ers. The evolution of the institute was the subject of a talk by Walsh McDermott, chairman of the department of public health at Cornell Medical School and chairman of the Board of Medicine, the precursor of the institute, established in the academy while Frederick Seitz was president.

Other speakers dealt with more general topics, and, considering the academy setting, there was some incidental irony in the talk by Victor W. Sidel, chief of the department of social medicine at Montefiore Hospital in New York, on medicine in the People's Republic of China. Sidel discussed his experiences on a recent, month-long visit to China, which he said was arranged under the auspices of the Federation of American Scientists, of which Sidel is a board member.

It was not lost on many in the audience that none of the relatively small number of scientists and physicians who have visited China since the selective lowering of barriers began this year have made the trip under the

Nuclear Physics: Does Competition Breed a Monstrous Game?

"You must realise that the ethics usual in the scholarly pursuits, literary and so on, do not apply to high energy physics. Outright dishonesty is prevalent, and there's not much stigma attached to being caught at it. I suppose the referee system is not too bad, but it also is definitely used immorally—to delay your competitor." So says a British nuclear physicist, one of 200 interviewed in a sociological study of competition and its effects on a scientific community. Corollaries of the fight for priority in the British nuclear physics community are suspicion of theft or fraud by other scientists, hasty publication, and reluctance to discuss unpublished ideas or results with potential competitors.

Such at least is the picture put on record by Jerry Gaston, a sociologist at Southern Illinois University, and described in the current issue of *Minerva* [**9**, 472 (1971)]. The study is based on a year's worth of interviews with more than 90 percent of Britain's 220 nuclear physicists. Gaston chose the British section of the nuclear physics community because of the advantages of studying people in another country, but the American section "is very much the same, except probably in this country the competition is much keener," he told *Science*.

As a measure of competition, Gaston chose the percentage of his subjects who had had results of theirs anticipated by other scientists. Nearly two-thirds of the British nuclear physicists reported having been beaten into print. Twenty-six percent of the physicists had had their results anticipated more than once, and 3 percent more than four times. British scientists competing chiefly with Americans were more likely to have their results anticipated than were colleagues working on problems primarily of interest to continental Europeans. Of scientists who said their work was influenced by American and European scientists, 83 and 57 percent, respectively, had been scooped on their research results. This may reflect the larger volume of work turned out by American physicists or the position of leadership in physics that the United States had held for much of the post-war period, Gaston says.

The likelihood of having one's work anticipated turned out to be related not to productivity, but to a scientist's habits of communication. Those who tended to rely chiefly on the spoken word for knowing what was going on were anticipated significantly more often than those who cited conferences and publications as their main sources of information.

What is the reaction to being beaten in a priority race? Besides a certain amount of demoralization, especially among younger scientists, Gaston was often told of plagiary. Whether or not instances of theft were common —Gaston's impression is that they were not—the fear of having one's ideas stolen was real enough. "The theft of ideas was felt to be a major threat to almost all the high energy physicists I interviewed," he reports. Failure to refer to the work of others, a form of petty plagiarism, was also rife, or felt to be rife. Half of the scientists interviewed knew of cases where their work did not receive a clearly merited reference, and 35 percent of these believed the omission was intentional. "It very often happens that people who haven't published much will not refer to your work because the only way they can get their paper into print is by not referring to the preceding paper that has done the same thing," one scientist told Gaston.

The risk of plagiary, whether real or imagined, makes nuclear physicists reluctant to discuss their work. Some three-fifths of the physicists interviewed said they would be secretive about discussing their results, though Gaston notes that natural reticence, as well as fear of being anticipated, may contribute to this attitude. One interviewee told Gaston: "If you have some result which is tentative, you obviously don't want to speak about it if you're not sure; you don't want to make a fool of yourself. I know that while we're supposedly grown men, you get childish rivalries coming in. Physicists are certainly a human lot, there's no doubt about that. They can even be a ruthless lot. I think you will find as much of this here as in industry."

In Gaston's opinion, the fear of plagiary often reflects a scientist's overinflated opinion of himself, and in any case is largely unfounded. "As in the culture of many groups, if something like this happens once or twice, it becomes part of the culture," he says. Gaston was also impressed with the pace of the competition and the ability of individuals whose work had often been anticipated to withstand it.

"It turns out to be a monstrous game," Gaston told *Science*. "I was amazed that, given this amount of competition, people hold up to it so well. In fact, people often change their specialty to less difficult problems, or become administrators. But the effect of anticipation is mitigated by a scientist's colleagues and superiors knowing how the game is played."—NICHOLAS WADE