acquainted with Fleming, comfortable entering through the back door of the office, comfortable to the point of either ignoring the president's secretaries or joking and flirting with them, exhibiting an air of self-confidence, and likely to remove his suit coat at some point of the meeting with Fleming."

The report was presented to the president, who subsequently agreed to attend some consciousness-raising seminars. One, said to be particularly effective, included a slide show depicting how a man would be treated at the university if he were treated like a woman.

Historic as the Fleming Follow was, it may have done more for the consciousness of the women than the men. Most women regard the president as a "nice man," but he has done little to erase the feeling that he is also a hopeless male chauvinist. (Fleming, asked recently how his perceptions about women had changed during the past couple of years, replied, "I find myself mostly amused by those kinds of questions.")

Day Care

Fleming's inability to perceive the truth about women is exemplified, in their eyes, by his attitude toward subsidized day care for children of graduate students and employees, which, according to Nordin, "is the current hot issue on campus." To the women, a university's willingness to set up low-cost day-care facilities has become an index of whether or not men are willing to recognize that women, just like men, want to have both family and career. Fleming says day care would be nice, but there is simply no money for it, and since most women don't have preschool children it would be unfair to use money that might be applied for wider benefits. To some women, though, Fleming's basic attitude is summed up in his comment at a recent meeting with the commission: "You want to have your cake and eat it too."

Women around the state are making it clear that they do indeed want their cake. Wayne State and Michigan State, unlike UM, have not been threatened so far with any reprisals from the government, but they too are beginning to discover that the women mean business.—CONSTANCE HOLDEN

This is the first of two articles.

IARC: An Environmental Approach to Cancer Research

Lyons, France. When the International Agency for Research on Cancer's new 14-story building was inaugurated here last June by French President Georges Pompidou, Pompidou, a chain smoker, turned to one of the agency scientists and asked if it was really true that cigarette smoking leads to cancer. He was told that statistics show it does. Madame Pompidou wondered if the risk were less if one doesn't inhale and was told that, unfortunately, one shouldn't count on it.

"The IARC operates on the assumption that 80 percent of cancers are related to the environment and that identification of the responsible factors can lead to their 'cleaning.' The reluctance shown by both governments and individuals to accept the link between smoking and lung cancer, regarded by cancer epidemiologists as the success of the specialty, may indicate that the cleaning part won't be so easy."

Seeing to it that its findings are acted upon, however, is not the major duty of a scientific organization. While the IARC hopes to be able to offer its data to governments in the form of cost-benefit safety curves for a given carcinogen, it will not make legislative recommendations. More pertinent to the IARC, an autonomous agency within the framework of the World Health Organization, is the question of whether it can retain the freedom to investigate and publish without political interference. And, while scientists in general remain skeptical about both science as done by international organizations and the politics of fighting cancer, persons close to the IARC feel it has done well in avoiding politics.

"I have never heard of any political problems in IARC," said J. C. Pansard, a delegate to the IARC governing council by virtue of his office in the French Ministry of Foreign Affairs. "This may be the only international organization that is entirely technical and scientific." By way of illustration, he cited the process of admitting the newest member, Japan. "In an organization such as the U.N., this might be a major question. At IARC it took about 20 seconds."

Raymond Latarjet, director of the Curie Foundation in Paris and current chairman of the IARC scientific council, a group that is "active, critical, and hard to please," seemed surprised that the politics of the center were even questioned. He pointed out that, in the area of environmental carcinogens, an international organization is likely to be much freer than a national one. To illustrate his point that no better mechanism exists for pronouncing on environmental carcinogens, he cited the handling of the cyclamate controversy in the United States.

IARC director John Higginson, not given to expressing himself in absolutes, believes that one of the agency's successes is that it hasn't been overly political. He attributes this partly to its small size ("too small to arouse jealousies") and voluntary nature, and partly to a conscious policy of not giving grants.

Another reason may be that the IARC's attitude toward environmental carcinogens is not a radical one. In Higginson's view, all biological phenomena must be expressed as probabilities rather than absolutes, and, while arbitrary margins of safety may be necessary when dealing with carcinogens for which the data are incomplete, knowledge of the concentrations at which a substance becomes carcinogenic for man may allow these substances to be used in lower concentrations.

Nevertheless, in incriminating contaminants in areas such as industrial chemicals or food, the potential for

trouble always exists. In discussing a project on the incidence of esophageal cancer in western France, where the principle suspect seems to be a strong, home-brewed calvados, one IARC scientist joked, "For heaven's sake, don't say that calvados causes cancer. The French government will take away our new building!"

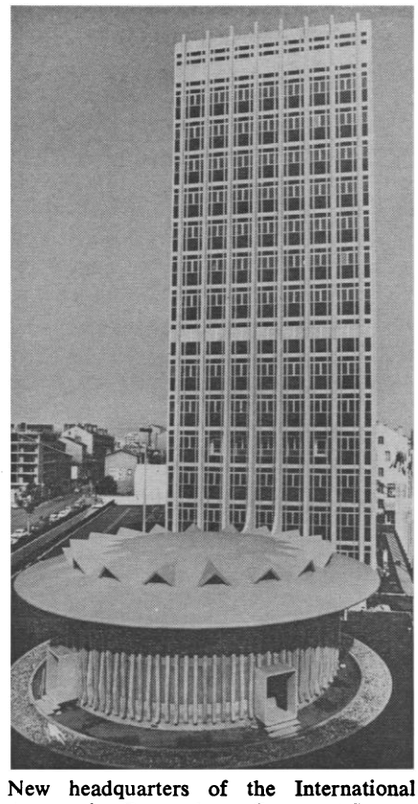
On a more serious level, however, the IARC has not been allowed to measure levels of aflatoxin, a fungal contaminant known to cause cancer of the liver in animals and strongly suspected to in man, in some African countries because these countries fear that it would have an adverse effect on their export of peanut products. Here, too, the political difficulties are probably relative: the IARC feels that, if they are not allowed in, probably no one is.

The irony of the IARC is that it was conceived as a political gesture (growing out of a suggestion made by a group of French intellectuals to the then President Charles de Gaulle that nations should allot a small percentage of their defense budgets for the fight against cancer) with no very concrete ideas about what was needed in the field of cancer research. A strategy was developed, taking into account what could best be done by a small international organization that would not duplicate national efforts. The strategy, that of identifying human carcinogens through international epidemiologic studies, has since been gaining scientific support as a valuable and neglected area; however, by now the political enthusiasm has cooled, and, at a time when millions of dollars are allotted for cancer research in national programs, the IARC is struggling to make modest increases in its budget of $2 million.

The strategy has become more popular since IARC's beginning in 1965, partly because of increased interest in the environment and partly because cancer researchers have begun to realize the limitations of extrapolating data on animals to human beings.

"This investment in research is a good one," says Latarjet, "and I am not a demogogue concerning research. Some research—the screening of just any chemical on 100,000 mice—is not worthwhile."

While epidemiologic studies could be done outside an international organization, "in a perfect world, nothing could be done by bilateral agreement," according to Higginson. He feels that the international approach offers



New headquarters of the International Agency for Research on Cancer at Lyons, France.

advantages. One is the reduction of overhead costs: "We can buy jeeps and use them for several years, whereas the research team on a single project rents them for a year, paying the purchase price in rents." Another is the avoidance of the paternalism that has sometimes characterized bilateral agreements between rich and poor nations. The cooperation of the developing countries is regarded as essential, since only in nonindustrial societies can epidemiologists find the large environmental differences that enable them to measure the results of human experimentation done by nature and culture.

In addition to the new popularity of its approach, the IARC has had some solid achievements to offer since its program was initiated in 1967. Besides a study describing the large differences in the incidence of esophageal cancer in the Caspian littoral of Iran, a study that lays the groundwork for determining the factors responsible for these differences, the IARC feels that it will soon be able to say something definite about liver cancer. "If we don't reach some conclusions about liver cancer, we'll be doing pretty badly," Higginson said.

Liver cancer, which, while common in Africa, is rare in industrialized countries, seems to be related to two different parameters: the amount of aflatoxin in the environment and the presence of Australia (Au) antigen in the blood. The IARC feels that their work on this project, using their own laboratories to help develop field methods, points to the value of laboratory studies as complementary to statistical studies, leading to a more sophisticated epidemiology. Besides measuring Au antigen, the IARC tested blood for the cancer-specific antigen alpha fetoprotein as an epidemiological marker for preclinical liver cancer.

Whether the IARC is yet at the point where it is recognized as the international center for cancer epidemiology seems to be a matter of opinion. According to Higginson, however, it is now being asked to collaborate with more national studies than it feels it can do justice to.

Hopes are that the new building, financed in equal parts by the French government, the *département* of the city of Lyons, and the city of Lyons, will provide a locus for international cooperation in cancer epidemiology, as well as better communication among the IARC scientists themselves, who have been working in several different facilities in different parts of Lyons, connected only by telephone and a limousine.

The IARC now has a staff of 120 in Lyons, about 25 of them professionals. An additional staff of about 110, most of them nonprofessionals, operates in the field, mainly in Uganda and Iran. Employment is open to recruits from both member and nonmember nations. There are no specific quotas, and 12 or 13 nations are currently represented on the staff. Higginson says, however, that the organization tries to avoid too heavy a concentration of persons from any one country, "because I think we would lose a part of the richness of our program."

It is also hoped that the new building will provide the impetus for other nations to join, specifically Canada, Switzerland, and Sweden, since the IARC's "hard money" comes from the assessments of member nations. Since 1968 [*Science* **159**, 513 (1968)], IARC has added two members, Belgium and Japan, to the nine countries that were members at the time (Australia, Federal Republic of Germany, France, Italy, the Netherlands, U.S.S.R., United Kingdom, United States, and Israel), but Israel

was forced to withdraw for financial reasons, leaving a membership of ten nations. Because the IARC was also hit by inflation and the devaluation of the dollar, and because, according to Latarjet, scientific research needs an annual budget increase of 15 percent just to maintain the steady state, attempts to get more money for the center resulted in two changes in assessments from the member nations in a period of 3 years.

While the original suggestion by de Gaulle was that countries would donate 0.5 percent of their defense budgets, by the time the IARC's statute was written this had been changed to a contribution of $150,000 by each member. When attempts were made to raise this amount, however, it became apparent that it would put some of the smallest countries in the position of giving more to the IARC than to their internal research programs. Thus it was voted that additional assessments be based on what a country gave to the World Health Organization (with, however, the two nations that would be paying the most under this method, the United States and the U.S.S.R., voting against the proposal).

According to this formula, approximately 60 percent of the IARC budget came from the equal contributions and 40 percent from the nonequal. The United States subsequently introduced a new scale that would make 80 percent equally contributed and 20 percent nonequally contributed, and a compromise of 70 to 30 percent was voted.

The position of the U.S.S.R. was that no deviation from the concept of equal contributions should have been made, and the U.S.S.R. therefore sometimes made its payments late and not in full, a not insignificant factor when the budget comes from so few sources. At the meeting of the governing council in October 1972, however, the U.S.S.R. agreed to the new formula and promised full cooperation.

While the U.S. position has been consistent with its position in all international organizations—just not to pay too much—certain other countries have been a bit galled that the United States has been asking to reduce its contributions, now $336,720 and less than twice that of the smallest nations, at the same time that $1.6 billion have been allotted to the National Cancer Institute for the next 5 years. "It seemed especially ridiculous when one knew that this tremendously large amount of money—a sum too large to be spent on research—was available for cancer research in the U.S.," Latarjet said.

Frank Rauscher, head of the National Cancer Institute, has been quoted as saying that the epidemiologic approach is valuable and neglected [*Science* **176**, 386 (1972)]. Rauscher is a new member of the scientific council, and "we are putting a lot of hope on him," Latarjet said.

While grants and contracts help, Higginson is wary of too much "soft money," particularly too many contracts from one member nation, which he believes would unduly distort the work of the IARC.

If more money can be found, his priorities would include new units of immunology and metabolism (the IARC currently has units of epidemiology and biostatistics, environmental carcinogens, biologic carcinogenesis, chemical carcinogenesis, and research and training) and the restoration of the fellowship program to its previous level.

Perhaps fitting for the director of a cancer center, Higginson, who was a professor of geographical pathology at the University of Kansas medical school prior to coming to the IARC, does not favor unlimited growth for the IARC. Both he and an independent study commissioned by the governing council recommend that the center, to be most effective in respect to expenditures, be given an annual budget of $4 million to $5 million.—LYNN J. PAYER

Lynn J. Payer, a free-lance medical writer, is now living in Paris.

Salk Institute: Elitist Pursuit of Biology with a Conscience

La Jolla, California. Glamor is not a customary attribute of scientific laboratories, but it is a salient quality of the Salk Institute, a 270-man establishment devoted to biological research with a difference. Besides the magic of Salk's name, the institute glitters with a college of fellows that includes four Nobel prizewinners and a well-heeled board of trustees that probably affords the only occasion for former presidential adviser John J. McCloy and actor Gregory Peck to sit around the same table. What is the purpose of this institute, referred to by its founder as an "experiment in the sociology of science"? How does it differ from less star-studded seats of learning?

Visitors are often driven to Greek architecture to find a comparison for the Salk Institute. The building, two wings flanking a courtyard that overlooks the Pacific, is an edifice of arresting elegance. "An austere Acropolis," comments one writer; "The modern equivalent of a temple of Zeus beside the Aegean," says another. The temple is situated on the northern edge of San Diego, a conservative, naval-base city whose citizens donated 27 acres of prime land to the institute. Designed by architect Louis I. Kahn, it was constructed at a cost of $15 million, mostly contributed by the National Foundation–March of Dimes, which financed both Salk and Sabin in the development of their respective polio vaccines.

The precise purpose of the Salk Institute is not easy to pin down in practical terms. The founders' intention, states a publicity brochure, was "to create a special kind of scientific institution, dedicated to contributing, from the powerful base of modern biology, toward the advancement of the health and well-being of man." Jonas Salk, eponymous founder-in-chief, says he created the institute because "I felt there ought to be a place for biological studies but which also contained the conscience of man."

Though the younger scientists are now more independent than they used to be, the work of the Salk Institute is still centered almost exclusively around the interests of its seven resident fellows.