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SWISS SCIENCE POLICY

CONFERENCE BY A DIRECTOR OF RESEARCH AT
BROWN-BOVERI LTD.

Scientific progress over the last 20 years may well have come on at too fast a rate, a leading scientist admits. Professor A. P. Speiser, director of research with Brown-Boveri, said in a lecture given at a Swiss Friends of the USA luncheon that "society at large has become anti-science minded, not only in the US but to a lesser degree also in Switzerland". And he added: "The conclusion which one is almost inevitably forced to draw is this: It appears that an expenditure of the amount of 2.8 or 3 per cent of the gross national product for research and development is too much—society simply cannot absorb the resulting technological progress".

The belief that scientific and technical progress was essential to national well-being, said Speiser, had suddenly been shaken as people found that the "quality of life" had not improved as a result of scientific advances but had actually got worse. This was leading to a "painful reappraisal" of science.

Speiser, who was drawing comparisons in his lecture between science policies in America and Switzerland, pointed out that it was in some ways unfair to compare two countries which were "so vastly different in almost all respects". There was, he said, a 33-fold difference in population between Switzerland and the US, and one had to take into account that countries of such differing size inevitably had different objectives.

He insisted, too, that he did not intend to criticise. America had been his host and his employer for many years, and Switzerland had contributed much to world science. But whatever the achievements of the two countries, he added, neither they nor any country in the world actually had a science policy as such "despite the fact that they have been struggling for such a policy for a number of years". There were no rules governing science of the kind that controlled military defence or foreign trade. However, said Speiser, "what matters are not the policies, but the results".

He went on to review the main features of American and Swiss science "policy". In the first third of this century, he said, America was a technological, not a scientific nation. The country produced major inventions like the phonograph and the typewriter, but the work on physics in the US in the early '30's "was definitely not on the European level".

However, all this changed with the "great immigration" of scientists

after 1933. Said Speiser: "The towering figure of Einstein is the visible signal of the greatest migration of brainpower in history".

The much deplored brain drain of the fifties and sixties was "totally insignificant" in comparison to what took place in the thirties, Speiser claimed.

When war broke out, America's scientific resources were channelled into two major projects—radar and the nuclear bomb. The results of these projects were dramatic "and are having a decisive influence on today's world," he said. After the war, American private industry invested heavily in scientific research and achieved impressive results in computers, electronics and other fields. Federal spending was mainly defence oriented. But the appearance of Sputnik in 1957, said Speiser, produced a dramatic re-orientation: "It is hard to imagine how an object of a few dozen pounds peacefully circling the earth could have such profound effects on the entire state of mind of a nation".

The upshot of Sputnik was a massive increase in government in-

volvement in science and technology, and President Kennedy's decision in 1961 to land a man on the moon within the decade provided a goal of great psychological importance which was reached brilliantly successfully—although at a cost of 30 billion dollars.

In the years before 1969, 2.8 of the American gross national product was used for research and development, almost two-thirds provided by the government and the balance by private industry. And, added Speiser, "the quality of the scientific work is excellent".

Swiss science policy, in contrast to the American scene, had been characterised by more continuity and less dramatic change. Since the beginning of the century, the standard of scientific work at Swiss universities had been excellent, and traditionally much of it had been done by immigrants from other European countries. The ability to attract intellectuals from abroad, said Speiser, was one of the common features of the two countries. But, because of the country's size, the areas in which Switzerland was a contributor were strictly limited. The



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areas included medicine, chemistry, mathematics and physics, and the work was done almost exclusively at the universities.

But after the war, Speiser continued, it became clear that the universities could not go on meeting the rising costs of scientific research at the same rate. This lack of funds led to the setting up of Nationalfonds by Alexander von Muralt in 1952. Von Muralt laid down that scientific projects should be judged only by their scientific excellence and not by their practical utility.

The Nationalfonds distributed 70 million francs per year, and was the largest single factor in Swiss science, said Speiser. And although, he added, this was a relatively small amount by contemporary standards, the influence of the Nationalfonds had been large and beneficial.

The second largest factor in Swiss science was the country's largest research establishment, the Swiss Federal Institute of Technology in Zurich. This institute, under its three presidents, Rohn, Pallman and Burckhardt, had been very successful in attracting world famous scientists. There were in addition nine further schools of university rank.

Research conducted in industry made a major contribution to Switzerland's scientific standing, said Speiser—and traditionally, this work had been carried out with virtually no government support. The biggest contributions had come from the chemical industry, which particularly in the post-war years had linked well with the universities to produce valuable results. However, he added, co-operation between industry and the universities had been "distinctly less fruitful" in other fields.

Switzerland's scientific standing was excellent if measured by the country's size, said Speiser. But to maintain this standing it was vital to concentrate on a sufficiently small number of fields: "A sprinkling of the limited resources would be ruinous," he said. Partly with this in mind, the Wissenschaftsrat had been set up in 1967 to advise the government on scientific policy. But while it had done good work, it had been faced with serious problems.

A basic problem was that setting priorities inevitably meant cutting out areas which seemed to be promising. Said Speiser: "This process is painful and also contrary to many people's idea of academic freedom".

This problem was made worse by the position of the universities. For of the ten universities, only two were under federal control—the others belonged to the Cantons. The Cantons could not afford to meet the growing costs of scientific research, and everyone agreed that they needed federal support. However, while the past few

years had shown that the Cantons were quite willing to accept federal cash, they were equally unwilling to accept the federal influence "that certainly ought to go along with it," Speiser remarked. "Thus, even when priorities are established it is going to be a painful process to enforce them," he concluded.

A feature which set Swiss science apart from all other industrialised countries was the almost total lack of government support for research and development projects with a view to industrial exploitation. Swiss industry maintained that it neither wanted nor needed government cash for research. But, said Speiser: "Whether or not this should stay so is a matter of considerable debate. As long as profits are good, the will to stay independent no doubt demands respect. With shrinking profits, however, it becomes increasingly difficult to survive against a competition which is so heavily subsidised by its governments".

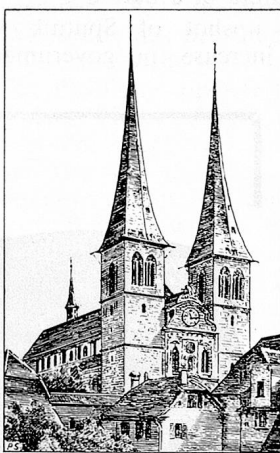
Research policy, said Speiser, was dynamic, not static. And there was ample proof of this in the reappraisal of science which started in America in 1969 and was now in full swing.

The shift in attitude, with a diversion of federal support away from scientific and technological excellence and into housing, health and environmental protection, would have far-reaching effects, Speiser predicted. Since 1967, research spending in America had fallen from 3.1 to 2.7 per cent of the gross national product, and many scientists were out of work. But, he said, "while it may sound almost ruthless to say so, this could be a necessary process". America may have been spending too much money on research.

Switzerland had not yet been forced to undergo such a reappraisal. But the changing psychological climate would necessitate some re-definition of research goals. Speiser ended his talk by quoting Patrick Haggerty, president of Texas Instruments and former president of the Institute of Electrical and Electronics Engineers: "It will take a very wise people indeed to make the choices that will allow us to improve the total quality of our life without simultaneously destroying the only system that thus far has made such choices feasible".

(MD)

SWISS CATHEDRALS



**LUCERNE:
ST. LEGER CATHEDRAL
(HOFKIRCHE)**

The part of the town separated formerly from the other quarters by the lake, was at all times called Im Hof. The most important of all churches in Lucerne is the principal edifice, the collegiate church of Im Hof, consecrated to Saint-Léodegar (Saint-Léger), patron of the town to whom it owes its name.

This church, founded in 735, was destroyed, except the towers, by the fire of 27th March, 1633. It was reconstructed in 1633-35. From the ancient edifice, both Gothic towers, 75 m. high, have been preserved. The new church is in German Renaissance style. The high altar of black marble, with dec-

orative marbling in alabaster and a tableau by the famous Italian painter Giovanni Lanfranc, was given by the chargé d'affaires papist Ranutus Scotti.

The stalls are splendidly ornamented. The chancel gate, of wrought iron, is very artistic. The baptismal fonts are encircled with gilt trellis richly open worked. Two excellent reliefs in Renaissance style "The Piety" and "Death of Mary", along with other sculptures, adorn the nave. Good organs, constructed in 1650 by Johann Geisler, have been repaired and improved several times.

Porticos with columns of Tuscan order surround the church on three sides; here repose representatives of ancient families whose names recall many glorious deeds in the national history.

Very much bent to ancient habits, Lucernese have treasured their religion through the centuries and have remained loyal to the Catholic faith. The beautiful churches of the canton bear witness to the piety of the inhabitants.

The sanctification of Sunday, the Church festivals, are speaking testimonies of the religious spirit that gets in all public and private life of the country. Children, education and family life rest on religious principles.

Religious feasts are sometimes united with patriotic ones, such as the commemorative festival of the battle of Sempach.

Pierre Savoie