ticle physics, solid-state physics, and who knows what else are relevant to our needs in this respect and are therefore deserving of public support. Nothing is more primitive than our means of generating power, either by building a fire, or, even worse, by starting a fission reaction; no part of our technology is more ripe for a scientific revolution.

New science can change our lives in highly desirable ways. There have been many notable examples in the past, and it does not make sense to behave as though it would never happen again.

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Diet and Stomach Cancer

In his interesting report "Talc-treated rice and Japanese stomach cancer" (17 Sept., p. 1141), R. R. Merliss advances data indicating that asbestos fiber contained in talc added to rice as a flavor fixative is the carcinogenic agent that causes a high incidence of stomach cancer in Japan. He suggests that the diets of Finland, Iceland, and Chile, where the incidence is similarly high, should be scanned for asbestos contaminants.

Being familiar with the dietary habits of the Scandinavian countries, particularly Finland, I believe that the high incidence of stomach cancer there is connected with methods of fish preservation. Great quantities of strongly salted fish, *smoked* fish, and *smoked* cereal powders ("talkkuna") are consumed in these countries. I am not aware that any asbestos fibers find their way into foods in Finland and Iceland.

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I presume that the talc content which Merliss found was for rice that had been dry-ashed from a raw state. However, no self-respecting Japanese woman serves raw rice. She rinses it many times in both cold and tepid water until the rinse becomes clear. At this stage she adds a final measure of water and either directly cooks it or uses a rice cooker. The thorough rinsing preparations certainly must remove a great deal of the asbestos-contaminated talc fibers, possibly lowering the content to an insignificant amount.

May I suggest that a similar study be made in which thoroughly rinsed rice, and then cooked rice, are used. Different amounts of talc and asbestos may be found.

The connection between rice eating and stomach cancer, however, may actually exist. Boiled white rice is bland, and in any country where rice is a staple something has been developed to add to its flavor. In India it is curries, in Korea and Thailand, hot and garlicky spices; the Japanese use soy sauce, pickles, and some commercial gravies, to say nothing of seaweed (nori). I would look for the cause of Japanese stomach cancer in (i) soy sauce, which is used in tremendous quantities, and in which there is ample opportunity for fungi to grow and produce aflatoxins; (ii) the wide variety of pickles and pickled vegetables that are eaten with the rice; (iii) seaweed, which is extensively consumed by the Japanese; and (iv) the method of rice storage, which could result in the growth of fungi and the production of aflatoxins in the rice.

These may or may not be blind alleys, but they are more reasonable than the assumption that the Japanese eat raw rice.

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Merliss's arguments and conclusions seem deceptively self-evident. However, there are two major flaws in his theory. First, most of the rice sold in Japan does not have a talc coating. No Japanese home is far from a rice shop, and much of the rice is never stored but moves quickly from the field to the consumer. In most instances the bran is removed just prior to sale in the shops. Second, if talc is used, the method of preparation used by the Japanese involves prolonged washing prior to cooking (instructions on bags of glucose and talc-covered rice packed in California by the Japan Food Corporation clearly indicate that the rice should be washed before using). It would therefore seem that the amount of talc ingested by the Japanese is negligible and thus not likely to be related to the high prevalence of stomach cancer in Japan.

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The talc used to coat the rice that Merliss analyzed may have been California talc, which contains about 20 to 40 percent tremolite (calcium magnesium silicate), a form of asbestos.

However, talc is suitable for human consumption, provided that it is nearly all hydrous magnesium silicate and contains only traces of calcium silicate. California talc, or talc of a similar quality, should not be used to dust foods or in medicines.

Baby-care products also contain large quantities of talc. The amount of talc used in the care of a baby can be estimated at 2 ounces per week per baby. Although only a small portion of this quantity is inhaled or swallowed by the baby, we should not underestimate the amount. The frequency of respiration is very high. An additional warning should be made against the use in baby-care products of talc with a high calcium silicate content.

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Miller and Smith make the point that washing would remove the asbestos-contaminated talc from talc-treated rice. I have not found this to be true. Examination on 19 October 1971 of rice that was cooked and canned in Japan and sold here in a Japanese market showed 1.1×10^4 asbestos-form fibers per gram of desiccated cooked rice. Apparently washing and cooking reduces the amount of asbestos-form fibers in rice but does not free it of these fibers. Miller says that most rice in Japan moves directly from the field to the consumer. It is hard to believe that this is so in metropolitan areas, and it is obviously not the case with the Japanese canned rice I examined. In all circumstances the incidence of stomach cancer in Japan varies from area to area, and differences in the nature of the rice might be one of the factors influencing this variation.

Bjorksten writes that he does not know of talc additives to food in Finland, a country where the incidence of stomach cancer is high. The problem is complex. Talc is usually considered so innocuous that specific inquiry or examination must be made to determine its presence as a food additive. Firm information about talc additives is needed from Finland, Chile, and Iceland.

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