search, and the Air Force Office of Scientific Research.

The total cost of the expedition has been estimated at $325,000—much food and equipment was donated by manufacturers and interested groups—and the cost of financing the scientific program and the scientists makes up, very roughly, a third of this total.

For a mountaineering expedition the group has unusual credentials. Of the 17 original American members of the party, five are Ph.D.'s, and three M.D.'s. The scientists, furthermore, are not supernumeraries. All are experienced climbers and some of them were expected to be on the final assault teams. Leader of the expedition is Norman G. Dyhrenfurth, a Santa Monica, California, motion picture producer who had had previous experience in the Himalayas.

The National Geographic Society, which has had long experience in financing the combined pursuit of adventure and science, is the principal patron, with a contribution of some $100,000. The Society sponsored glaciophysical investigations on the Khumbu Glacier on the approach route to Everest. The emphasis is on morphometric, movement, and subsurface studies of the glacier in an attempt to define a behavior pattern for ice in the eastern Himalayas.

A member of the *National Geographic* magazine staff is with the expedition and is assigned to measure solar radiation above 20,000 feet. The Weather Bureau also expects to get meteorological data from the group.

Not surprisingly, the projects sponsored by the federal agencies deal with the effects on humans of the strenuous life of climbers in the Himalayas—the effects, as one proposal put it, of "hypoxia, fatigue, cold, dehydration, and psychogenic factors."

With a $35,000 contract, the Office of Naval Research is supporting a psychological study of individual and group behavior under the conditions of prolonged and severe stress imposed by the expedition.

Members of the group submitted to extensive tests and interviews to provide background on personality before they left the United States, and the investigators hope to relate changes in the members' judgment, imagination, and problem-solving ability to activity and altitude.

The investigators will be particularly interested in finding how attractions and repulsions developed among members of the group as the going got tough, and how status altered within the group. The investigators planned to rely on the members of the group to rate themselves and each other, as well as on their own observations.

Focus on Reactions

Both NSF and the Air Force are supporting projects to provide information on the "adaptation syndrome" at high altitudes. An $11,600 NSF contract was awarded for the study of red blood cell production and of adrenocortical activity in regulating the body's functions at high altitudes. The aim is to trace the inevitable deterioration in human efficiency and endurance at high altitude in part by taking blood and urine samples for later analysis and by periodically testing pulse and breathing rates and blood pressure.

The Air Force has contributed $10,000 for studies of blood chemistry at altitudes from sea level to 23,000 feet and also for information on cardiac output. The Air Force also expects to gain some psychological data.

NSF is also sponsoring a $24,700 study in communications "feedback" (contracts cover salaries of investigators and costs of equipment and transportation). Under test is a theory that sustained group action toward a difficult goal is decisively influenced by communications within the group, and that feedback which may encourage group effort under normal conditions may, under stress, have an opposite effect.

Members of the group will be asked for self appraisals, and the "participant observers" will draw up daily balance sheets based on observation and will ask leading questions and record the answers. In addition, each member of the group will be equipped with a small recorder, and the radios used for communication between camps will also be equipped with recorders. As the group moved higher on the mountains, observers were to rely largely on "observation routines," to prevent intrusion of research into the main business of getting to the top.

The studies are being conducted separately, but the scientists are expected to coordinate their activities so that it may be possible, for example, to relate changes in individual behavior to biochemical changes.

The military services are naturally interested in the results for their relevance to the problems of small groups carrying out missions during prolonged periods under stress—submarine crews, astronauts, or groups isolated in arctic posts, for example. The results of the scientific projects all will be published and made freely available.

The expedition has been timed to take advantage of the best climbing weather of the year, which in the Himalayas is usually the last 2 weeks of May. Such scheduling involves a gamble, however, since the situation for climbers on the mountains deteriorates rapidly and dangerously when the warm winds of the monsoon begin, as they can any time after the middle of May.

The expedition's original plans called for an attempt at a triple assault, with ascents not only of 29,028-foot Everest but of two lesser, neighboring peaks, Lhotse (27,890 feet) and Nupte (25,850). Recent reports have indicated that their designs on Lhotse and Nupte have been deferred, or perhaps abandoned, in order to concentrate on Everest.

When the party leaves the area it will require about 2 weeks to return to its jumping-off place at Katmandu, the capital of Nepal. Most of the analysis of scientific data will be made on return to the States.

One thing the scientists should be learning is how successfully a study of human behavior under stress can be conducted in the field when the investigators are subjected to the same conditions as the subjects.—J.W.

United Nations: Space Committee Makes Little Headway Developing International Law for Space

United Nations, New York. "Life itself," the Russians repeated frequently at the U.N. last week, "places certain problems before states in the space age." Not the least of these, it often seems, is the fact that Russians and Americans can so rarely agree on anything, and that even when there is some agreement, both countries are more skeptical than confident in accepting it. In 3 weeks of meetings that ended 3 May, the legal subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space did little more than illustrate the point.

The United States and the Soviet Union have both recognized that expanding national space programs will create delicate legal questions, and, prodded by the U.N., have made efforts to produce an international law

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for outer space. So far, "space law" consists of the two points expressed in a General Assembly resolution of December 1961: that international law, including the U.N. Charter, applies to outer space and to celestial bodies, and that these are free for exploration by all states, and are not subject to national appropriation.

Attempts to elaborate these principles into practical rules were hampered between 1958 and 1961 by a Soviet boycott of the U.N. Space Committee because of dissatisfaction with its composition. Subsequently, they have been hampered in more fundamental ways by serious differences in the American and Soviet concepts of what a suitable law for outer space might be. These differences stalemated the legal subcommittee, both at its first meeting in Geneva last spring and at its recent session as well.

Different Approaches

What the Soviets want, essentially, is a binding law that would qualify general pieties about free exploration and use of outer space with specific limits and prohibitions on permissible space activities. Once these principles are established, they say, then more detailed legal provisions can be worked out, but without them there can be no progress.

The United States envisions a more pragmatic evolution of space law, beginning with agreements on liability for space accidents, and for the rescue and return of disabled astronauts and spacecraft. The Americans go along with many of the general pieties the Soviets have proposed, but find certain of the specific qualifications repugnant. In addition, the U.S. wants the general principles, if at all, only in the form of a U.N. resolution, while the Soviets want them in a formal international treaty.

If they reflected nothing more than the differing legal traditions of their sponsors—American pragmatism versus a Soviet predilection for theory—the different approaches might be reconcilable. In fact, however, they become the source of additional mistrust. The American delegation thinks the Soviets are hammering at points clearly unacceptable to the U.S. precisely to prevent agreement, and cannot bring itself to believe that the Soviets may be serious about them. The Soviets, in turn, think

the American focus on smaller legal issues grows out of fear that general principles would compromise what they regard as the more nefarious aspects of our space program. Problems that to the Americans appear separable, seem to the Soviets interwoven, and the result is deadlock, even on issues where agreement seemed within reach.

Four principles proposed by the Soviet Union as qualifications on the "absolute" freedom of outer space caused most of the trouble. These called for (i) prohibiting the use of outer space for "propagating war, national or racial hatred, or enmity between nations"; (ii) international consultation and agreement prior to any experiment in space "that might hinder its exploitation or use for peaceful purposes"; (iii) limiting space activities to states and international organizations; and (iv) prohibiting the collection of intelligence data by satellites.

The cynicism with which Western delegates greeted the proposal to ban war propaganda in outer space was based on experience at the Geneva disarmament talks last year. A similar proposal had been debated, on Soviet initiative, and agreement had been reached. A draft had already been prepared for signing, when the Soviets suddenly changed their minds, and in the end they refused to sign. Speculation abounds, but a good many Western delegates attributed the switch to Chinese objections based, they think, on a particular provision which prohibited propagandizing for "wars of national liberation." Even aside from its political history, however, most Western delegates thought the proposal too broad and ambiguous to be useful.

Military Complications

The Soviet proposal for international consultation on potentially harmful experiments was a bit delicate for the U.S., since Project Starfish (our high altitude nuclear test series) and Project Westford (orbiting communications needles) have aroused widespread scientific controversy around the world. The U.S. moved a considerable way toward the Soviet position during the course of the meeting, agreeing to use the consultative facilities of the international Committee on Space Research (COSPAR). The Soviet position is still open, but they would apparently like to go beyond simple consultation to real international scientific agreement on potentially dangerous experiments.

As long as the space programs of

both the U.S. and the U.S.S.R. continue to have military implications, however, anything approaching an international scientific veto on space projects is unlikely to be accepted—by either side. Coexistence of military and civilian space programs in both countries was affirmed by the committee's explicit recognition of "aggressive" rather than the "military" as the antonym of the "peaceful" in its title. Neutral delegations, led by the United Arab Republic, supported nonetheless a binding prohibition on all military activity in outer space.

The proposal to exclude private companies from space activities—an obvious attack on the American Communications Satellite Corporation—also was a bit embarrassing to the U.S. Our official response was that the Soviets had taken an ideological position, were attempting to impose a single economic system (their own) on outer space, and that our system was none of their business. We were publicly supported by other Western states on the committee, but in private, both Western and neutral delegates appeared to share some of the Soviet's uneasiness about commercial exploitation—uneasiness shared by many in Congress as well.

The genesis of the Soviet position may be ideological, but many of their arguments and fears are practical. Private ownership, in their view, compromises the principle of the liability of the launching state for space vehicles. This was one reason why they refused to consider a separate treaty on liability, despite very close agreement with the U.S. on the specific contents of such a treaty. The U.S. sought to alleviate this worry by explicitly recognizing that private corporations active in outer space were to be chartered and regulated by the government, and by accepting liability for them. But the Soviets fear, nonetheless, a sort of "United Fruit Company" in outer space, and imagine a time when the U.S. would shrug, deliver a lecture on free enterprise, and claim it had no control over the activities of its citizens in outer space.

On this question the deadlock seems permanent unless the Soviet position changes, for the Communications Satellite Corporation is a going concern, and there is little chance that it will be dismantled.

The final point of disagreement came on the use of reconnaissance satellites (such as the Air Force's Samos) for intelligence gathering. The Soviets call

this espionage, and want to prohibit it altogether. The U.S. calls it "observation to promote national security," and regards it as a legitimate and "peaceful" use of space that promotes international stability by closing the "information gap" between Communist and non-Communist countries. Since what we call the "information gap" amounts, in fact, to the overall Soviet security system, it is hardly surprising that they failed to welcome our arguments.

The Soviets also related reconnaissance satellites to a treaty on rescue and return of disabled astronauts and spacecraft, pointing out that no country would return an enemy intelligence satellite that fell by chance on its territory. The U.S., basically, agrees that this is a problem, but it would rather smudge over the issue, make de facto exceptions for the spy satellites, and proceed with the rescue and return treaty nonetheless. The Soviets, insisting on stark clarity, say the two are incompatible, and they won't take one without the other.

The failure to reach any agreement on legal principles does not augur well for international cooperation on scientific projects in outer space. The technical counterpart of the U.N. legal subcommittee opens meetings in Geneva next week, and the U.S.-U.S.S.R. bilateral agreements on weather and communications satellites are scheduled to go into effect on 20 May. These do not seem directly threatened by the legal stalemate, but the work of the scientists would be a good deal easier, and their positions less tenuous, had the politicians been able to record some progress.—ELINOR LANGER

Announcements

The National Cancer Institute and the U.S. Atomic Energy Commission have begun a joint project to investigate the roles of radiation, viruses, and chemicals as **causes of cancer**. The research is being conducted at Oak Ridge National Laboratories, Tennessee.

Films and other educational materials on **dermatology** may be bought or rented from the new Institute for Dermatologic Communication and Education. The institute was established in response to recommendations made last September at a meeting of the International Committee of Dermatology and the house of delegates of the