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THE LAW AND THE CONQUEST OF SPACE

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THE legal profession can well view with awe and admiration the tremendous advances being made by science. Dedicated men in this country and abroad have pushed forward from one frontier to the next at such amazing speeds that it is difficult enough for the rest of us to comprehend the nature of their accomplishments, let alone the serious implications they may hold for our future.

The launching of Sputnik symbolized, in a sense, the culmination of these advances. The drama of the earth satellites has shaken every American to the roots. It has evoked a thorough analysis of our way of life and has touched off a sort of national soul-searching about where we stand and why. This is a natural reaction and is entirely proper. The important thing is that we go about this national self-examination in a rational manner. In our natural desire to measure up to the military and scientific challenges, we must not overlook other, longer range problems which also cry for solutions now. Though most all of us will admit the need for acceleration in scientific research, development, and education, we cannot let the new-found glamor of the sciences blind us to the need of keeping other fields abreast of these advances.

There is, for instance, much talk that it will be the scientist who will chart the future course of the world. That is, of course, true to a certain extent. Clearly, scientific technicians and specialists will provide the know-how and inventive genius which will spell much of the progress of the world in the years ahead. But that is only half the story. There are others who will play important roles. They are the long-range operators, who might be classed together as the social scientists. They include the anthropologist, the historian, the philosopher, political scientist, and the lawyer. These people are concerned that our attitudes, our customs and our laws keep pace with achievements in the scientific world.

The problem for the legal profession is not a new one. Down through the ages man has striven to attune his legal codes to progress in other fields. Constant change to insure maximum justice has been the hallmark of progressive and successful legal thought. History reveals that the physical sciences did not reach fruition until the proper moral climate had been achieved in civilized sectors of the world. This was brought about by the rise of mature religions and the promulgation and acceptance of legal standards by which man's conduct could be guided.

From all sides we are bombarded with talk of atoms and missiles.

The newspapers are full of news of rockets and reactors. The radio and television bring word of cosmic rays and predictions concerning travel in the vast reaches of outer space. The sciences are definitely on the ascendency.

Lawyers should not resent this, but they should be pondering its significance. They should remember the old maxim that forewarned is forearmed. Let that be the guide for the legal fraternity as it attempts to meet the promises and dangers of the dawning age of space conquest. It behooves all lawyers to be up and doing. They should challenge the demand that America channel *all* its best brains and talent into a Gargantuan effort to develop scientists and engineers. Many of our young people should be guided in that direction, but not all, for America's greatest contribution to the future may well lie in adapting rules of law to advances in the physical sciences. Freedom, fairness, compassion, and justice may then accompany and survive any such advance, regardless of how revolutionary it may be.

Our goal must ever be to strive for the truth, to search for the means to achieve maximum justice, and to explore paths to the happy road of worldwide peace. Space age challenges to the legal profession are not far off. They are not obscured from our view at some distant, ephemeral point. They are upon us now, for scientists have taken us, in little more than 12 short years, from the dawn of the atomic age to the threshold of the conquest of space. The fact that we have reached the threshold of space with such breath-taking rapidity means that new rules of the road must be formulated to meet new challenges that will be facing us. The untold wonders of the universe lie before us, ready to be tapped. The grave challenge is whether we will employ these treasures for peace or for war.

The United States should take the lead in finding a way to save space for peace. But at the same time it must face realities. In the world in which we live our safety and survival requires that we forge ahead with the military plans for exploitation of space, while ever searching for the key to making space out of bounds for war.

Just as no one could foresee all the military applications of the airplane at the time of the Wright Brothers' first flight, so it is extremely difficult today to predict with any precision the military potential of outer space. Many people feel the military value of space will be limited to reconnaissance and weather satellites. Clearly, these are the most immediate possibilities. But while many of the experts seem to have reservations about the uses to which space may be put in case of war, there is a realistic determination not to rule out the possibility of military utilization of space just because of the difficulties and high costs involved.

Reconnaissance and weather satellites can circle the earth at altitudes ranging from 200 to 4,000 miles, carrying photographic and television equipment, and transmitting data to earth electronically. At present, the successful launching of such vehicles would be of far

greater military value to this country than to the Soviet Union. The Russians already know a great deal more about our military targets than we know about targets in the long-isolated Soviet empire. It is especially important to keep this fact in mind as we ponder any space-for-peace plans. If, under any such a plan reconnaissance satellites were to be prohibited or their control internationalized, the Russians would be the principal beneficiaries.

On the other hand, some international agreement concerning their use could benefit all mankind in the long run. For example, if the United States were to launch a satellite to an altitude of some 22,000 miles, it could rotate around the earth once a day. If it went in an east-to-west direction, following the earth's path, it would appear to stand still in the heavens. As an outpost for international peace, such a vehicle could have tremendous value. As a weather station it could report information for the benefit of all nations. As a radar platform it could watch all nations for the possibility of missile launchings. In all probability it could detect a missile taking off seconds after it was launched. A fleet of such high-orbiting vehicles could be a potent factor in monitoring the world's activities and thus helping to curb man's warlike tendencies.

Careful study is also being devoted to a satellite equipped to measure, for meteorological purposes, the cloud formations around the earth. The more we can learn about the whys and wherefors of weather, the better will be served the peaceful pursuits of man. At the same time, there is, in the foreseeable future, the awful possibility of turning nature's destructive forces from the heavens to military use.

High priority has or will be assigned to putting a man in space and returning him safely to earth. If the United States were willing to spend \$10 million on this project, it is estimated it could put a man in space in one year. The capability now exists to send a man 150-200 miles into space and return him safely to earth in the nose of a missile. While some may question what is to be gained by such an experiment, one need only think back to the turn of the century when people wondered why a man named Wright would bother to put a flying machine in the air only 100 feet.

The culmination of the current, well-publicized experiments concerning man's reactions to space travel, and the conquering of the launching problems involved, would be the establishment of a permanent base in outer space. The uses of a space platform would be many and varied for both scientific and military purposes. A large enough device would enable space explorers to assemble interplanetary rocket ships. This would eliminate the terribly difficult job of launching huge space vehicles against the clutches of the earth's gravity. Once the vehicles were assembled on the platform, they could more easily proceed from there to the further reaches of space.

There have been several suggestions about how we should go about setting up a permanent, manned base in space. The simplest way would

seem to be to fire into orbit a mechanism containing a man and equipment. Though this is certainly the most direct way of doing it, it would necessitate the very real problem of choosing a volunteer to make the effort. In addition, such an outpost would of necessity be small, due to the tremendous thrust needed to send it up from the earth.

Another means for establishing a manned station might be by launching into space the personnel and equipment there to assemble the component parts. This is not as fantastic as one might think. Some leaders in the field feel it is the logical and most effective way. After the basic segments of the station had been assembled, additional personnel and more elaborate parts could be sent up and put together. When further supplies and equipment were needed, they also could be sent up by rocket.

Another suggestion is that the parts be fired into orbit first and later the personnel sent aloft to rendezvous with the equipment and assemble it. All of these possibilities are being carefully studied by our experts.

Sending up a manned space platform and stationary satellites could be the vital link which would facilitate interplanetary flight. They could act as stepping stones to the moon. That is a trip of approximately 240,000 miles, which will take somewhere around $4\frac{1}{2}$ days to accomplish.

President Eisenhower has recently authorized efforts to shoot the moon in an unmanned vehicle. If sufficient funds and personnel are allocated to the project, there is an excellent chance to rendezvous with the moon within a year. This mission should be pursued with the utmost vigor. The propaganda as well as scientific potentialities of a moon probe are very great.

The question is not so much whether the United States can afford the expense of such a project, as whether it can afford *not* to undertake it. In terms of world prestige and influence, an American satellite circling the moon would be worth literally billions of dollars. This nation should forge ahead aggressively and speedily to beat the Russians to this goal.

It is one thing to hit the moon with a rocket, and another to put a man up there. As has been indicated, the first step to achieving the latter is the establishment of stepping-stones, permanent bases in outer space. They are the key to getting men to the moon.

There are conflicting views as to the strategic value of controlling the moon. They range from predictions that the moon has no practical military use, to the idea that the nation which controls the moon can readily control the earth. Some claim it is ridiculous to plan on using the moon as anything other than an observation post, if that. They say the most direct military use, that of employing it as a launching site, is impractical or impossible. In their opinion it would be far-fetched to attempt to shoot any kind of a missile 240,000 miles, much less to expect to hit anything with it. They point out the prohibitive costs involved, the great amount of time it would take for a missile to reach

the earth, and the environmental conditions on the moon which would make missile launchings extremely difficult.

There are, on the other hand, military leaders who view the moon as the perfect strategic "high ground." They point to the excellent reconnaissance possibilities and emphasize that, due to the lesser gravitational pull, missiles could be launched toward the earth with about one-third of the thrust needed on earth. In fact, the lack of resistant atmosphere might make it possible to send a payload to the earth in a retaliatory move without any internal propellant.

A major factor to consider in determining the value of the moon as a launching site is the accuracy with which missiles can be fired from there. It is known that if an intercontinental missile is aimed at a target 5,000 miles away, a lateral error of only one degree can cause it to miss the target by nearly one hundred miles. An object launched from the moon with this much error would pass the earth some 4,200 miles off course. Tremendous strides are being made, however, through the development of more and more accurate inertial guidance systems, to perfect the accuracy of long-range missiles. It is entirely conceivable that such systems can be applied eventually to moon shots earthward with such success as to make such launchings practicable.

Another factor to consider is that the moon's gravity may well be only about one-sixth of that of the earth. This could render the movement of heavy construction equipment and material that much simpler, facilitating the building of military posts. In addition, it has been pointed out that the concealment potential of the moon is great. One side of the moon, never seen from the earth, would be ideal for launching sites, while the other could well be employed for manned reconnaissance stations.

Far-sighted military leaders and planners of this nation are actively considering all of these possibilities as they grapple with the more immediate problems of perfecting launchings and developing new propulsive methods. For they know that the United States cannot take second place in this race.

Because the military potential of outer space is so awesome, so untapped and so unknown, it is doubly imperative that this nation take the lead in efforts to save space for peace. We must work hard now to prevent the use of space for military purposes, while its developments are in their infancy, or we court disaster. While satellites are still searching for scientific data is the time to act. It will be too late when more sophisticated vehicles are capable of zeroing in on earth targets.

It is also time we began to ponder the many legal questions which the amazing possibilities of life and commerce in space will raise. Lawyers must concern themselves with scientific advances and predictions for things to come, for only if they are well-informed can they define the issues and approach their solution. As the President and our leaders search for answers to the puzzling enigmas of this new age,

they must be aided by enlightened and understanding work by the legal profession. It is, after all, the function of the lawyer to help make rules to govern an orderly society, and to create understanding and respect for those rules.

Laws must be based on human experience. They must change to meet the changing needs of society. And where any society, or where any civilization itself, progresses to the point where existing laws are not adequate, then new laws must be shaped. There is good reason to believe that we have reached that point. New laws and new concepts must be formulated to meet the promises and dangers of this coming age, and the lawyers of America can and must lead the way in this vital work.

It is not premature, therefore, to give serious consideration now to the legal problems which in all probability will accompany the conquest of space. To await the collisions before devising rules of the road could be to destroy all hope for the settlement of the clashes by a rule of law. What time will there be for judicial speculation when rival claims are made to the moon or to space itself?

It is true that law must reflect experience and to some extent, therefore, that legal solutions cannot precede practical needs. The impact of the space age, however, presents us with a unique challenge. We must anticipate and confront its problems before they become additional elements of world tension. The rule of law in the age of space is not a matter of philosophy, but a matter of survival.

Of first importance is that our law-makers, and the people themselves, be kept informed of our endeavors and of our scientific progress in this field in order that new laws and policy may be shaped intelligently. It is essential that this job be done by permanent executive and legislative bodies which can coordinate our activities and study and recommend basic legislation and policy.

On the legislative front, the Senate and the House of Representatives each has a select committee studying these problems. At the same time, other committees in both Houses, such as the Armed Services and Foreign Affairs Committees are continuing to exercise their jurisdiction over some of the problems in this area. This has meant that a great deal of the valuable time of our top scientists and military experts is being spent on Capitol Hill instead of in the laboratories. While the testimony of these experts is, of course, essential to the work of Congress, it is incumbent upon Congress to devise more efficient methods for conducting its investigations. To that end, I have advocated from the beginning establishment of a Joint Committee on Outer Space modeled after the Joint Committee on Atomic Energy.

On the executive front, the Administration has proposed a civilian-directed National Aeronautics and Space Agency, and I have introduced a bill to create it. This agency would be responsible for programs concerned with problems of space technology, space science and civil space exploration. It is anticipated that this new agency will use the

present National Advisory Committee for Aeronautics as its nucleus. In my opinion, such utilization of an outstanding existing facility is the best means of advancing our space programs with a minimum of delay and confusion.

The President has instructed the existing N.A.C.A. to review jointly with the Department of Defense space programs currently under way or planned by the Department of Defense and to recommend to the President which of the programs should be placed under the direction of the proposed N.A.S.A. This review is now in progress. Since the military are now the only ones charged with any responsibility for space matters, everything is under their direction. There is no question but that many of these projects are purely civilian and should be turned over to N.A.S.A.

The bill is explicit in declaring that our National Space Program shall be controlled by a civilian agency except "insofar as such activities may be peculiar to or primarily associated with weapons systems or military operations." While it is important that the military continue unabated its research activities related to military operations, the non-military implications of space should be under civilian rather than military control.

Although this new space Agency would represent a substantial first step, I am convinced that eventually we will see the need for a Department of Science headed by a Cabinet-rank Secretary. Such a department could co-ordinate the efforts of existing agencies such as the N.A.C.A., Atomic Energy Commission and the National Science Foundation. This would bring under one roof all fields of scientific endeavor in which our Government has an interest. Meanwhile, the importance of our activity on the space front is so great that the Director of the newly formed Space Agency should participate in the formulation of policy at the very highest level by sitting with the Cabinet and the National Security Council.

Turning to specific legal problems of the space age, the most pressing, now that the first satellites actually have been launched, is the question of who owns space. We know that at common law, the ownership of land extended indefinitely up to the sky and indefinitely down in the earth. In *Coke on Littleton* we find the maxim: "To whomsoever the soil belongs, he owns also to the sky and to the depths. The owner of a piece of land owns everything above and below it to an indefinite extent." This maxim just barely survived the invention of the airplane.

In 1902, shortly after the Wright brothers' first flight, a convention was proposed under which the air would be free to commerce and travel just as is the sea. This proposal was rejected. During the First World War, each nation began to assert exclusive control of the air space over its territory. After the war, the law of absolute sovereignty over air space was formalized in the Paris Convention of 1919. This provided that "every power has complete and exclusive sovereignty over the air space above its territory." This principle has since been

consistently adhered to in domestic legislation as well as in international treaties.

Significantly, the term "air space" has never been defined in any of these treaties. Scientists have now established that there is no fixed separation between air space and outer space. It is apparent that law and science will have to join forces in arriving at an acceptable definition of these terms.

Suppose one were to attempt to apply the principles of established international law by extending the boundaries of each nation into outer space. Because of the curved face of the earth, the extension would produce an inverted cone which would grow bigger and bigger in relation to the country as it reached farther into space. At some point these cones would overlap and more than one state would be occupying the same air space. Moreover, the continuous movement of the earth on its axis means that the relationship of particular areas on the surface of the earth to space beyond the atmosphere would be constantly changing.

These solar facts illustrate the impossibility of applying existing concepts of international law to the control of outer space. In my opinion, space beyond the atmosphere must remain the common property of all the nations, or, what is the same thing, the property of no nation.

To an informal and limited extent, freedom of outer space has already been recognized by the course of international conduct in connection with the International Geophysical Year. Under the various conventions relating to air travel, any nation could have objected to the flight of earth satellites over its projected territory. The fact that there were no protests after announcement of plans for space flight in connection with IGY, or after the actual launching of the Sputniks by Russia, is strong evidence that the nations of the world have agreed that outer space should be free at least for scientific purposes.

The United States should take the lead in formalizing international recognition of freedom of outer space before the end of the International Geophysical Year. Specifically, I recommend the following three point program for international action:

First, the United States must work for an international agreement barring the use of outer space for military purposes. Adequate inspection safeguards will, of course, be necessary to make such agreement effective.

Second, the United States must seek international agreement that outer space shall be the common property of all nations and not subject to appropriation of any one sovereignty. Any attempt to slice up the areas and bodies of outer space is bound to have dangerous and world-shaking consequences. The only reasonable solution lies in dedicating all these bodies to the use of the entire world.

Third, the United States should press for the formation of an international organization for the joint exploration of space. Space travel and exploration is very expensive business. No one nation can do the

job adequately by itself. If funds, resources, brainpower and know-how could be pooled in one organization, the conquest of space would be accelerated and the chances of saving it for peace augmented.

We must face up to the very real dangers involved in the development of outer space for military purposes. The prospect of reconnaissance from satellites, or of rockets armed with nuclear weapons must be reckoned with. This extension of the tools of war into space would heighten tremendously chances for the total destruction of earth civilization. To avoid turning down a road of sure global suicide, the nations of the world must devise means for preventing the use of outer space for military purposes. In a more positive vein, we must make every effort to achieve cooperation and sharing of solar information to promote the causes of peace and progress.

Recently I introduced in Congress a resolution which could be an important first stride in this crusade. This resolution states in strongest terms our desire that outer space be devoted to peaceful pursuits. A ringing vote of approval by Congress, speaking for the American people, would put the United States firmly on record against using space for military purposes. I have been assured this resolution will have early consideration, and am extremely optimistic it will be adopted.

To a certain extent the United States has already rejected any use of outer space for military purposes. A United Nations resolution sponsored by the United States and a number of other nations provides for a joint study "of an inspection system designed to insure that the sending of objects through outer space will be exclusively for peaceful and scientific purposes." While thus far the salutary purposes of this proposal have been frustrated by Kremlin rejections to inspection we should continue to press for an early agreement along these lines.

Today we are paying the toll for our failure to reach a timely agreement for inspection of atomic devices while that inspection was still practicable. And after two months of intense negotiation a United Nations conference on the law of the sea recently failed to agree on an internationally acceptable limit for territorial waters. Now is the time, therefore, while space travel is still in its embryonic stages, to clip the wings of those who would utilize space flight for other than the pursuits of science and peace.

Another major legal problem is whether the international rules of discovery and occupation are suitable for determining the rights of nations to celestial bodies on which landings may be made. The prospect of annexing the moon or a planet would, of course, appeal to any nation, and no nation could be expected readily to surrender its claims. In my opinion any attempt to apply the present rules to solar claims would precipitate and magnify the same territorial conflicts in outer space which have plagued the earth for its entire history. The moon and other planets can never be successfully occupied on any exclusive basis without immeasurably increasing the risk of war. The moon and

other planets, therefore, must be regarded as the satellites of all the nations of the earth. And there must be an early and firm assertion of international jurisdiction over these areas by an organization of all the countries of the earth.

A host of practical problems will accompany commerce in outer space. New principles of law may have to be adopted for the protection of persons, industries and states from misguided missiles or petered out Sputniks. Rules will have to be devised with respect to liability for injury or damage from activities in outer space.

Some Federal regulatory agencies already are up against practical space age problems. The Federal Communications Commission, for example, has received a formal protest that radio transmissions of the Soviet Sputniks have violated global agreements for radio frequency allocation. Under the International Telecommunications treaty, certain bands are reserved for worldwide use for distress signals and scientific purposes. The unauthorized use of these bands by the Sputniks may have resulted in serious errors of instrument calibration and interference with aircraft radio and radar beacons. This situation will be aggravated, of course, as more Sputniks and baby moons are launched. A conglomeration of satellites, transmitting conflicting signals could endanger lives and would make tracking and transmission virtually impossible.

Another government agency, the Civil Aeronautics Board, recently received an application from a transportation company for an interplanetary passenger route emanating from Atlanta, Georgia. This application was rejected by the Board because the applicant did not specify terminals to be served and failed to designate the type of aircraft to be employed. The agency indicated also that the application might be somewhat premature. But it was all carried out with a straight face.

The United States must bend its efforts now to reach international agreement and cooperation respecting the many legal, jurisdictional, communications, navigation, rescue and other problems raised by ventures into outer space. And in these efforts, the legal profession must lead the way. Lawyers have their work cut out for them. They must begin to think now of a space navigation code, a space radio communications code, and even a space rescue code. It may be that in our lifetime, we will be drafting agreements governing the carriage of goods and passengers in space. All lawyers should keep advised of progress in these fields, offer suggestions, and participate wherever possible. Specific attention should be given to establishing law school courses devoted to these legal questions. The success of pioneering courses in atomic energy law provides a good precedent for this.

The proposals I have advanced for international agreements to bar the use of outer space for military purposes, to dedicate planetary masses to the use of all nations, to form an international agency for joint ventures into space, and to formulate codes of behavior in space are offered as more than parts of a formula for victory in a race for

survival. Our aim shall be more than mere survival. If we act now it is within our power to make Sputnik and Explorer the spark, not that touches off world destruction, but that lights the path to world cooperation and good will.

In this great endeavor, America must lead the way. While we may be uneasy about what lies ahead, we must be bold, imaginative and resourceful, aware of the promises as well as the perils of the unknown. Here is an opportunity to establish rules of law to govern the relations of nations as well as individuals in a completely new world. If our efforts to insure the peaceful use and control of outer space are successful, we may open a new era for all mankind. Perhaps man, freed from the ties of his earthbound existence by the common challenge of space, might even shake free from some of the jealousies and differences which have for so long beset human affairs and placed peace on earth on such a precarious footing.

If the nations of the earth can cooperate to prevent anarchy in space, they may well come to realize that respect for one another on earth is the best hope for peace. Perhaps by this means men will learn that only through mutual understanding and give-and-take can we hope to survive to achieve maximum justice and freedom for all.

Our satellite, "Explorer," is well named. We have sent it forth into the heavens to search out the facts and implications of a new age. Let us too be searching for the means of dedicating this new knowledge to peace and not destruction. We must insure that down through the years as other Explorers soar upward into space, it will be in search, not of targets to destroy life, but of facts to enrich and benefit all men. Only thus can we lay claim to an inheritance in that Kingdom beyond outer space.