EPIDEMIOLOGIC DATA ON AMERICAN PERSONNEL IN THE MOSCOW EMBASSY

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I had prepared a long paper to present, but after yesterday's discussions, it was evident that there is so much misunderstanding about the basic facts that I shall deviate from my prepared text and present a historical background to the so-called "Moscow" situation to put the problems in context and in perspective as to what actually occurred.

The United States started relations with the Soviets during World War II and established a Lend Lease mission in Moscow. This mission was housed in a building on the Moscow River close by the Kremlin, right next door to the British and other embassies.

When finally full diplomatic relations were established, an embassy replaced the mission. The ambassador always lived in a house many miles from the chancery buildings and most of the people who worked in the chancery lived in apartment houses from two to four miles from the chancery. There were a variety of conditions under which people lived with respect to exposure to any environmental contaminant.

In 1952 the Soviet government asked the United States to move its chancery building from the neighborhood of the Kremlin to Chekovsky Street, several miles away. An empty apartment house had been reconstructed for the use of the American chancery. The Soviets had an opportunity to rebuild this building from the inside, but that is part of another story.

Periodic electronic surveillance of all of the offices in the chancery was carried out. In the course of these routine electronic sweeps, in 1953, a very peculiar signal was picked up. At first this signal was intermittently

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present. It varied in frequency from about 2 gigahertz to 7 gigahertz, it came on in a series of modes without any definite pattern and appeared and disappeared without any apparent regularity. In the late 1950s this signal became constant. The use of the electronic surveillance, or sweeping, equipment was a function of Department of Defense personnel assigned to the embassy. (Various military attaches are present in all the embassies.) About the end of the 1950s and in early 1960, the State Department decided to take over complete surveillance of this peculiar type of microwave signal which was now present in the embassy on a very definite and routine basis. A system was set up whereby continuous tape recordings were made in all four areas—north, south, east, and west—of the chancery building on a 24-hour basis. Periodically, spectrum analyzers, bolometers and other equipment measured the actual intensity and identified the various frequencies. Anytime a deviation occurred on the strip recording, a new measurement was made to see just in what direction these changes were taking place. An essentially continuous record exists of the microwave beam which was focussed on the chancery from about 1962 to date, and it is still going on.

From 1953 until May 28, 1975 there was a single source beam illuminating the west facade of the chancery building starting at about the sixth floor, peaking at around the tenth floor and the roof. The north, south, and east had no evidence of any beaming whatsoever. By using a directional antenna, one could identify the source of the beam very quickly. There was a horn on the balcony of a Soviet apartment house. Those of you who have read the Johns Hopkins Report should note the footnotes in Appendix II, which describe the intensity of the radiation beam. The maximum intensity up to May 28, 1975 was 5 microwatts. To achieve a 5 microwatt exposure the individual had to stand in front of an open window fully undressed for a full part of the working day. The characteristics of microwaves are such that once away from the open window, inside the room, a variety of field intensities fluctuate depending upon the wall, the furniture, the presence of steel cabinets, and so forth.

A few feet from the window, the intensity was down to fractions of a microwatt most of the time with occasional points there where one could measure one or two microwatts. In reporting the story up to now, we have always used maximum intensities because of having been accused of trying to cover up facts. The values to which people were actually exposed routinely were indeed much lower than the maximum readings. And in

Moscow, where it is 45° below zero, centigrade and Fahrenheit, for weeks and weeks at a time, I question whether anybody stood in front of an open window dressed or undressed.

By the end of May of 1975 there were indications that the Russians were going to change this illumination of the chancery buildings. Soon two beams appeared hitting the embassy, one from the east on the other side of Chekovsky Street and one from the south from a high rise Soviet building. And by the use of a directional antenna, these sources were very quickly located and the intensities and frequencies were measurable and recorded. The intensity increased to a maximum at one point and in one place of $18\mu W/cm.^2$, in one part of the building on the southeast corner, where two beams converged into a room. The rest of the building did not really get a full $18\mu W$ at any time. However, we adhered to the principal of discussing maximum exposure for the benefit of avoiding the accusations of cover up and minimization.

With this background and remembering that most people did not live in the chancery, there were about 12 apartments where people had some exposure to microwaves during the daytime. But the rest of the 300 some odd people at the embassy lived away from the chancery buildings and they had no exposure whatsoever.

A number of people worked on the ground floor of the chancery and had absolutely no exposure. The estimate of the exposure indices, reported in the Johns Hopkins report, is based upon these placements. Individuals' working offices were located by assignment, their living quarters were located and based upon these measurements, the maximum possible dosage which they could have received over the period of time was calculated.

Most people served an average tour of duty of two years, and many served two tours, that is four years. Others served as long as three tours, or six years, in this Moscow environment, not continuously but intermittently over a period of time.

The object of the Johns Hopkins study was to compare morbidity and mortality exposure of Foreign Service employees who had served in the American Embassy in Moscow during the period 1953 to 1976 with employees who had served in other selected Eastern European embassies or consulates during the same period of time.

Microwave exposures at the chancery building in Moscow varied during this time. Prior to May 1975 there was a single source of radiation which

illuminated the west facade, essentially from the 6th floor to the roof at a maximum of 5μW/cm.^{2} about nine hours each day. From the end of May 1975 to early February 1976 there were two sources of radiation, one illuminating from the south and one from the east. The maximum measured level at one point was 18μW/cm.^{2} for 18 hours each day. Relative power levels were recorded continuously from early 1963 on a strip chart recorder. Apartment complexes in Moscow distant from the chancery were monitored at frequent intervals. Tests for microwave radiation at all Eastern European posts included in the study were made periodically using appropriate techniques.

The study itself is a broad survey of mortality and morbidity among the employees and their dependents with special emphasis on illnesses, conditions, or symptoms allegedly associated with exposure to microwaves, i.e., asthenic syndrome and others. The information came from two main sources: The medical records in the Office of Medical Services at the State Department. These were in excellent shape because each Foreign Service officer has a complete physical examination, including blood count, about every two years. A health history questionnaire was sent from Johns Hopkins to each employee who could be located. A concerted effort was made to obtain a death certificate for every deceased study subject. The study population was 4,388 employees and 8,283 dependents. More than 1,800 of the employees had worked at the Moscow Embassy. More than 3,000 of the dependents were or had been living in Moscow. About one third of the employees in the study have been followed 15 to 20 years. An average tour of duty was two years, about 23% served more than one tour, up to 8 in a few instances; 42% served less than two years.

The mortality experience can be summarized very briefly. Obviously, the most important health effect on a population would be reduced longevity or early death. Although there were 152 deaths among male employees studied, this is estimated to be only 50% of the mortality based on United States population mortality rates for white men. No differences were observed between the Moscow and comparison groups either in total mortality or in mortality from cancer, which was proportionately more frequent than the other causes of death in both groups, but still somewhat less in the Moscow and somewhat higher in the comparison group than expected from American mortality statistics.

The mortality experiences of the female employees were not as favor-

able as observed for the males (better than the standard United States) and the 42 observed deaths represented 80% of the expected mortality based on the American population experience.

Alterations in the health status of a population produced by the introduction of some health hazard would, in all likelihood, be detected first by an increase in the frequency of nonfatal conditions, particularly in a group examined as frequently as this group. Hundreds of comparisons were made based on information obtained in the medical records. The risks of developing health problems were shared nearly equally by both the Moscow and comparison groups. Two differences did stand out: the Moscow male employees had a three-fold higher risk of acquiring protozoal infections (Giardia) than the comparison employees and both men and women in the Moscow group had a slightly higher frequency of most of the common kinds of health conditions reported. No consistent pattern of increased frequency in the group exposed to other than background microwave radiation could be found. An analysis of the health history questionnaire brought out some different indications. The Moscow group, especially the men, reported a variety of symptoms after their study tour more frequently than the comparison group, i.e., more depression, more irritability, more difficulty in concentrating, and more memory loss. However, no relation was found between the occurrence of these symptoms and exposure to microwaves.

Congenital anomalies in children were studied. Although some anomalies occurred, no difference could be detected between the two study groups.

The Johns Hopkins group summarized their report* as follows: "To summarize, with very few exceptions, an exhaustive comparison of the health status of the State Department employees who had served in Moscow with those who had served in other Eastern European posts during the same period of time revealed no differences in health status as indicated by their mortality experiences and a variety of morbidity measures. No convincing evidence was discovered that would directly implicate the exposure to microwave radiation experienced by the employees at the Moscow embassy in the causation of any adverse health effects as of the time of this analysis."

*Lillienfeld, A.M., Tonasha, J., Tonasha, S., et al.: *Foreign Service Health Status Study. Evaluation of Health Status of Foreign Service and Other Employees from Selected Eastern European Posts.* Springfield, Va., Nat. Tech, Inform. Service, 1978.