

Confidential

VISIT TO MOSCOW HIGH ENERGY PHYSICS CONFERENCE - MAY 1956

These notes should be read in conjunction with those produced by Skinner. I agree entirely with Skinner's assessment, and merely wish to add a few of my own impressions. I shall issue a separate technical report.

I, too, searched for microphones in my hotel room, and found no evidence. Similarly, carefully placed papers left in my room were not disturbed.

I visited Kurchatov's institute, the Moscow Physical Institute, on three occasions. Although one of many institutes in Moscow, this is much larger than any of the others which we saw and is roughly analogous to Harwell. There are, as yet, fewer buildings than at Harwell but there are great open spaces within the fence (rather like Saclay). I took part in a linear accelerator symposium there, and was closely questioned about our 600 MeV project. There is a large and active group studying these machines, under the overall direction of Artsimovitch who is an Academician and a man of considerable importance and striking personality. They are well behind us at present, in knowledge of high energy linear accelerators, but will soon leave us behind. They appear to be serious in their intention to build a 1000 MeV machine, and to install it in the grounds of the institute.

Artsimovitch is also in charge of work on electromagnetic isotope separation and on Budker's ideas for stable relativistic plasma. The Budker project must surely have emerged from gas discharge projects; it was stated to have been initiated in 1952. The E.M. separators looked essentially the same as the British and American ones, and were said to have been operating since 1947. There was also a 60" cyclotron started during the war and built in 2 years. The Moscow Physical Institute is surrounded by a fence, with opaque gates, and passes have to be shown. We were shown only a part of one building, and a reactor with attached hot laboratories. It is located 12 kilometres from the centre of Moscow. Kurchatov was ill during our visit; I found later that he was suffering from high blood pressure and had been away from work for some weeks.

The Institute on the Volga is now referred to as the "United Institute"; it embodies two institutes formerly directed by Mescheryakov and Veksler, and is apparently directed by Blochintsev. Contrary to Skinner's impression, Blochintsev stated definitely (in Geneva) that the 50-60 GeV machine now being planned under Vladimirovsky will not be built there. They are still looking for a suitable site, which must have good subsoil. Blochintsev also stated that, under a new rule, no more institutes will be built in Moscow; certainly many scientists from other cities expressed their resentment of the concentration of so much activity in Moscow. The "United Institute" is to be formed into a C.E.R.N.-type organisation, with 11 member states (the usual list) paying no contributions. It was stated that the 50-60 GeV machine would not be available to this organisation.

Contrary to other reports, Veksler's 10 BeV synchrotron is not particularly extravagant in steel weight for a constant gradient machine. It is in a very advanced state, and should operate in less than a year. Some features of its design are open to criticism. The synchrocyclotron on the other hand, is extravagant in steel but beautifully engineered. It was built in less than three years, and we were told that 9 months had been saved, at great expense in steel, by the adoption of air cooling.

A group in Kharkov, at an institute run by the Academy of Sciences, is working actively on accelerators - especially linear accelerators. They are independent of the Moscow group and appear to have little contact with them. Sineinikov is the head of the Kharkov Institute; he and his collaborators, whom we met in Geneva, were most sociable and friendly. They entertained the Harwell contingent at dinner and the conversation ranged far and wide, including discussions of Khrushchev's celebrated speech.

Many of the "interpreters" in Geneva appeared to be security men of some sort; some of the Russians became adept at arranging to be out of earshot of these gentlemen. It became apparent that some of the senior Russians were rather hard, and were less friendly than the others. One of them was very interested to know the whereabouts of Sir George Thomson, and was clearly suspicious when told that Sir George had retired from active participation in research.

A curious feature was that the Russian official interpreters had no scientific training at all. We suffered badly from this in Moscow, since many of the Russian papers were unintelligible to the interpreters. However, they suffered in Geneva for the same reason; in this case, Volkoff helped during the discussion periods.

New accelerators are still being announced. At Geneva, we heard of a 600 MeV strong focusing proton synchrotron, intended as a model of the 6 BeV model of the 60 BeV machine! Mescheryakov said that he wished to convert the big synchrocyclotron to a 900 MeV, 500 / μ a machine using spiral ridges, but that the research physicists would not give up the machine.

Everywhere we saw evidence that the standard of living, at present very low for the proletariat, is improving rapidly. There is fairly heavy traffic on the streets, most of the cars being nearly new, privately owned Pobieda's. The behaviour of pedestrians and drivers confirms that this is a recent development.

I agree completely with Skinner's assessment of the seriousness of the Russian challenge. Vast teams of technologists have been trained on projects such as the large accelerators; accelerator projects are an exceptionally good training ground. They appear to be able to switch these teams from one job to another; for example, a very senior electrical engineer (Mintz), a most charming and competent man, had been involved in both machines at the Volga, in linear electron accelerators for Kurchatov, in the development of 150 Mc/s high power triodes and 10 cm. klystrons, and in the production of medium wave high power valves for Moscow radio. There appeared to be much interest in transfer machines and the applications of computing techniques to industry. When the time comes for the Russians to expand their light industry for manufacture of durable consumer goods, our exporters will have to face very severe competition. This time may be soon. The motor industry, in particular, appears to be developing very rapidly and has just announced some very attractive designs.

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20th June, 1956.