is no direct evidence in the new material that Oppenheimer had indeed been a Communist.

Deborah Shapley

Soviet radio-catastrophe

Another theory

Washington

What *did* happen in the southern Ural mountains in 1957–58? Did buried radioactive waste explode? Or was the landscape blighted and thousands of people hurt by a strange weather pattern that rained fallout from Soviet atomic bomb tests in the north?

The disaster has been a mystery since it surfaced in the West in a Copenhagen newspaper report in 1958 that implied that a Soviet weapons test had gone awry, and speculation grew into controversy in 1976 when Zhores Medvedev, a prominent Soviet dissident scientist living in London, alleged there had been a catastrophic, volcano-like explosion from buried nuclear wastes in a secret area near the city of Kyshtym.

Now a new theory has been advanced by the Los Alamos Scientific Laboratory, that links the disaster, among other things, with acid rain. The public summary of a classified report concludes that there was no single catastrophic explosion of buried wastes, and certainly not an explosion involving nuclear criticality. Instead, widespread damage to the land and population was caused by "a series of relatively minor incidents . . . severely compounded by a history of sloppy practices" at a plutonium production plant.

The new report confirms the allegations of Medvedev and Soviet scientist Lev Tumerman, who drove through the region in 1960, in their horrid accounts of burned people and devastated land. It recounts that there were "death squads" of radioactively contaminated prisoners assigned to work in the area, essentially until they dropped dead.

The site of the alleged disaster was a plutonium production plant built for the Soviet weapons programme east of the city of Kyshtym on the site of a munitions plant that operated under the Tsars. The plutonium plant was apparently built in the late 1940s, after the Smyth and Groves reports had been published explaining how the United States had built its atomic weapons during the war. The report indicates that the Soviet Kyshtym plant was modelled on the US plutonium plant at Hanford, Washington, and that, the Soviet Union had detailed information about Hanford practices and procedures. The evidence for this, however, is not given.

So, the report says, a city was built having "thousands" of workmen and engineers. A graphite-moderated, uranium-fuelled reactor was built, called "Unit O". Cooling water from Unit O was pumped into a large artificial lake dug on the grounds. Later, the cooling water from

Rorvik disowned

New York

Dr Derek Bromhall, formerly of the University of Oxford, has won his suit against journalist David Rorvik and the publisher Lippincott and Company. On the third day of the trial this month (see *Nature* 1 April, p.383) and before a single scientist had taken the witness stand, the defendants settled out of court. The settlement is important not only because it amounts to a public disavowal by the publishers of Rorvik's book, published in 1978 under the title *In His Image: the Cloning of a Human*, but also because it is a precedent for other complaints of the unauthorized use of scientific data in popular works.

In an apology to Dr Bromhall which accompanied the settlement (said to amount to some hundreds of thousands of dollars) Martin H. Lippincott, Chief Executive Officer of the publishers, conceded that "this company now believe the story to be untrue" and acknowledged that "Dr Bromhall did not consent to the inclusion of his name or his research techniques in the book and also that Dr Bromhall never engaged in, or attempted to engage, or advocated the cloning of a human being. We regret any embarrassment, humiliation, or other injury to him that the reference to Dr Bromhall in the book might have caused".

Lippincott and Company had promoted the book, about an unnamed American millionaire financing the birth of his clone, as non-fiction.

Judge John Fullam of the United States District Court, who had been hearing Dr Bromhall's suit last year, called the book "a fraud and a hoax". Apparently Lippincott began withholding royalty cheques from Mr Rorvik as soon as the initial suit began.

As Dr Bromhall is no longer an academic scientist, the direct damage to him from the book where his cloning techniques were quoted would have been difficult to prove, according to observers. Only the threat of punitive damages forced the hasty end to the trial.

Michael Stein

at least two reactors built there was also pumped into the lake. Fuel-rod cladding failures were probably frequent, the report says, so the rods leaked material. By 1953, the lake had become dangerously radioactive.

The lake fed into the Techa River, a slow-moving stream along which lived a primitive Bashkir people. Soon, the Techa, too, became "a chronic, waterborne source of radioactive contamination" long before any of the dates of alleged disasters. To separate plutonium from the irradiated fuel elements would have needed nitric acid. The off-gas belched yellow smoke out from a high smokestack, 24 hours a day for

years on end. Because of the high humidity of the region, the Los Alamos theory goes, the nitrogen oxides in the gas would have produced acid rain and acid-laden snow which could have caused the "dead" landscape seen by Tumerman.

The Soviet Union was in such a hurry to get as much bomb-grade material as possible that the irradiated fuel elements were not allowed to cool, so the gases from the plant would have included radioactive iodine as well. The authors of the report say that the impact of the consequent acid rain would have been appalling. A third source of contamination was the burial of radioactive wastes from the late 1940s and the 1950s. The wastes were not put in steel tanks as at Hanford but radioactive liquid waste was simply dumped into a dry lakebed 5 or 6 kilometres south-east of the plutonium complex.

People in the Techa River region began having radiation sickness, crops were killed by acid rain and the stackgases. So, the report says, the authorities must have evacuated the Bashkirs and burned their homes. This would account for the burned buildings, and for the disappearance of local villages — signs Medvedev interpreted as indications of a nuclear disaster.

The Los Alamos report, like others, confirms that the landscape of the region was changed mightily in the late 1950s. The report includes "before" and "after" maps showing that new lakes were created, drainage canals dug to circumvent other lakes, and so on. All this, it seems, was necessary to stem the contamination of the Techa.

If there were explosions, the report concludes, they would have been chemical, not nuclear. Likely causes cited include ammonium nitrate and hexone, a flammable solvent often used in waste separation.

The report is the latest in a chain of Western "explanations" for the disaster. Curiously, one of the report's two authors, Danny Stillman a Los Alamos staff member, was a co-author of an earlier Los Alamos report attributing the disaster to fallout from "dirty" atomic weapons tests to the north at Novaya Zemlya, and a meteorological fluke that dumped the fallout southwards. Stratton was not available to discuss why the theory has changed: nor was the other author, Diane M. Soran. However, Harold Agnew, a former Los Alamos director who is president of General Atomic Corporation, and who co-authored the Novaya Zemlya theory, says the new theory is an improvement.

The proponents of the buried nuclear waste explosion theory are not convinced. Medvedev says that the report is simply wrong. The people who lived in the area were not simple Bashkir tribesmen as claimed in the report — the Bashkir Republic is somewhere else: the villages that disappeared after the disaster all have Russian names, and therefore had Russian inhabitants.

Moreover, Medvedev says his notion all

along was that the nuclear waste had heated and exploded thermally, or perhaps chemically. Especially during the first two years, nuclear wastes can heat up and possibly explode, unless they are carefully cooled. Medvedev notes that his theory, and a study published by the US Oak Ridge National Laboratory in 1980, conclude there was a single, major disaster on the basis of the ecological literature — evidence that the Los Alamos report ignores.

The Los Alamos report asserts that the incident is relevant "in the light of the current nuclear waste disposal questions facing the United States" but does not explain just how. But it implies that even when nuclear wastes were disposed of in the sloppiest manner imaginable, they caused no single catastrophe. **Deborah Shapley**

Britain in space

Up, up and away

The British government, not usually enthusiastic about spending public money, seems keen to find the cash for a major national programme in remote sensing. Members of a "task force" who have spent the past six weeks working out the details, were putting the finishing touches to their report earlier this week.

Behind the government's enthusiasm is its wish to make the best use of the European Space Agency's (ESA's) Earth Resources Satellite (ERS1) to which it has already pledged £28 million, or 13 per cent of the cost. Britain does not seem to be the only country to find an interest in remote sensing. All ESA's 13 member states are expected to meet next week's deadline for pledging their contributions to the satellite, even though it will be built under ESA's optional applications programme.

Assuming that the money is forthcoming, ERS1 will be a pre-operational ocean-monitoring satellite following along the lines of Seasat, the United States equivalent, which hinted at the usefulness of looking at the oceans in microwave before it went out of service after only three months.

Thus the three instruments that will make up the ERS1 payload — a synthetic aperture radar, a wind scatterometer and a radar altimeter — will all record in the microwave band. The satellite's low polar orbit will give it global coverage for measuring such variables as wind speed, wave height and polar ice cover. Data are expected to be of use to the scientific community, weather forecasters and shipping and offshore oil companies.

Britain's singular interest in ERS1 was stimulated last month when a team from the Science and Engineering Research Council's Rutherford Laboratory won a competition to design a fourth instrument for the payload — an infrared scanning radiometer to measure sea-surface temperature to within half a degree Kelvin.

But the instrument, costing about £1 million, must be built with British money.

If the general level of interest is anything to go by, however, the Rutherford team has little cause for anxiety. The "task force", which includes representatives from the Science and Engineering Research Council, the Natural Environment Research Council, the Meteorological Office, the Royal Aircraft Establishment at Farnborough, industry and the Department of Industry, has been drawing up plans for a far grander national remote sensing programme that could involve spending more than £4 million. The report addresses three questions: the content of a programme of fundamental research into understanding microwave data; how to get the data to the user; and how to exploit commercially remote sensing in general.

The most costly consideration could be that of disseminating data from ERS1. ESA plans to set up a central ground receiving station at Kiruna in Sweden from which data can be relayed to agencies in individual nations. But the British study describes several options for a national ground station that could receive data directly from the satellite. These range from a £4 million station capable of receiving 120 megabits per second from the synthetic aperture radar to a much cheaper station capable of handling data at no more than 1 megabit per second. The cost would almost certainly have to be met by the industry department, which may try to persuade industry itself to chip in.

The data-handling part of the national programme could ride on the tide of the British government's general enthusiasm for information technology, so that it is no surprise that the report will be placed before Kenneth Baker, minister for information technology. The other important aspect for the government, however, is how to make money out of what is widely heralded as a growing international market. One option that the industry department is considering is to persuade private industry to set up a company to sell remote sensing data, as well as hardware and software for ground stations and satellite payloads.

The final details on the form of the national programme will probably take some months to work out. In the meantime, the plans seem to beg two questions. Are remote sensing data sufficiently attractive for potential users to pay for them? And is Britain, which has no national space agency, sufficiently well organized. On the first point, the industry department seems aware that it will be treading in the dark. But an earlier survey of more than 100 potential users has persuaded it that the risk could be worth taking, especially for ocean monitoring. And the civil servants who have been debating the merits of a national space agency for some time, could be encouraged by a decision to embark on a remote sensing programme. **Judy Redfearn**

Polish universities

Warsaw's rector

Poland's Council of Ministers has resumed consideration of two bills aimed at restructuring Polish higher education, apparently undismayed that the replacement of Dr Henry Samsonowicz as rector of Warsaw University is regarded in academic circles as a confirmation of growing fears for the future of scholarly life.

Dr Samsonowicz became rector in September 1980, under a compromise arrangement between the old system of government appointment of rectors and the promised reform by which the rector would be elected by the academic community. Subsequently, he was confirmed in office by a free election in which academics, students and university auxiliary staff were represented.

Since the imposition of martial law, Samsonowicz has been under increasing pressure and, according to some sources, was temporarily detained during the round-up of intellectuals in the first few days after the military take-over. A few weeks ago, he was expelled from the Polish United Workers' Party, since when his dismissal has been thought to be only a matter of time.

Nevertheless, the announcement that Dr Samsonowicz's "resignation had been accepted" caused a major wave of protests by Warsaw academics and students. At one point, all lectures were stopped in Warsaw University for 15 minutes to allow students and staff to sign protest letters.

The new rector, selected by the Minister of Science, Higher Education and Technology, is Professor Lazimierz Albin Dobrowolski, head of the department of zoology and ecology. In spite of the unfortunate circumstances of his appointment, Professor Dobrowolski does not seem as severe a hard-liner as some pessimists have assumed.

In a discussion on the proposed reforms of academic life in November 1980, he accepted as necessary the demands for reforms at all levels of education. He even implied that, theoretically, the universities already possess the right to make changes in their syllabuses which, if true, would make many of the reforms promised by the Lodz accords of February 1981 merely a re-statement of powers which the universities already possessed but had not used.

With martial law, the reforms were cancelled and university life reverted to the statutes of 1958, which place full administrative power in the hands of the rector and reduce university senates and faculty councils to a merely consultative role. Many features of the pre-Lodz syllabuses, including compulsory Russian, have been restored.

How far the proposed new law will embody these "temporary" measures is not clear. As early as last summer, the then minister, Dr Jerzy Nawrocki, tried to