which they are put, presumably to prevent them from threatening the integrity of the tribal and lineage structure—though it is not clear why they should wish to do so, or why they should be regarded as a threat. Yet it is clear that the focus on structural aspects of the relationships among the various lineages has the effect of creating and reinforcing the loyalties to the maximal lineage, while preserving the sentiment of unity to the tribe as a whole. The libations and commensal feasting are, of course, too obvious to warrant further comment. Perhaps the most important feature of the ritual in creating this sense of unity is so obvious that it is easily overlooked. Convocation in the presence of the truly great leaders of the lineages and clans instills in one a very real sense of the power and importance of the units, each at its own level, and thus strengthens that sense of commitment that is so important in the maintenance of any social order.

Your Obt. Servant,

/s/ WALTER GOLDSCHMIDT

NEWS AND COMMENT

Britain and the EEC: How Strong Is the Technological Argument?

London. Opinion polls here have consistently shown that a majority of the British oppose the idea of their country's entering the European Economic Community (EEC), or Common Market, but nevertheless expect Britain to join. The British public seems to regard membership as regrettable but inevitable, and the governing Conservative Party is expected to carry the crucial vote on British entry in the House of Commons this week, although by a narrow margin and only with the help of the pro-marketeers in the Labour Party.

The government's case in favor of entry has stressed both security and prosperity, but there has been relatively little detailed forecasting of the political or economic benefits that will accrue to Britain as a result of EEC membership. If Parliament accepts the principle of entry this week, however, a lot of gaps will be filled in through negotiation and "enabling" legislation before the effective date of entry at the end of 1972.

Much of the discussion during the rather muted "great debate" on British entry in recent months has focused on the economic aspects of joining the Common Market. The most familiar economic argument for entry is that Britain will gain a larger market for trade and industry—an American-sized market of 225 million people. Along with this frequently goes the assertion that Britain will have a special advantage in the high-technology sector—aviation, space, electronics, computers, nuclear industry—because of heavy national investment in research and development and because British high-technology firms tend to be larger than their continental counterparts.

The governing Conservatives have, on the whole, made less of this technological edge than did their Labour Party predecessor, but the argument still finds a prominent place in pro-market speeches and promotional literature. Some economists, however, are asking whether even the European market provides a big enough base to enable Common Market companies to compete successfully in the major aviation, computer, and nuclear fields, which now require a world market.

Labour Party opposition to British entry has centered chiefly on the terms accepted by the government. Main points are that customs duties and quantitative restrictions on trade between Britain and Common Market countries will be eliminated over a 5-year transition period and that Britain will accept the EEC's common agricultural policy, which will result in a substantial rise in food costs in Britain. The chief direct cost to Britain's balance of payments will be the country's contribution to the EEC budget—annual payments will start at $250 million in 1973, and rise to $500 million in 1977.

Knowledge as Entry Fee

For science and technology, the most significant part of the initiation process is that Britain will join Euratom, the European atomic energy agency. After some hard bargaining, it was agreed that Britain would join without an entry fee, but that after accession to the Euratom treaty Britain would "deposit knowledge" of equivalent value.

These Euratom negotiations have illustrated once again the peculiarities of European science relations. Where basic research is involved, Europeans have cooperated well, often brilliantly. Where applied research and development with military or commercial payoffs is concerned, cooperation becomes much trickier. British university scientists and science bureaucrats generally feel that British entry into the Common Market will have little immediate impact on British collaboration with other Europeans on fundamental research, graduate education, or university interchange. This is because Britain has for some time been an active participant in regional research organizations and programs. These range from CERN, the European particle physics research organizations, to the European Launcher Development Organization, which was established mainly at British behest in the early 1960's and has never really, so to speak, gotten off the ground. The European Space Research Agency has settled for fairly modest goals and is currently credited with brighter prospects. And the European Molecular Biology Organization, which exists chiefly because of the dynamism of a group of distinguished European biologists, several of them British, has shown considerable vitality, but has so far been unable to settle the issue of whether, how, and where to establish a European laboratory. British scientists, therefore, are already very much "into Europe."

Euratom, an EEC subsidiary, has had a relatively long and recently unhappy history. Like CERN, it was established at a time when Europeans saw scientific cooperation as an avenue of postwar reconciliation. Euratom was

launched with high hopes and a big budget, and in the early days was essentially a research organization focused on the peaceful uses of nuclear energy. As nuclear power became a commercial possibility, the major members of the Common Market began to see Euratom as a rival to their own national nuclear industries. The French first pursued their own nuclear destiny on the basis of the reactor technology developed for their nuclear submarine. In Germany, private industry assumed the initiative and built itself up by licensing American technology. Britain, for its own part, had made a heavy investment in nuclear power development and showed no disposition to share the results through Euratom or otherwise.

The strains of technological nationalism have been reflected in the impasse over Euratom policy, which has caused the agency to operate on a year-to-year extension of the budget for the last 4 years rather than a longer term plan. Now, prospects seem better for the financing of a program extending to 1974. Euratom has always been more comfortable with work promising a remote commercial payoff—such as work on fusion reactors—and the new program would call for research on various aspects of reactor deveolpment, rather than on the development of a particular commercial reactor. Research categories would be enlarged to give researchers more flexibility; more work in nonnuclear fields, using the multidisciplinary skills of staff at Euratom's joint research centers, is also contemplated. The British are reportedly amenable to the new tack Euratom proposes to take.

Euratom aside, there are some clear signs that Europeans are coming around to the view that the impulse to go it alone is unrealistic for nuclear industry. It is true that electricity-generating authorities in major European countries are still virtually certain to buy new nuclear power stations from their own national companies; at this point, there are no real prospects for British companies in France or vice versa. But there is still a limited market for nuclear stations in Europe, as well as wholly inadequate markets in individual countries. In Britain, five groupings of nuclear power station design and con-

Briefing

L'Affaire Eole

Franco-American cooperation in space has never been a vigorous affair, and what little there is to it suffered an agonizing stroke of bad luck last month. In an incident that drew little notice here, the French weather satellite Eole, launched in August by the National Aeronautics and Space Administration (NASA), got its signals mixed during one orbit of the earth and radioed destruct commands to scores of weather balloons from which it was supposed to be collecting information. NASA officials, who said the loss of the balloons was an unfortunate but not disastrous setback for the cooperative Eole program, attributed the faux pas to mission controllers at an installation outside Paris.

The incident occurred on 11 September, shortly after French and Argentine technicians had launched the first 115 of the balloons from three sites in Argentina. The balloons, which were eventually to number about 500, carry a 6-pound instrument package to an altitude of 38,000 feet. At that height, they drift eastward across the Southern Hemisphere between latitudes 20° and 70°S, gathering data on wind speed and direction, temperatures, and air pressure. On command from Eole, which orbits 560 miles above the earth, the balloons transmit their information to the satellite. Eole then relays the data to the Bretigny center near Paris, where it is analyzed before being sent for further study to a group of French and American meteorologists at the Goddard Space Flight Center near Washington, D.C.

To eliminate useless data from balloons that stray outside the 20° to 70°S experimental zone, French engineers equipped the gasbags with explosive charges, which Eole could detonate on command—singly or all at once. It was this provision that backfired, according to Eugene Ehrlich, NASA's manager for the cooperative program.

As the satellite sped over Bretigny on its 346th orbit, Ehrlich said, French personnel inadvertently sent up the general "destruct" command instead of the "interrogation" command. The error was discovered quickly, but not quickly enough. Before the order could be rescinded, Eole had hurtled over the horizon and beyond control. "I couldn't tell you what happened after that, what sort of chaos broke loose in the station," Ehrlich said. East of Argentina, events were clearer. Seventy-two of 115 balloons, all those in Eole's flight path on that orbit, plunged to Earth, mostly into the Atlantic Ocean. NASA officials said the mistake resulted in some "procedural changes" at mission control as well as the possible demise of "one dumb computer programmer."

—R.G.

Nixon on Science

President Nixon has seldom revealed his attitude of mind toward science and scientists. His few recorded remarks on the subject suggest an interest, such as it is, that stems from faith in technological progress rather than intellectual curiosity. Nixon has shown a penchant for ambitious glamor projects such as the SST and the breeder reactor program, and his familiarity with the technical details of the breeder is said to have surprised the AEC staff who briefed him for the decisions taken on the program this June. But he is apparently less well primed on the scientific underpinnings of technology. "That was one of my poorest subjects, science," the Chief Executive informed citizens of Hanford, Washington, last month. "I got through it, but I had to work too hard. I gave it up when I was a sophomore. But I can assure you that it always has been fascinating to me, because it seems to me that if a people are to be a great people, we must always explore the unknown. We must never be afraid of it. That is why we have to go to space. That is why we should have built the SST. That is why . . . we must not be afraid [of nuclear power]. We must explore it."—N.W.

POINT OF VIEW

AEC to Referee, Not Promote, Industry

A major turnabout in the attitude of the Atomic Energy Commission toward the nuclear power industry was signaled last week by the new AEC chairman James R. Schlesinger. With patrician froideur, *Schlesinger informed a mass gathering of the nuclear power industry at Bal Harbour, Florida, that from henceforth the AEC would act as the referee of nuclear power, not its promoter. Saying he would dispense with the "anecdotes and clumsy jests" customary on such occasions, Schlesinger served notice on the nuclear banqueters that their cozy relationship with the AEC was at an end. The industry should not expect the AEC to fight its battles: it should take its own case to the public—as the Sierra Club does. Nor did the AEC intend to bend the rules in industry's favor. "We have had a fair amount of advice on how to evade the clear mandate of the federal courts. It is advice we did not think proper to accept," Schlesinger said. Even on matters of engineering quality, the diners were told they knew full well they had "reason to blush."*

Roused out of any postprandial euphoria by this glacial disdain, the industry representatives heard the new chairman announce the following radical upheavals in official AEC philosophy.

From its inception, the Atomic Energy Commission has fostered and protected the nuclear industry. . . . But that industry, insofar as it involves the exploitation of light water reactor technology, should now be on a self-sustaining basis. Those of you who regard the response to Calvert Cliffs * as indicating a climatic change in the relationship between the industry and the AEC could well be right, though perhaps for the wrong reason. The move toward greater self-reliance for the industry had a certain historic inevitability. . . . One result will be that you should not expect the AEC to fight the industry's political, social, and commercial battles. . . .

It is the responsibility of the Atomic Energy Commission vigorously to develop new technical options and to bring those options to the point of commercial application. It is not the responsibility of the Atomic Energy Commission to solve industry's problems which may crop up in the course of commercial exploitation. That is industry's responsibility, to be settled among industry, Congress, and the public. The AEC's role is a more limited one, primarily to perform as a referee serving the public interest. I might add that it is to industry's long-run advantage that the public has high confidence that the AEC will appropriately perform its role in this regard.

In the weeks since I came into this job, I have been impressed on a number of occasions by the failure in the industry and in-house properly to distinguish between the role and responsibilities of industry and the separate role and responsibilities of the AEC. In the future, I trust the distinctive responsibilities of a government agency will become more sharply etched in the minds of all of us. . . .

Environmentalists have raised many legitimate questions. A number have bad manners, but I believe that broadside diatribes against environmentalists to be not only in bad taste, but wrong. . . . The question had been raised, by Michael McCloskey of the Sierra Club among others, whether our society for environmental reasons viewed broadly ought not to curb its appetite for energy and for electric power. It is a legitimate social question. It is not unreasonable to question whether neon signs or even air conditioning are essential ingredients in the American way of life. More fundamentally it is not unthinkable to inquire whether energy production should be determined solely in response to market demand. Some of you I suspect have strong views on this matter. You should be prepared, whenever the necessity arises, to present your position to the public just as the Sierra Club does—and I suspect that at this reading you are likely to have the public with you.

It would seem to me inappropriate for the Atomic Energy Commission to take a position on this issue. The AEC should be officially neutral.

* The AEC unexpectedly declined to fight the court decision in July which held that the AEC had made a mockery of the legal requirements for assessing the environmental hazards of power plant construction.

struction companies have been reduced to two consortia, and these consortia are establishing links with companies in EEC countries. The initial results could range from British companies contributing components to jobs done by continental companies to joint performance of contracts.

On an even more formal level, the British, French, and Germans have just concluded an agreement to set up a company for the reprocessing of nuclear fuels. Called United Reprocessors, ownership is shared equally by British Nuclear Fuels, a company split off from and still partly owned by the U.K. Atomic Energy Authority, the French atomic energy agency, and a German consortium. The idea is to capture the European market for irradiated oxide fuels and to avoid the building of more fuel-processing capacity until need is demonstrated.

The agreement is similar to a tripartite pact involving Britain, Germany, and the Netherlands in the development of a new centrifuge method of uranium enrichment. And Britain's Central Electricity Generating Board is expected to join a new British-French-German company being set up to pool experience in the development of high-temperature reactors. Ironically, Euratom has tried to prevent bilateral links in the nuclear field outside Euratom, and now it appears that multiple arrangements of this kind represent the real hope for making European nuclear industry competitive.

The same questions of sovereignty over national economic markets that have inhibited nuclear industry in Europe apply to other high-technology fields. A number of major cooperative projects are afoot in aviation. The best known, of course, is British-French collaboration on the Concorde. The Jaguar strike/trainer aircraft is another Anglo-French project, and Britain, Germany, and Italy have recently agreed to develop a new multirole plane through a joint company (PANAVIA).

With both nuclear power and aviation projects, of course, either national security or national prestige is involved, and, in either case very heavy expenditures of money. As one governmental observer candidly put it, "What it's all about is middle-sized countries wanting to play with toys they can't afford."

It is evident that the British government recognizes that there are penalties implied in obtaining the fruits of high technology. The clearest examples are provided by sophisticated military air-

craft and weaponry. For example, if Britain depends on the United States for combat aircraft, there is a feeling that there are political strings attached. On the other hand, if Britain decides to undertake the task itself or in concert with its European partners, there are heavy national costs implied.

The British are wont to point out how the U.S. Department of Defense and NASA have underwritten the American aerospace industry and, for that matter, IBM; and the British are looking for ways to compete without crippling their economy. For the British, the ordeal of Rolls Royce and the bailout operation by the government was an even more sobering experience than the sorrows of Lockheed were for the United States. The British are acutely aware, as one knowledgeable civil servant put it last week, of "the limit of the size of the risk one can take."

For the high-technology companies in the EEC, the crucial question may be whether the members will agree to open public contracts—for power plants, aircraft, telecommunications facilities—to companies throughout the community. This has been recommended in the so-called Colonna memorandum on industrial policy, but there is as yet no real indication that such a change will occur. Such action would do perhaps more than anything else to encourage mergers and less informal associations that would make it possible for the EEC to operate effectively across old political and psychological frontiers.

Despite the dominance of economic arguments in the public discussion of British entry into the EEC, a reporter talking to British government officials gains the strong impression that Prime Minister Edward Heath's government has made an essentially political decision. Since World War II, Britain has profoundly altered its ties with the Commonwealth and is now modifying its "special relationship" with the United States. The rationale was clearly put in this excerpt from Heath's speech at the recent Conservative Party Conference.

"I must tell you today that the change which I and others foresaw is now upon us. The United States, faced with deep-seated problems at home and abroad, is working towards direct arrangements with the Soviet Union and Communist China. Even more important, the United States is acting drastically to protect its own balance of payments and its own trading position against the erosions which they suffered. Everyone concerned with trade and finance knows that rough winds are beginning to blow across the world. . . .

"Fortunately this change in the world has come upon us at exactly the time when we have the opportunity to associate ourselves with other countries of the European Community. And by associating ourselves now, at this time, we can work together to protect effectively our own interests and theirs in a way which would not be possible were we to remain alone."—JOHN WALSH

Human Environment Conference: Citizen Advisers Muddle Through

In an unusual gesture last January, Secretary of State William Rogers promised that his department would solicit advice from the public on what the United States ought to contribute to next year's United Nation's Conference on the Human Environment, in Stockholm (*Science*, 22 October and 4 June). For all its public-spirited intentions, however, the State Department is having a hard time getting the advice its presumably wants. An advisory committee of distinguished citizens—designated by Rogers in January as the main channel through which the interested public could pass its "views and support" for the Stockholm meeting—has conveyed little of either to the State Department in its 6 months of somnolent existence. What it has provided instead is a stunning illustration of the pitfalls of blue-ribbon advisory committees, whatever their purpose.

Some of the committee's 27 members, notably the environmentalists among them, say the group has worked poorly and accomplished next to nothing since it first met last May. Even the committee's staunchest supporters are hard put to say how it has influenced U.S. preparations for the Stockholm conference next June, if at all. One member, a conservationist, sourly denounces the group as a "piece of window dressing, a wheel-spinning operation that's supposed to produce endorsements for U.S. positions."

This judgment may be excessively harsh, however, for more than anything else, the State Department's advisory committee seems to be the innocent victim of paralytic circumstances—the chief circumstances being the lethargy of government, some extremely tight deadlines for preparatory work set by the U.N. secretariat, and the hypersensitivity of conservationists.

For one thing, the committee was handicapped by an extremely tardy start. State Department officials had talked about forming it months before Rogers announced it in January; two more weeks then passed before the appointment of a chairman, Senator Howard Baker, an earnest Tennessean who is interested in environmental affairs and who aspires to be identified as the Republican answer to the leadership of Edmund Muskie (D–Maine) in that field. Not until late April did the White House finally complete a lengthy screening process for the remaining 26 members.

As finally constituted, the committee was about evenly divided between the top executives of such major corporations as ALCOA and Atlantic-Richfield, and environmentalists like Joseph Fisher, who is president of Resources for the Future, and Sidney Howe, president of the Conservation Foundation. In addition, there is Laurance S. Rockefeller, who serves on at least two other presidential committees, plus a few academics and newsmen and a sprinkling of political appointees. Among the political appointees is Mrs. Bruce B. Benson, whom another committee member describes as a "nice garden club lady" who has trouble grappling with global environmental issues couched in terms of parts per million and the oblique langauge of