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SETI and International Space Law

by

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Abstract

International law is a body of rules originally intended to regulate the relationship between states. In the last century it has also allowed the creation of international agencies through which matters of international concern can be agreed and regulated. International Space Law is an amalgam of many of such matters and already contains principles applicable to SETI. There is room both to develop these more explicitly for SETI use, and also to create new norms to apply either directly or incidentally to the Search. Particular development is needed in the realm of radio frequencies, and in the setting aside (preferably on the Moon) of an interference-free location for SETI activities. Progress has been achieved in the matter of obtaining agreement as to procedures to be followed in the event of the detection of ETI and as to the question of any reply message. These could be given fuller legal standing.

The paper is divided into five sections: A. Introductory Matters, B. Space Law and SETI, C. Radio Frequencies, D. A Moon Site?, and E. The Detection and Reply Declarations. In general citations are given fully for ease of use by non-lawyers.

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A. Introductory Matters

SETI

The question of Extra-Terrestrial Intelligence is one which has occupied many minds for many centuries,[1] but it is only within the last half-century that significant progress has been made in actually 'searching' as the development of radio-astronomy has made it possible to seek to 'hear' evidence of ETI.[2] There is now a real body of interest in SETI, both as a technical scientific topic and as a question of relevance within the social sciences. These elements of SETI occupy two sessions at the annual meetings of the International Astronautical Federation, some of the papers given at previous conferences of the IAF appearing in special issues of *Acta Astronautica*.[3] And, of course, the lawyers have appeared on the scene.[4] In previous papers on SETI I have tended to treat separately the law that is and the further law that is needed.[5] This time I take the two together. But first a word about International Law and its sources.

International Law

International Law is the body of rules originally developed to regulate the relationship between states. In the last century or so it has also developed international agencies and institutions including various legal fora in which legal disputes can be settled. The sources of International Law are commonly said to be those listed in art. 38.1 of the Statute of the International Court of Justice. In making decisions, the court is directed to apply International Law stated to be found in treaties, in international custom, in the general principles of law recognised by civilised nations, and as subsidiary sources, judicial decisions and the writings of the most highly qualified legal experts.

Some would now add to that list Resolutions of the General Assembly of the United Nations, their weight in any given instance being related to the degree of acceptance of individual resolutions.

International Law is not the same as scientific law. Both indicate the results of action, but scientific law is certain in its outcome. If it is not, there is no law. It is, however, possible that the kind of law I work with will be broken, without consequence for the offender. It is also possible in International Law for there to be law applicable to some, but not to others. Thus only the parties to a treaty are bound by it. Whether others (non-parties) are bound by its concepts if the treaty is very widely accepted is a matter of continuous discussion in principle and in individual cases. Indeed, whether the Outer Space Treaty is law for everyone is a common exam question in law schools. But I go too fast. The Outer Space Treaty is part of International Space Law.

International Space Law

International Space Law has the same sources as other sections of International Law. As far as treaty law is concerned, the basic international instruments directly relative to Space are the five Treaties which have come into being through the United Nations mechanisms.[6] These have differing degrees of acceptance. Other treaty law has also space application. Of major relevance to much of the effort currently being put into the Search is the work of the International Telecommunication Union.

As far as customary international law is concerned, ordinary principles of law apply in space as elsewhere, such as the duty not to damage other states. Of more interest is, perhaps, the question alluded to above - whether the principles found in the Space Treaties or the various Principles adopted by the General Assembly of the United Nations may be part of customary international law, and binding on that ground. Customary international law requires state practice, and that the practice is complied with by a state in the belief that it is binding on the state.[7]

If International Law applies to state activities in and concerning space, general principles of law obviously apply in space. There are few judicial decisions as yet (none relevant to SETI), and there is an increasing body of writing on space law. Whether the International Court of Justice would consider what has so far been written as being helpful, or authoritative, is moot (in the U.K., not the U.S., sense of that word).

International and National Law

Another matter has to be stated before we turn to substantive law. International Law relevant to SETI mostly imposes duties on states, and has to be implemented through the ordinary legislative, administrative and judicial processes of those states. Without that implementation, what is claimed to be International Law is merely good intentions, exhortation, a climate of expectation as to conduct and similar things. It is not Law. Law requires to be obeyed, and to be enforced if it is not obeyed. That depends on state action.

A Warning

Last in this section, I must issue a warning. In some discussions of International Law one can detect tendency to overstate positions. There is a difference between *lex ferenda*, and *lex lata* - the law we would wish to see in being, but which is not yet, and the actual law that is in existence at present. It is tempting to state as a 'principle of law' what we think the law ought to be, not what it actually is. Often there is no law in its normal signification - no enforceable set of norms that governs the questions that vex us.[8] 'Rights' are claimed, which are in fact merely aspirations being sheltered under a fig-leaf of apparent legal language. 'Obligations' which may have moral force are sought to be strengthened by their being affirmed to have a legal basis. We need to be careful in the language of our discourse.

B. Space Law and SETI

Is SETI an activity lawful under International Law? The answer is an unequivocal 'yes'. It is a principal pillar of International Law that what is not prohibited is permitted.[9] Although there are some national systems which appear to base themselves otherwise, for example with lists of citizens' rights, for our purposes SETI activity is not inimical to the general welfare and therefore can be engaged in.[10] But has SETI a special standing within Space Law?

It has to be said at the outset that the Search for Extra-Terrestrial Intelligence was not one of the main motivators of thought when Space Law was emerging as a category. Nonetheless, there are principles within Space Law which can be applied to SETI. There is also room both to

develop those principles more explicitly for SETI use, and also to create new norms to apply either directly or incidentally to the Search.

As far as the five Space Treaties are concerned, their provisions have limited relevance for SETI. There is the duty to carry out space exploration in the general benefit and interest of all countries contained in art. I of the Outer Space Treaty.[11] More important for SETI is the requirement of cooperation, mutual assistance and regard for the interests of others of art. IX. Putting these two together there is a legal argument that SETI should be aided and protected, perhaps, more than it is at present, particularly in the matter of radio-frequencies, to which we will come below.

There would also be the relevance of the 1975 Convention on Registration of Object Launched into Space were a SETI search to be conducted from a space-craft. And there are the indications of action to be taken to avoid a variety of dangers - as in art. V and IX of the Outer Space Treaty, and art. 5.3 of the Moon Treaty of 1979.[12]

But that brief recital shows that the Space Treaties, are not directed towards SETI matters. The fact is that SETI was not in the minds of those drafting, signing or ratifying these agreements. The only clear reference to life in outer space is in art. 5.3 of the Moon Treaty, and that is to require that the Secretary General of the United Nations be informed of the discovery of any indication of organic life in outer space - a far remove from Extra-Terrestrial Intelligence.

That requirement to inform is only one of several statements of such duties. Under art. XI of the Outer Space Treaty 1967 there is a duty imposed 'in order to promote international cooperation in the peaceful exploration of outer space' that states shall inform the public, the scientific community and the Secretary General of the United Nations of the nature, conduct, location of activities and of any results. This duty is, however, qualified. The obligation is to inform 'to the greatest extent feasible and practicable', a phrase which any lawyer worth his salt can use to justify almost any secrecy.

C. Radio Frequencies

The bulk of SETI activity most likely to produce results is the 'listening to the stars' in the hope of picking up artificial radio signals. Such would be indicative of extra-terrestrial intelligence.[13]

The major body of international law therefore relevant to most day-to-day SETI activity is that relating to the allocation and use of the radio spectrum, secured through the mechanisms of the International Telecommunication Union (the ITU). The ITU revised its structures in 1992 (effective 1994), separating its work into three new Sectors, the Development Sector, the Standardisation Sector and the Radiocommunication Sector.[14] This last is of most importance for us. Through it much of the international agreement is arrived at, and it is responsible for running the system of registration of assignments of radio frequencies by national authorities, with the effect that a properly registered assignment has some legal claim to protection over a later assignment notified to the ITU.

The Radio Regulations form part of the ITU basic documents and have the status of an international treaty.[15] Under the Table of Frequency Allocations contained in the Regulations,[16] the radio spectrum is divided and bands within it allocated to named services on a world-wide or regional basis. These allocations may be primary, primary but shared with another services, or secondary, in descending order of protection. In addition a footnote may provide for another use by a state, or limit a freedom to allocate. The assignment of a frequency is a matter for the state having jurisdiction over the transmitting station. An assignment (or under certain circumstances a proposed assignment) is notified to the ITU Radiocommunication Sector. The Sector circulates the notification to other states and itself checks that the assignment is a) in conformity with the Radio Regulations' Table of Allocations, and b) does not conflict or cause interference to another assignment already notified. Where there is a possible interference steps are taken to settle the matter by agreement. The Radio Regulations provide that assignments in many bands shall first be coordinated with other states whose stations might be interfered with. Technically, priority of notification will normally secure protection from interference by a later assignment, although in the last analysis a state may persist with an unlawful assignment.

Apart from such procedural safeguards, there are also duties to use minimum necessary output, and to fine-tune equipment and make speedy use of the latest technical advances so as to minimise causing interference to other users.[17] For non-space matters the procedures work - thanks to the laws of physics - and real disputes have been few.[18] In general also, space systems have been satisfactorily dealt with by these procedures.[19]

Matters are different for SETI and other passive uses of the radio spectrum. Although there is special provision in arts. 6.6 and 36 of the Radio Regulations for Radio Astronomy, that Service is not absolutely protected. It is sheltered, mostly by recommendation and suggestion to Administrations, but has limited areas of protection, which, I understand, do not always squarely fit the appropriate radio frequencies. It is therefore not surprising that SETI gets a bare mention and no special protection within the Radio Regulations.[20] As Professor Kopal has noted,[21] footnote 722 to RR8-94 states: 'In the bands 1 400 - 1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extra-terrestrial origin.' In fact bands 1 400 - 1 427 MHz are set aside for passive activity in Earth Exploration-Satellite, Radio Astronomy and Space Research, and footnote 721 to RR8-94 prohibits all emissions in those bands.[22] However, the other bands noted in footnote 722 as being of interest to SETI are otherwise allocated to fixed and mobile services, to space operations, maritime and aeronautical mobile satellite, meteorological satellite, and to radiolocation services.

The problem of interference continues to worsen for SETI. More and more terrestrial sources can cause emissions which affect SETI instruments. Although there are the duties already mentioned that states shall ensure that harmful interference is minimised and requiring the best use of available technology,[23] I would ask whether enough has been done to eliminate spurious and unnecessary radio emissions.[24] Further, more and more use is being made of space transmissions, particularly for telecommunication purposes. I am open to being corrected, but it would seem to me that the low Earth orbit systems planned, such as Iridium and the INMARSAT systems cannot do other than make life more difficult for the ETI Searchers. I know that technology has now improved so that vast tracts of spectrum can be scanned very quickly and analysed by computer. Nonetheless, the better the technology used both on Earth and in space, the more likely is SETI to have fewer signals of Earth origin to eliminate from its trawl.[25]

Perhaps psychologically unfortunately the references in the ITU documents to 'harmful interference' to 'radio services'. It might be easy for some therefore to diminish the respect given to passive rather than active use of radio systems. However, as radio-astronomy is listed as a service under the Radio Regulations it does therefore qualify for protection.[26] SETI conforms to the definition as it involves the use of radio astronomy, but has only the lesser limited footnote protection mentioned above. It would be useful were there more explicit and specific recognition of the requirements of radio-astronomy and SETI for minimised interference across all relevant frequencies.

That said, the Radio Regulations remain the source of protection for SETI and for the Radio Astronomy at an international level. More must be done by national administrations to comply with their duties to secure that interference to such passive use of the spectrum is minimal. There is a community of interests here between the radio astronomers and the SETI specialists. They should tackle such matters jointly, both through lobbying national administrations, and through the appropriate mechanisms of the ITU, including the new working groups of the Radiocommunication Sector. Perhaps it is unrealistic to expect further radio channels to be freed from other use, but at least that which you have should be preserved.

In that connection it should be noted that there is a move within the ITU to simplify the Radio Regulations. That may or may not be possible. If work is done to achieve that purpose, it might provide an opportunity to strengthen the safeguards which SETI and radio-astronomy has. But, *per contra*, it might result in weakened protection. Searchers should be vigilant on this matter.

But whatever happens this is yet another area where International Law alone is not enough. The appropriate national enforcement agencies must be active in seeing that such protections as exist are effective.[27] It would be a pity were a 'possible' signal to be missed because of interference caused by human activity to signals of extra-terrestrial origin. It would be worse were that activity to be in breach of such protections as the law does afford SETI.[28]

D. A Moon Site?

Many of the problems of radio astronomy in general, and of SETI in particular, would be alleviated were radio-telescopes to be fully shielded from man-made radio interference. The proposal has been made that a appropriate site would be within a crater on the far-side of the Moon, the crater Saha being particularly identified as suitable.[29] Of course, legal questions arise with

such a proposal, the main proponent of the idea having outlined his questions in 1994.[30]

By art. 1 of the Outer Space Treaty, outer space including the Moon and celestial bodies is free for exploration and use by all, and this specifically includes scientific investigation. As indicated above, by art. 6 of the Outer Space Treaty what is done is subject to the supervision of the appropriate national state having jurisdiction over those conducting the relevant activity. The other general aspects of International Law indicated above, including the question of 'nuisance', would also have relevance.[31]

But that is obviously insufficient protection for the project. What is required is a proper setting aside of a specific site, and its protection for radio astronomic purposes, which we expect would include SETI. A gateway exists through which that could be achieved.

Under art. 11.5 of the Moon Agreement, 1979, states parties to that treaty agree that when the exploitation of the Moon is imminent, a regime for the Moon will be negotiated. Under the regime the exploitation and use of the Moon would be dealt with. But how would such a system work? Two models can be examined, the Antarctic regime and the International Sea-Bed Authority acting under Part XI of the Law of the Sea Treaty 1982. While neither could be simply transplanted to Moon requirements, both provide some useful insights as to how the future may deal with such matters on the Moon.

The Antarctic regime

The Antarctic regime is now well developed. It stems from claims as to sovereignty over parts of Antarctica, some of which overlap, the refusal by some states to recognise any such claims, and scientific interest in the region which gained an immense impetus in the International Geo-Physical Year of 1957 in which many states took part. The result of that interest, cooperation and the realisation that matters of sovereignty were stifling scientific endeavour was the Antarctic Treaty of 1957,[32] which opened the region to scientific exploration by any state and 'froze' questions of sovereignty for the duration of the Treaty - thirty years initially. Subsequently the Treaty has been extended in time, and, through the setting up of a series of meetings and the adoption of Protocols to the Treaty, what amounts to an Antarctic regime has been established. It has to be said, however, that the system of this regime is coming under strain as, in addition to scientific research, the Antarctic has come to have some commercial value. Mineral deposits and tourism are two matters causing intense discussions.[33]

That said, there is in existence (and working pretty well) a specific legal regime designed to remove an area of the surface of the Earth from disputes about traditional concepts of sovereignty in order that scientific exploration can be carried out. What is done there is not 'licensed' in the ordinary sense, but is at least tacitly permitted. States retain jurisdiction over their nationals, and exercise limited forms of jurisdiction over what is done within the small areas of territory that constitute the difference bases. So far this system works.

The Deep Sea-Bed

The other legal regime which may provide some pointers for the establishment of a Moon-base is that applicable to the Area, as the deep sea bed beyond national jurisdiction is known.[34] By Part XI of the Law of the Sea Convention, 1982,[35] as that has been subsequently amended,[36] what is done in the Area is subject to control and licensing by the International Sea-Bed Authority. By art. 136 of the Convention the Area and its resources are declared to be part of the 'common heritage of mankind' - a phrase also to be found in the earlier Moon Treaty of 1979, to which we are coming. By art. 137.2 'All rights in the resources of the Area are vested in mankind as a whole', the Authority acting on behalf of mankind.

The International Sea-Bed Authority, established under Section 4 of Part XI of the Convention (arts. 156-185), has its headquarters in Jamaica. All states members of the Treaty are members of the Authority, which functions through an Assembly, a Council and a Secretariat. The Authority acting through these bodies, and more particularly through an organ known as 'The Enterprise' (art. 170) has powers with regard to the exploitation of the resources of the Area. *Inter alia* it also assesses contributions due from members of the regime on the same basis as that used for regular U.N. budgetary matters (art. 160.1.(e)).

So much for the regime in outline. However, the United States, United Kingdom and various other of the developed world were unhappy with the original version of the Treaty, and after negotiation its terms have been amended, notably to provide the developed nations with a stronger voice within the Council, and to weaken the aspects of the

Treaty involving finance, technology transfer and the curbing of commercial operations.

This is not the place further to discuss the 1982 Law of the Sea Convention, but enough has been said to show in outline certain elements of it which may help us. It does also provide a glimpse of how the relevant provisions of the Moon Agreement could be fleshed out.[37]

The Moon Agreement, 1979

The Moon Agreement, 1979,[38] is the least successful of the five United Nations sponsored Space Treaties. Requiring only five ratifications to come into force (art. 19.3), the Treaty has acquired only nine ratifications in its eighteen years of existence.[39] A further five states have signed, but not yet ratified, the Agreement.[40] Of the ratifying states, only Australia and the Philippines might be said to have a reasonable chance of mounting an expedition to the Moon in the near future. Of the non-ratifying signatories, France and India might also so qualify. Arguably the signatory-only states, and certainly the non-signatory states have been wary of the Agreement because of certain of its terms, particularly parts of art. 11. In fact some parts of art. 11 are commonly agreed as legal principles already as they are contained in other more widely approved documents. Thus art. 11.2, providing that the Moon is not subject to national appropriation simply repeats the term of art. 2 of the Outer Space Treaty of 1967. But art. 11 also states that the Moon is part of the common heritage of mankind (art. 11.1), a new statement, and, perhaps more contentiously, that when exploitation of the Moon becomes feasible, a review conference shall establish an international regime to govern such exploitation (art. 11.5).

Whether the Moon Agreement ever will become a general agreement is uncertain. But in art. 11.5 a serious point has been made. The use of the Moon, and its exploitation, will require some sort of agreed regime. The parallel with Antarctica is clear, albeit that with the Area is less so.

The Far-Side Proposal

The limited terms of the Moon Agreement do not provide sufficient protection for a far-side site on the Moon for radio-astronomy purposes. While there is provision making lawful landing, the placing of facilities, stations and installations anywhere on the Moon (art. 8.1), art. 8.3 merely requires that activities of states parties to the Agreement shall not interfere the activities of other states parties on the Moon. This is quite vague and imprecise. 'Interference' is not a reference to 'radio interference' though it could encompass that. Article 8.3 therefore is inadequate for the protection of a Saha project.

From the preceding paragraphs, however, our experience in similar matters here on earth foreshadows two possible developments. An international regime on the model of the International Sea-Bed Authority may be constituted for the Moon, as art. 11.5 of the Moon Agreement requires. Alternatively space competent nations may well consider that a formal Moon organisation would unnecessarily restrict their activities, and possibly result in an unwelcome diversion of return on their investment to non-contributory nations. In that event the Moon Agreement may continue as a dead-letter, and the space competent nations may simply proceed with exploration and in due course exploitation. But even if that happens, some sort of regime will be necessary to provide a sufficient legal basis for states (and perhaps entrepreneurs) to found and finance their activities.

At present it seems to me that the more flexible, non-authoritarian Antarctic system is a more likely model to be adopted. It has the merit of having been developed basically for the sort of scientific enterprise that is likely at first at least to be seen on the Moon. However, if significant resources are discovered in some particular and restricted areas of the Moon, something legally stronger and more structured may be required. Thus, should it be the case that there is recoverable water resources frozen in the bottom of deep craters near the Moon's poles, there may be rush to set up bases there. Such a development would logically at least require some sort of regime to regulate competition, and give a good 'title' to those involved.[41]

But, irrespective of which of these alternatives comes to be, some sort of regime will be required to provide ground rules at least between participants in the exploration and exploitation of the Moon. However such matters are arranged, care should be taken to ensure that the fullest protection is given to the requirements of a far-side lunar radio observatory under any Moon regime.

Thereafter, once the legal basis has been established for the site, the ordinary procedures of assignment and notification would be gone through for the site's use of telecommunications services. Its protection from interference would, however, be

dependent on the enforcement of the appropriate provisions of the Radio Regulations.

Finally, states and chancelleries are not known for their abilities to be far-sighted and visionary. Concerns more domestic and mundane than scientific inquiry often mould their thought. They should not, therefore, be assumed to have the interests of either the radio-astronomers, or the SETI Searchers in the forefront of their minds. Those interested in these subjects must therefore ensure that the international negotiators and legislators are fully conversant with the requirements of their disciplines. To that end approval of the project by space relevant organisations such as the ICSU/COSPAR, the IAA and the IAU would be useful.[42]

E. The Detection and Reply Declarations

The Detection Protocol,[43] outlines a set of principles which, it is suggested, should be followed following the detection of extra-terrestrial intelligence. The Reply-Communication Declaration deals with the question of who should reply and how a reply should be formulated. These have both been much discussed.[44] A Position Paper regarding these Declarations and the Decision Process for Examining the Possibility of Sending Communications to Extra-terrestrial Civilisations has been approved by the Board of Trustees of the International Academy of Astronautics (IAA) and by the Board of Directors of the International Institute of Space Law (IISL).[45]

What status should these Declarations have, and in particular, should they have the force of Law??

At first I thought there was no point in attempting to give such documents such a status. There are many other matters of more obviously pressing concern to take the attention of our lawmakers, national and international. And even if there is a legal obligation, what are you going to do with the person who violates it? Will you sue him because you were not informed, or fine or imprison him for a failure to comply with procedures? Surely not. If SETI succeeds we will have lots of other things to consider more important than the discoverer's intransigence. Such were my first thoughts.

Now my view has changed, but I would make a distinction between the two Declarations.

If possible within the crammed agenda of international lawmaking, steps should be taken to embody the principles of the Detection Declaration in an international treaty, with the requirement that states ratifying the treaty should incorporate them into licenses they grant to SETI activities and/or otherwise impose appropriate obligations on SETI Searchers. I suggest this not to provide an excuse for the bureaucrats to issue more pink forms, nor so that breach of a licence may be punished, but simply in the belief that while most scientists are law-abiding, ones on the margin may just comply with a formal legal requirement when they might ignore what amounts to a private agreement among their colleagues. We can do nothing about the rogue elephant.

Should a Reply-Communication Declaration also be legally binding? Logic indicates I should be of the same opinion as to bringing legal force to such a Declaration as I now hold with regard to the Detection Declaration, but, as a famous American judge, Oliver Wendell Holmes, said: 'The life of the law has not logic: it has been experience'.[46] I doubt whether states would be willing so to confine their freedom of action on such a matter, and, under these circumstances consider that a formal but non-legally enforceable agreement among those working in the field of SETI more useful than an international treaty which is not likely to attract ratifications, and less likely to be observed.

The last sentence was written to relate to the question of the Reply-Communication Declaration. Its doubts may also, however, apply to the Detection Declaration were its principles proposed as a treaty.

There is, however, a step short of treaty which might be useful. One can look to the effect that has been obtained in Space Law by the declarations of principle which have been adopted as Resolutions by the General Assembly of the United Nations on the recommendation of the Committee on the Peaceful Uses of Outer Space, either by unanimous vote, or better, by consensus without vote. By contrast the effect of non-unanimous declarations is much impaired - many would say 'destroyed'.[47]

There is argument as to the precise legal status of UN declarations.[48] They are not treaties or treaty-law, but they are more than good intentions. They are an affirmation by states - an affirmation made by their consent to their adoption by the General Assembly - that they do contain principles which each assenting state will seek to observe. Recently the term 'soft law' has been used to denote this class of international 'agreement'. The term indicates a difference from 'hard law',

and in the mind of some, a hope that what is stated as 'principle' will eventually become 'hard law'. Certainly if state practice follows such principle, and were the generality of states to come to believe that they act in accordance with that principle because they are bound to do so, the principle will have become customary international law. And, short of such general consensus as to the obligatory nature of the principles as seen from the stand-point of the Chancelleries and Foreign Offices of the governments of the world, those involved in SETI might well feel 'obliged' even before their rulers do if the principles are set out in a Resolution of the General Assembly of the United Nations.

If that is the route to be preferred, then I would first suggest that the two Declarations be consolidated and their terms revised into the proper form for expression in a UN Resolution. Then we should seek to have the matters considered by COPUOS, which is the avenue for space matters into the General Assembly. COPUOS has had recent problems in deciding its future agenda, and now might therefore be the time to get its attention. Thereafter the UN General Assembly, which has debated stranger things in the past, might be disposed to take a view. After all, potentially SETI could change our view of the world. I need only cite the excitement caused recently by the possibility of signs of life in that Martian meteorite.

NOTES

ILM = *International Legal Materials.*
Proc. IISL = *Proceedings of the Colloquia of the International Institute of Space Law.*

1 See S.J. Dick, *Plurality of Worlds: The Origins of the Extra-terrestrial Life Debate from Democritus to Kant* (Cambridge: Cambridge UP, 1982); M.J. Crowe, *The Extra-terrestrial Life Debate, 1750-1900: The Idea of a Plurality of Worlds from Kant to Lowell*, (Cambridge: Cambridge UP, 1986). These books between them cover two and a half millenia. See also K.S. Guthke, *The Last Frontier: Imagining other Worlds from the Copernican Revolution to Modern Science Fiction* (Ithaca NY: Cornell UP, 1990) and A. Koestler, *The Sleepwalkers, A History of Man's Changing Vision of the Universe*, (London: Hutchinson, 1959; Pelican Books, 1968).

2 See F. Drake and D. Sobel, *Is Anyone Out There?* (New York: Delcorte Press, 1992); J. Heidmann, *Extra-terrestrial Intelligence*, (S. Dunlop, trans.)(Cambridge: Cambridge U.P., 1995); P. Davies, *Are We Alone?*, (London: Penguin Books, 1995).

3 See (1990) 21 *Acta Astronautica* and (1992) 26 *Acta Astronautica.*

4 Two early discussions of SETI and legal matters are: A.G. Haley, *Space Law and Government*, (Appleton Century Crofts, 1963) 394-421; and E. Fasan, *Relations with Alien Intelligences*, (Berlin: Berlin Verlag, 1970). More recently see G.S. Robinson and H.M. White, Jr., *Envoys of Mankind*, (Washington DC: Smithsonian Institution, 1986).

5 F. Lyall: '*Legal Aspects of SETI - Present and Future Arrangements*' IAA.9.2-93-788; F. Lyall, '*Communications with Extra-Terrestrial Intelligence: A New Dimension of Space Law*' IAA-96-IAA.9.2.04.

6 The five treaties are:

The Outer Space Treaty - Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, 27 January 1967. (1968) 610 UNTS 205; (1968) UKTS 10, Cmnd. 3519; 18 UST 2410, TIAS 6347; 6 ILM 386; 61 AJIL 644.

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 22 April 1968; 672 UNTS 119; 1969 UKTS 56, Cmnd. 3997; 19 UST 7570, TIAS 6559; 7 ILM 151; (1969) 63 AJIL 382.

Convention on International Liability for Damage Caused by Space Objects, 29 March 1972; 961 UNTS 187; (1974) UKTS 16, Cmnd 5551; 24 UST 2389, TIAS 7762; (1971) 10 ILM 965; (1971) 66 AJIL 702.

Convention on the Registration of Objects Launched into Outer Space, 14 January 1975; 1023 UNTS 15; (1978) UKTS 70, Cmnd 7271; TIAS 8480; (1975) 14 ILM 43; (1979) 18 ILM 891.

The Moon Agreement or Treaty - Agreement Governing the Activities of States on the Moon and other Celestial Bodies, UN Doc. A/34/664. Nov. 1979; UN Doc. A/34/20, Annex 2; UN Doc. A/RES/34/68; (1979) 18 ILM 1434.

7 This could lead into a long technical discussion as to the nature of law in general, and customary international law in particular.

8 The International Court of Justice is duty bound to decide on a basis of law cases which are submitted to it. It cannot say 'there is no applicable law' on a matter. Commentators are not under that duty, and should be more cautious as they may be advocating a particular position rather than dispassionately considering a matter.

9 The SS Lotus (France v Turkey) 1927 PCIJ Ser. A, No. 10; (1935) 2 *Hudson, World Court Reports* 20. Some doubt has been cast on such a simple formulation in the recent Advisory Opinion of the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons, 8 July 1996; (1996) 35 *ILM* 809-938, with Declarations and further Separate Opinions at 1343-58.

10 There might be an argument that any activity drawing attention to the Earth risks indicating to an alien race the existence of unculled protein, and therefore is unlawful, but this is to enter the realm of another of my interests - science fiction. Cf. Clifford D. Simak, 'Small Deer' in *Immigrant and Other Stories by Clifford D. Simak* (F. Lyall, ed., London: Mandarin, 1980) 65-80.

11 Cited above, n.6.

12 Both cited above, n.6. Note: the Moon Treaty has not been widely accepted. Reliance on its terms as law is not justified except as among its members.

13 Cf. matters reported in Project Phoenix Greenbank News, obtainable through www.seti-inst.edu.

14 F. Lyall, 'The International Telecommunication Union Reconstructed' (1993) 36 *Proc. IISL* (Washington DC: AIAA, 1994) 78-88.

15 ITU Constitution (1992) arts. 4.1 and 43. What follows is very cursory. On the procedures prior to the 1992 reconstruction of the ITU (which in broad will continue to be used) see D.M. Leive, *International Telecommunication Union and International Law: The Regulation of the Radio Spectrum* (Leiden: Sitjhoff; New York: Oceana, 1970); F. Lyall, *Law and Space Telecommunications*, (Dartmouth: Aldershot; Gower: Brookfield VT, 1989) 345-409; R.L. White and H.M. White, Jr., *The Law and Regulation of International Space Communication* (Artech House: Boston, 1988), 85-97.

16 The current Radio Regulations are those adopted by the World Administrative Radio Conference, Geneva, 1979 (Geneva: ITU, 1980), as amended by subsequent conferences (in detail but not substance).

17 Article 5 and relative Annexes and Appendices of the Radio Regulations deal with technical characteristics. Arts. 1.2.a and b, 6.1 and 2, 42 and 45.1, 2 and 3 of the current ITU Constitution (1992) impose similar duties in the primary document of the Union.

18 The General Rules for the Assignment and Use of Frequencies are contained in Art. 6 of the Regulations. The ITU Convention and Constitution contain specific provision imposing duties to implement the ITU arrangements (ITU Convention art. 6.2), and see immediately previous note.

19 An emergent problem, however, is that the ITU systems is becoming clogged through states notifying systems in order to gain priority of notification, although these systems may never in fact come to be established: see F. Lyall, 'Paralysis by Phantom: Problems of the ITU Filing Procedures' (1996) 39 *Proc. IISL* 187-93.

20 H.C. Kahlmann, 'SETI and the Radiospectrum' (IAA-90-579) (1992) 26 *Acta Astronautica* 213-7.

21 V. Kopal, 'International Law Implications of the Detection of Extra-terrestrial Intelligent Signals' (1986) 29 *Proc. IISL* 118-21 at 120.

22 The 'hydrogen line' is 1 420 MHz.

23 See n. 17.

24 See ITU Constitution, art. 45.3 regarding electrical apparatus and installations capable of causing interference.

25 G. Hovde, 'Frequency Management and SETI: Threats to SETI observations in the 1-3 GHz Band', IAA-97-IAA.9.2.03, presented at the Turin Conference ably discusses this matter and contains useful documentation.

26 Radio Regulations, art.1.3.36: 'Radio Astronomy Service: A Service involving the use of radio astronomy.'

27 Cf. M. Bourley and S. Courteix, 'National Institutions responsible for Space Activities: A Comparative Law Approach', (1996) 39 *Proc. IISL* 235-45.

28 Cf. M.K. Klein and others, 'An Assessment of the Impact of Radio-frequency Interference on Microwave SETI Searches,' (IAA-87-593), (1992) 26 *Acta Astronautica* 227-32; J. Tarter, 'Summary of Interference Measurements at Selected Radio Observatories', (IAA-90-580), (1992) 26 *Acta Astronautica* 2338; J. Tarter, 'Radio Frequency Interference at Jodrell Bank Observatory within the Protected 21cm Band,' (IAA-86-425), (1989) 19 *Acta Astronautica* 907-12; W.J. Welch, 'A Strategy for SETI Observations at Arecibo Observatory', (IAA-88-540), (1992) 26 *Acta Astronautica* 219-21 at 220.

29 J. Heidmann 'Saha Crater: A Candidate for a SETI Lunar Base' (1994) 32 *Acta Astronautica* 471-2. Prof. Heidmann is to present a paper 'Recent progress on the Lunar Farside Crater Saha Proposal' to the Turin Scientific/Legal Round Table. I have been privileged to see an advance draft copy of his text, and would refer readers to it.

30 J. Heidmann, 'What legal questions are raised by the establishment of a dedicated lunar farside specific crater for high sensitivity radioastronomy?' 1994 37 *Proc. IISL* 255; cf. A.A. Cocca, 'Reservation of a Lunar Zone for SETI Purposes', (1995) 38 *Proc. IISL* 270-3.

31 Cf. the Trail Smelter Arbitration (US/Canada, 1938, 1941) 3 *Reports of International Arbitral Awards*, 1905; (1941) *American Journal of International Law* 684.

32 The Antarctic Treaty, Washington 1 December 1959, in force 23 June 1961: 402 UNTS 71; 12 UST 794; TIAS 4780; (1980) 19 *ILM* 860.

33 A useful source, and access to other documents, is 'Antarctic Treaty Consultative Parties: Measures Relating to the Furtherance of the Principles and Objectives of the Antarctic Treaty' (1996) 35 *ILM* 1165-89.

34 Defined in art. 1 of the Convention cited in the next note.

35 UN Convention on the Law of the Sea, 10 December 1982, (1983) 21 *ILM* 1261.

36 An Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, was adopted by General Assembly Resolution 48/263 of the United Nations on 28 July 1994: see (1994) 33 *ILM* 1309-27. In the light of that Agreement President Clinton recommended U.S. ratification of the Convention: see his Letter of Transmittal of the United Nations Convention on the Law of the Sea and the Agreement relating to the Implementation of Part XI to the U.S. Senate (with commentary) of 7 October 1994, available at (1995) 34 *ILM* 1393-1448.

37 Session 1 of the 39th IISL Colloquium, Beijing 1996, was entitled 'The Legal Status of Property Rights on the Moon and Other Celestial Bodies.' The papers presented are relevant for what follows: all (1996) 39 *Proc. IISL* - E. Fasan, 'Dominium Lunae, Proprietas Lunae', 1-8; A. Cocca, 'Property Rights on the Moon and Celestial Bodies', 9-19, H. Almond, 'The Legal Status of Property Rights on the Moon and Other Celestial Bodies', 20-30; V. Mani, 'The Common Heritage of Mankind: Implications for the Legal Status of Property Rights on the Moon and Celestial Bodies', 31-7; H. van Traa-Engelman, 'Clearness Regarding Property Rights on the Moon and Other Celestial Bodies, 38--44; G. Gal, 'Acquisition of Property in the Legal Regime of Celestial Bodies', 45-9; P. Sterns, G. Stine, L. Tennen, 'Preliminary Jurisprudential Observations Concerning Property Rights on the Moon and Other Celestial Bodies in the Commercial Space Age', 50-60.

38 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 5 December 1979, 1979 UNGA. Res 34/68, 1363 UNTS 3; (1980) 18 *ILM* 1434: in force 11 July 1984.

39 IISL Standing Committee on the Status of International Agreements Relating to Activities in Outer Space, A. Terekhov, Chairman, Annual Report 1997 - to be published as an Addendum to the (1997) 40 Proc. IISL. The ratifying states are: Australia, Austria, Chile, Mexico, Morocco, The Netherlands, Pakistan, The Philippines and Uruguay.

40 These are: France, Guatemala, India, Peru and Romania.

41 Note that the word 'title' is here in inverted commas. The most that is likely is a lease or license for a limited time and area: cf. art. 137.2 of the Law of the Sea Convention, 1982 which restricts the nature of legal titles involved in the Area and to minerals and other resources extracted. By art. 6.2 of the Moon Agreement states members of that Agreement have a right to use appropriate quantities of mineral and other substances found on the Moon for the support of their missions, as well as to collect and remove samples.

42 Cf. comments by S. Doyle on Dr Heidmann's proposal, summarised (1994) 37 *Proc. IISL* 302.

43 The 'Declaration of Principles Concerning Activities Following the Detection of Extra-terrestrial Intelligence' is available from the SETI Institute, 2035 Landings Drive, Mountain View, California 94043, and printed (1990) 21 Acta Astronautica 153-4, and in draft annexed as Appendix 1 to M. Michaud, 'An International Agreement Concerning the Detection of Extra-terrestrial Intelligence' (IAA-88-530) (1992) 26 *Acta Astronautica* 291-4 at 293, and his 'A Unique Moment in Human History' in B. Bova and B. Preiss, eds. *First Contact* (London: Headline, 1990), 325-8. See also the SETI Institute website: www.seti-inst.edu.

44 The two Declarations are available at the SETI Institute, address above, its website (www.seti-inst.edu) and are also annexed to my 1996 paper, 'Communications with Extra-terrestrial intelligence: A New Dimension of Space Law', IAA-96-9.2.04.

45 Available from the IAF Secretariat, 3-5 rue Mario-Nikis, 75015, Paris, France, and the SETI Institute, 2035 Landings Drive, Mountain View, California 94043.

46 O. Wendell Holmes, *The Common Law*, (1881)(Boston: Little, Brown, 1948) 1.

47 The Declaration on Principles Governing the use by States of Artificial Earth Satellites for International Direct Television Broadcasting, 10 December 1982, UNGA Res. 37/92, is effectively a dead-letter as it was not adopted unanimously, but was voted through COPUOS and the General Assembly by a majority of states which did not include the major satellite using states. Since then COPUOS has resumed its former practice of proceeding by consensus only.

48 O. Schachter, 'United Nations Law' (1994) 88 *American J of International Law* 1-23, and his 'The UN Legal Order - An Overview' in O. Schachter and C.C. Joyner, eds., 1 *United Nations Legal Order*, (Am. Soc. Int. Law/ Grotius Publications, Cambridge UP, 1995) 1-31, and P. Szasz, 'General Lawmaking Processes', ibid, 35-108.