One relatively immediate application of this research may be in establishing a therapeutic index of the effect of treatment on cancers of the herpes-related types. High levels of antibody to the nonvirion antigen persisting after therapy would be a sign that things were not going well, and, perhaps, treatment could be adjusted accordingly. Conversely, an absence of antibody would be a good sign.

Further in the future, Sabin says, is the prospect of a vaccine. Although he has been, for the last couple of years, an outspoken critic of the notion that there is any point in hoping for a vaccine against cancer, he says that his skepticism is over the prospect as far as it applies to RNA viruses, not DNA ones like herpes. (Most of the claims that have been made of the discovery of a human cancer virus have been about RNA viruses, which, presumably, are vertically transmitted from cell to cell, from generation to generation. If so, everyone carries these viruses from conception, and the thought of vaccinating against them in a traditional sense is impractical. Furthermore, virtually all of these RNA viruses are known to be oncogenic. The potential hazards of injecting them in anyone are obvious.)

But, as Sabin sees it, the situation with the herpesviruses is different. "If," he says, stressing the if, "we could find strains of herpesviruses that are infectious but are definitely not oncogenic, it might be possible to develop an attenuated vaccine which would produce immunity to all forms of herpes, including the oncogenic ones. But that is a very long way away, if it happens at all." Nevertheless, Sabin, who only began working at the Frederick center in January, is optimistic about the chances.

The work that Sabin and Tarro have just completed after weeks of intensive effort began, in a sense, as long ago as 1965, when Tarro came to Sabin's laboratory in Cincinnati as a post-doctoral student to learn virology. At the time, they were looking for ways to identify nonvirion antigens and prepare them for laboratory use by separating them from the virus antigens with which they are associated. "There was a long period of poking around in the proverbial dark room looking for a black cat that may not be there," Sabin says of the time, using one of his favorite expressions.

During that period, the two Cincinnati researchers did some work with Ariel Hollinshead of George Washington University, whose studies focused on ways of identifying, isolating, and characterizing specific virus-induced tumor antigens. That marked the beginning of a close association between Tarro and Hollinshead which has continued to this day. Their most recent joint effort involved experiments from which they demonstrate that herpesvirus nonvirion antigens are associated with lip and cervical carcinomas, but not with normal vaginal tissue or intestinal tumors. They found evidence of the antigen in tumor tissues, as opposed to serums, which Tarro and Sabin used, and concluded in a report in the 16 February issue of *Science*, that, because the nonvirion antigens are probably specific markers for the presence of virus within the tumor cells, "the findings could support an etiological role of herpesvirus in selected human malignancies." Both Hollinshead and Tarro have said that Sabin urged Tarro to ask *Science* to delay publication of that paper. The authors believe that he did not want them in print before a paper of his own with Tarro would appear in the *Proceedings of the National Academy of Sciences*. Sabin, on the other hand, says he had reservations about the soundness of the Hollinshead-Tarro data. Tarro considered their data the best so far with respect to the connection between herpesviruses and lip and cervical tumors.

But to go back to earlier work, by 1970 Sabin and Tarro had resolved—reportedly with Hollinshead's help—some of the problems of getting a handle on the antigens and published a paper in the *Proceedings of the National Academy of Sciences* (to which Sabin belongs) describing properties of the nonvirion antigen of the herpesvirus type 1. It was about that time, too, that Sabin left Cincinnati to assume the presidency of the Weizmann Institute in Israel and Tarro went back

Two Patent Studies Pending

In her maiden speech as Assistant Secretary of Commerce for Science and Technology, former Boeing Company physicist Betsy Ancker-Johnson announced that two programs to put the department's file of 11 million patents to work in aiding American technology are under way, with some preliminary results expected soon.

Speaking to the Washington Chapter of the National Association of Science Writers, Ancker-Johnson said that the larger effort is to break out the data in the Patent Office's massive files of 11 million patents (which already divides new inventions into 85,000 subclasses), to indicate where technology is advancing rapidly, where it is proceeding more slowly, and who literally owns it. The premise, she said, is that "Changing patterns of patent activity . . . can be an accurate indication of technological activity throughout the world."

Patents granted in tunneling technology are one example. "U.S. inventors clearly dominate in the broad field of hydraulic and earth engineering, with 69 percent of the patents. However, in the subcategory dealing with tunneling, the figures are quite different. The U.S. share is only 31 percent, while Germany, with 37 percent, emerges as the most active country." In citing this sort of example, Ancker-Johnson was reflecting a feeling shared by others in the Commerce Department and in Administration science circles that, increasingly, American scientists and technologists should keep a weather eye on their foreign competition. At present, she explained, Commerce is preparing a preliminary report which will suggest formats and categories for breaking out this kind of patent information for use by business and government.

A second, smaller effort she cited is a review of the 25,000 government-owned patents to see which might be turned into profitable commercial ventures, or, in her words, into "acres of diamonds" for industry. The effort here, according to a department spokesman, is a result of the President's Technology Message of March 1972. If Ancker-Johnson's speech, with its concluding pitch for women's rights, is an indication, the long-silent science office in the Commerce Department could be livening up.—D.S.