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ally cautious about claiming what science can do for society. Max Perutz, in the title essay of his book *Is Science Necessary?* (Oxford University Press, 1991), offers the following sober view:

Science often exacts a price. Most technical advances are subject to Niels Bohr's principle of complementarity, which he formulated to explain that waves and particles are dual aspects of matter. According to this principle, benefits and risks are complementary aspects of each technical advance. Society must judge between them, but such judgment can present us with agonizing choices where neither moral values nor scientific facts lead us to clear decisions.

One of the principal architects of US science in what Vaclav Havel and other postmodernists now deprecate as the modern era was I. I. Rabi, a Nobel laureate and confidant of President Eisenhower. Havel speaks of the "arrogant, absolutist" vision of science. Here, however, are Rabi's views:

Only by the fusion of science and the humanities can we hope to reach the wisdom appropriate to our day and generation. The scientists must learn to teach science in the spirit of wisdom, and in the light of the history of human thought and human effort, rather than as the geography of a universe uninhabited by mankind. Our colleagues in the nonscientific faculties must understand that if their teachings ignore the great scientific tradition and its accomplishments, however eloquent and elegant their words, they will lose meaning for this generation and be barren of fruit. Only with a united effort of science and the humanities can we hope to succeed in discovering a community of thought, which can lead us out of the darkness, and the confusion, which oppress all mankind.

Those words, spoken in 1955 at a lecture at Harvard University, hardly reveal the arrogant, absolutist attitude for which scientists are so casually condemned.

Several letters point out that I misinterpret Havel by failing to understand that when he speaks of "science" he is talking about Marxist science and dialectical materialism, not science as the readers of *PHYSICS TODAY*, or for that matter *The New York Times*, know it. In *Alice in Won-*

derland, words can mean whatever you wish, but I take "science" to mean science. More to the point, so does most of the US public. Gerald Holton's recent book *Science and Anti-Science* (Harvard University Press, 1993) describes in some depth the danger to science of Havel and postmodernism. For an account of attacks on science from within academia, including the excesses of the postmodern movement, see *Higher Superstition: The Academic Left and Its Quarrels with Science*, by Paul R. Gross and Norman Levitt (Johns Hopkins University Press, 1994).

Normand Mousseau's letter inspired me to reread John Lukacs's op-ed piece in *The New York Times*. Lukacs was opposing the Superconducting Super Collider, then a live issue and a reasonable target for serious criticism. One can hardly argue with his assertion that science cannot explain everything and that we are better off for realizing it, but the main body of his piece is a condemnation of science in such Monty Pythonish rhetoric as the following:

Near the end of the Middle Ages, a few theologians (the "scientists" of that time) persuaded a king of France to give them permission for an experiment that had been forbidden by the Roman Catholic Church. They were allowed to weigh the soul of a criminal by measuring him both before and after his hanging. As usually happens with academics, they came up with a definite result: The soul weighed about an ounce and a half.

We laugh at such things, of course. But remember how much suffering such coarse and foolish ideas about the soul produced in the wars of religion from the transition from the Middle Ages to the Modern Age—not to speak of the fact that the soul-weighting experiment was somewhat less costly than the supercollider.

Such logic leaves one speechless.

DANIEL KLEPPNER

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5/94 Cambridge, Massachusetts

Historical Perspective on New PhDs' Low Pay

Perhaps it is because I grew up during the depression of the 1930s that I find it difficult to sympathize with the complaints about pay for young physicists with families expressed by Peter Duncan (July 1993, page 11). The son

of a minister in a small Virginia town, I considered myself fortunate to be able to enter college in 1934 and upon graduation to become a graduate student at Princeton, thanks to a modest fellowship and additional financial support from my family. Of some 200 graduate students at Princeton, only a handful were married. It was generally accepted that one completed his education before assuming family responsibilities. My first teaching position, in 1940 after I had received a master's degree, paid me \$1500 for the nine-month session. After I got a PhD from Princeton in 1949, my next appointment was as an assistant professor with a salary of \$3500. It was only after I was financially able to support a family that I married. The majority of my contemporaries had similar experiences. In addition, many of us, including myself, saw military service during World War II.

In my view Duncan wants to blame others for his own lack of personal responsibility. I assume, although I do not know, that he received considerable financial support while a graduate student. And I doubt, although again I do not know, that he had his career interrupted by active military service. Duncan and others of his generation should consider the fact that they have had a relatively easy time obtaining their educations. If he has exhibited sufficiently poor judgment to contract family responsibilities before he can fulfill them satisfactorily, he has no one to blame but himself.

REUBEN E. ALLEY
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11/93

DUNCAN REPLIES: What a sad *ad hominem* letter to have to respond to!

The question that still remains unanswered is, Why should the intelligent youth of the country invest their time and abilities in studying physics when the return is so low that they cannot even expect to be able to support a wife and children at 28 years old? Indeed the benefit-to-cost ratio over a lifetime is so poor that it is surprising the field is attracting any candidates at all. The psychic paycheck is worth a lot—but it doesn't pay the rent.

Consider the case of identical twins who have different life histories. They are equally intelligent and hard-working. One becomes a postal clerk on leaving school at 18, while his brother goes on to a university to become a scientist. In 1993 a postal clerk with a high school diploma started at \$24 000 *per annum*, while an advertisement in PHYSICS TODAY offered \$25 000 *per annum* for an as-

tronomer. Let us be generous and say that the physicist brother can find employment in physics and that he starts at \$36 000. He can reasonably be assumed to be 28 years old. Let us assume that both men get salary increases at 3% greater than inflation each year. Both retire at 65 years old.

Then the lifetime earnings of the physicist are always less than the postal clerk's. On a pay-per-hour basis the physicist does very poorly: I never knew a scientist who worked a mere 40-hour week.

We really do need to pay our scientists more for the investment they have made in their education.

None of this affects me personally. But if I were a 28-year-old PhD astronomer, I would feel a deep and burning anger at an offer of only \$1000 *per annum* more than the pay of an 18-year-old postal clerk.

PETER DUNCAN

4/94

Walnut Creek, California

Fritz Houtermans in Bad Times and Good

I would like to offer some remarks on Iosif B. Khriplovich's article "The Eventful Life of Fritz Houtermans" (July 1992, page 29). I had the sad opportunity to look through materials in the KGB archives connected with Houtermans's firing from the Ukrainian Physico-Technical Institute at Kharkov in October 1937, his arrest in December 1937 and his subsequent imprisonment until his extradition to Germany in April 1940. The most impressive pages of the "Case N15844 of Arrested F. Houtermans" concern the last interrogation (the 14th one), which began at 9:40 pm on 3 December 1939 and finished at 2:45 pm the next day. Excerpts from the interrogation follow:

Question: What do you plead guilty to?

Answer: I admit that I am guilty of making false statements, in which I slandered both myself and several other people whom I knew as absolutely honest people. I also admit that in some private conversations with acquaintances who visited my apartment, I criticized, from an anti-Soviet position, certain measures taken by Soviet institutions and the government. An example was the law banning abortions. Such criticism is called "counterrevolutionary" in Soviet circles, so I admit I am guilty here. I later carried on some anti-Soviet conversations in my [prison] cell.

Q: As a result, you created circumstantial evidence that you were a

Gestapo agent. Do you really deny that evidence?

A: Yes, I deny all my previous statements, since I was forced to make them while in poor moral and physical condition.

Q: What do you mean by poor moral and physical condition?

A: Before I began to make my statements in Kharkov, I was subjected to continuous interrogation, with no opportunity to sleep, for about ten days. . . . In addition, the investigators read to me some statements about my wife. On the basis of these statements, I was directly threatened that if I did not make statements my wife would also be arrested, and my children would be sent to a children's home. The children would be registered under new names, so that I would not be able to find them later on.

Subjected to all this, I decided to dream up some statements, especially since the investigators assured me that I would not be given any serious punishment by a Soviet court . . . and that I, as a foreigner, would simply be deported from the Soviet Union.

Q: Why do you consider the testimony that you gave at the hearing in Kharkov false?

A: At the hearing, I gave testimony in two versions. The first version was that I had been recruited by Lieutenant Schimpf. . . . I later testified [about] some espionage activity with [Valentin P.] Fomin, an assistant professor of mine. . . . I later stated that I came to understand . . . that the following people were carrying out espionage for Germany: [Lev V.] Rosenkevitch, [Anton K.] Walter, [Lev V.] Shubnikov, Reiter or Rietter, and Oscar Heil. That is a summary of the first version of my testimony. That testimony was false, because none of the people I named had, to my knowledge, taken any part in German intelligence work.

Q: Were you acquainted with the people named in your testimony?

A: Schimpf as an officer of the German Reichswehr I knew back in 1931–32 when he was a physics student at an institute in Berlin, where I was working as an assistant professor. . . . I did not know him as intelligence agent Schimpf.

I stated in my testimony that a certain "Hans" attempted to get in touch with me in England on Gestapo orders. I declare to the court that that person does not exist in reality. I dreamed him up to lay the groundwork for my trip to the USSR "on espionage missions."

Later in the interrogation Houtermans recounted how he had been read