one which would bring about localized synthesis of wall material to produce swellings, and one which would form crosswalls to delimit the structures. Since in *Pilobolus* it is possible through suitable manipulation of light to determine the regions in which wall synthesis occurs, it may be possible to study the biochemistry and fine structure of these regions and thus explore a significant and intriguing channel in the archipelago of events which stretches between genetic information and physical shape.

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NEWS AND COMMENT

Nuclear Energy for India: U.S. Position on Safeguards Raises Concern of IAEA

Supporters of the International Atomic Energy Agency (IAEA) are readying mourning bands and casting accusatory looks toward the Kennedy administration, despite public and private assurances that the administration is dedicated to promoting a bright future for the IAEA.

There is substantial evidence that a bright future is, in fact, what the administration wishes for the IAEA; but the matter is not a simple one, and friends of the agency can be forgiven if they conclude that there is a disturbing discrepancy between American words and deeds.

This discrepancy has been evident throughout the 5-year history of the IAEA, an organization that slowly and painfully grew out of the Atoms-for-Peace proposal put forth by President Eisenhower in 1953. Now numbering 78 member nations, IAEA is a large and busy enterprise, devoted in large part to communicating peaceful nuclear technology to underdeveloped nations. But the original justification for its founding—to provide assurance that the major nuclear powers, in spreading nuclear technology, would not be contributing to the spread of nuclear weapons—has never been realized in actual operations.

The reasons for this failure are technical and political. Nuclear power came along far more slowly than was expected when Eisenhower first made his proposal. Thus there proved to be no immediate grounds for fears that nations newly equipped with power reactors could surreptitiously divert nuclear materials to weapon production. In the meantime, the two major nuclear powers had entered into a large number of bilateral agreements with nations seeking the benefits of nuclear technology. The bilateral agreements, of which the United States now has 44 and the Soviet Union 14, were in most instances preferred by the recipient nations, who came to look upon a nation-to-nation relationship as more prestigeful than assistance channeled through the IAEA. This feeling was fostered by the Soviets' traditional aversion to international inspection, and, politically, it put the United States in a poor competitive position when lesser-developed nations suggested they would look toward the Soviets if the United States insisted upon working through the IAEA. In all bilateral arrangements, the United States and, presumably, the Soviets have insisted that their own inspection and safeguards accompany assistance, with the result that the IAEA has not come to play a significant role in inspection.

The agency, meanwhile, has justified its $7 million budget and 600 employees by evolving into a useful service organization for training technicians and developing international standards in such areas as health, safety, and waste disposal. It has also sponsored what are generally regarded as extremely useful conferences and symposiums on a wide variety of subjects related to the peaceful development of atomic energy.

However, the agency's failure to make any headway in a safeguards or inspection role has been a constant source of concern to its supporters, since this role has been regarded from the first as the main justification for the agency's existence. The creeping development of nuclear energy has until recently provided an explanation for this failure, but the safeguards issue has now presented itself in a concrete form, namely, India's decision to buy a 380-megawatt nuclear power plant from this country.

India's Plans

There is no doubt that there will be outside inspection of the Indian plant; the United States has made it clear that it will not permit shipment of the nuclear materials unless it has ironclad assurance that the installation operations will be open to trustworthy inspection. Rather, the question is whether the inspectors will come from this country or from the IAEA. The agency regards the decision as an extremely critical one for its future since the Indian installation, larger than any that has yet been sold abroad, would for the first time give a nuclear have-not nation the capacity for acquiring a sizable amount of weapon-grade plutonium. What disturbs the IAEA is that United States officials, apparently in deference to India's opposition to IAEA inspection, have stated that this

country considers IAEA inspection preferable but not mandatory.

This position was disclosed several weeks ago by Harlan Cleveland, assistant secretary of state for international affairs, in an address to the Atomic Industrial Forum, an association devoted to the commercial development of nuclear energy. The American position, he said, is that "We should work hard toward achieving an international consensus on the superiority of the international safeguards system.

". . . we are clear in our view," he continued, "that after a shaky start, the IAEA has evolved some valuable programs — like technical assistance, fellowships, and conferences—which merit our continued support; that the IAEA will have much more—and more important—work to do in the near future; and that its international safeguards system is definitely to be *preferred* to bilateral supervision."

The announcement of this position led A. Sterling Cole, one-time congressman and former director of the IAEA, to predict "this is the beginning of the end."

Administration officials reject this gloomy appraisal by arguing that (i) the decision is yet to be made; (ii) the death of IAEA need not be an inevitable consequence of a bilateral arrangement; and (iii) in pursuing IAEA's interests, there is more than one way to skin a cat.

They also point out that a brief look at the history of the Indian reactor, as well as Indian relations with the IAEA, suggests that the situation is sufficiently murky to discourage any quick conclusions about the rigidity of the Indian position on IAEA inspection. The picture is made even more uncertain by the fact that, while for purposes of enhancing the IAEA's prestige it would be useful to have a swift and favorable decision, it will be at least 3 or 4 years before the reactor goes into operation.

Although the Indians are reported to be hinting that they will go elsewhere if the United States adopts an unacceptable position on inspection, it appears that the United States is in a rather good position to bring the Indians around to its way of thinking. In inviting bids, about 2 years ago, the Indians issued specifications calling for a single 300-Mw natural uranium reactor. One of the American firms interested in the project got the Indians to agree to consider two synchronized 190-Mw reactors fueled with enriched uranium, which is plentiful in this country and scarce elsewhere. The Indians appeared to be particularly interested in the firm's argument that this combination would be more economical than the original specifications. When the bids were evaluated, the Indians assigned first place to International General Electric, with a price somewhere around $100 million. Westinghouse was second in a total field of seven that included firms in the United Kingdom, Canada, and France. Bids and related information are usually held in close confidence, but it is understood that the credit terms available through I.G.E. played a significant part in the decision. At this point, the Indians announced that the United Kingdom and Canada were out of the picture, leaving the implication that India would do business with France if a satisfactory arrangement could not be made with the United States. The French, who do not accept IAEA inspection, were reported ready to make a bilateral deal with no quibbling about IAEA, but the nettlesome issue of inspection appears to have taken a secondary place to advantageous financing. I.G.E. subsequently received a letter of intent from the Indian government, although the safeguards issue not only was unresolved but had not even been formally discussed.

When an Indian delegation came to Washington last July to take up the issue, the administration informed it that U.S. policy toward the IAEA was under study, and that, since there was no need for an immediate decision, the safeguards question would be left hanging, which is where it is at the moment.

There appear to be several reasons for this delay, but the main one, according to an administration figure who holds a key place in the deliberations, is: "There is no need to throw the issue into the face of the Indians as an either-or proposition. There are lots of things now happening in Indian thinking, and it seems that if we just let it ride for a while, the results are far more likely to be beneficial to the IAEA than if we bring it to a head, back the Indians into a face-saving refusal to accept the IAEA and end up with a precedent that does no one any good." The Indians, he emphasized, have not yet committed themselves on the inspection issue.

The conclusion that the Indians are opposed to IAEA safeguards is not unreasonably based on the fact that when IAEA adopted its safeguards procedures in 1960, the Indians were in opposition. They based their position on the grounds that safeguards constituted an invasion of sovereignty if they applied to have-not nations while the U.S. and the Soviet Union did not subject themselves to international inspection.

(As a symbolic gesture toward the IAEA, and to help the agency train inspectors, the United States last year opened four small experimental reactors to IAEA inspection; however, large American power reactors remain outside IAEA's scope. One reason is that IAEA safeguards, under the 1960 agreement, do not extend to reactors above 100 Mw (thermal); another is that, technically, the agency's jurisdiction is limited to facilities using nuclear materials supplied under IAEA auspices. American officials say that with the Indian situation looming they have privately urged the agency to call for raising the 100 Mw limit, and they cite this as part of the evidence of their strong but not always public support for the agency.)

Further basis for doubt about the rigidity of the Indian position lies in the shift toward the West that has been forced upon India by the Chinese invasion. The invasion has added to India's already serious economic difficulties, and it is considered not unlikely that this will discourage her from standing on her pride at the possible cost of the most favorable deal available for obtaining the power plant.

It is also significant that in working out a policy on the Indian reactors, the State Department has enlisted the fulltime services of Henry D. Smyth, chairman of Princeton's university research board. Last May, at the administration's request, a committee headed by Smyth undertook a study of the IAEA. With a few carefully worded reservations, it came out in favor of strong American support for the IAEA, recommending that "activities now being conducted under existing bilateral agreements should be transferred to agency auspices wherever practicable." The Smyth report also recommended that "The United States take the lead in securing international agreement that the agency be recognized as the instrument most appropriate for carrying out certain important functions in the field of atomic energy . . . [including] the provision of the best attainable assurance against diversion of material and equipment to military purposes."—D. S. GREENBERG.