

August 2015

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Recommended Citation

Goldie, L.F. E. (1972) "Science, Policy and the Developing Frontiers of International Law," *Akron Law Review*: Vol. 4 : Iss. 1 , Article 5.

Available at: <http://ideaexchange.uakron.edu/akronlawreview/vol4/iss1/5>

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SCIENCE, POLICY AND THE DEVELOPING FRONTIERS OF INTERNATIONAL LAW†

by *L. F. E. Goldie**

I: Introduction

SCIENCE HAS ALWAYS BEEN a most important, if not the most important, agent of legal change. The hydraulic engineering achievements of ancient Egypt and China not only determined the laws of land ownership, use and planning, but also the administrative and constitutional structure of society. Where would the law of the sea be without the development of ships and the science of navigation? In a lighter view too we can imagine chariots creating traffic problems (and laws) on the Appian Way, or in the main streets of Athens and Pompeii—for it created problems for pedestrians both in peace and war.

But more than ever today the artifacts of the applied natural sciences, and the concepts of social science, have a heavy and continuing impact on much that we do and think. A range of the points in one's daily life where the sciences have a significant impact would include almost everything we do that has legal significance. One example we see in our daily lives is provided by the modern day highway systems. These span this Nation, and make possible that safe, comfortable and speedy movement of traffic in and out of its cities, between the areas of business, and around population centers which we are coming more and more to take for granted. To speed the driver so effectively and safely over the distances he travels on this country's freeways, turn-pikes, and urban by-passes there is a daily and hourly reliance upon a wealth of sophisticated knowledge of highway engineering, urban development, traffic control and human behavior.

Aside from the impact of multifarious modifications recent developments in science and engineering upon municipal law as agents of legal change, a comprehensive discussion of the whole

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impact of technological developments on international law would require a full course, not this paper, for its adequate discussion.

For example, in little over half a century the application of science to warfare has rendered many of the most important of the Hague Rules of Warfare obsolete. Similarly an extended discussion would, presumably, include a review of the influence of the aviation sciences and air navigation upon the international air agreements and practices which regulate our present-day globe-encircling civil aviation, an analysis of the impact of marine biology and ecology, meteorology, ocean physics, radar, sonar, and a host of other special sciences on ocean fisheries (with the result that many species in the once-inexhaustible oceans are now threatened with extinction) and the consequential obsolescence of the present-day international law of fisheries, and, to take as a final and most important example, the necessity of present-day scientific uses and discoveries in almost every field of endeavor for the every-day working of the United Nations and its specialized agencies. Brief and impressionistic as these examples may be, they graphically illustrate this elementary preliminary point that the sciences are all-pervasive in international law (as in many other legal disciplines) and have a direct condition, if not determinative, effect both upon existing rules and upon the progressive development of new rules.

II: The Deceptions of Legal Fictions—Some Examples

Instead of seeking to cover my subject by resort to generalities that would rapidly become trivialities, or, alternatively, expansively try to cover the subject in exhaustive detail, I shall discuss the problem of relating social (including technological) change with legal change. I shall also indicate, for purposes of example only, four modern groups of human activity, only recently made possible by the application of science to ambition, and point up their capability of either rendering legal change inevitable or inducing chaos. I shall also suggest certain shortcomings of one time-honored and favorite lawyers' method of dealing with new phenomena and of bringing them within the scope of legal regulation, namely the method of "cutting the problem down to size" by seeking the nearest existing and law-tamed analogy to it and then applying the rules governing that analogy to the problem. I shall, further, suggest that such a method verges upon one of the most dangerous professional pastimes known to lawyers—the manufacture of legal fictions ("legal

fictioneering"). The four topics I have selected and intend to discuss are: (1) *Weather Modification*; (2) *Space Activities and Nuclear Liability*; (3) *Man's Invasion of "Inner Space"* (i.e., the the volume and bed of the deep oceans); and (4) *Nuclear Weapons*.

(1) *International Weather Modification*

The technique relevant to this discussion is colloquially known as "cloud-seeding." A man in an aeroplane "seeds" a small cloud with iodized salts of one kind or another. The purpose is to cause the cloud to "grow" and to precipitate moisture in at least approximately the area for which rain is desired.

Legal problems arise when, for example, a cloud seeded by country A causes through errors in judgment, excessive rains in country B, causing floods, or when it draws off rains expected in country C, causing drought and famine. Can country B assert that A's cloud escaped and injured it? Or can country C claim compensation for A's "larcenous" taking of *its* cloud and rain?

International lawyers' methods of discussing these problems have generally been patterned on those of municipal law lawyers and have, in general, been so imaginative as to verge on the fabulous. Just like the common lawyers pioneering oil and gas law during the last century and establishing criteria for determining property rights in the oil and gas in a field under a considerable number of parcels of real estate (i.e., farms, houses, suburban lots, etc.), one group has sought to liken the clouds to "wild animals."¹ These are seen as only becoming the subject of property rights and duties when "tamed." That is, as in the early days of oil and gas law, the so-called "Law of Capture" tells us how to apply rules to cloud-seeding in a complex civilization in just the sort of terms that, in the early days of the West, rules developed to govern the human uses of broncos and buffalo. The Law of Capture, and the proprietorship rights seen to be flowing therefrom, is surely used fictitiously in both contexts of oil and gas and "cloud seeding." Is there any need for those who formulated and applied the Law of Capture in terms of both oil and gas and clouds to be conscious that they were developing legal fictions in this regard for them to be such?

¹ The acquisition of property rights thru capture of wild animals is a familiar concept to every beginning law student. See, *Pierson v. Post*, 3 Caines 175, 2 Am. Dec. 264 (Sup. Ct. N.Y. 1805).

(2) *Space Activities*

As with early discussions of air law, a number of the early writers on the application of legal rules to govern space activities were governed by territorial concepts and analogies.² Of these the commonest were analogies with the territorial sea and the relevance, or otherwise, of the doctrine of *occupatio terrae nullius* (occupation) to the acquisition of jurisdiction over lunar, planetary, and stellar bodies. These writers proceeded blithely with the earth-bound analogies—parochially assuming their general relevance.

The absurdity of the territorial sea analogy is easily illustrated by pointing out that because the earth rotates upon its axis, revolves around the sun and, with the solar system, moves through space, the zone of a state's superjacent analogy to the territorial sea would be always changing, and changing at an enormous rate of speed. Even if an attempt were made to limit such a superjacent zone to an area so close to the earth that those conditions of change would not be felt to prevail, one insurmountable difficulty remains. In order to assure each subjacent state a constant zone beyond the portion of the belt of terrestrial air above its surface territory, a terrestrially-oriented navigation would still have to be used for the determination of a space vehicle's position. Would this be feasible? Nobody knows. Yet the burden of establishing that feasibility is upon those who uphold the practicability of establishing extra-terrestrial zones under the jurisdiction of the subjacent states on the analogy of the territorial sea.

Similarly, to assert the relevance of the doctrine of occupation to states' rights in extra-terrestrial bodies assumes many facts regarding the physical and social capability of exercising authority and control over land domains and their inhabitants which simply may not exist when the only inhabitants capable of being the human subjects of human laws (in contradistinction to being the non-human objects of such laws) are members of state expeditions, formed either as a result of the joint efforts of several states, or by one state. Could a Russian law be validly made to apply to a Franco-German expedition on the moon any more feasibly than, say, an Australian law be enforced against a Russian encampment in the Antarctic Continent?

² See the excellent analysis of the Roman view on the ownership of the air space and above by Dr. John Cobb Cooper, *Roman Law and the Maxim Cujus Ejus Solum in International Air Law*, Institute of International Air Law, McGill University, Publication No. 1, 1952.

Surely for a considerable time to come the basis of authority in human affairs beyond the outer envelope of terrestrial air will be the cohesion and discipline of each crew or each expedition—and the jurisdiction which may feasibly be made to apply will be personal, and not territorial?

(3) *The Volume and Bed of the Oceans*

Traditionally international law distinguished between two categories of seas: those under the sovereignty of the coastal state by reason of a number of labels—territorial waters, internal waters, historic waters; and those beyond the sovereignty of any state—the “free high seas” being viewed as *res extra commercium* whether as *res nullius* or as *res omnium communis*. In recent years some novel doctrines have been developed for the affirmance of coastal states’ claims to extend their exclusive authority further and further out from their coasts and into the maritime areas which formerly were characterized as “free high seas.” Although these many doctrines pay lip service to the freedom of the seas, like the older formulations of territorial and internal waters, they fall within the general category of exclusive rather than shared claims to use a resource or to exercise a jurisdiction. These variations on the older theme of exclusivity include: contiguous zones, zones of specialized jurisdiction, the continental shelf doctrine, and conservation zones. All these resemble the older concept of territorial and internal waters in that the rights they justify arise from the unilateral action of the coastal state and remain exclusively subject to that state’s authority. Although guided by the ideal of “progressive development” as well as faithful to the task of codification, the Geneva Conventions on the Law of the Sea, and their attendant Resolutions and Protocol, did little more than cast the traditional pattern of the international law of the sea into an authoritative form, consecrate several emerging doctrines (for example that of the continental shelf) as existing law, and introduce some reforms. The Conference did not, however, effectively temper the basic pattern of the regime of the world’s oceans.

The general customary regime has been modified, with respect to a number of resources, and especially various species of fashionable edible fish, by treaty regimes (some bilateral, others multilateral) establishing regional fishery authorities which conduct research and exercise independent regulatory powers over

access to the fishery in terms of conservation and exploitation claims.

But even when due account is made of these treaty regimes, the traditional, conceptualistic, approach still holds sway over the general study and application of the discipline called the international law of the sea. This is true, not only of those areas where regimes have failed to replace the traditional order, but even in the negotiations for and interpretation of the treaty regimes. Invocation of the traditional concepts only too often provides the rhetoric for asserting claims and pressing advantages within the treaty context.

As world population increases, so mankind is looking more and more to the sea to supply natural resources of all kinds as these diminish on land in the face of an ever-increasing demand. The oceans offer us a great variety and multitude of mineral and organic resources; some have only come within the scope of our understanding and use in recent years, and in some cases merely months; others have long been available. The traditional and still-existing rules which govern the international law of the sea have become completely inadequate to give a secure basis for winning these resources. The economics of these activities call for a stupendous allocation of capital, skill and imagination. But the law as it stands at present places the fruits of enterprise in jeopardy. It provides no adequate security of title once a coastal state's zones of jurisdiction have been left behind, thereby rendering investment in activities in the deep oceans unnecessarily risky and unattractive to lenders or entrepreneurs. Hence there is a pressing need to develop legal concepts and doctrines to secure transactions, equitably allocate the benefits derived from placing the oceans' resources at the disposal of mankind, and ensure that inconsistent uses of the high seas do not lead to conflicts not amenable to juridical formulation and resolution.

Edible fish constitute perhaps the oldest, and certainly the most valuable, of these resources. But, from the most far-off times to the present, mankind has had only one approach, the most primitive, to the winning of this resource, that of the "hunter and collector"—again the "Laws of Capture" provides the primitive justification. This is equally true of the Australian aboriginal wading in a mangrove creek at low tide and a modern radar-equipped, ocean-scouring trawler. Today we stand on the brink of great changes. Mankind must, to survive, change his

habit from the hunter of fish to the herdsman and shepherd of some species and the farmer of others, thereby changing fundamentally his ecological, social, economic and legal relations to the sea. The effect on international law of such a revolution calls, as a preliminary step, for the complete overthrow of the Grotian notion that the fish resources of the sea are inexhaustible and that all may freely fish without causing detriment to others. To move away from the traditional dichotomy, and the traditional analogies, and to develop the legal concepts suitable for this very different use, and for the transformation from the existing situation to a regime which, at one and the same time, maximizes the utilities of ocean exploration and exploitation, establishes functional standards for the equitable allocation of the benefits derived from those activities, is a momentous and pressing challenge to international lawyers. A fundamental task is, accordingly, to point up the need for legal change, outline the legal concepts which social and economic developments will demand of the lawyer, and foreshadow the terms of the transition from the existing doctrines and institutions under which the high seas and their contents constitute a common property natural resource with access open to all, to a regime which facilitates the maximization both of the resources' availability for consumption, and of the economic return they provide to producers.³

(4) *Nuclear Weapons*

The morality of the Allied bombardment of Hiroshima and Nagasaki with the atomic "Thin Man" and "Fat Man" bombs was originally justified, and has been traditionally defended since, on the ground that these atomic bombs merely provided a more efficient and economic bombing raid effect—"a bigger bang for a buck." The analogy here was with high explosive and incendiary bombs—a familiar and accepted terror of civilian populations in World War II.

Here again the use of the familiar, as an analogy, is misleading. To equate atomic and hydrogen bombs to fire plus high explosive bombs is simply false. Radioactive fallout and radiation sickness, as well as the bombs' known genetic effects, makes even analogies with traditional poisonous gases a misleading, if comforting use of analogies in order to clothe the horrors of the future with the ill-fitting dress of the familiar present.

³ See, Pardo, *Who Will Control the Sea Bed*, 47 *Foreign Affairs* 123-137 (1968).

Nuclear weapons are neither war explosives nor war gases. They are *sui generis*, as are the continental shelf, mining claims in the deep oceans, the uses of outer space, weather modification, and the multitude of new human activities and powers which modern science has made possible.

III: Some Concluding Thoughts

To fashion extensions of familiar concepts of the traditional rules, principles, and institutions of the law to control the challenges of increasingly unfamiliar sectors of the environment by resort to "as if" propositions, is to engage in legal fictions. (On the other hand the process of change of the purposes, scope, and rationale of a legal institution or rule, for example the British Monarchy, the American Presidency, the Rule Against Perpetuities, Real Property Easements, does not necessarily exemplify the inevitability of legal fictions.) Thus, perhaps I should emphasize that the concept of legal fictions used here is completely distinguishable from that bearing the authority of Professor Lon Fuller of Harvard. In Professor Fuller's theory an essential ingredient is the conscious knowledge on the part of those who operate the fiction that the concept is a fiction or is being used fictitiously, *i.e.*, that the operative facts are not congruent with empirical reality. Such a rationalistic approach is rather surprising, since it gives little recognition to the authority and significance of subconscious drives, irrational evaluations and imperfect information. (See Fuller, *Legal Fictions* (pts 1-3) 25 *ILL. L. REV.* 363, 513, 865 (1930-1931).) Nor is Professor Fuller's general condonation, and even approbation, of resort to legal fictioneering supported here. Rather than having resort to the misleading and frequently absurd legal analogies briefly indicated in the preceding paragraphs, the legal profession should not deem it beyond the wit of man to devise fitting, if new, and *sui generis*, legal concepts appropriate for the new and *sui generis* situations they are called upon to regulate and reduce the manageable proportions.

What is needed today is not the continued stretching of analogies, so that at least the appearance, but not the fact, is given of still using time-tested concepts of continued vitality. Rather there is a call for the formulation of new bodies of rules, and new ideas to underpin those rules. My own proposals for a treaty regime governing claims over mineral resources beyond continental shelf regions provide one type of example. Examples of the type of thinking and formulation already embodied in

existing treaties may be found in such instruments as the Treaty on the Peaceful Uses of Outer Space (18 U.S.T. 2410, T.I.A.S. 6347), the Antarctica Treaty (12 U.S.T. 794, T.I.A.S. 4780), the European Convention on Human Rights (213 U.N.T.S. 221), and the Treaty on Non-Proliferation of Nuclear Weapons (--- U.S.T.C. ---, T.I.A.S. 6839). In brief then, Man should establish his control of the changing material of his destiny by the direct and express formulation of the international equivalent of legislation, by treaty, and reject the arcane and deceptive construct of fictions.