poverty and inequality are exclusively found in capitalist societies. The course concentrates on Britain and makes no attempt to compare it with any other country—an intellectual trick that is, says Professor Gould, often used by Marxists. Or, as Professor David Martin puts it: "The Marxists do not play fair. They never compare our society with any existing society, only with societies that do not exist."

The history of the British Society for Social Responsibility in Science, started in 1969, is an example of the use of a worthy cause to promote a Left-wing campaign, according to Professor Gould. To begin with, the society included many liberal scientists, but rapidly became radicalized under the influence of Professor Steven Rose of the Open University (a biologist) and his wife Hilary Rose, now professor of sociology at Bradford University. Today what is left of the BSSRS is indeed a Marxist organization, though its influence is so small that it scarcely matters. To represent a more moderate view of scientific responsibility, a new organization, the Council for Science and Society, has been founded. So far, it is still firmly in moderate hands.

The Gould report makes no attempt to estimate how many Marxists there are in British higher education. Nor does he suggest that the study of Marxism is an improper activity, or that the Marxist interpretation of history or sociology should be proscribed. Many distinguished academics, including the historians Professor Eric Hobsbawm and Christopher Hill, the late J. D. Bernal, a biologist, and historian of science Dr. Joseph Needham have made no secret of their socialism, nor has it been thought to detract from the work they have done. The distinction, as Gould sees it, is between those who can operate in a scholarly way despite their political convictions, and those who have abandoned all pretense of scholarship in favor of propagating a Marxist—or, as they usually put it, a "radical"—view.

There seems, despite the anxieties of the Left, no danger of a witch-hunt. But it is now claimed, without much convincing evidence, that it is harder to gain a tenured position on a university faculty if you are known to be Left wing. One candidate at Oxford is said to have been turned down simply because he had a book published by a well-known Left-wing publisher. This is not a consequence of Professor Gould, more a case of the ebb and flow of intellectual fashion, which now favors the Right rather than the Left. The universities, most consider, face greater danger from a shortage of money than they do from the activities of Marxists in their midst.

—NIGEL HAWKES

Laetrile at Sloan-Kettering: A Question of Ambiguity

A painful case of overexposure to laetrile has beset the Sloan-Kettering Institute, a leading cancer research center. A team of researchers at the New York City institute has spent some 5 years testing the alleged anticancer properties of the apricot pit extract under the close attention of the press and suspicious eye of laetrile cultists. A string of predominantly negative results was announced at a press conference held this June, but the institute has now been zapped with charges of suppressing pro-laetrile evidence.

Its accusers are an anonymous group of institute members known, after their underground newsletter, as Second Opinion. A founder member of the clandestine group revealed himself at a counter-press conference held this month to publicize Second Opinion's criticism of Sloan-Kettering's trial of laetrile. He turned out to be Ralph Moss, second in charge of the institute's public affairs office. He was fired the next working day.

The institute's entrammelment with laetrile began in 1972 at the behest of Benno Schmidt, a member of its board. When he had to answer letters with the reply that laetrile had no effect against cancer, Schmidt said, "I would like to be able to do so with some conviction."

Though Schmidt's request would have been hard to refuse, the institute deserves credit for knowingly walking into a minefield. Any negative results would be blasted by the laetrile cultists as a kangaroo court verdict on the pit, any positive results would be widely disbelieved in the biomedical profession, and even the attempt to get results would draw criticism from doctors of dignifying the apricot nostrum with more attention than it deserved. Perhaps as much in prayer as in prediction Lewis Thomas, president of the Memorial Sloan-Kettering Cancer Center, was quoted as saying that "This institution can answer the laetrile question fairly quickly" (*Science*, 7 December 1972).

The laetrile project went forward under the direction of Lloyd Old, the institute's vice-president for basic research, and Chester Stock, vice-president for chemotherapy research. Robert Good, the immunologist who became head of the Sloan-Kettering Institute in 1973, was glad on arrival to see laetrile under trial. But in retrospect, he now says, "I sure as hell wish the Sloan-Kettering Institute had not taken on the testing. It has been such a bag of worms. It has nothing to do with science, it has to do with politics."

The institute's first problem occurred when Kanematsu Sugiura, the scientist put in charge of laetrile testing, got what might in one perspective be called the "wrong" results. He found that laetrile tended to inhibit the growth of secondary tumors in mice, although it did not destroy the primary tumors. Sugiura did the experiment three times, with the same results, and has since repeated it another three times, again with the same outcome.

Sugiura, now 85, is an emeritus member of the Sloan-Kettering, and his abilities are held in high regard by both Good and Stock, even though they believe, in the light of subsequent work by others, that laetrile does not have the positive effects Sugiura noticed in his experiments. "He has had more experience in tumor testing than anyone in the institute—I still consider him a very capable observer," says Stock. According to Good, "I think from everything we know that he is a reliable scientist, and he has an extraordinary record through the years of being right."

Sugiura's first group of experiments was completed in 1973 but was not published in the usual way. Asked about the departure from customary scientific practice, Stock explains that "If we had published those early positive data, it would have caused all kind of havoc." Good adds that "the natural processes of science are just not possible in this kind of pressure cooker."

A major cause of the heat was that Su-

giura's results, though not published, were nevertheless leaked in 1973 to members of the laetrile movement, putting the institute under both public and scientific pressure to resolve the issue. What has happened since is that laetrile has been put to test in no less than 14 animal tumor systems. These experiments, along with Sugiura's, will be published early next year in the *Journal of Surgical Oncology*. But the results, in another departure from usual practice, were announced on 15 June. They constitute a dominant negative for laetrile in animal systems. "Laetrile showed no beneficial effects against any of these types of cancer," stated the Sloan-Kettering press release.

Good is careful to restrict his conclusions to what the experiments test, the effect of laetrile on animal cancers. "We don't want to be put in the position of saying that laetrile has no action. It is conceivable that laetrile might have some effect on well being or pain, which does not show up in animal experiments," Good remarks. The Sloan-Kettering researchers conclude that there is no scientific case for taking laetrile to clinical trials although "other considerations may require that one be conducted."

Sugiura's position differs from that of his colleagues. He stands by his original findings, which he has repeated in the same system, and with similar results in two other systems. He continues to believe that laetrile is not a cure for cancer but is a palliative agent. In the article to

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Waterfowl Hunters Must Give Up Lead Shot

Waterfowl hunters are now having to accept regulations that ban the use of lead shot in heavily hunted areas. Large numbers of ducks and geese are believed to be poisoned from the ingestion of such shot, which they apparently mistake for grit or edible seeds and pick up from river, bay, and marsh bottoms.

In a typical year the fall flight of migratory waterfowl in North America exceeds 100 million birds, with somewhat less than half that number destined to fall to hunters' guns or to die from disease or other causes before the next nesting season.

The U.S. Fish and Wildlife Service (FWS) believes that as many as 2.4 million waterfowl die from lead poisoning each year, to say nothing of sublethal effects that make millions of other birds more vulnerable to disease and predation. Each year's gunning season results in some 3000 tons of shot being deposited over bottom sediments where it can be picked up readily, both by diving ducks and by dabbling ducks.

Over the past two seasons the FWS has required hunters along parts of the Atlantic and Mississippi flyways to switch from lead to nontoxic steel shot. By next fall the regulations will apply to parts of the Central and Pacific flyways as well.

A leading scientific investigator of the lead shot problem has been Frank C. Bellrose of the Illinois Natural History Survey. Back in the 1950's, Bellrose studied numerous die-offs of waterfowl that had occurred over a 20-year period and conducted various dosing experiments. In one of the latter, some 4000 mallards were trapped, and half of the birds were dosed with lead shot before all were banded and released.

From the different band recovery rates, Bellrose concluded that about 4 percent of the mallards in the Mississippi flyway die from lead poisoning each year and that another 1 percent are afflicted but are bagged by hunters.

Estimates as to how much lead poisoning reduces the breeding population of the various waterfowl species are necessarily subject to wide error. But Robert Smith, FWS coordinator of the steel shot program, and his colleagues at the Service are convinced that the scientific basis for the mandatory switch to steel shot is more than adequate.

Drawing by Richard Pellicci

Nevertheless, many hunters—and quite a few state game commissions—are against the switch, either opposing it outright or demanding that it be delayed until enough is known to allow the "hot spots," or worst problem areas, to be pinpointed. One of the concerns underlying this opposition is a widespread belief that, despite all test results to the contrary, steel shot is an ineffective load and will cripple more birds than it will save. Among some hunters there seems also to be a largely unspoken—and wholly unjustified—belief that the "antihunters" are responsible for the lead shot ban.

In the fall of 1976, the National Rifle Association (NRA), a group best known for its opposition to gun control legislation, filed suit to stop implementation of the steel shot regulations, arguing that the environmental impact statement was inadequate and that the FWS had abused its discretion. But the NRA lost at the district court level and is now given little chance of winning on appeal. The National Wildlife Federation (NWF), which like the NRA is made up largely of hunters (at least in its voting membership), has intervened on the side of the FWS in the belief that the switch to steel shot is long overdue. Several years ago, in commenting on an early FWS proposal for the switch, Thomas L. Kimball, the NWF's executive vice president, observed that, inasmuch as private industry was required to take extraordinary steps to reduce or eliminate its emissions of lead to the environment, duck hunters certainly should be amenable to giving up lead shot. "What is sauce for the goose is sauce for the gander," Kimball said.

A Mixed Verdict on NBC Nuclear Waste Documentary

Almost a year ago, on 26 January, NBC-TV presented in prime time a documentary entitled "Danger! Radioactive Waste" which left people associated with the nuclear industry outraged. They regarded the documentary as grievously lacking in balance and perspective, shot through with factual errors, and characterized by emotion-engendering production tricks such as beginning each new sequence with the ominous clicking of a Geiger counter.

Many of those who took offense at the program wrote letters of protest to the Federal Communications Commission (FCC)—indeed, such letters are reported to have been so numerous (250 of them,

be published next year, of which he is a coauthor, he states that his belief is based "on his own observations reported with his experiments which include inhibition of lung metastases [secondary tumors], temporary initial stoppage of growth of small primaries, inhibition of the appearance of new tumors, and the better health and appearance of treated mice."

Stock makes clear that he does not say Sugiura's results are wrong. But he and Good believe that an important test for choosing between Sugiura's results and his colleagues' was a blind experiment in which the mice were injected by others and Sugiura, who did the pathology, was not told which mice were treated with laetrile and which were the controls. Although the system was the same as that of Sugiura's first six experiments, in this case laetrile turned out to possess no anticancer activity.

If the inference is made that the results with the 14 tumor systems are more likely to be true, Sugiura's results are an anomaly. No immediate explanation is available, but perhaps none is necessary: anomalies are a common feature of the scientific landscape and there is only time to resolve the most interesting.

The agree-to-differ approach is not acceptable to Second Opinion. In a 50-page article* issued this month, the group contends that the Sloan-Kettering report on laetrile is "incomplete and scientifically invalid." The group's press conference was cosponsored by the laetrile movement, but this was a mere alliance

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by an FCC count) as to suggest that an organized campaign had been mounted. But the Atomic Industrial Forum, the American Nuclear Society, and several other parties chose to direct their grievances not to the FCC (which has taken no action with respect to the documentary) but to the National News Council (NNC), a still relatively obscure organization established in 1973 as a private, unofficial body of 18 persons drawn from journalism and other fields such as law, education, and civil rights. The NNC could offer the industry groups no formal redress, but it could pass judgment on the merits of their complaints.

Recently, after an investigation, the news council pronounced a mixed verdict. NBC was exonerated on some of the major charges but was found at fault with respect to parts of the documentary which could well have led viewers to think that, in two specific instances, radiation exposures may have caused sickness or severe genetic damage in livestock and humans.

The NNC found no merit in the charges that the documentary lacked balance and perspective. The NNC said "we applaud NBC for bringing this substantial controversy to the attention of its viewers," and, in one philosophical aside, observed: "What is essential in a documentary is that its conclusions be based on verifiable information—that is on documentation—and not that it be fully objective. A major function of journalism is responsible interpretation."

But the council found evidence of "scare tactics, beyond the limits of sound journalism" with respect to the documentary's implicit suggestion that radiation exposures may have led to severe genetic harm to a worker at the now-closed Nuclear Fuel Services reprocessing plant at West Valley, New York, and to sickness and the death of cattle on farms near the low-level radioactive waste disposal facility at Maxey Flats, Kentucky. The worker at West Valley was shown in the documentary with his two young sons, both born after he left the reprocessing plant and both afflicted with Hurler's Syndrome, a rare genetic disease expected to lead to death by the age of ten. The worker plainly suspected that radiation exposure was the cause of his children's disease, although he added that "I can't find a doctor that would definitely say so." But no scientific opinion was cited in support of this worker's conjecture—nor was any cited to give credence to the suspicions of farmers near Maxey Flats.

Predictably, both NBC and nuclear industry spokesmen are now claiming a kind of moral victory. The Atomic Industrial Forum is expressing satisfaction at the fact that the NNC upheld complaints with respect to the reporting about the West Valley and Maxey Flats episodes. Lester Crystal, president of NBC News, stands by the documentary and points to the council's favorable overall judgment and to the fact that its chairman, Norman Isaacs of Columbia University's Graduate School of Journalism, dissented from the two adverse findings on the grounds that the flaws in the reporting were minor.

More Burning of Coal Offsets Gains in Air Pollution Control

The Council on Economic Priorities (CEP), a nonprofit public interest group based in New York and San Francisco, has some discouraging news for those who have been hoping that the increased use of coal called for in national energy plans can be accompanied by an improvement in air quality. Unless electric utilities do better in the future than they did during the first half of the 1970's, the gains made from installation of pollution-control equipment in their fossil-fuel generating plants will not be sufficient to offset the effects of burning more coal.

In an update of a 1972 report on the pollution emissions from the fossil-fuel plants of a representative group of major utilities, the CEP says that the level of emissions for the period 1971 to 1975 remained "substantially unchanged," the industry by and large "continues to lag behind what is technically feasible and legally required."

The new study *The Price of Power/Update* covers the performance of 15 utilities, including most of the larger ones. CEP attributes the relatively good emissions record of companies such as Pacific Gas & Electric, Southern California Edison, and Consolidated Edison of New York largely to their use of low-sulfur fuel oil and, in some cases, natural gas.

The six companies that CEP ranked lowest with respect to emissions—the Southern Company, Commonwealth Edison, American Electric Power, Northern States Power, Union Electric, and the Tennessee Valley Authority (TVA)—rely on coal as their primary fuel. TVA, the nation's largest electric utility, was ranked at the bottom with respect to rate of emissions by unit of power output. CEP attributed this to TVA's use of dirty, high-sulfur coal and "its resistance to the use of state-of-the-art pollution control equipment."

The price of retrofitting the 15 utilities' existing major fossil-fuel plants with the best air and water pollution control equipment available would run between $9 billion and $13 billion. The cost to TVA alone could amount to $2.7 billion.

In his preface to the report, Representative Richard L. Ottinger (D–N.Y.), a past chairman of the House of Representatives' Environmental Study Conference, calls for both strict enforcement of high pollution control standards and adoption of policies that will lessen the need to build more large coal-fired central station generating plants.

— Luther J. Carter

of convenience against Sloan-Kettering: Second Opinion does not consider laetrile a cure but rather, with Sugiura, that it may be palliative.

The thrust of the Second Opinion attack is that Sugiura is right and therefore the rest of the Sloan-Kettering experiments are wrong. Second Opinion charges errors both of omission and commission: some experiments supporting Sugiura's position have been omitted from the Sloan-Kettering report, whilst others have been reported but misrepresented. "The top leaders of SKI are terrified of reporting *any* positive results with Laetrile, even if these are modified by more negative findings," Second Opinion charged in a recent newsletter.

In a laconic one-page rebuttal, the top leaders of Sloan-Kettering dismiss the Second Opinion broadside as "irresponsible and malicious." Two "minor inconsistencies" uncovered by Second Opinion in no way alter the scientific conclusions, the statement avers.

Three of what seem to be the most important of Second Opinion's many criticisms are the following:

• Second Opinion charges that Sloan-Kettering has suppressed some results favorable to laetrile. The group has obtained certain data from the files of Elisabeth Stockert, a member of the Sloan-Kettering team, and claims that they show a positive anticancer effect for laetrile. Stock says he did not suppress the results, because he didn't know about them, and would not have included them if he had because they are uninterpretable. Stockert agrees; the study, she says, was not a proper experiment but a preliminary investigation which had to be abandoned when she went to Paris for 5 months.

Ambiguous Result Underplayed

• Another Sloan-Kettering researcher, Franz Schmid, conducted a trio of experiments with laetrile, in two of which the substance offered no sign of efficacy. In the third, however, laetrile showed a positive antitumor effect which was significant at the 0.04 level of probability. A reasonable summary of the Schmid experiments might seem to be that one experiment confirmed Sugiura, two did not, and the series as a whole failed to give support to Sugiura's hypothesis. Second Opinion contends that the Sloan-Kettering report underplays the third Schmid experiment. The charge has some merit, particularly when considered in the light of a key sentence in the summary of the report: "All experiments of 3 independent observers . . . have failed to confirm Sugiura's initial results."

• Another key statement in the Sloan-Kettering summary states that each of eight agents recognized by the National Cancer Institute as clinically effective against human breast cancer is also active against a particular mouse cancer, known as CD_8F_1 spontaneous mammary cancer. "Thus, the negative laetrile findings in this animal tumor model appear particularly significant," the Sloan-Kettering report avers. Second Opinion states, apparently with justice, that neither leg of this important argument stands up. The eight agents effective against human breast cancer are only active against the CD_8F_1 tumor when it is transplanted into another host, not when it is in its original host. Laetrile was tested only against original host tumors, giving no basis for comparison with the eight effective agents. Stock agrees that the statement is incorrect; in fact the drafts of the report he now hands out have the paragraph in question excised.

According to Second Opinion, both the error of presentation, and the fact of testing laetrile in a system in which no other agent is effective, demonstrate a bias of Sloan-Kettering reseachers against laetrile: "It is almost as if they wanted it to fail." The disputed paragraph was written not at Sloan-Kettering but by Daniel Martin of the Catholic Medical Center in New York. Martin collaborated in the laetrile trial because he possesses a large colony of CD_8F_1 mice. He has also become a zealous and vocal antagonist of laetrile. He concedes the paragraph was in error, explaining that he put it in to answer the objections of the laetrile people that tests in transplanted tumor systems are irrelevant to the clinical situation. Asked if the Sloan-Kettering report wasn't addressed to scientists, not the laetrile movement, Martin replied, "Oh, nonsense. Of course this was done to help people like [Benno] Schmidt and Congressmen answer the laetrilists."

Martin's error (attributed by Stock to "enthusiasm,") and the glossing over of Schmid's third experiment, are matters of presentation which do not affect the mass of experimental data on which the conclusions of the Sloan-Kettering report are based. Nonetheless, if questions of attitude are at all important—and the crucial role of the blind experiment with Sugiura indicates that they can be—even the appearance of a departure from strict objectivity is unfortunate.

It is only natural for Second Opinion to have seized on the various anomalies and discrepancies thrown up in the course of the laetrile trial. The group is interested both in laetrile and in using the issue to demonstrate what it believes to be basic truths about the Memorial Sloan-Kettering Cancer Center and the political structure of society. "We feel that it is inherent in the nature of our entire economic and political system that threatening and revolutionary scientific ideas can be and are suppressed," Second Opinion opines.

The group's purpose is to speak for the rank and file at the cancer center and to "raise people's consciousness about their own grievances." Founded a year ago, the group's charter members belonged to a local chapter of Science for the People, a radical movement with roots in Boston and elsewhere. Second Opinion now has "about a dozen members," who include "laborers, scientists, clerical people, and ex-public affairs officials," notes Ralph Moss.

Moss, whose Ph.D. is in Latin literature, says that the group has remained anonymous through fear that confession of membership would lead to dismissal, and cites his own summary firing in evidence. Sloan-Kettering counters that Moss was fired because he abused his position as a public affairs officer, not because he was a member of Second Opinion. "Moss was in a position of major trust, he knew my innermost thoughts," says Good.

Since December 1976, Second Opinion has put out five newsletters in addition to its special report on laetrile, and claims to distribute 3000 copies within the cancer center. Besides laetrile testing, the newsletters have taken up such issues as employment practices at the center and an alleged admissions policy which favors rich patients over poor.

Second Opinion suggests that Sloan-Kettering has suppressed the truth about laetrile in part because its board of trustees includes the directors of large corporations whose profits are liable to be threatened by revolutionary techniques. The thought that the board of trustees is dictating their findings on laetrile does not sit well with Sloan-Kettering researchers.

Political analyses apart, it is hard to see that Second Opinion comes very close to establishing its basic premise, that the data on laetrile has been significantly suppressed or distorted. Such points as it raises can be most parsimoniously explained in terms of anomalies or overenthusiasm. Yet the errors of presentation in the Sloan-Kettering report, ascribed by Moss to an institutional "intolerance of ambiguity," mark a curious flaw in an otherwise thorough study.

—NICHOLAS WADE

**Second Opinion Special Report: Laetrile at Sloan-Kettering*. Obtainable free from Second Opinion, c/o Alec Pruchniki, Box 548, Bronx, New York 10468.