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Legal Aspects of the Lunar Landings[†]

Man did not find life on the Moon; instead he brought life to the Moon. Among the most engrossing remarks made at the time of the first lunar landing were those comparing Eagle's descent to the American voyage of Columbus, or counting it an evolutionary act as significant as the emergence of life from the Devonian sea to dry land. In a more hyperbolic vein, President Nixon called the lunar descent the greatest event since Creation.

Still, since most of us remain here on Earth to tend the small Edens of our individual lives and work, one may well begin to discuss the legal problems brought to the foreground by the Apollo 11 and 12 successes.

The legal problems arising from activities on celestial bodies may be divided into those that have already arisen, and those that may be expected to arise as a result of expanding activities on those new frontiers.

The most important points of intersection of Apollo activities and the Space Treaty would appear to be the following:

1. The carrying away of lunar soil and planting of the U.S. flags on lunar bases in relation to Articles I and II of the Space Treaty.

Space Treaty Article I states that the Moon is free for exploration and use by all States, while Article II says that it is not subject to national appropriation by any means.

The conflict between Article I—freedom of use of celestial bodies—and the Article II non-appropriation mandate has been treated elsewhere.¹ This conflict is only potential; it does not become actual until a certain magnitude of use has occurred in relation to the resource above and beyond a minimal use for scientific testing and local needs to maintain a space base. This critical point has not been reached by the removal of more than 100

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¹Brooks, *Control and Use of Planetary Resources*, PROCEEDINGS OF THE ELEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE, 1968, p. 339-350.

pounds of lunar dust and rocks to the Lunar Receiving Laboratory at Houston, Texas, and distribution of part of this material to scientific facilities, on request, all over the world.² The effect of this distribution has also been to fulfill the obligation of Article XI of the Space Treaty requiring Parties to inform the public and the international scientific community of the nature, conduct, locations and results of space activities. This generosity promotes international scientific cooperation as contemplated by Article I.

The rocks taken from the lunar surface are as old as the solar system;³ are igneous in nature; are said to consist of a mixture of olivine, pyroxine and calcium rich feldspar; contain much titanium, used for hardening steel;⁴ are mixed with minute glassy spheres; and provide some evidence of metallic oxides⁵ and a metallic core of nickel and iron, similar to Earth's core.⁶ Minute quantities of gold have been detected, but not enough to finance the space program.⁷ Since all the rocks have been used for scientific purposes and no commercial intentions have yet surfaced, one must await further developments before attempting to predict to what uses lunar materials will be put.

The planting of American flags on the Moon, displayed prominently, and duly saluted by the astronauts, appears to have satisfied an emotional need. Regrettably but not unexpectedly, a U.N. standard was not permitted to join the Stars and Stripes, pursuant to a Congressional amendment to a bill authorizing space program appropriations.⁸ Awed by the magnitude of technological accomplishment, no nation protested these arrangements—evidence that there is no strong commitment among nations to internationalize celestial bodies.

However, national rituals are not necessarily inconsistent, but may be compatible, with international ventures. In fact, Astronaut Aldrin managed to bracket the salute to the flag with an "almost mystical unification of all people in the world at that moment," a syntactical ambiguity best explained by the journalistic agility of LIFE's editors.⁹ These rituals have absolutely

²The Soviet Union made no request for specimens collected by Messrs. Armstrong and Aldrin.

³New York Times, August 25, 1969, at 1, col. 2.

⁴Jastrow: *The Moon is a Rosetta Stone*, NEW YORK TIMES MAGAZINE, NOV. 9, 1969, § 6, at 25; SCIENCE MAGAZINE, Sept. 19, 1969, at 1226-1227.

⁵NY Times, July 29, 1969, at 1, col. 2.

⁶*Id.*, August 3, 1969, § 4, at 3, col. 1.

⁷*Id.*, January 6, 1970, at 26, col. 1.

⁸*Id.*, July 18, 1969, at 13, col. 4. Representative Allard K. Lowenstein deplored the Congressional diktat as short-sighted.

⁹LIFE MAGAZINE, August 22, 1969, at 26, col. 2-3.

no practical, territorial—or lunatorial—significance. They were not accompanied by any declaration of intent to appropriate, and stand in the same posture as the deposit of the hammer and sickle on the lunar surface in 1959.

Whether the area surrounding the bottom stage of the lunar modules, together with flags and scientific instrumentation, constitutes a space station is problematical, to say the least. The National Aeronautical and Space Agency informally named the Apollo 11 landing area “Tranquility Base,” but no official claim has been made to any special rights in the area concerned. Automatically, under Article VIII of the Space Treaty, ownership and jurisdiction of residual artifacts on the Moon remain with the United States. These objects fall under the heading of “equipment,” “space vehicles” and perhaps “installations” mentioned in Article XII. Accordingly, they are open to inspection by representatives of any other State. The same Article requires that the visiting State give reasonable advance notice to the U.S. of any visit, followed by consultations deemed appropriate.

Significantly, no name was given to the Apollo 12 touchdown site on the Ocean of Storms.

2. The flight of Soviet Spacecraft Luna 15 in relation to Articles III, IX and XI of the Space Treaty.

On July 13, 1969, three days prior to the scheduled lift-off of Apollo 11, the Soviet Union launched Luna 15, an unmanned probe, toward lunar orbit. The Tass Agency said the aim of the flight was “to check the systems on board the automatic station and to conduct further scientific exploration of the Moon and space near the Moon.”¹⁰ The Soviet Union did not, at the time it announced the launching, provide the intended orbital characteristics of its vehicle, from which might be deduced its eventual proximity to the orbits of the two elements of Apollo 11, Columbia and Eagle; nor did the Soviet Union seek international or bilateral consultations prior to launch.¹¹

The U.S. reaction to Luna 15 was not entirely consistent. *The New York Times* reported that space agency officials were concerned that Luna 15 was a “dramatic attempt to upstage America’s scheduled launching of a lunar mission on Wednesday.”¹² NASA’s launch director, Rocco A. Pet-

¹⁰New York Times, July 14, 1969, at 1, col. 8.

¹¹*Id.*, col. 7. Russian Space experts had, however, made references to the probe during the prior week.

¹²*Id.*, col. 6.

rone, made the guess that Russia was attempting something spectacular, a Moon landing and return of lunar material.¹³

But Col. Neil. A. Armstrong, the next day, responding to a press conference inquiry about fuel needs based on a possible conflict between the orbits of the American and Soviet flights, discounted any such conflict, saying: "I think the probabilities are nearly infinitesimal that would be an actual case."¹⁴

Nevertheless, the United States, on July 18, 1969, through Col. Frank Borman, asked the Soviets for specific information beyond that already issued. Academician Mstislov V. Keldysh, President of the Soviet Academy of Sciences, communicated to the U.S. the mathematical values of the orbital elements, concluding that "the orbit of probe of Luna 15 does not intersect the trajectory of Apollo 11 spacecraft announced by you in flight program."¹⁵ Thereupon NASA expressed pleasure with the Russian response, and ventured the hope that it indicated fruitful cooperation in the future.¹⁶

The entire proceedings cannot be said to have reflected the most artistic way of handling the informational aspects of Luna 15. A lingering residue of suspicion of Russian motives and fear of potential danger to Apollo 11 persisted on American television commentary despite the Russian announcement.

Article III of the Space Treaty requires the Parties to conduct outer space activities "in the interests of maintaining international peace and security and *promoting international cooperation and understanding.*" (Emphasis supplied)

Article IX requires States to conduct activities on the Moon and other celestial bodies "with due regard to the corresponding interests of all other States Parties to the treaty." It then goes on to say, among other things, that if a State has reason to believe that an activity or experiment planned by it would cause potential harmful interference with the activities of other States Parties, it shall undertake appropriate international consultations before proceeding with any such activity or experiment.

Can it be said that the Soviet Union adhered to the spirit as well as the letter of Articles III and IX?

The question of "upstaging" may be dismissed out of hand. If the moon

¹³NEWSDAY, July 14, 1969, at 3. Kenneth Gatland, Vice President of the British Interplanetary Society, criticized Luna 15 as a "rather unnecessary experiment just before the Americans make their historic bid to land a man on the moon.

¹⁴New York Times, July 15, 1969, at 15, col. 6.

¹⁵*Id.*, July 19, 1969, at 38, col. 8.

¹⁶*Id.*, at 19, col. 5.

project was, from the beginning, the question of "beating the Soviets" as President Kennedy wrote,¹⁷ the Soviets cannot be faulted for attempting, unsuccessfully as it turned out, to salvage a precious bit of dwindling prestige.

But in 1969, the question was also one of fulfilling a Space Treaty obligation. Under Article IX, Russia is required to act with due regard to an interest of the U.S.—a paramount interest—of insuring the safety of its astronauts as they orbited the Moon. This implied that other nations not only refrain from creating additional dangers but also avoid acts creating a fear of danger, well- or unfounded.

In addition, even if the Soviet Union, in possession of the statistical basis of its certainty that Luna 15 would not intersect Apollo 11, felt it had no reason to call for consultations with the U.S., the Soviet Union under Article IX had a duty to inform the U.S., well in advance of the event, of the facts which Academician Keldysh later provided only on request.¹⁸ This is particularly true, since Article XI requires a Treaty Party to furnish the Secretary General, as well as the public to the greatest extent feasible and practicable, with the nature, conduct, locations and results of such activities.

Though the general reporting feature of Article XI refers primarily to communications to be submitted after the activities have been completed, it does not preclude the possibility of prior notice in certain cases.¹⁹ In the context of a contemporaneous all-important U.S. lunar expedition, advance information was certainly desirable, and would have followed the spirit, if not the letter, of Article XI.²⁰ The initial non-disclosure of critical information speaks for itself.

It must be said, finally, that NASA's public speculations as to Soviet motives might well have been dispensed with in favor of an immediate

¹⁷Letter to Vice President Johnson, April 30, 1961, reprinted New York Times, July 17, 1969, Special Supplement, at 32, col. 4.

¹⁸Once a State believes an activity may cause harmful interference, it is mandatory for that State to "provide information on its intentions; it went without saying that no consultation could take place without prior notification." These were the Soviet Union's own words in the Legal Subcommittee. U.N. Doc A/AC.105/C.2/SR.68, at 4-5.

¹⁹See Comments of Japanese representative and Bulgarian representative in the Legal Subcommittee, *supra*, note 18, at 6-8. Originally, the Soviet draft treaty did not contain any provision for reporting; A/AC.105/35 Annex I, at 12-16. Later it insisted on the principle of voluntarism. *Id.*, Annex III, at 3. Finally, however, it abandoned that reservation. On the matter of prior notification, a UAR proposal that "all information shall be promptly submitted, preferably in advance or at the carrying out of these activities or immediately after" was never accepted. *Id.*, Annex III, at 5.

²⁰The American view concedes that the phrase "to the greatest extent feasible and practical" whittles down the reporting obligation to one largely subject to the judgment of each country. *Hearings Before Committee on Foreign Relations, U.S. Senate on Treaty of Outer Space*, 90th Cong, 1st Sess, at 60-61, U.S. Gov't Printing Office, Washington, D. C.

request for the desired information, in the interest of international understanding.

3. The Apollo 11 and 12 precautions against contamination in relation to Article IX of the Space Treaty.

Article IX of the Space Treaty is directed in great part against harmful contamination of both celestial bodies and reverse contamination of Earth, as follows:

States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of Earth resulting from the introduction of extra-terrestrial matter, and where necessary, shall adopt appropriate measures for this purpose.

Contamination is the introduction of impurities to a given place. There is little difference in meaning between harmful contamination, barred from celestial bodies by the above article, and adverse changes in environment, applied to Earth, except in degree. The one is local, the other widespread. A large degree of contamination, whether on Earth or Moon, would lead to changes in environment.

Neither contamination nor changes in environment is limited to biological effects. The introduction of unwanted non-living matter to either Moon or Earth might result in harmful contamination or adverse changes in environment.

In the Apollo 11 flight, prevention of reverse contamination of Earth, from a biologic standpoint, took center stage, and very little public attention was directed to contamination of the Moon by Earth materials. If non-living gases (oxygen and carbon dioxide) and terrestrial bacteria were introduced to the Moon's surface when Eagle's hatch was opened, it is doubtful that any bacteria will survive, much less thrive, on the Moon's radiation-ridden surface.²¹

The Committee on Space Research (COSPAR), through its Consultative Group on the Potentially Harmful Effects of Space Experiments, considered, in 1964, the question of contamination of the Moon and the planets. The Consultative Group then recommended standards of sterilization for the protection of possible life on Mars and recommended that the nations declare Mars a biological preserve.²²

²¹Actually, on the Apollo 11 flight, a fan near the opening of Eagle's hatch drew the capsule's air back in, rather than permitted its escape.

²²UN Doc A/AC.105/20, Annex III, at 3. The full Committee on Space Research never formally ratified the Consultative Group Recommendations.

COSPAR said that exobiology should be a primary objective of space science activities, and that the introduction of Earth contaminants would interfere with detection experiments on the planets and lead to undesirable alterations of planetary environment. It expressed the belief that the scientific desirability of sterility control was absolute, but the degree of sterility depended on a judgment of acceptable risks, without the taking of which planetary exploration would not proceed.

This judgment was that the probability that a single viable organism would be aboard any vehicle intended for planetary landing must be less than 1×10^{-4} (one chance in 10,000), and that the probability of accidental planetary impact by an unsterilized fly-by or orbiter must be less than 3×10^{-5} (three chances in 100,000).²³ These standards applied to Mars and to other planets which "cannot firmly be excluded as a possible abode of terrestrial life,"²⁴ including Venus.

However the Moon was thought to stand in a somewhat less critical situation than Mars:

In the case of the Moon, the surface conditions are rigorous enough to reliably exclude biological contamination of the surface. We cannot exclude the possibility that conditions several tens of metres below the lunar surface will permit microbial replication. Such depths, however, are unlikely to be reached unintentionally during lunar landings. Accordingly, we recommend much less rigorous sterilization techniques as bioclean room assembly and terminal gaseous sterilization of all spacecraft intended for future landings; but rigorous sterilization of drills desired for lunar subsurface boring.²⁵

It was then the scientific consensus in 1964 that the surface of the Moon could be firmly excluded as a harbor for terrestrial life, but that this could not be said for depths of, say, 30 feet. In this view, no part of the Apollo 11 or 12 missions disregarded the 1964 standards, assuming the drills used for lunar cores were sterilized.

In 1966, COSPAR met again. This time, it refrained from specifying fixed values for the probability of contamination, in the belief that weighing the facts was "best left to those nations responsible for meeting (for each of its own missions) the overall constraint on the probability of planetary contamination, and that by doing so engineering implementation is freed of an unnecessary constraint."²⁶

Thus, each nation is judge of its own decisions and is liberated from

²³*Id.*, at 13-15.

²⁴*Id.*, at 15 (emphasis in original).

²⁵*Id.*, at 16.

²⁶Hall, *Recent Developments in Planetary Quarantine*, 9 DEVELOPMENTS IN INDUSTRIAL MICROBIOLOGY, 19, 21. Amer. Institute of Biological Sciences, Washington, D. C. 1968.

specific international restraints. In view of this history, it would be difficult to argue that Article IX of the Space Treaty incorporates the 1964 COSPAR Standards, or any definitive standards at all, although it might be said that those standards have not been withdrawn and are still factual touchstones to be observed.

It will be noted, however, that COSPAR did not publicly discuss the merits or demerits of exposing the Moon to *non living* terrestrial elements. Arthur C. Clarke reports estimates that the combustion products and cabin leakage from only 20 landings of the Apollo type could double the mass of the very tenuous lunar atmosphere, and the rate of contamination will increase when mining, food production and similar activities begin.²⁷

Article IX does not outlaw all contamination—just “harmful” contamination; harmful, that is, to the uses to which the Moon is to be put or such that it would interfere with the activities of States Parties to the treaty. Under the treaty, then, it would be permissible to import and distribute substances not indigenous to the Moon, provided that these substances do not pose a disadvantage for others who come later.

The difficulty is that the full range of optimum uses to which the Moon is to be put remains as yet unknown. One prime lunar use is that of an astronomical laboratory. The Moon provides a clear unclouded window to the rest of the universe. The Moon may also be called a cosmic archaeologist’s dream, being a store-house of information about the origin of the Earth and of the solar system. It is even suggested that the far side of the Moon, free from Earth’s radio noises, may be a listening post for the messages of extraterrestrial beings.²⁸

Competing governmental or commercial uses may interfere with these scientific uses. If water is found in extractable form on the Moon, this may encourage the setting up of self supported lunar bases used to produce rocket fuel for regular Earth-Moon missions, and as a launching stage for deep space voyages. If scarce resources such as titanium are exploitable, mining camps may mushroom on the Moon. Several publicity-conscious airlines have already compiled reservation lists for Earth-Moon passenger trips; these tourist jaunts presuppose the establishment of a Luna-Hilton chain on the Sea of Tranquility. Thomas O. Paine, NASA’s administrator, foresees lunar colonization in the form of domed cities, and other planetary societies with “diverging cultural trajectories.”²⁹

²⁷NY Times, July 17, 1969, Special Supplement, at 47, col. 1. But Dr. A.G.W. Cameron points out that doubling the present insignificant lunar atmosphere would be insignificant in itself, and that such atmosphere would soon be dissipated in space due to the moon’s weak gravity. Transcript of WEVD Radio Panel, *Colonies on the Moon*, Nov. 7, 1969, New York.

²⁸*Id.*, August 3, 1969, Special Supplement, at 17.

²⁹*Supra*, note 27.

Well, why not? What better use for the dead Moon than creation of a mirror Earth? Still, all these latter uses involve electrical, nuclear and rocket installations, the by-product of which will create a film around the Moon and alter its surface to the despair of cosmologists and Rosetta-stone practitioners. To cite an example of unexpected interference: a dump of waste water from Apollo 11, Moon-ward bound, is reported to have masked stars for nearly an hour.³⁰

At the very least, activities on the Moon as on Earth, should proceed, not haphazardly, but according to a considered judgment of all consequences, with an eye to the future. If the best use of the Moon is a combined habitation-quarry, this choice should be a conscious choice. Long-range planning should dictate what contaminants are to be sanctioned, and what degree of contamination permitted. This process involves more than the optional consultations provided for by Space Treaty Article IX. It involves continuing international conferences and agreement as to the particulars and pace of human activities, and the accommodation of competing uses.

It is believed that this can best be done by an international agency having jurisdiction over all activities on celestial bodies. If this solution is not selected, the entire subject should be reviewed by COSPAR, and its recommendations forwarded to the U.N. Secretary General. The matter is of sufficient importance to call for a new Subcommittee on the Uses of Celestial Bodies to be attached to the parent Committee on Peaceful Uses of Outer Space.³¹

The matter of changes in Earth's own environment has, apparently, received exhaustive scrutiny, as shown by the immediate three-week quarantine of all Apollo 11 and 12 astronauts following their splash-down in the Pacific Ocean. Prior to launching, a controversy swirled in the American press as to whether the announced precautions were in fact sufficient. The two supposed deficiencies concerned the venting of the Apollo 11 command module in the upper atmosphere at some point in its descent toward Earth, and the opening of the hatch of Columbia after splash-down to permit the exit of the astronauts. There is no way to judge the merits of the dispute. Logic indicates that if the danger of Earth contamination, however small, was sufficiently real to call for the extreme of a rigid

³⁰SKY AND TELESCOPE, September, 1969, at 145.

³¹In 1968, the Special Working Group on the Legal Status of Stations on Celestial Bodies, considering conservation of resources and contamination of celestial bodies, said: "This is an important problem throughout the whole of space exploration for the future, affecting Earth as well as the celestial bodies, and may involve scientific consultation on the lines suggested in Article 9 of the Treaty and action by international bodies such as COSPAR." PROCEEDINGS OF THE ELEVENTH COLLOQUIUM, New York, 1968, at 144.

quarantine, then all avenues of contact between the transported lunar material and Earth should have been closed without exception. This is another question which calls for COSPAR discussion.

4. The dissemination of information on the results of Apollo 11 and 12 in relation to Article XI of the Space Treaty.

Article XI, as indicated earlier, binds the treaty parties to inform the Secretary General of the United Nations as well as the public and the international scientific community, of the nature, conduct, location and results of space activities. In general the information supplied to the Secretary General has been supplied on a *pro-forma* basis. The United States submits an annual report on its national and international space activities to the Secretary General, special reports on the scientific results of programs of unusual interest, and a broad selection of the scientific and technical publications which report the detail of the NASA program.

By far, the greater amount of information on the Moon landing has reached the public through press briefings, interviews, television programs and popular articles authored by prominent persons such as Wehrner Von Braun, Robert Jastrow, Thomas O. Paine and Isaac Asimov. In the case of the Soviet government, space news reaches the world through government agency releases, radio programs and international conference papers. The Soviet Union obviously construes Article XI obligations narrowly, as shown by the paucity of information supplied, usually after the fact, rarely in advance. The world at large is still ignorant of the true nature and actual results of Luna 15. Both nations, however, appear to have fulfilled their basic obligations to the international scientific community, through COSPAR, scholarly publications and general information exchanges.

The dramatic nature of space exploits has emphasized public dissemination of information rather than the role of the Secretary General. This is a healthy development, permitting people of all nations to be direct witnesses to the lunar landing. The Secretary General's function has been saved for dissemination of specialized information relating to intergovernmental space activities.³²

This discussion has thus far revolved around the application of the Space Treaty to the Apollo 11 lunar landing. As planetary exploration

³²As, for example, its Review of National and Cooperative International Space Activities. U.N. Doc A/AC.105L.46.

proceeds, one may expect human activities to come into contact with other facets of the Space Treaty. The following would seem to be the most likely points of legal convergence:

1. Article II in relation to setting up human bases and colonization of the Moon and Mars.

Present U.S. plans, as revised, call for seven more lunar landings on sites selected for their topographical differences. Dr. George E. Mueller, Associate Administrator of NASA, optimistically hopes that water locked in moon rocks will make possible self-sustaining life-support systems deriving power from nuclear plants. Then it would be possible to create an atmosphere for a Moon base, and obtain propellants for travel. Suitable housing would provide a base, whether nationally or internationally supported, eventually to exploit the "rich natural resources" which Dr. Mueller believes the Moon to have. The Moon would also become an island base or way station near Earth, for exploration of more distant parts of the solar system. It would be possible to build a low-cost re-usable shuttle system between Earth, Moon and the other planets.³³

Recently however, NASA's Director, Thomas O. Paine, told the Committee for the Peaceful Uses of Outer Space that there is so far no evidence of the presence of water on the Moon.³⁴

NASA has issued contracts for a land-rover to expedite lunar exploration, while Donald A. Beattie, program manager for plans and objectives of NASA's Lunar Exploration Office, envisages men remaining on the Moon or several weeks by 1973, and for months by 1975—all this followed by a functioning colony by 1980. He concedes that true colonization—people "living, working and raising families"—would depend on the practical uses to which the lunar surface could be put.³⁵

If these predictions come true, the point at which peripheral uses pass over into national appropriation will have to be considered. National appropriation is wholly forbidden by Article II of the Space Treaty.

An installation or base, manned by a small number of astronauts or scientists for scientific purposes, using lunar materials for local needs, would not constitute national appropriation. A large permanent lunar colony, private or public, operating under national auspices for commercial purposes, would, by its magnitude and the nature of its activities, violate the stricture against national appropriation.

³³New York Times, July 21, 1969, at 14.

³⁴New York Post, September 9, 1969, at 25.

³⁵NEWSDAY: Special Supplement, *The Moon*, July 25, 1969, at 9A.

Obviously, borderline situations would be presented if, for example, a small number of people under one flag occupied a moderate area and employed lunar materials for both local needs and commercial purposes. The ban on national appropriation may be the one space treaty provision flouted in fact, while the parties proclaim their adherence to it or interpret it out of existence. It is time that Wilfred Jenks' suggestion of a Space Resources Agreement requiring U.N. concessions for exploitation, be explored; or, better still, that an international agency for planetary activities be established.

2. Article IV military provisions in relation to possible surveillance devices on the Moon.

Military power is more effective at close range than from afar. For that reason, space military developments have centered on multiple and fractional orbital bombardment systems, military satellite communications, navigation, surveillance and detection devices, and space stations, all of them designed for near space rather than celestial bodies.

Article IV prohibits the stationing of nuclear or other weapons of mass destruction on the planets, and reserves the use of the Moon and other celestial bodies exclusively for peaceful purposes.³⁶ The establishment of military bases, installations and fortifications, the testing of weapons and conduct of military maneuvers on the Moon, are forbidden. Military personnel may be used on the Moon, but only for scientific research or other peaceful purposes. In the same way, the use of any equipment or facility "necessary for peaceful exploration of the Moon and other celestial bodies" is also not prohibited.

It is not appropriate here to review the settled difference in meaning placed on the word "peaceful" by spokesmen of East and West. Whether "peaceful" in space matters means only "non-aggressive," and therefore condones "defensive" military activities, or is expanded to mean "non-military," has been the subject of recent extended debate.³⁷ No further general gloss is possible.

³⁶"States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

"The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited."

³⁷PROCEEDINGS OF THE ELEVENTH COLLOQUIUM OF THE LAW OF OUTER SPACE, *supra*, note 1, at 24-39, 73-81.

The Space Treaty, however, is special legislation, and must be specially approached. Article IV treats celestial bodies somewhat differently from space generally. As to the planets, it forbids military installations. Therefore, surveillance (and communications) installations serving military aims predominantly, may not be placed on the Moon.

An object can have an intended purpose and an actual use. The Space Treaty outlaws surveillance installations in both cases. If these installations have a predominant rather than incidental scientific or exploratory use, and the data derived therefrom is actually used for scientific purposes, the installation is not military. Even if some of the data could be used for surveillance purposes having a military value in such case, there could be no legal objection. Thus, in the case of a radar chain deployed on *Mare Tranquillatus* to detect and guide incoming ships, the fact that it can also be used for detecting space military vehicles of another nation or even Earth-based nuclear plants, could give no rise to justified complaint.

If, however, the main purpose or main use of the installation is for military surveillance, the treaty would be violated. If it is objected that in certain cases it may be hard to determine the predominant purpose or use of an installation, the short answer is that this situation is unlikely—such circumstance might reflect on the competence of the experts consulted to determine the facts, rather than the ambiguity of the facts themselves. Besides, the installation is subject to close inspection by any treaty party. This problem would not arise if all installations on celestial bodies were managed by an international agency.

The Space Treaty also permits any “equipment” or “facility”—whether of military character or not—to be used on celestial bodies, provided it is necessary for peaceful exploration. Here the authorized use is quite limited and exclusive. The word “necessary” adds weight to this restriction. Any use other than for an exploratory (including scientific) purpose is banned. This effectively prohibits any use of equipment for military surveillance irrespective of the interpretation of the phrase “peaceful uses,” and irrespective of whether the surveillance purpose or use was predominant or incidental.³⁸

To sum up, the best interpretation of this portion of Article IV is that an incidental use of an *installation* on the Moon for military surveillance is permitted, provided that the main purpose and use of the installation is not

³⁸The distinction between an installation and equipment or facility is that an installation probably contains a greater number of component units and has a greater degree of permanence and/or attachment to the lunar surface. But not too much stress should be placed on the semantic distinction, because Article IV log-rolled specific U.S. and Soviet draft phraseology into one article. The word “installation” was included at the insistence of the United States; the word “equipment” at Russian insistence. See U.N. Doc A/AC.105C.2/SR 65, at 9-11.

military. But no piece of *equipment* may be used for military surveillance at any time. Though this distinction is illogical, it flows from the provisions of the treaty and from the background of the negotiations.

It is believed that space surveillance in general has in fact provided subjective security and therefore peace, irrespective of the motives of any State, because it enables each potential adversary more correctly to gauge the weapons of the other side, and warns those in power of the danger of military adventures. But since, in the case of space, satellites in near-space are as effective for surveillance as are installations or equipment on celestial bodies, it is recommended that all nations refrain from using any celestial body for any form of military surveillance if only to avoid mutual irritation.

3. Article II and VI provisions in reference to non-governmental private tourist activities on the Moon.

Pan American Airlines currently has on hand 70,000 reservations for lunar trips estimated to cost \$14,000 round trip per person. The airline has received no charter from the Civil Aeronautics Board to run flights to the Moon.

The Space Treaty aside, no legislation directly prohibits a private citizen or U.S. firm from lofting a spaceship to the Moon, or establishing crater cabins on terminator taverns. Though the National Aeronautics and Space Act of 1958 contains a Congressional declaration that all non-military space activities "shall be the responsibility of, and shall be directed by a civilian agency exercising control over aeronautical and space activities sponsored by the United States . . .," this declaration, in its context, was only inter-governmental legislation concentrating the powers and functions of different space-oriented administrative bodies into NASA, and did not affect private rights.

However, indirect legal barriers to unauthorized private launches would be insuperable. The Federal Airport Act gives the Federal Aviation Agency power to formulate policy as to the use of navigable airspace and to prescribe regulations governing the flight of aircraft; the agency has in fact issued rules for unmanned rockets. This mandate might very well be interpreted to apply to all spacecraft while in airspace. The Federal Communications Commission regulates the use of telemetry frequencies which are the life force of space vehicles. Other United States statutes and the laws of many states regulate and license the use of explosive materials.³⁹

³⁹See National Aeronautics and Space Act, 72 Stat. 426 (1958), 42 USCA 2451 (1964); powers of the Federal Aviation Agency are reflected in 49 USCA 1348, and see FAA Regs.,

No doubt every State intended, from the first, to preserve a monopoly over all space launchings. It was, in fact, the Soviet view that all space activities should "be *carried out* solely and exclusively by States" as well as controlled by them.⁴⁰ This view was resisted by Western nations which desired some space activities like telecommunications, to be operated by private enterprise.

The Space Treaty places on States international responsibility for all national activities in space or on celestial bodies, whether the activities are carried on by government or by non-governmental entities, and says, in Article VI,

The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the treaty.

This means that all aspects of space flight to the planets and all activities on the planets must be regulated by the State concerned from start to finish. This is because, as Jenks has said, space activities are too enmeshed in matters affecting international peace and security to be a proper field for private enterprise.⁴¹

Aside from the above considerations, no legal reason prevents a private company, nationally supervised, from ferrying sightseers to the Moon, though they are likely, on the ground of expense, to prefer that the government concerned actually launch the vehicle.

It would be possible for private tourist flights to take place if no extensive permanent facilities on the Moon were involved, but a real conflict would arise with non-appropriation Article II in the case of extensive permanent facilities. The building of a chain of hotels and supporting facilities on the Moon would occupy an inordinate amount of terrain and might well constitute an appropriation. It might also contravene Article I of the Space Treaty which requires space uses to be carried out for the benefit of all countries. In the example given, the benefit would enure to private individuals of one nation or a small set of nations. Private prospecting for minerals, too, would undoubtedly constitute illegal appropriation.

4. Article XII inspection privileges in relation to future lunar exploration.

If indeed installations, bases and colonies come to be placed on the

14 CFR, Part 101; 47 USCA § 301 deals with telecommunications. As to explosives see 50 USCA 121-131 and 134. Future use of nuclear fuel would fall under the watchful eye of the Atomic Energy Commission 42 USCA 2077 and 2131.

⁴⁰U.N. Doc A/AC.105/6, at 4, July 9, 1962.

⁴¹JENKS, SPACE LAW, 1965, at 211.

Moon or on Mars, Article XII of the Space Treaty, providing for access on reasonable advance notice, will become increasingly important.

Such inspections would be desirable for several reasons, such as to assure:

1. that Article II national appropriation does not take place.
2. that prohibited military uses do not take place.
3. that private activities have some governmental authorization and are properly supervised.
4. that no harmful contamination or potential interference with activities of other States takes place.

Most of these assurances may be satisfied by aerial inspection or by the monitoring of communications, but some aspects may require on-site inspection. The results of all visits should be reported to the Secretary General, the public and the scientific community as prescribed by Article XI.

Complaints of alleged violations would call for consultations. Unfortunately, no arbitral or judicial body has been set up by the Space Treaty to settle disputes arising from such violations. Under present international law, the disputants have recourse, on mutual consent, to negotiations, inquiry, mediation, conciliation, arbitration and to the International Court of Justice. The 1969 Vienna Convention on the Law of Treaties, although not yet in force, and which in any case would not apply retroactively to the Space Treaty, nevertheless points the way to possible conciliation procedures. Under the Vienna Convention, a majority of a panel of five conciliators is empowered to make non-binding recommendations in a special class of disputes.⁴²

Compulsory settlement of disputes would, however, be preferable in a matter of such cosmic urgency. It may be advisable, too, to give private persons the right to move to enjoin flagrant treaty violations, since every person has a stake in the peaceful use of outer space.

The International Exploration of Celestial Bodies.

It is apparent that whatever problems arise in the settlement of celestial bodies will spring from conflicts of national interests, and may aggravate tensions on Earth. This is particularly true in respect to quasi-military activities and exploitation of resources on a national basis. It is for this reason that an international agency having jurisdiction over all activities on

⁴²The text of the Vienna Convention may be found in VIII International Legal Materials, No. 4 (July, 1969) at 679-713, *see* 712-713 for the annex dealing with conciliation; also 63 AMER. J.L. INT. LAW, at 875-903, October, 1969.

celestial bodies has been promoted by many space commentators. The suggestion of Jenks for a Space Resources Agreement⁴³ and of Richard N. Gardner for a United Nations Space Institute⁴⁴ have the same rational basis: prevention of conflict and promotion of international concord.

On September 20, 1963, President Kennedy urged that the United States and the Soviet Union send a joint expedition to the Moon.⁴⁵ The fate of the Kennedy gesture is an interesting example of international delinquency. The public record is insufficient for a test of the sincerity of national spokesmen in reference to joint U.S.-Russian space flights. The utterances of the protagonists abound in structural ambiguities. President Kennedy seems to have proposed a joint Moon flight without hard specifics. The proposal was given only lukewarm support by NASA, and met immediate Congressional hostility. It is not even certain that any formal proposals were made, although preliminary steps to implement the President's proposal were suggested informally from time to time.

Russia treated the Kennedy proposal coolly, ignored it, tied it to the solution of other international problems, and neither accepted the Kennedy plan nor offered substantive proposals of her own. The foot-dragging was more pronounced on the Soviet side. In the end, both countries abandoned talk of joint efforts, and were reduced to quiet and innocuous murmurs of international cooperation and collaboration.

It is periodically necessary to reiterate the reasons why an international space agency is desirable. This paper has referred to several practical benefits of a space agency with respect to control of contamination, management of lunar bases and surveillance. A more basic treatment is now warranted.

There are two approaches to the question of the merits of an international planetary organization. One may, if one chooses, deal with the subject of activities on celestial bodies as an isolated subject, separate from the rest of international law and life. Under this perfectly permissible approach, it is necessary to justify an international organization in terms of specific advantages to particular aspects of space progress. The question then arises as to whether more or less centralization will be beneficial for on-going space activity.⁴⁶

⁴³*Supra*, note 37, at 246-265.

⁴⁴New York Times, July 26, 1969, at 24, col. 5.

⁴⁵New York Times, September 21, 1963, at 1, col. 8.

⁴⁶The *Introductory Report* by Eilene Galloway in the PROCEEDINGS OF THE ELEVENTH COLLOQUIUM, at 8-13 is a cogent example of this approach. It attempts to determine whether a space agency would be more helpful than not in implementing the Space Treaty; whether it could better guarantee freedom of access and scientific investigation of celestial bodies, better redress a violation of the non-appropriation clause Article II, better enforce the non-military aspects of Article IV, better handle registration of space vehicles, and so forth.

Given this diminished field of view, one might even find that the space race spurs the total world space effort, accelerates space-related invention, and provides a diversity of detail and a testing ground for technological innovation.⁴⁷

Whether the total speed-up of space exploration, coupled with corresponding short-range benefits to particular space powers, is sufficient to justify the huge cost of two parallel systems, the duplication of effort, and the forfeiture of possible results obtainable by a unified world-space-development program is an interesting question in cost analysis worthy of further study.

The alternate approach places international space activities in the context of the human world—the world of the arms race and the threat of nuclear war in which the combined annual defense budgets of the two superpowers alone is well over \$100 billion; in which bloody conflicts flare up and continue on all continents, threatening to draw the great powers into a final holocaust; in which nations compete with one another for markets and resources with unabated fury; in which the new hydra-headed specter of overpopulation, civil wars, famine, disease, riots and ecological disaster rear up in front of a horizon of future possibilities of long life, health, leisure, miracle grains, travel for all, instant communications and planetary conquest.

Under this approach, the activities of all men and nations are inextricably intertwined and cannot be detached from each other as if they were artifacts suspended in a conceptual vacuum. History cannot be ignored. World Wars I and II were not mirages. Pernicious and unremitting, national rivalries in all their forms and features pervade the waking hours of all national leaders and poison all human endeavor.

To the distress of anti-rationalists, there is a remedy. The remedy is for nations to join in common endeavors that will produce a unity of interest in peace. No surrender of national sovereignties is involved. A network of functional, integrated activities should be encouraged that would gradually displace the excessive competitive aspects of the power struggle which, organized on national lines, has always led to organized violence. Space flight has seized the imagination of men. It can serve also as a catalyst for the institutions of peace.

⁴⁷Rivalry with the Soviet Union, thus, became one of the main factors in energizing America's space effort. Staff Report: SOVIET SPACE PROGRAMS 1962-1965, Committee on Astronautical and Space Sciences, at 3.