don't know if he did.

VERA C. RUBIN  
Carnegie Institution of Washington  
Washington, DC

9/89

GREENSTEIN REPLIES: A limited answer to Vera C. Rubin's letter is that I did not then, nor do I now, wear a hat. If I doubted Harlan Smith's discovery that 3C273 varies, I should by now have eaten many hats, ornamented with artificial bitter fruit. I do not

recall the event Rubin mentions; my memory of that symposium is scientifically more nourishing.

However, I note that in a paper published from the symposium, Smith credits me with explaining variability as "explicable...[by] changing opacity in a substantial hydrogen cloud."<sup>1</sup> That explanation, alas, is also incorrect. My paper on 3C48 and 3C273 from the symposium, written with Maarten Schmidt, assumed the 3C273 variability to be real and sought for a physical cause.<sup>2</sup> We suggested that relativistic electrons that produced the optical synchrotron continuum decayed in about a year. The emitting region could be a light year in radius if it were at high electron density. In retrospect, we should have gone further, but black holes had not yet become as fashionable as dark matter is now.

If the unfortunate conservatism of many scientists is the message of Rubin's letter, her point is well taken. But many other scientists will have to eat many hats, plates or tapes when hindsight is the mode for criticizing the past.

## References

1. H. Smith, in *Quasi-Stellar Sources and Gravitational Collapse*, I. Robinson, A. Schild, E. L. Schucking, eds., U. Chicago P., Chicago (1965), p. 221.
2. J. L. Greenstein, M. Schmidt, in *Quasi-Stellar Sources and Gravitational Collapse*, I. Robinson, A. Schild, E. L. Schucking, eds., U. Chicago P., Chicago (1965), p. 200.

JESSE L. GREENSTEIN  
California Institute of Technology  
Pasadena, California

3/90

## Landau's Brain Injury: A Fuller Account

I read with interest I. M. Khalatnikov's article about Lev Landau in your May 1989 issue (page 34). His account of the last part of Landau's life, however, is defective. Although the error concerns the least significant part of Landau's life for physicists, some of your readers may be interested in it.

Landau was in the rear of a friend's small car one icy winter evening when there was a mild collision, as I recall the account, with a truck, and Landau's head hit the right rear doorpost. Such incidents in which there is no cranial penetration are termed closed head traumas. One typical immediate consequence is edema, with the patient lapsing into a coma. At the time, few such patients survived, and it was only with heroic

measures that Landau was kept alive. Internationally known experts were called in for consultation, among whom were Wilder Penfield, the great Canadian neurosurgeon, and Alexander Romanovich Luria, the great Russian neuropsychologist. A full account of this and the subsequent part of Landau's life is given by Alexandre Dorozynski.<sup>1</sup>

The "old brain" (the diencephalon) is a fairly rigid structure. The cerebrum (the telencephalon) is protected by the cranium. The white matter between the two is filled with neurons connecting the old brain, the intermediate bodies and the cerebrum, and has the consistency of Jell-O. During a closed head trauma, this white matter quivers, breaking some neuronal connections, thus causing diffuse damage. The myth that a blow to the head causes loss of memory is often untrue. The patients frequently retain excellent memory. This can be a severe hindrance to rehabilitation, for they remember what they could once do but cannot any longer, and so they may become very frustrated and develop severe behavioral problems. What they lose, mainly, is not memory, but function: They cannot think as fast or as effectively. There is always dementia of greater or lesser severity.

Because there had been so few survivors of closed head traumas at the time of Landau's accident, much of this was not yet known. Luria's expertise came from the study of patients wounded in World War II, most of whom had focal lesions. He developed an extraordinary skill at diagnosis of the affected brain function by the application of very simple tests. It was he, and not a psychiatrist, as Khalatnikov writes, who was testing Landau, who apparently did not appreciate what Luria was attempting. These tests may have been inappropriate, for they were designed to interpret local damage. In Landau's case, there must have been diffuse damage. As Khalatnikov reports, Landau complained constantly about a pain in his leg. No injury to the leg could be found. It therefore seems likely that some of the damage in his brain was in the upper area of the sensory portion of the Rolandic strip, a region located above the forward part of the ear in the cerebrum, or in the connections to that area.

## Reference

1. A. Dorozynski, *The Man They Wouldn't Let Die*, Macmillan, New York (1965).

WILLIAM PRIMAK  
Hinsdale, Illinois

6/89

## Sakharov and Aruri: An Unapt Comparison

I was surprised and disappointed to see a letter by Freeman J. Dyson (August 1989, page 87) stating that "Andrei Sakharov violated Soviet law by his political activities." This is simply not true, and the Sakharov family has been very sensitive to this issue.

Sakharov was never accused of committing any crime. His exile to Gorki and the harassment and abuse of his human rights by the KGB were adequately documented and were never disputed by the Soviet authorities. It was clear that the reason for this treatment was his speaking out openly in criticism of his government and that there was no alleged breaking of any Soviet law. The Soviet authorities never gave any acceptable reason for the treatment of Sakharov, and there was not a single member of the APS who would have written letters supporting the Soviets like those that appeared in the August PHYSICS TODAY supporting Israel.

The debate in the May and August issues on the case of the Palestinian physicist Tayseer Aruri muddies the waters by mixing in not only Sakharov but also other previous human rights activities by physicists. Different situations require different tactics, and it is important to focus on the special aspects of each.

The case for supporting Soviet Jewish refuseniks who were not allowed to emigrate for various reasons is more complicated than that of Sakharov, but clearly legitimate and not controversial. The Soviet Union had signed a treaty with the United States, the Helsinki Accords, that guaranteed the right of free emigration. The US gave the Soviets a *quid pro quo* for this concession, and the APS had a legitimate right to demand that the Soviets fulfill this agreement in the cases of Soviet physicists who wished to emigrate.

In my discussions with Soviet physicists, including members of the Academy of Sciences close to the establishment, I never heard a single justification for the treatment by their own government of Sakharov or of the refuseniks who were denied permission to emigrate for so-called security reasons. They all said that the actions of their own bureaucracy were ridiculous and encouraged us to exert pressure from outside (without quoting their names, of course). Most of the individuals whose cases we brought up last year have now been given permission to emigrate.

There is unfortunately still much to

## 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,  
pages annually

\$1260 Domestic  
\$1275 Can/Mex/Cent. &  
S. America/Carrib  
\$1285 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

## "Enthralling"

New Scientist

## "An excellent job"

Nature

## HISTORY OF PHYSICS

Edited by Spencer R. Weart  
and Melba Phillips

With an array of accomplished contributors including seven Nobel Prize winners, this critically acclaimed anthology deepens your appreciation of modern physics. Over forty-five articles include . . .

How I created the theory of relativity, **Albert Einstein** • Poincaré and cosmic evolution, **Stephen G. Brush** • The roots of solid-state research at Bell Labs, **Lillian Hartmann Hoddeson** • The giant cancer tube and the Kellogg Radiation Laboratory, **Charles H. Holbrow** • Alfred Lee Loomis —last great amateur of science, **Luis W. Alvarez** • The discovery of fission, **Otto R. Frisch and John A. Wheeler** • J.J. Thomson and the discovery of the electron, **George P. Thomson**.

Over 300 photographs and illustrations • 1985 • 375 pp. • Softcover • ISBN 0-88318-468-0 • \$25.00

Send your order and checks made payable to:  
**AMERICAN INSTITUTE OF PHYSICS**

c/o AIDC

64 Depot Road • Colchester, VT 05446  
Call Toll Free to place credit card orders 800-445-6638  
In Vermont 802-878-0314 • Fax 802-878-1102