SYMPOSIUM ARTICLES

SCIENCE AND THE LAW *

Law is of necessity the most conservative and orthodox of all disciplines. It is the only discipline whose function is in part to assure continuity of society and to slow down changes in our mores. Men and women must always be able to expect with reasonable confidence that their promises, duties and obligations shall be respected in the foreseeable future. Clients do not only want to know that a document just signed is valid today; they must be assured of later validities.

This function of law-stabilization bespeaks even more rigidity than the function of religion which presumes to hold before our eyes everlasting symbols of good and evil, while law prescribes more concretely and in much greater detail the conduct of human affairs. Because of the demands on law for orthodoxy it is to be expected that the law should more often follow than lead the desires of our people, however it must not lag behind the gradual transformation of that desires of man. It must accept the irksome inconvenience of change in return for the enrichment of new attitudes in the light of fresh scientific discoveries and unprecedented researches and explorations in various fields.

It is generally recognized fact that law and legal procedures lag far behind any type of social and scientific change. This is true even in matters of change in social custom, religion and habits of the people. But it seems to be far more marked when one approaches the problem of picking up scientific developments and transposing them to be used as tools in the legal and governmental procedures.[1]

The reasons for the failure of the legal system to immediately adopt scientific innovations are numerous. Many of them are found in the nature of the legal system itself. Its ancient origins written statutes and constitutions, judicial reliance upon precedents, the doctrine of STARE DECISIS, and the habit of a free legal profession to be largely occupied in the profitable business of defending the status quo all constitute brakes on any sudden change. The machinery for change which is provided by most governments, the system of legislative law, is not well calculated to pick up innovations in the field of science.

Most of our legal and major governmental devices, having been established before the industrial and scientific revolution to govern a type of society now almost extinct shows how ancient their origins are. "Our legal forms, customs and methods of procedure are much

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* This article and the other two which follow have been delivered on September 13, 1958 at the fifth annual symposium sponsored by the Order of the Purple Feather, honor society of the U.P. College of Law. Budgetary and spatial limitations prevent us from printing the following articles which were also discussed on the same occasion: Extraterrestrial Application of Laws by Johnny Antillon; Tort Liability Arising from Peaceful Uses of Atomic Fission by Danilo Mendoza; Should Push-Button Justice Be Adopted in the Light of Scientific Progress and Developments by Filipinas Campomanes; and Security and Scientific Freedom by Manuel Ortega.

[1] Bentel, Frederick K., Experimental Jurisprudence, University of Nebraska Press (1957) p. 68.

older than any known science and any of them have existed almost without change through the centuries." [2]

Mankind from the dawn of history has believed that fundamental legal rules could be written down for all times. "The Babylonian Code of Hammurabi 2100 B.C., the Hebrew Ten Commandments about 1200 B.C. and the Roman Twelve Tables, 400 B.C. are all nearly examples of the world habit of reducing current legal concepts to writing, endowing them with supernatural sanctions and setting them up as guides for future generations." [3] Our own constitution and statutes are directly descended from this age-old device of freezing social control to prevent change. "True, we no longer rely upon the supernatural, and our constitutional convention wisely provided a machinery for amendment and interpretation to take care of change but in practice the means for change have not been particularly effective in picking up new ideas." [4]

The doctrine of STARE DECISIS is another deterrent to change. In many situations where an ancient rule of law has been specifically abolished in plain words by the legislature to dovetail the law to new scientific discoveries, the doctrine of STARE DECISIS has made courts adamant in following the clear intention of the legislators.[5]

Legislative change itself is not geared to the immediate adoption of new ideas. The Philippine Legislature as such, has little continuity, depending almost entirely upon the whim of public election. Congress having no independent research equipment,[6] has to depend for their factual material upon public pressure which makes its appearance at the legislative hearings in various forms of lobbying.

The separation of governmental functions,[7] one of the basic tenets of government in this country, also stands in the way of progress. Our separation of powers in the national government plus our division into provinces, cities, and towns and myriads of local units [8] are liable to retard the bringing of new information into the law. Added to this is the complete reliance on the democratic process which assumes that desired changes will arese from an informed public and when considered in the light of the fact that scientific data

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[2] Wigmore, A Panorama of the World's Legal Systems 69 (1928); *see also* Gluckman, The Judicial Process of the Barotse of Northern Rhodesia, 357 *ff.* (1955) where the author points out that the court system of the savages closely resembles our own.

[3] Buckland and McNair, Roman Law and Common Law 1 *et. seq.* (1936); Wigmore, *op. cit., supra* note 1, 848.

[4] See Lynd and Lynd, Middleton c. 2 (1929); of. Seagle, Law, The Science of Inefficiency (1952)

[5] A few examples of this tendency will suffice. In the field of Commercial Law, the Negotiable Instruments Act adopted almost uniformly in England and in all states of the United States provided in plain terms that credit should be value for the purpose of giving a transferee the special rights of a holder in due course (Uniform Negotiable Instruments Law Section 25, 191) but to this day the majority of the courts still following the prestatutory decisions refuse to treat bank credit as value. In the field of constitutional law, courts put a narrow interpretation upon the U.S. Bill of Rights, holding, inspite of much plain language to the contrary, that it only limited the Federal government. *See also* 2 Grosskey, Politics and the Constitution, 1058 *et. seq.* (1953), Rottschaeffer, Constitutional Law, 781, 782, 785, 800, 812, 817 (1939).

[6] *See* Cardozo, A Ministry of Justice 35 Harvard L. Rev. 113 (1921). Even to third day little has been done to implement the suggestions of this great jurist. The So-called legislative research agencies connected with many state legislatures should not be confused with the Ministry of Justice. Most of them are drafting bureaus for continuous committee hearings during recess.

[7] Section 17 Adm. Code "Government are distributed, respectively among the executive, legislative and judicial branches, severally exercising the functions and powers conferred on them by law;" U.S. vs. Bull. 15 Phil. 7, 27.

[8] Anderson, The Units of Government, Pub. Ad. Serv. 11 *et. seq.* (1934).

is known only to a few people [9] and is so complicated as to be beyond the reach of the masses at large, it might be expected that it is not only difficult but almost impossible to bring the information from new and rapidly growing scientific revolution back into our conservative forms of government, and law.

The judicial system, moreover, has failed to pick up among available scientific advances to improve its procedure. In a recent case Senator McCarthy in defending himself against a libel suit, wanted to use a wire recorder to take record of the testimony. Although no possible harm could be done by the introduction of such device and much time could be saved, the court summarily denied the request.[10]

In like manner blood tests to aid in the determination of parentage have now been developed to a point where it may be possible to prove conclusively by comparison of blood samples the nonpaternity of a certain chlid, yet in many cases particularly in American states juries have been allowed to hold men as fathers, where the blood tests showed it to be impossible. Abhoring such stubbornness of juries Justice Williams in *Jordan v. Mace* [11] said:

"We are not disposed to close our minds to conclusions which science tells us are established. Nor do we propose to lay down as a rule a law that the triers of fact may reject what science says is true, for to scientific truth and *stare decisis* and in that contest, the result would never be in doubt." [12]

Similarly in the use of scientific methods to determine the truth of statements made by witnesses and suspects, mechanical lie detectors which have proved to be accurate in over 75% of cases.[13] are still unpopular, but on the other hand no such proof is available for the accuracy of judges, judging the veracity of witnesses.

In a recent test under controlled conditions, out of five guilty persons only one was apprehended by ordinary criminal investigation. He was tried and found not guilty. Afterwards a lie detector operator by testing the suspects and a number of innocent parties reproduced the crime in most of its details, identifying three principals and one accomplice. The fifth guilty party was able to beat the lie dietector by taking an overdose of aspirin, but on retest after the effects of the drug has worn off he was also found guilty.[14]

There are thousand of other scientific means in physics, chemistry and other sciences for determining basic facts in litigation far more efficient, but none of these devices are used by the courts which still follow the plan of submitting expert testimony to inexpert jurors

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[9] The number of people granted Ph.D's in science totaled less than 4,000 in the United States in 1950, less than 6/100 of one percent of the population over their age, Wolfe, Intellectual Resources, 185 Sci. Am. 46 (Sept. 1951).

[10] Bentel, *supra* p. 97.

[11] Jordan v. Mace, 144M. 351; 69 Atlantic 2nd. p. 670.

[12] Justice Williams in concluding said, "If the jury may disregard the fact of non-paternity shown here so clearly by men trained and skilled in science the purpose and intent of the Legislature that the light of science be brought to bear upon a case such as this, are given no practical effect."

See also Schatkin, Disputed Paternity Proceedings 211 *et. seq.* (2nd ed. 1947).

[13] Inbau, Lie Detection and Criminal Investigation 77 (1948).

[14] Bentel, *supra* p. 99.

particularly and American courts without any qualification for distinguishing between the scientist and charlatan.[15]

These examples are a mere drop in the bucket to the number of instances where the legislative system is behind or unconscious of scientific developments. To these can be added such subjects as tests for intoxication like the drunkometer, use of truth serums, radar, the revision of sex, marriage and divorce laws, sterilization and artificial insemination, in which scientific information is developed and waiting to be adopted into our legal system.

It is indeed wholesome that new ideas should always have to fight their way into the market place of acceptance for this retarding process demands added vitality of novel impressions but as we approach the most dramatic scientific revolution of man's entire history, we can suffer greatly if the law profession continues to frown with deep furrows on the unorthodox.

With the same necessity the law must be malleable to cope with newness, speed and complications of future scientific ventures and developments. When a new situation, appears in the legal stage, it is always difficult to select from analogies, not intended for that situation, the one which should apply. The problem is doubly difficult when the new facts present not a matter of degree but an entirely new dimension, one whose scope and repercussions cannot be foreseen.[16]

Today scientific inventions and discoveries are being turned back into the scientific process where each innovations breeds at an accelerated pace a myriad of other changes in scientific methods and devices.[17] Explorations in space will necessitate drastic modification in today's legal principles governing man's relations with man. "Science is rapidly out-distancing law in the field of space explorations and travel and legal scholars must act forthwith if we are to avoid perpetuating the inadequacies of the international law of today in the space law of tomorrow.[18]

The law must if possible anticipate kaleidoscopic problems arising from launching of earth satellites, their orbiting descent, collisions and other concomitant injuries to persons and property. Conquest of space and other heavenly bodies, paced by science and spurred by national rivalries brought with it the problem of extra terrestial application of laws.

The "Sonic Boom," a phenomenon that is created by the diving [19] of an aircraft travelling at a speed faster than sound; causing damage to property, as well as injury to persons and animals entails new legal problems. Should courts decide that a "sonic boom," is an

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[15] Prof. Smith of the Univ. of Texas has undertaken a research on how to enlighten the medical and legal profession on the present use of obsolete court fact-finding machinery. (Bull. Law-Science Course, 1953).

[16] Freeman and Yaker, "Disarmament and Atomic Control," Cornell Law Quarterly, Ithaca, New York: v. 42, No. 2, W. 1958, p. 244.

[17] Figures from the U.S. Patent Office show that there have been twice as many inventions registered since 1907 as in the whole history of the patent office from the founding of the republic down to that time. The railroad block signal patent issued to Biss in 1907 was No. 861,015. As of June 1952 the number of issued patents had passed 2,600,000.

[18] Andrew G. Haley, Basic Concepts of Space Law (Space Law Bulletin No. 8: 1958).

[19] With the advancements in jet aviation the "sonic boom" can even be achieved by a plane travelling in a horizontal direction, thereby creating a greater danger to life and property.

explosion, insurance companies would subsequently be liable for damages to property insured under contract with explosion causes.

Should the court find that the characteristics of "sonic boom" do not constitute an explosion, some insurers may be liable under the building collapse and glass breakage perils under the broad form and all risks features of insurance contracts.

Most certainly it should prove very interesting to observe the evolution of this newcomer to the liability family—"sonic boom."

The rapid development of peaceful applications of atomic energy will make it entirely possible that nuclear power will soon be as familiar as gasoline and like so many technological deveopments of this century, the new industry wil raise legal complications for lawyers and courts to settle.[20] Likewise atomic and hydrogen bomb tests, their fallouts and germane consequences raises problems of security against health laws. "As regards atomic energy, since we have no power to thrust back into its bottle the jinni so rashly uncorked we have no choice but to attempt to control its uses and further exploitation." [21]

In contrast to the many institutions and organizations set up to accelerate scientific change, there are few if any bodies or organized efforts to place this vast accumulation of scientific data at the disposal of the legal system.[22] Attempts approximating the desired liaison have been done by the American Law Institute,[23] the defunct John Hopkins Institute,[24] the research division of the Harvard Law School [25] and the University of Chicago Law School.[26] It is in this light that this symposium is presented, with a hope that it may have a profound influence upon legal research and may aid in closing the wide lag between science and law.

ROMULO M. VILLA *

LEGAL PROBLEMS ARISING FROM THE USE OF UNMANNED EARTH SATELLITES

Many of us can easily call to mind the great excitement caused when the news spread around the world that there was a satellite orbiting in space. The fact that it had come from Russia made it much more newsworthy. Then we heard about another Russian satellite whirling around the earth; this time with the startling disclosure that there was a live dog inside it. Finally, after much anxiety and trepidation over the many unsuccessful launchings, there came the news that America, too, had a satellite in space.

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[20] Harlod P. Green, "A Broad New Field: Atomic Energy and the Practicing Lawyer:" ABA Journal; Aug. 1950. Vol. 43, No. 8.

[21] Newman and Miller, "The Control of Atomic Energy", New York: Toronto (1948) p. 2.

[22] Among these are: Am. Bar Ass'n, Commissioners on Uniform Laws, Am. Institute of Criminal Law and Criminology, Louisiana Law Institute.

[23] Goodrich, The Story of the American Law Institute, Washington Univ. Law Quarterly 283 (1951).

[24] Johns Hopkins University Circular No. 7, p. 7.

[25] Dean's Report, The Law School, Harvard University 17 (1951-52).

[26] Kalvin, How Jurors Think, University of Chicago Magazine 5 (March 1956).

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The two Sputniks and the American Explorer [1] made it evident to everyone that the conquest of space is fast becoming a reality. With the ever-advancing progress in engineering tools and skills, coupled with rapidly accumulating knowledge of outer space, man now looks forward to the day when spaceships will be as familiar as the airplane. But just as the advent of the airplane raised many new and perplexing problems, so has the presence of unmanned satellites orbiting in space above us. Some of the legal problems posed by the introduction of aircraft now reappear in the area above and beyond the atmosphere.

JURISDICTION OVER THE AIR

The necessity for drawing up a new set of legal principles involving sovereignty and territorial jurisdiction seems warranted, in the opinion of many, by technological developments in missiles and earth satellites.[2] To more fully realize the legal implications of earth satellites, it is considered wise to first briefly trace the development of jurisdiction over the air.

At the dawning of international air law, probably the most discussed question was whether a state had sovereignty over the airspace above its territory.[3] The discussion went back to a maxim of early English law, of ancient Roman origin: *cujus est solum, ejust est usque ad coelum.*[4] Although the maxim had been established in connection with problems of municipal law,[5] an attempt was made to carry it into the domain of international law. On the other hand, there was the diametrically opposed view, also based upon a preaviation tradition, of complete freedom of the air spaces, analogous to the freedom of the high seas. At the turn of the present century, a Frenchman, Fauchille, made the auspicious proposal that the two propositions be combined to allow freedom of the air, subject to the right of self defense.[6]

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[1] At present, there are three American and one Russian space satellite circling the globe in orbit. N.Y. Times (Int. Ed.), October 5, 1958, p. 4.

[2] John C. Cooper, former Director of the Institute of International Air Law, McGill University, and perhaps the foremost American historian of international air law, claims that the flight of present day rockets and satellites is not governed by any existing agreement or regulations. Furthermore, he warns that these spacecraft are actually being used today in areas of "outer space", beyond the territorial sphere of any state, entirely unregulated, and beyond the rule of law. Cooper, *Missiles and Satellites: the law and our national policy*, 44 A.B.A.J. 317 (1958).

[3] 4 HUDSON, DIGEST OF INTERNATIONAL LAW 357 (1942).

[4] Who owns the land, owns even to the skies. For an interesting account of the development of this maxim, see Cooper, *Roman Law and the maxim 'cujus est solum' in International Air Law*, 1 MCGILL L. J. 23-65 (1952). Cooper's thesis is that at least since Roman times states have continually recognized, regulated and protected rights in space held by the owner or occupant of lands on the surface below. The existence of these property rights, he claims, "constitute the conclusive proof that states have always claimed and exercised territorial sovereignty in space above their surface territory to the extent needed to make valid the public and private rights in space. . . ."

[5] The first recorded case in which the maxim was quoted was Bury v. Pope (I Cro. Eliz., 118, 78 Eng. Rep. 375), decided in 1586, where it was held that where a landowner erects a house so close to a window in the adjoining property that the light is cut off therefrom, the injured landowner has no complaint even though his building, and his window, were built forty years before the second biulding was erected. For general comment on the case, *see* MCNAIR, THE LAW OF THE AIR 296-297 (1953).

The application of this maxim in present day municipal law is extremely doubtful. In the presently controlling case of U.S. v. Causby (328 U.S. 256 (1946), it was stated in the earlier portion of the opinion: "It is ancient doctrine that at common law ownership of the land extended to the periphery of the universe—cujus est solum ejus, est usque ad coelum (citing Coke, Blackstone, and Kent). But that doctrine *has no place in the modern world*" (Italics mine).

[6] At the 1911 session of the Institute of International Law, there was adopted a brief text providing for the regulation of aircraft in times of peace and war. The provision dealing with the subject of sovereignty, stated: "International aerial circulation is free, saving the

It remained for World War I, however, to settle the question of jurisdiction in terms of the extreme claims of sovereignty.[7] Each nation asserted its absolute dominion over the air space above its territory and this was affirmed in a Convention concluded in Paris in 1919 on Aerial Navigation.[8] Subsequent multi-lateral and international air conventions [9] also adopted this principle of air sovereignty. Mutual recognition of the airspace sovereignty is further emphasized by the existence of (and, therefore, the need for) bilateral air traffic agreements.

SOVEREIGNTY OVER THE AIRSPACE—the present confusion confounded.

The primary rule of international air law today is the Convention of International Civil Aviation, signed in Chicago in 1944, article 1 of which declares that "the Contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory." [10] Sixty six nations, including our own, were signatories. Although Soviet Russia was not a party,[11] for years it has by statute [12] and otherwise also asserted its sovereignty in the airspace over its lands.

With the advent of the Sputniks and Explorers, the definition of the term "airspace" assumes considerable importance, and the most important question facing us is whether the sovereignty conceded to the various nations of the world in the airspace above their territories, *extends or should extend* into the area above and beyond the atmosphere above such territories.

Unfortunately, when there is so much need for a clear-cut demarcation, we find no definition of the term "airspace" in any of the proceedings of international conferences; nor are any attributes given thereof. What most legal writers have attempted is to define the word according to their own viewpoints and the situation at present remains a confused one, confounded by the presence of unmanned

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right of subjacent States to take certain measures, to be determined, to ensure their own security and that of persons and property of their inhabitants". *See* 19 ANNUARE DE L'INSTITUT DE DROIT INTERNATIONAL LAW (1902) 19, 21, *id*, 293, 297 (1906), 24, *id*, (1911) 303. Fauchille's proposals, however, were never implemented in an international convention.

[7] As Brierly states, "The experience of the war made it certain that states would accept nothing less than full sovereignty over the airspace superintendent over their territory. . . ." BRIERLY, LAW OF NATIONS 186 (1955).

[8] Article 1 of the Convention provides: "The High Contracting Parties recognize that every Power has complete and exclusive sovereignty over the airspace above its territory."

[9] The most outstanding of these conventions include the Ibero American Air Convention of 926 and the Pan American Convention of Commercial Aviation, concluded in Havana in 1928.

[10] This article, in fact, is a mere reaffirmation of Article 1 of the Paris Convention on Aerial Navigation, *supra* note 8. A few writers have taken the stand that the Chicago Convention on sovereignty in airspace is automatically applicable to outerspace. *See* references in footnote 36 in McDougal and Lipson, *Perspective for a Law of Outer Space* 52 A.J.I.L. 407 (1958)

[11] Among the nations which have not ratified the Chicago Convention are the USSR, Communist China, Hungary and Bulgaria.

[12] Article 1 of the Air Code of the USSR, approved by the Central Executive Committee of the Council of People's Commissars of the USSR on August 7, 1935, states: "To the Union of Soviet Socialist Republics belongs complete and exclusive sovereignty in the airspace above the Union of Soviet Socialist Republics"

Cf. the United States statute: "The United States of America is hereby declared to possess and exercise complete and exclusive national sovereignty in the airspace above the United States, including the airspace above all inland waters and the airspace above those portions of the adjacent marginal high seas, bays, and lakes, over which by international law or treaty or convention the United States exercises national jurisdiction". Sec. 6(a) of U.S. Air Commerce Act of 1926, as amended, 52 Stat. L. 1028, 49 U.S.C.A. s. 176.

earth satellites whirling in space above us, with various theories [13] at large but without any one being generally accepted.

Does the airspace end where there is no longer sufficient "air" to support an airplane, although in the year 1944, when the Chicago Convention was signed, no aircraft had as yet risen to that height? Most of the legal writers adhere to this view.[14] They have interpreted the vague term "airspace" as comprising that part of space above the earth's surface containing "atmosphere," quoting in support of their view the definition of aircraft given in the Annexes to the Chicago Convention. Since the definition includes any machine "which can derive support in the atmosphere from the reactions of the air",[15] they are able to contend that each State is sovereign only in "those areas of space where sufficient gaseous atmosphere existed to lift and support the aircraft." But even if it is agreed that the criterion should be the physical limit of the earth's atmosphere, not even the scientists can agree as to the exact height at which this point is reached.[16]

Apart from this difficult problem of where sovereignty upwards can be said to extend, let us examine some of the legal problems created by unmanned earth satellites.

SOME LEGAL PROBLEMS INVOLVED

1) *The launching of the satellite*

Regardless of the definition given to the term "airspace"—that is, whether or not it is considered to extend beyond the atmosphere—it is probable that a satellite that has been launched may touch the atmosphere of another sovereign state. Many admit, in fact, that the recent satellites probably passed over the surface territory of every important state in the international community. For, even assuming that the satellite may be able to go straight up without infringing on another state's territorial jurisdiction, once it starts orbiting, some problems is created. Fo r those who contend that a state's sovereignty upwards is not delimited, it is patent that the

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[13] Many writers have attempted fixing a demarcation line between "airspace" and "outer space". Some would place it as low as thirty miles, others at fifty or fifty three; others as high as two thousand. Others would fix the line with reference not to a stated number of miles but to a supposed physical constant like "the point where the earth's gravitational effect ceases", or the point where there ceases to be enough air to sustain the flight of aircraft. On the other hand, Hingorani places no limit and would have all flight instrumentalities "subject to existing rules and regulation, no matter at what height they float". Ringorani, *An Attempt to Determine Sovereignty in Upper Space*, 26 KANSAS CITY L.R. 6 (1957).

[14] Note this observation by Professor Cooper: "The Chicago Convention contains no definition of "airspace" but it may well be argued that as it was adapted from the Paris Convention, it deals with no areas of space other than those parts of the atmosphere where the gaseous air is sufficiently dense to support baloons and airplanes". Proceedings of the American Society of International Law, Wash., D.C., April 25-28, 1956, p. 88.

[15] International Convention Relation to the Regulation of Aerial Navigation (October 13, 1919), Annex A, Preliminary Section; Cenvention on International Civil Aviation (December 7, 1944), Annex H, Def (a).

[16] Scientists divide 'atmosphere' into four zones. In order of their nearness to the earth, they are: troposphere, stratosphere, ionosphere and exosphere. Unlike the comparable identification of scientists on the extent of the first three zones, there is quite a diversity of opinion on the extent of the exosphere. Even assuming that the concept of airspace is limited to atmospheric spaces, how can we fix the upper limit in view of the fact that some geophysicists think the exosphere extends up to 1,500 to 60,000 miles? As Hingorani asks, where should the line of demarcation be drawn between airspace, i.e., the atmosphere, and outer space? *See* Hingorani, *supra* note 13.

Furthermore, the most advanced scientists are in agreement over the fact that the height of the atmosphere is at variance above the different parts of the earth.

sovereignty of the state underneath is being impugned [17] by the orbiting satellite. As one distinguished international law writer [18] has asked, are the present Sputnik and Explorer flying in the upper spaces violating the 'ad coelum' sovereignty of the states beneath them? Or are we to say that a violation could only take place if in the later stages of their flight they should descend and take a much lower orbit, as happened, apparently, to the first two Russian satellites? [19]

Is there a need, therefore, for previous permission from other states before launching? It would appear that the United States, at any rate when it was planning to launch its rockets and satellites, felt the need, in the absence of any convention provisions, to obtain the express or tacit consent of states likely to be overflown. For example, the tests of guided missiles, long conducted in Florida, required a series of bilateral agreements with the United Kingdom for the purpose of establishing over the Bahamas and adjacent waters a vast test area for the launching and flight of missiles over distances of more than 1,000 nautical miles.[20]

Express consent or an international agreement would certainly eliminate any doubt as to the right of passage of unmanned earth satellites. The question has already arisen, however, as to what extent tacit consent may be inferred.

With respect to the American Explorers, the launching of which was announced by the White House way back in 1955 as a contribution to the studies being made in the Geophysical Year, no protest having as yet been made against the flight of the satellites, the United States Government apparently considers that they have received the tacit consent of the other nations, particularly those of which are members of the International Committee of the Geophysical Year. As for Article 8 of the Chicago Convention, which forbids the unauthorized passage of pilotless aircraft "over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization", many contend that this treaty provision, even admitting it has been violated, has been fully complied with by the advance communication and non-protest over the launchings, concluding that the satellite program is legitimate under all criteria of international law.[21]

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[17] "Now the first and foremost restriction imposed by international law upon a state is that—failing the existence of a permissive rule to the contrary—it may not exercise its power in any form in the territory of another State." The S.S. Lotus (France v. Turkey), Permanent Court of Int'l. Justice, Sept. 7, 1927, Judgment 9, Ser. A, no. 10, p. 18. MANLEY HUDSON, WORLD COURT REPORT, Vol. 2 (1935) p. 35.

[18] Professor Fenwick, in an Editorial Comment, 52 A.J.I.L. 96 (1958).

[19] According to data furnished Dr. John Cooper by the Mullard Radio Astronomy in Cambridge, England, indications were that the minimum height of the original orbits of both Sputnik I and II was only about 125 miles above the earth's surface, and that the orbit time of both Sputniks decreased initially each day—indicating a decrease in the maximum height of the satellite flight daily. *See* Cooper, *Supra* note 2.

[20] Agreement of 21st of July, 1950, U.N. Treaty Series, Vol. 97, no. 1351. Agreement of 15th January, 1952. *id*, Vol. 127, no. 1697. *See* Pepin, E. *The Legal Status of the Airspace in the Light of Progressive Aviation and Astronautics*, 3 MCGILL L.J. 70, 77 (1956).

[21] This has been the contention especially of Mr. Andrew Haley, President of the American Rocket Society. He writes, ". . . the earth satellite will pass over numerous countries in a period of hours. These nations will be immediately aware of the actual launching. Knowledge of the impending launching will have been available for a considerable time prior to the launching. In view of this the nations could be expected to express their consent or non-consent in a timely manner. This they did by their enthusiastic endorsement of the satellite program or their significant silence with respect thereto. With express consent present, there is no need to look for implied consent in usage. . . ." Haley, The Present Day Developments in Space Law and the Beginnings of Metalaw (pamphlet), p. 8, reprinted from 8 CANADIAN OIL J. 15 (1957).

The legality of the present satellite launchings, in connection with peaceful and scientific purposes, will probably not be questioned. But the ominous question arises whether international conduct already, as some appear to feel, has begun to create new customary rules as to the extent to which tacit consent may be inferred.[22]

2) *The descent or fall of the satellites*

In the explanatory note of the United States announcement of July 29, 1955, it was stated: "The satellite itself will orbit around the earth for a period of days, gradually circling back into the upper atmosphere, where it will eventually disintegrate." It is quite possible, however, that some parts of a satellite may come back to the earth without being completely disintegrated, thereby causing damage on the earth to persons or to property. There has been no report so far of any parts of satellites falling, let us say, on the heads of persons or causing damage to buildings or property. Assuming, and we cannot discount the possibility, that such injury or damage is caused, what legal rules should be applied? Would the offended persons have any legal rights of action? Who would be responsible? Who can be sued? Where can the action be brought?

There is no sound reason why the generally accepted tort rules on damages should not be applicable, although there is difficulty as to the question of liability. An eminent authority (Professor Quincy Wright) asks, for example, is the risk so great that, if a satellite falls down anywhere and does any damage, the country responsible for its launching is bound to pay the damages, or should you say that there is no liability if due precautions were taken and there was no negligence? [23]

There is a generally recognized principle in international law that 'a State owes at all times a duty to protect other States against injurious acts by individuals from within its jurisdiction and must refrain from such acts itself'.[24] There is the concomitant rule that any person who creates a source of danger through the use of certain objects has a responsibility to the community to see to it that no one is endangered by such use. Thus, it would seem that nations intending to send up satellites should ensure that any components, such as burnt out stages of multi-stage rockets,[25] which have been detached in flight from the space vehicle, will reach the earth's surface or the high seas without causing damage or injury. In other words, the state must see to it that satellites launched from within its jurisdiction must not be injurious to foreign States or their na-

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[22] Haley goes on to show how the proposition respecting free flight for earth satellites, 'which has been established by the consent of these many nations', is not unlike several propositions that have long been recognized by international law, e.g., right of innocent passage through territorial waters. Haley, *ibid.* 8

This statement is of doubtful validity. As McDougal and Lipson point out, "an implied general consent to use of outer space for any and all purposes can scarcely be derived from express consent to uses connected with IGY. Indeed, such express consent might perhaps be reasonably interpreted as limiting such interference, at least beyond uses of the same type and under similar auspices as the IGY uses". McDougal and Lipson, *supra* note 10.

[23] Professor Wright himself suggests that the principle of *sic utere tuum* would probably be applied. *See* Quincy Wright, Remarks on International Air Law, in *Proceedings of the Amer. Soc. of Int. Law*, Wash., D.C., April 25-28, 1956, pp. 107-108.

[24] Trail Smelter Case (1938, 1941), 8 UNRIAA, p. 1905, at p. 1963.

[25] Each of the U.S. Vanguards, for example, throws into orbit the empty shell of its third stage rocket. *See* U.S. News and World Report, May 2, 1958, p. 56.

tionals. Any failure in this obligation would entail responsibility under international law.[26] It would seem, therefore, that the injured party has a remedy against the offending state. But how is the legal right to be enforced? The rule, at least in common law countries, that a foreign sovereign state cannot be impleaded against its will in national courts,[27] makes it essential that any claim by an individual against a government owned spacecraft or satellite would have to be taken up on the international level by his own state.[28]

3) *The problem of collisions in upper space*

With a number of unmanned earth satellites moving about in outer space at the same time, the possibility of collisions cannot be dismissed. The probability of a traffic jam in outer space has already begun to worry some American scientists.[29] A news report predicted that there will be at least a dozen and perhaps more than twenty U.S. satellites moving about in outer space by 1959.[30] This is not counting anything the Russians may launch into orbit. It is clear that certain rules will have to be drawn in regard to collisions that may take place in upper space. Perhaps there may even be particular orbits granted by an international body to each country intending to send up satellites, similar to 'airlanes' granted to civil aircraft. In fact, even before the satellite reaches the outer atmosphere, there is the possibility that there might be regulations required in order to avoid possible interference with flying civil aircraft.[31]

4) *The problem of identification*

Mention has already been made of the possibility of damage being caused not only in the ascent but also in the descent of the unmanned earth satellite. In order to identify the author of the damage, it seems necessary that some identification marks be required.[31a] Again, the possibility of licensing of unmanned earth satellites to be launched should be seriously considered. McDougal has suggested that each state about to launch a satellite could register its intent to do so with an international agency, filing a flight plan and a description of certain characteristics of the satellite, such as load, weight and size.[32] This suggestion should aid considerably in the location of national responsibility.

5) There is also the question of spying. Would a satellite flying through outer space fitted with a telescopic camera capable of photographing military installations on the surface of the territory be violating a right of the state beneath? Certainly, such a satellite

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[26] Bin Cheng, *Recent Developments in Air Law*, CURRENT LEGAL PROBLEMS 208,220 (1956).
[27] *See* The Parlement Belge, 5 P.D. 197 (1880), the S.S. Cristine, A.C. 485 (1938), Hosford, *Principles of International Law in Spaceflight*, 5 ST. LOUIS UNIV. L. J. 70, 72 (1958).
[28] McDougal and Lipson state that whether there is a place for public or private or mixed insurance schemes; whether an international fund might be set up to accommodate worthy claims and whether efforts should be made to reach international agreement on limits of liability are "questions that may abide further experience". McDougal and Lipson, *supra*, note 10, at p. 428.
[29] *See* "A Traffic Jam in Outer Space? Something New to Worry About", U.S. News and World Report, *supra*, note 24
[30] *Ibid.*
[31] Pepin, *supra* nate 20.
[31a] Pepin, *Legal Problems Created by Sputnik*, 4 MCGILL L.J. 66, 68. ( ).
[32] McDougal, *Artificial Satellites: A Modest Proposal*, 51 A.J.I.L. 74, 77 (1957).

would have tremendous use as a reconnaissance weapon.[33] According to a pioneer in rocket design, the next step in the Russian satellite program will be the sending up of a reconnaissance satellite.[34] It is difficult to see how anything can be done to prevent such "spying" if it is readily agreed that sovereignty extends only up to the limits of the earth's atmosphere.

THE PRESSING NEED FOR A SOLUTION

Man's ventures into outer space will continue to be one of constant activity. Since the first Sputnik was launched last October 4th, (less than a year ago) six more unmanned earth satellites have found their way into orbit.[35] Their number will certainly increase, and the United States has already attempted shooting for the moon. We cannot stay these excursions into outer space, any more than we can stay the setting of the sun.

Arthur Kuhn, in his enlightening *Pathways in International Law*,[36] emphasized that: "Whenever physical, chemical, or electrical science introduces new forces into the life of man, it may reasonably be conceived to be the task of jurisprudence to adjust and coordinate the legal relations both of states and of individuals under the new conditions." New conditions are definitely at hand; some of the legal problems that have arisen with the conquest of space have been mentioned.

Perhaps an international convention will be called, something like the Chicago Convention of 1944; perhaps we may be able to adopt existing jurisprudence to the problems posed by developments in spacecraft, or, perhaps, in the end, we may find it necessary to construct entirely new international laws for outer space. In the interim, space law awaits its development.[37]

The question—the main question—of sovereignty over the airspace and outer space will not be easy to resolve. Looking for a moment at the law of the sea (from which, incidentally, many writers have adopted analogies for application in outer space), we can easily see that though the problem of the extent of sovereignty over territorial waters has had centuries in which to be argued, tried and formulated, up to the present time nations cannot agree as to its precise limit. Is it any wonder, therefore, that there is no agreement among writers today as to the extent of a nation's sovereignty upwards? Air sovereignty, in the short space of its development, has gone through the process of being held to be unlimited, then reduced

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[33] The U.S. Air Force reported in January 1958 that it hoped to launch a military reconnaissance satellite with a recoverable capsule by the spring of next year. Some officials were reported as saying that such a satellite carrying a telescope 40 inches in diameter could detect objects on earth less than 2 feet in size from an altitude of 500 miles. *See* McDougal and Lipson, *supra* note 10 at footnote 5.

[34] *See* statement by Dr. Walter R. Dornberger in U.S. News and World Report, Nov. 15, 1957, p. 58.

[35] Russia has succeeded in putting three Sputniks into orbit above earth. The United States, in turn, has been responsible for putting four small satellites into space. N.Y. Times (Int. Ed.), July 27, 1958

[36] PATHWAYS IN INTERNATIONAL LAW 23 (1953).

[37] For an indication of some of the types of prospective controversies between nations over the use of outer space and the prescription and application of authority to uses of outer space, and the way these controversies are likely to be resolved, *see* the illuminating article by McDougal and Lipson, *supra* note 10

to varying stages or degrees of freedom of sovereignty, then being held to extend to infinity, until the present confused position. At once we have to note that in this instance, political and military, and not merely legal, considerations, together with the stage of technological developments, must all ultimately go to the resolution of the problem of the extent of sovereignty.

Even as we realize that general agreement over the exact extent of a nation's sovereignty upwards may take years to come, let us hope that some of the other legal problems may find easy solution. As such new rocket is fired, as each new satellite is launched, the already wide gap between technological advances and legal science widens. Something will have to be done. The law has already lagged dangerously behind, and the world can ill afford that it lose track of science altogether.

TEODORO D. REGALA *

ATOMIC ENERGY AND PHILIPPINE LAW

Government is not a machine, but a living thing. It falls, not under the theory of the universe, but under the organic life. It is accountable to Darwin, not to Newton.—WOODROW WILSON.

BACKGROUND DEVELOPMENTS: THE DAWN OF THE ATOMIC ERA

After years of scientific research and experimentation, the first controlled chain reaction was finally perfected in utmost wartime secrecy at the University of Chicago. Subsequently, on July 16, 1945, the first atomic bomb was successfully exploded in Alamogordo, New Mexico. Less than a month later, the same highly destructive weapon was unleashed on the Japanese cities of Hiroshima and Nagasaki. On August 13, 1945, Japan surrendered. This quick tempo of events marked the dawn of the Atomic Era—an "age beyond the fondest dreams of a struggling humanity."[1]

THE U.S.-P.I. ATOMIC AGREEMENT: A PHILIPPINE ATOMIC ENERGY PROGRAM EVOLVES

Two months after the horrors of Hiroshima and Nagasaki, President Truman demanded for the renunciation of the use and development of the atomic bomb. On December 8, 1953, President Eisenhower, in a great setting at the General Assembly of the United Nations, proposed an atoms-for-peace program and concluded that the world must finally disarm or suffer catastrophic consequences.[2]

The story of Philippine participation in the atoms-for-peace program goes back to July 27, 1955, when the U.S.-P.I. Atomic Agreement, whereby the two countries expressed the desire to cooperate

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* B.A. (University of Sydney); Notes and Comments Editor, Student Editorial Board, PHILIPPINE LAW JOURNAL, 1958-59.

[1] David Dietz, *Atomic Energy in the Coming Era*, Dodd, Mead & Co., N.Y., 1945, pp. 24 *et seq.*

[2] For more details on the U.N. effort towards atomic control, *see* Harrop Freeman and Stanely Yaker, *Disarmament and Atomic Control: Legal and Non-Legal Problems*, 45 CORNELL L.Q. 236 (1958).

with each other in the development of the peaceful uses of atomic energy, was signed in Washington. This was a concrete expression of the Eisenhower Plan. Shortly, thereafter, the first steps were taken to implement the accord. Filipino scientists were sent abroad on an observation tour of atomic research centers and to attend international atomic conferences. Meanwhile, the late President Magsaysay created an interdepartmental committee on atomic energy to handle all matters arising from the country's initial plunge into this new field.[3] A law was subsequently passed creating the Philippine Nuclear Energy Commission.[4] This commission was abolished by the Science Act of 1958, and in its place was established the Philippine Atomic Energy Commission, which is the country's top atomic body now.[5]

WHAT IS ATOMIC ENERGY?: ITS PEACEFUL APPLICATIONS

To better appreciate the tremendous potentialities of atomic energy, let us look at a few elementary facts about this newly-won force. Atomic energy is energy derived from the basic unit of matter.[6] In general, there are two ways to obtain the release of atomic energy. One is by the breaking down of the heaviest nuclei. This is scientifically termed nuclear fission. The other is by the synthesis of the very light nuclei into heavier ones. Atomic scientists refer to this as nuclear fusion.[7]

Nuclear fission is initiated, maintained, and controlled in what is technically known as an atomic reactor. It is here where the tremendous energy of the atom is converted into such forms as to make it capable of performing peaceful work, such as power to run machines, generate electricity, and other types of power.[8] As of date, nuclear fission can be sustained only by the use of fissionable materials, such as U-233, U-235, and PU-239, as atomic fuel. These substances are extracted from source materials, like uranium and thorium ores, by a series of complicated processes. One other fact that should be mentioned in this connection is that by-product materials, such as radioisotopes, are yielded during nuclear fission. These radioactive substances are capable of varied uses. Thus, we hear of the use of radioactive cobalt and gold for cancer treatment, radioactive phosphorus for leukemia treatment, and radioactive iodine for treatment of hyperthyroidism, angina pectoris and congested heart failure.[9]

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[3] Reyno Oloroso, "Peaceful Atoms for the Philippines," Panorama, March, 1956, p. 13; "The Heart of the Atom in Asia," The Sunday Times Magazine, Vol. XI, No. 33, April 1, 1956, p. 18; Antonio Escoda, "P.I. to Lead Asia 'Atoms for Peace Program'," Manila Daily Bulletin, 56th Annual Ed., Sec. III, April 9, 1956, p. 22. For the full text of the U.S.-P.I. Atomic Agreement, *see* Manila Daily Bulletin, Vol. 163, No. 25, July 29, 1955, pp. 4 & 5.

[4] Rep. Act No. 1815 (June 22, 1957). This law was never enforced.

[5] Rep. Act No. 2067 (June 13, 1958).

[6] Gessner Hawley and Sigmund Leifson, *Atomic Energy in War and Peace*, Reinhold Pub. Corp., N.Y., 1945, p. 32.

[7] ENCYCLOPEDIA BRITANICA, Encyclopedia Britanica, Inc., Chicago, 1953, Vol. 2, pp. 647 *et seq.*

[8] James Mouldon, *Alice in Nuclear Energy Land (Part II)*, 42 MASS. L.Q. 41, 45 (1958); Harold Green, *A Broad New Field: Atomic Energy and the Practicing Lawyer*, 43 A.B.A.J. 692, 694 (1957).

[9] James Lane, "Economic Technology of Nuclear Power," The Annals of the Academy of Political and Social Science, Philadelphia, 1953, Vol. 290, p. 35; Jesse Johnson, "Nuclear Fuel for the World Power Programme," Economics of Nuclear Power, Pergamon Press, N.Y., 1957, p. 127; J. P. Don Gail, Jr., "Operations Peace," The Philippines Herald Magazine, Aug. 20, 1955, p. 22; James Neuman and Byron Miller, *The Control of Atomic Energy*, McGraw-Hill Book Co., Inc., N.Y., 1948, p. 108; Charles Thomas, "Atomic Age," Free World, Vol. III, No. 6, Aug.-Sept., 1954, p. 10.

As for nuclear fussion, which is said to be the same process by which the energy of the sun is generated, very little is known, and even this is still held in secret.[10]

Gustave Lebon complained in 1895 that science has promised us truth, but it has never promised us either peace or happiness.[11] It seems that atomic energy has proven him wrong, for this physical phenomenon has literally a thousand and one peaceful uses. It is enough to state here that atomic energy can and is now being utilized in industry, agriculture, medicine, research, transportation, and practically in everyday living.[12] That is why Daniel Wit was compelled to state that atomic energy is likely to inaugurate a second Industrial Revolution.[13]

THE LEGAL PROBLEMS INVOLVED: WILL THEY EVER ARISE HERE?

The development of an atomic energy industry in the Philippines, resulting in the widespread use of high-level radiation sources, will create many unique and novel problems in law. This is a common experience attending the growth of any new industry. It is the object of this paper to discuss briefly the most salient of these problems. However, it must be borne in mind at the very outset that this discussion will be for the most part predictive and speculative. The legal problems that will be treated here may or may not arise, depending upon future developments in our atomic energy projects. At the present time, it can only be stated that there is much evidence to show that one or two decades from now, there will be in full operation in this country a large-scale atomic energy industry.[14]

The Problem of Control

The first problem that we encounter is an administrative one. What should be the nature of the governmental body that will control the peaceful use of atomic energy in the Philippines?

The following are a sample of the prospective powers, functions, and duties of this body: 1) to sponsor, promote, and coordinate research and development, both public and private, in the field of atomic energy; 2) to control the production, transfer, and use of fissionable materials, source materials, and by-product materials; 3) to control the manufacture, transfer, and use of atomic reactors and other atomic energy production and utilization facilities; 4) to control radiation hazards and protect the health and safety of the inhabitants; 5) to control atomic information consistent with the national security; 6) to issue rules and regulations for the conduct and exercise of its powers, functions, and duties; and 7) generally,

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[10] G. Gamow, *Atomic Energy in Cosmic and Human Life*, MacMillan, 1956, p. 37

[11] *Cited* by Neuman and Miller, *op. cit.*, p. 176.

[12] For more details on the peaceful uses of atomic energy, *see* Lawrence Hafstad, THE INDUSTRIAL APPLICATIONS OF ATOMIC ENERGY; Paul Aebersold, IMPORTANCE OF ISOTOPES IN TECHNOLOGY AND INDUSTRY, Geneva Conference, Ref. No. A Conf. 8/P/308 (pamphlets kindly lent by Prof. Ignacio Salcedo, Jr., of the Atomic Energy Commission).

[13] Daniel Wit, "Some International Aspects of Atomic Power Development," Law and Contemporary Problems, Vol. 21, 1956, p. 148.

[14] *See* Salvador Bigay, "Uranium Prospects in the Philippines," This Week, Vol. XI, No. 45, No. 4, 1956, p. 6; A. Escoda, "'MERALCO Seeks Atomic Power Plant," Manila Daily Bulletin, 56th Annual Ed., Sec. III, April 9, 1956, p. 25.

[15] *See* U.S. Atomic Energy Act of 1946 and U.S. Atomic Energy Act of 1954.

to administer.[15] It will thus be seen that this contemplated body will be performing both quasi-judicial and quasi-legislative functions. It will make policy decisions in many diverse fields.

In the solution of this problem of what is the most effective organization for our atomic energy program, some would propose that until much more is known about atomic energy, its control and development should be lodged with the Department of National Defense.[16] Because of the traditional supremacy of civil authority in our scheme of government, others would suggest an independent civilian commission. This technique of delegating authority to an independent regulatory agency, subject only to broad legislative standards, is familiar to students of constitutional and administrative law. It is generally utilized when the field of regulation requires special knowledge or expertise, or when flexibility is necessary or desirable.[17]

This administrative problem has been partly solved with the passage of the Science Act of 1958 creating the Atomic Energy Commission. It must be observed, however, that this body was not intended for a full-scale atomic energy industry such as this paper contemplates.[18]

The Issue of Ownership

Then, there is the problem of ownership. The operation of an atomic energy industry in the Philippines will pose the question of whether or not private persons should be allowed to own, and not merely possess, fissionable materials and atomic reactors.[19]

There are several reasons for government monopoly. The activities connected with the production and distribution of fissionable material are of too great import to national security. Fissionable material being the principal ingredient of the atomic bomb, it has a vast destructive potential. If the push of a button can destroy a city, no nation can afford to leave the button in private hands.[20] There is a close relation between the peaceful and military uses of atomic energy, and this relation makes government ownership imperative. There might be an emergency in which fissionable material may be needed for military use. It would thus be easier for the Government to recapture this material if the need for it should ever eventuate.[21] Government monopoly is more likely to assure the continuity of operations than private ownership. Maximum progress can be achieved under such a system.[22] Furthermore, the production and distribution of fissionable material is attended by serious hazards to public health and safety the control of which is clearly a

[15] Neuman and Miller, *op. cit.*, p. vii.

[17] Wayne Leys, "Human Values in the Atomic Age," The Annals of the Academy of Political and Social Science, Philadelphia, 1953, Vol. 290, p. 130; William Mitchell, "Some Administrative and Legal Problems Related to the Widespread Use of High-Level Radiation Sources," Economics of Nuclear Power, Pergamon Press, N.Y., 1957, p. 304.

[18] *See* Rep. Act No. 2067 (June 13, 1958). This commission has for its primary function the sponsorship, promotion, and coordination of research and development on nuclear science.

[19] The ownership of source materials does not seem to be open to question because of the provisions of Sec. 1, Art. XIII, of the Constitution.

[20] Dean Dunlavey, *Federal Licensing and Atomic Energy*, 46 CALIF. L.R. 69, 71 (1958); Neuman and Miller, *op. cit.*, p. 57.

[21] Everett Hollis, "The United States Atomic Energy Act of 1954: A Brief Survey," Economics of Nuclear Power, Pergamon Press, N.Y., 1957, p. 495; David Cavers, *Legislative Readjustments in Federal and State Regulatory Power Over Atomic Energy*, 46 CALIF L.R. 22, 24 (1958).

[22] Hawley and Leifson, *op. cit.*, p. 190.

governmental function. Property rights to fissionable material should therefore be entrusted to no entity less inclusive than the State.[23] On the other hand, there is the time-honored doctrine of private enterprise, according to which government monopoly is undemocratic. The atomic energy field should not be made an island of socialism in the midst of a free enterprise economy.[24] Ownership is not a necessary prerequisite to adequate regulation of atomic energy activities.[25] The benefits of atomic energy are the heritage of the people. They should be distributed as widely as possible.[26] Lastly, the success of the private contractor system in the United States militates against government ownership.[27]

The Patent Law

Under our present law, any invention of a new and useful machine, manufactured product or substance, or process, shall be patentable. The same thing is true with respect to any new, orginal, and ornamental design for an article of manufacture, and any new model of implements or tools or of any industrial product. Once the patent for the invention, design, or utility model is issued, the patentee shall have the exclusive right to make, use, and sell the thing patented.[28] Should these provisions of the Patent Law be made applicable to the sphere of atomic energy?

The exculsion from patent coverage or patent protection of inventions, designs, and utility models which have something to do with the production of fissionable material is justified by some people on the ground of national security. The invention, design, or utility model might touch upon matters which the Government considers classified, and since the very nature of the patent system requires the disclosure in detail of the thing to be patented, the publication of the application for the patent might be detrimental to national security.[29] Another reason is that the patent system might interfere with the devolpment of the atomic energy industry and strengthen monopolistic practices. The Government must have to come in order to check the growth of monopoly and encourage competition in this new field.[30] The other school of thought on the matter urges full and untrammelled application of the normal patent law. The patent system provides a stimulus to our scientific and industrial progress. The public benefits not only from the stimulation of inventive effort, but also from the public disclosure of the thing to be patented.[31] Indeed, to promote the progress of the useful arts is the interest and policy of every government.[32]

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[23] Neuman and Miller, *op. cit.*, p. 65.
[24] Robert Dahl, "Atomic Energy and the Democratic Process," The Annals of the Academy of Political and Social Science, Philadelphia, 1953, Vol. 290, p. 1.
[25] "Licensing and Commission Control of Atomic Enterprise," Workshop III, Workshops on Legal Problems of Atomic Energy, University of Michigan Law School, Ann Arbor, Michi., 1956, p. 86.
[26] Neuman and Miller, *op. cit.*, p. 66
[27] Hollis, *op. cit.*, p. 495.
[28] Secs. 7, 55, & 37, Rep. Act No. 65, as amended (Patent Law; June 20, 1947).
[29] Neuman and Miller, *op. cit.*, p. 145.
[30] Stefan Riesenfeld, *Patent Protection and Atomic Energy Legislation*, 46 CALIF. L.R. 64, 65 (1958); "Patent Problems in Atomic Energy," Workshop V, Workshops on Legal Problems of Atomic Energy, University of Michigan Law School, Ann Arbor, Mich., 1956, p. 82.
[31] Grant v. Raymond, 6 Pet. 218, 241 (U.S. 1832).
[32] *See* Sec. 4, Art. XIV, of the Constitution.

The Liability Dilemma

There has been much speculation about the liability rules that will apply in this field. The liability problem has become a thorny but interesting one. Our present law on quasi-delicts is generally founded on negligence. Except for a few minor instances, if ever a person is held liable to another for damages, it is because he failed to exercise that degree of diligence required by circumstances of person, time, and place.[33] In the light of certain facts peculiar to the atomic energy industry, it is not amiss to raise the question of the extension and application of this negligence principle to this unique and novel enterprise.

The development of an atomic energy industry in the Philippines will present exceptional and ultra-hazardous risks. We have already seen that an atomic reactor is the basic equipment of an atomic energy idustry. Hence, the danger of an atomic explosive will ever be present. An accidental leakage or discharge of radioactive particles resulting in widespread contamination of the surrounding area and consequently danger of grave harm to human life, will be highly possible.[34] The breakdown of the atomic reactors in Texas, U.S.A.,[35] Windscale, England,[36] and Canada,[37] causing damage to person and property, has proven that even utmost human care cannot totally discard or prevent a reactor catastrophe. Not being negligent, the reactor operator or owner can go scotfree.

It is for this reason that some have proposed the application of the doctrine of strict liability, or liability without fault, of the common law. The English courts have held a person liable for damages resulting from an unnatural use of his land.[38] The American courts have enunciated the principle that one who is engaged in an undertaking which contains within itself hazards of great magnitude is liable for a result harmful to others although unexpected and not preventable by the exercise of even extreme care.[39] The reactor situation seems to fall squarely within both the English and American rules.

But one view is of the belief that to impose liability upon a person who has measured up to the standard of a prodent man is to penalize activity.[40] The application of the doctrine of strict liability will stifle the growth of atomic energy activities.[41] Opposed to this thinking are those who argue that we are dealing with a tremendous force of which we have much to learn. A rule of strict liability will give to victims of an incident the protection to which they are entitled against risks so great that only national necessity can justify

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[33] Benedicto Balderrama, *The Philippine Law on Torts and Damages*, Philaw Publishing Co., Manila, Phil., 1952, pp. 239 *et seq.*; *see* CIVIL CODE OF THE PHILIPPINES Arts. 1173, 2176, 2183, 2187, 2189.

[34] James Mouldon, *Alice in Nuclear Energy Land (Part I)*, 42 MASS. L.R. 12, 15 (1957); Dunlavey, *op. cit.*, p. 69. DeRoy Thomas, *Can We Insure Against Liability from Nuclear Incidents*, 46 CALIF. L.R. 14, 15 (1958); Cavers, *op. cit.*, p. 22; Warren Seavey, *Torts and Atoms*, 46 CALIF. L.R. 5, 7 (1958).

[35] Atomic Tragedy in Texas," Look, Sept. 3, 1957; digested in Reader's Digest, Oct., 1957.

[36] James Mouldon, *Alice in Nuclear Energy Land (Part I)*, 42 MASS. L.R. 12, 18 (1957).

[37] Mitchell, *op. cit.*, p. 392.

[38] Rylands v. Fletcher, L.R. 3 H.L. 330 (1868)

[39] MacPherson v. Buick Motor Car Co., 217 N.Y. 382, 111 N.E. 1050 (1916).

[40] Seavey, *op. cit.*, p. 7.

[41] "Liability for Radiation Injuries," Workshop II, Workshops on Legal Problems of Atomic Energy, University of Michigan Law School, Ann Arbor, Mich., 1956, p. 41.

[42] Seavey, *op. cit.*, p. 9.

them.[42] Moreover, strict liability should attach in order to stimulate standards of conduct needed to protect the public.[43]

Other Problems

What kind of atomic information should be considered restricted? Some are of the opinion that classification should be the rule so that national security will not be endangered.[44] Others think that classified information cannot co-exist with the peaceful use of atomic energy because information control impairs the freedom of the scientist to publish, communicate, and exchange his ideas with other scientists, and his classic freedom of scientific research.[45]

The Civil Code of the Philippines provides that actions upon an injury to the rights of the plaintiff and upon a quasi-delict must be instituted within four years from the time the cause of action arises.[46] Since it is a scientific fact that injuries which result from radioactive substances may not be discovered for ten, fifteen, or even twenty years after the impact, it may happen that by the time the victim becomes aware of the symptoms, the period allowed for bringing the action shall have expired.[47] The question may be asked: When should the cause of action be deemed to have arisen in this case?

In the field of insurance, the problem is complicated by the magnitude of the loss, the lack of the type of actuarial data needed to appraise the probabilities involved, and the imperfectly known hazards that attend the atomic energy industry.[48] In view of the uncertainty of the hazards involved, and the large-scale destruction which might result from one accident, what method of insurance is considered best, government or private?

CONCLUSION: WISE LEGISLATION IS THE ANSWER

Many other legal headaches lie ahead. They involve not only questions of policy and security, but also the essential freedoms of man. There is one other fact that should not be overlooked. The countless peaceful applications of atomic energy assure that it will have a direct and powerful impact not only on our way of life but also on the structure of society itself. Thus, the whole situation calls for wise legislation. The advice of experts is a requisite to the best solution of the problems.

It is said that law being a growing science, it must necessarily follow its destined pattern of meeting the demands of the ever growing and increasing problems of civilized society.[49] Let us close this

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[42] Mitchell, *op. cit.*, p. 397.

[44] John Palfrey, "The Problem of Secrecy," The Annals of the Academy of Political and Social Science, Philadelphia, 1953, Vol. 290, p. 99; Harold Green, "Information Control and Atomic Power Development," Law and Contemporary Problems, Vol. 21, 1956, p. 91.

[45] "International Legal Problems," Workshop IV, Workshops on the Legal Problems of Atomic Energy, University of Michigan Law School, Ann Arbor, Mich., 1956, p. 63; Leys, *op. cit.*, p. 130.

[46] Art. 1146.

[47] Bruce Breene, "Workmen's Compensation Aspects of the Peaceful Uses of Atomic Energy," Economics of Nuclear Power, Pergamon Press, N.Y., 1957, p. 379; Seavey, *op. cit.*, p. 12; Thomas, *op. cit.*, p. 16.

[48] Mitchell, *op. cit.*, p. 400; George Manov, "Administrative Problems in the Industrial Utilization of Atomic Energy," Economics of Nuclear Power, Pergamon Press, N.Y., 1957, p. 373; Francisco Ortigas, Jr., *Insurance Problems: The Effect of the Atomic Age*, 43 A.B.A.J. 822, 826 (1957).

[49] Balderrama, *op. cit.*, pp. 1 & 2.

discussion with a quotation from Thomas Jefferson: "I am not an advocate for frequent changes in laws and institutions. But laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, laws and institutions must advance also to keep pace with the time. We might as well require a man to wear still the coat which fitted him when a boy as civilized society to remain ever under the regime of their barbarous ancestors."[50]

LORENZO G. TIMBOL *

[50] *Cited* in Neuman and Miller, *op. cit.* (back of title-page)
* Recent Decisions Editor, Student Editorial Board, PHILIPPINE LAW JOURNAL, 1958-1959.

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