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METEORITES: INTERNATIONAL LAW AND REGULATIONS

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ABSTRACT

Although meteorites are now considered as scientific objects, they still bear a strong and powerful symbolic meaning due to their extraterrestrial provenance. Meteorites are valuable objects. The present article focuses on their legal status, in other words the collection of rules, very diverse in nature, which are applicable to them. Despite a growing international market, the question of meteorites is often ignored or regarded as a detail in international relations and is rarely taken explicitly into account in negotiations and treaties. This relative neglect explains why a non-State player, the Meteoritical Society, has taken methodological initiatives into meteoritic science and has effectively become a regulator of meteorite naming and acceptance, with a global scope. We show that to understand the legal status of meteorites, it is necessary to consider them under the prism of public international law, transnational law and national law. We conclude that, despite the universality of meteorites as extraterrestrial objects, the variability of legal rules applicable to meteorites depending onto which territory they fall or where they are found. We note however that there is a trend towards regulatory uniformity in the scientific analysis of meteorites, which frames the practices of researchers and regulates traders' activities. Finally, we contend that a meteorite remains a badly defined legal object, because it can be viewed under many angles: as an object susceptible to private appropriation, as a "common thing" (*res communis*), or as an element of national heritage.

INTRODUCTION[1]

The relationship between men and meteorites is long and complex (Burke 1991). For many millennia, meteorite falls were viewed as omens or portents, while meteoritic stones were considered as sacred objects conserved in temples or in other religious contexts (e.g d'Orazio 2007). Meteoritic iron has also been used in several historical contexts to make jewels or weapons (Comelli et al. 2016; Buchwald 1975). In either case, archaeological and historical records indicate that the possession of these artefacts was associated with power or prestige. During the European Renaissance, most meteorites were kept in curiosity cabinets among many other curious and precious objects, with the notable exception of the Ensisheim meteorite that fell in 1492 that has been chained in a church for centuries (Marvin 1992). After the 18th century and the recognition of their extraterrestrial nature by natural philosophers (Gounelle 2006), meteorites have been preciously kept in scientific institutions and routinely used by scientists to understand the mechanisms of Solar System formation and evolution (Lauretta & McSween 2006).

Despite the fact that meteorites have become scientific objects whose origin is clearly understood, they still hold a strong symbolic character. Some are sold as lucky symbols, or are proposed at prestigious auctions together with art works (Golia 2015), while others are used by artists who are seduced by what they evoke (Roussopoulos 2016). The Ka'aba stone which is central to the annual Muslim pilgrimage to Mecca has been said to be a meteorite (Thomsen 1980), and meteoritic metal has been incorporated into precious pieces of weaponry, such as Pharaoh Tutankhamun's dagger (Comelli et al. 2016) or Indonesian krisses (Brandstätter et al 2016).

For these many reasons and for the mere fact the number of collectors has dramatically increased, meteorites have become extremely valuable objects. The question of their ownership and legal status is therefore very important. This is all the more so, as the number of meteorites has increased from roughly 2000 in 1966 (Hey 1966) to >60000 in February 2019, and because meteorites are very unusual objects that change juridical status as they enter the Earth's atmosphere. In the present paper, we will follow the suggestion of Rubin et al (2010), and define a meteorite as *a solid object of extra-terrestrial origin that landed on the ground of Earth or another celestial body due to natural forces*.

The present article focuses on the legal status of meteorites, in other words the collection of rules, very diverse in nature, which are applicable to them. We could almost repeat word for word, for meteorites, what has been written for dinosaur fossils: "inventoried, classified, evaluated, studied, exhibited, this museum star is a recognised heritage piece for the nations which house them, natural in origin, scientifically witnessed, cultural in their legendary dimension. The law therefore protects them on every level." (Wahiche 2013)

[1] The views presented in this paper are those of the authors and do not represent the policies or commitments of the journal, the editors, the publisher or the Meteoritical Society.

We note however that the meteorite is misunderstood as a legal object. The historical development of Space law, which it is intuitively part of, was initiated during the Cold War by the accords between the United States of America and the Soviet Union, accompanied by resolutions from the United Nations General Assembly and was reinforced by multilateral treaties with a universal aim. Within this legal framework, the question of meteorites is often ignored, neglected or regarded as a detail in international relations, that is rarely taken explicitly into account in negotiations and treaties.

This explains in all likelihood why academic legal works are few in number and envisage only some of the rules applicable to these rocks from the sky (La Paz 1959; Machoswki 1969; Schmitt 2002). This relative neglect also explains that a non-State player, the Meteoritical Society, has taken methodological initiatives into meteoritic science and has effectively become, outside the realm of public international law, a veritable *de facto* regulator with a global scope. We should not forget, however, that, according to its very definition, a meteorite falls onto the ground, and particularly onto a country's territory.

The legal status of meteorites is thus made up of a combination of public international law (I), transnational law (II) and national law (III).

METEORITES AND PUBLIC INTERNATIONAL LAW

The international rules that could concern meteorites are many in number, and very diverse. We will follow their legal chronology to explain their complexity and their evolution.

Unesco

This international organization was concerned with this question from 1964. Within the organisation a "Working Group on Meteorites" was created. Essentially centred on scientific questions such as conservation according to internationally recognised standards, international exchanges between scientific institutions and museums, and methods and techniques of analysis, its mandate included "*report[ing] to UNESCO its findings and recommendations for action by UNESCO or by international non-governmental scientific organizations, with a view to ensuring the optimum use for scientific purposes of the meteoritic material available in all parts of the world*." (UNESCO 1964)

The working group adopted eleven recommendations from 1964, some of which were incontestably legal in interest. This is particularly the case for Recommendation 9:

"*The Bureau of Legal Affairs of UNESCO is requested to prepare a study of existing legal materials relating to meteorites and ultimately to suggest recommendations for the consideration of the Working Group*."

We see from the beginning that a legal preoccupation arose to which the working group could not directly respond: it was essentially made up of renowned scientists, assisted by the

UNESCO Secretariat. The comparison of Recommendations 2 and 4 is also interesting from the point of view of the institutional ethos that prevailed from the beginning. In accordance with a typical method used in the framework of international intergovernmental organisations, a questionnaire was addressed to the Member States. The answers had to be sent to the Permanent Commission on Meteorites of the *International Union of Geological Sciences*, a non-governmental organisation. It was also recommended that new finds or falls were announced and that detailed information was sent to the Academy of Sciences of the USSR and to the Director of the Natural Sciences Department of UNESCO. As the interest in meteorites was from an international relations perspective, we can see from the beginning the appearance of an institutional triangle. Nations, an international organisation and a NGO with a scientific mission shared the work resulting from the internationalisation of questions raised by these fragments of celestial bodies. The working group met again in 1965. It examined the twenty responses of the Member States to the questionnaire devised the previous year. Distributed to the members of the group were "*Preliminary notes on legal materials relating to meteorites"* (UNESCO 1965a) emanating from the Office of Legal Affairs, statutorily part of the UNESCO Secretariat. For reasons which are not indicated, the document entitled "Preliminary notes" attempts a partial review of applicable national rights, and only covers quite a restricted geographical and cultural zone: The United Kingdom, the Commonwealth and the United States. These "Preliminary Notes" point out that, for the first two, specific legal provisions did not exist, and provides an ensemble of jurisprudential references, essentially founded on analogies. With the United States, the basic principles are very comparable, even if in the detail subtle differences are visible. Movable property, discovery of treasure, and exploitation of deposits essentially make up the basic elements of their analogical reasoning in determining a status for meteorites.

The principal interest of these "Preliminary notes" has to do with the chosen position. The Bureau for legal affairs insisted on the fact that the Declaration of the United Nations General Assembly on the principles regulating the activities of nations regarding the exploration and use of outer space (Res/1962 (XVIII) of 13 Dec. 1963) is of great interest with regard to meteorites, as it wonders "whether they should be considered as belonging to no one, i.e. res nullius, or belonging commonly to everyone, i.e. res communes, could have important implications in formulating rules governing the use of meteoritic material on earth and possible duties of appropriators to utilize such material for socially important scientific purposes" (UNESCO 1965a). The Working Group, while taking the "Preliminary notes" into account, considered that it would be necessary "*to study the possibility of the General Conference of UNESCO adopting some specific convention or recommendation to Member States regarding the legal status of meteorites*" (UNESCO 1965b). It was unanimously agreed that "*meteorites should in the future be regarded as the property of the state in whose territory they fall, rather than that of the finder or the owner of the land…*" (UNESCO 1965b). The Group therefore adopted "Recommendation 3" which clearly proposed that the status of meteorites be incorporated in a specific international instrument (Convention or Recommendation), or by "*including appropriate provisions in the conventions relating to the*

peaceful uses of outer space to be adopted by the General Assembly of the United Nations." (UNESCO 1965b).

We can easily determine from the group's work, how sensitive its members were to the relevance of including the status of meteorites in public international law. At that moment in the history of international relations, the Statist approach was predominant: territorial states should have ownership of the meteorites and not private individuals, to avoid that these fragments of rocks from the sky are not the objects of commercial transactions.

The working group's sensitivity to the internationalisation of the status of meteorites would be frustrated. It met one last time in October 1966 (UNESCO 1967). Point 4 from the order of the day is devoted to the legal status of meteorites.

The UNESCO Secretariat is shown to be quite unenthusiastic about the procedural feasibility of an international convention or recommendation on meteorites, suggested by the working group from 1965. Doubtlessly aware of the diplomatic difficulties of such an operation, the latter officially renounces: "*In view of the complexity of the processes involved in the preparation of such international legal conventions, the Working Group was of the opinion that action could better, for the time being, be undertaken at the national rather than the international level.*" (UNESCO 1967).

We are therefore moving from a desire of internationalisation to what we could designate, with a handy if not elegant neologism, as an "ad hoc dis-internationalisation" …

We also see, however, the appearance of the first contours of a legal system: when in space, it comes under public international law… but it is not yet a meteorite! When it falls onto *terra firma* or into a maritime zone under national jurisdiction, it enters a very developed network of rules of sovereignty and property that comes under the territorial state where the object is found. This does not prejudge the issue of meteorites which fall in open waters, nor that of meteorites found in Antarctica.

The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies

This international agreement constitutes, in addition to the work by UNESCO, the legal base for peaceful use of space. This treaty has a very large field of application: it includes all "celestial bodies". A celestial body is considered here as an element of the solar system, and can be defined as an "*element that is natural (not created by man), identifiable, situated in outer space, namely the Moon, the planets and all other elements (for example, comets, asteroids, etc.)*" (Salmon 2001). The expression "outer space" alone suffices to exclude the meteorites from the treaty's field of application, since, as we remember, these are objects which by definition rest upon a planetary surface. The treaty can however concern asteroids - from where the majority of meteorites come from- if they are sufficiently massive to lend themselves to military activity, explicitly forbidden by the treaty.

The Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property

This convention, signed in Paris on 17th November 1970 under the auspices of UNESCO, probably applies to these peculiar objects known as meteorites. The response is not clear right away and, as we have remarked, it depends quite considerably on the reserves and interpretative declarations of the State Parties (Goy 1970). Article 1 of the Convention effectively does not offer total clarity on the extra-terrestrial objects in question:

"*For the purposes of this Convention, the term 'cultural property' means property which, on religious or secular grounds, is specifically designated by each State as being of importance for archaeology, prehistory, history, literature, art or science and which belongs to the following categories:*

a) Rare collections and specimens of fauna, flora, minerals and anatomy, and objects of paleontological interest;
b) property relating to history, including the history of science and technology…"

An interpretation of the lay terms of the Convention, in light of the broadening conception of cultural property which results from the article overall, appears to include meteorites in the treaty's field of application. We see clearly however that the authority to accord the category of "cultural property" is attributed to each State Party, which must therefore set within in its own national legal system a list of these items of property. Nothing in the Convention forbids a State from designating meteorites as objects "important to science".

In the absence of a systematic scrutiny of all the national provisions made in the framework of the implementation of the Convention, we will note that two States filed, at the moment of ratification, a document equivalent to an interpretative declaration or a reservation which are of interest for the question studied here. Denmark thus declared that "*a meteorite found in Denmark is a fossil trove if the object is of unique scientific or exhibition value. Fossil troves shall belong to the State. Any person who finds a fossil trove and any person who gains possession of a fossil trove shall immediately deliver it to the Danish Museum of Natural History*."

As for France, it considered that "*the property designated, in accordance with Article 1 of the convention are the following properties:*

…12 – collections and specimens from collections of fauna, flora, minerals, and anatomy."

Besides these two States, other documents and international practices do not tell us anything precisely. Broadening the interpretation as proposed above seems to us to lead reasonably to include meteorites in the category of cultural property, which doubtlessly adds another element of complexity to the question of their legal status.

The Convention concerning the protection of world cultural and natural heritage

This treaty, adopted under the auspices of UNESCO on 16th November 1972, is not, as such, destined to be applied to all meteorites (UNESCO, 1972). It can however be considered, within strict limits, as applicable to certain of them. In Article 2 therefore, the Convention defines what we should understand as "*natural heritage*". In paragraph 4, it is clarified that included in this category are "*natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty*."

In this respect, peculiarly, we can envisage the existence of meteorites, whatever their size or weight, in practice un-transportable and immovable, as for example the Hoba meteorite, discovered in Namibia in 1920. The discretionary power of the State Party to the Convention when it compiles, as much as it possibly can, the inventory of the natural heritage located on its territory, is very wide: it can choose to incorporate or not a natural meteorite site, and adopt the protection measures it judges necessary, notably against looting (Article 11, §1&3 of the aforementioned convention (UNESCO, 1972)). The territorial State can have some interest in classifying the site by the Intergovernmental Committee on World Heritage, which brings certain restrictions, but can allow for specific technical and financial benefits.

For such a variety of meteorites, immutably incorporated into a protected natural site, the provisions of the Convention would certainly be applicable. In particular article 4 which obliges the site's State to "*ensur[e] the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage*".

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

This agreement, signed in New York on the 18th December 1979, is doubtlessly the most precise legal base for discerning the status of meteorites. Article 1 §3 is in effect very clear:

"*This Agreement does not apply to extraterrestrial materials which reach the surface of the earth by natural means*."

This measure expressly targets meteorites coming from other celestial bodies. The preparation of the Agreement led to long negotiations within the Committee on the Peaceful Uses of Outer Space (COPUOS) in the United Nations and notably within its legal Sub-Committee. It was unanimously accepted from 1972 that meteorites would be excluded from the planned treaty (Fazan 1998). However, given the definition of meteorites in the introduction, meteorites found on other celestial bodies can be the subject of this agreement. In fact, two small meteorites were brought back from the Moon by the Apollo missions (e.g. Zolensky 1997) and the exploration of Mars by robots allowed the identification of at least six iron meteorites, but no sample was returned to Earth.

The rarity of these finds does not stop us questioning the law applicable to such meteorites. All the more because article 11 §1 of the agreement affirms the fundamental principle that: "*The Moon and its natural resources are the common heritage of mankind*". Celestial bodies cannot be subject to national appropriation (article 11 §2) and therefore cannot constitute property, whether public or private:

"*Neither the surface nor the subsurface of the Moon, nor any part thereof, or natural resources in place, shall become property of any State, […] national organization or non-governmental entity or of any natural person*."

The freedom of scientific investigation is proclaimed (article 6 §1) and includes the right to collect and remove samples, notably minerals. They remain "*at the disposal of those States Parties which caused them to be collected*". These countries are called on to not keep them for themselves, but to share them with other nations, to benefit the international scientific community.

We understand that all these special measures are applicable to meteorites found on the Moon and the other celestial bodies of the solar system. We will simply note that the right of exploration accorded without discrimination to all nations is not without privilege, and justifiably so. Any explorative State therefore acquires a special prerogative: to keep the collected samples and thus to choose which fragments are delivered to others, as well as to decide on the timeframe in which the samples are delivered when requested by foreign researchers. This obligation to make samples available (article 6 §2, third sentence) is only very lightly qualified, leaving the State a fair margin of discretionary interpretation. Knowing that the primacy of publications is, in the scientific domain, an important element in the competition between research teams, we clearly see that a stalling delay linked to bureaucratic national procedures can distort competition in astrophysics research.

To a certain extent, we can consider that these measures of the 1979 Agreement attribute to the few States or groups of States with the technological capacity of exploration the legal grounds which legitimises the long-term possession of meteorites, but with a quid pro quo: retention implies the obligation of storage conditions compatible with international scientific standards.

Finally, we note the prospective nature of the Agreement, which will be able to be applied in the future, with the anticipated technological advances in exploration, for any meteorite discovered on whichever celestial body of the solar system… except on planet Earth.

The Montego Bay Convention

The famous Montego Bay Convention defines the general regulations of the sea (United Nations, 1982). Part XI of the 1982 Montego Bay Convention creates an "Area" made up of

the seabed and its subsoil that is outside national jurisdiction[2], in which meteorites are likely to be discovered. According to scientists specialised in this subject, we have not yet however found any on the seabed, because they don't survive there for a long time, except for micrometeorites (Murray 1891) and the Eltanin meteorite found in Pacific Ocean sediments (Bostwick et al. 1995). In the case where technological methods would allow in the future for easier exploration, less cost and be regarded as scientifically useful, the issue of the legal system for such meteorites could be raised. The essential concept at work here is decreed in article 136 of the Convention: "*The Area and its resources are the common heritage of mankind*." According to the most conventional analysis, this implies the application to the Area in three fundamental ways: non-appropriation, peaceful use and exploitation in the interest of all mankind. With meteorites, it is the first of these principles which is especially relevant:

"*Article 137 §1 – No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor shall any State or natural or juridical person appropriate any part thereof.*"

If the interpretation of this text doesn't appear to pose any difficulties, we nevertheless have to ask ourselves if meteorites are "resources" in the sense of the 1982 Convention. The answer is delicate. Article 133 "Use of Terms" reads:

"*For the purposes of this Part:*

a) "resources" means all solid, liquid or gaseous mineral resources in situ *in the Area at or beneath the seabed, including polymetallic nodules;*
b) resources, when recovered from the Area, are referred to as "minerals"."

In the general spirit of Part XI of the Convention, there is hardly any doubt that the purpose of a "resource" is to be exploited. The concrete mechanisms of exploitation lead to a great controversial issue that is the diplomatic reason for the 1994 Agreement (Tanaka, 2012; Lévy 2005). It is a different case for meteorites whose potentially precious materials are not, as far as we currently know, economically exploitable. Indeed, the largest known meteorite could only supply, after the necessary costly processes, one kilo of gold. We will add that according to paragraph b) of Article 133, what defines "resources" is that they are subject to being "recovered". This necessitates heavy-duty equipment, machinery and technical means, which habitually exclude harvesting or easy collection.

We will therefore look instead at the inapplicability of Part XI of the Montego Bay Convention, as per its 1994 modifications, to meteorites found on the seabed. Due to a lack of an explicitly foreseen legal system for them, the customary practices of the research community could be applied in case of a discovery.

International System for Antarctica

[2] Part XI (articles 133 to 191 of the Convention) was modified, in regards to the rules of future exploitation, by an Agreement in New York on 28 July 1994, formally incorporated into Resolution 48/263 by the United Nations General Assembly.

Antarctic meteorites are collected on a territory which does not come under, in the strictest sense, any national sovereignty. The "Antarctic System", based on the Treaty of Washington of 1 December 1959 forms the backdrop for the evaluation of the legal status of a meteorite that landed on the "White Continent". We know that Antarctica is subjected to an international system whose notable objective is to freeze contradictory national claims. It is a progressive institutional system built on the conclusion of a number of special treaties. The activity of the "Representatives of the Contracting Parties" envisaged in article 9 of the Treaty of Washington can above all be qualified as "quasi-legislative".

The general legal framework that especially concerns meteorites is provided by the 4 October 1991 Protocol of Madrid relative to the protection of the environment in Antarctica. Article 2 states that the Parties "*designate Antarctica as a natural reserve, devoted to peace and science*". The "sixth continent", before it was even made into a sanctuary in order to protect the environment, was dedicated to the freedom of scientific research and to the vital necessity, in these latitudes, of concrete and effective intergovernmental cooperation.

The first Antarctic meteorite was discovered by chance in 1912 by an Australian expedition (Graham et al. 1985). Today, more than 38000 meteorites have been found over the course of systematic searches. Considerations that are first scientific, and then environmental, have thus led the governing authorities of the Antarctic System to worry about the specific question of meteorites.

The search for meteorites in these extreme latitudes is first of all a matter for national public organisations such as the Antarctic Search for Meteorites (ANSMET) that manage large-scale programmes. Prospecting is essentially localised in the territorial sectors under the responsibility of the programme's State sponsor. They must respect, in their practical implementation, the measures of an international nature drawn up in the framework of the Antarctic System. Of particular relevance is "*Annex IV to the Protocol on Environmental Protection to the Antarctic Treaty – Prevention of Marine Pollution*" adopted by the Representatives of the Consultative Parties in Bonn in October 1991 in the form of a Recommendation (Number XVI-10, came into effect 24 May 2002). Access to these specially protected areas is granted through obtaining a permit from a relevant authority designated by each Party (Articles 3, 4, and 7 of Annex V to the aforementioned Protocol). Meteorite hunting under the aegis of official public institutions is therefore well regulated, and has hardly given rise to any notable problems, except that of tighter and tighter regulations: the freedom of scientific research in Antarctica is incontestable, but like all freedoms, it is defined by international legal measures.

At the end of the 90s however, diverse authorities of the Antarctic System expressed new and serious preoccupations about meteorites. In the workings of a highly conventional administrative and diplomatic chain, it was first the Scientific Committee on Antarctic Research" (SCAR) which caught the attention of the Committee for Environmental Protection (CEP, created by articles 11 and 12 of the Madrid Protocol, and made up of representatives of State Parties) on "the potential for unrestricted collection of Antarctic meteorites by private

expeditions" (SCAR 2000). The CEP took on the issue in 2000 and notes that the collection by private (non-governmental) expeditions "might lead to the degradation of, or substantial risk to areas of scientific significance" (SCAR 2000) and could be considered as contravening Article 7 of the Madrid Protocol which stipulates that "*Any activity relating to mineral resources, other than scientific research, shall be prohibited.*" Indeed, the first private expeditions took place in 1998 and 2000. In 2001, New Zealand delivered a report to the CEP which insists on the potential damage to Antarctic science through inappropriate collection methods. Added to this is the risk of concealment or sales of meteorites by private individuals, i.e. collecting with non-scientific, mercantile goals. The CEP reported to a meeting of Representatives of Consultative Parties in Saint Petersburg which adopted, on 20 July 2001, an international instrument with the following terms:

"Concerned *at the potential loss to scientific research because of unrestricted collection of meteorites in Antarctica;*

Urge *Parties to the Environmental Protocol to take such legal or administrative steps as are necessary to preserve Antarctic meteorites so that they are collected and curated according to accepted scientific standards, and are made available for scientific purposes*" (Antarctic Treaty Consultative Meeting, 2001).

This resolution became binding from the end of the Antarctic Treaty Consultative Meeting (ATCM) meeting, which adopted it. Legally considered as a "measure" in the sense of the Antarctic System, it was addressed to all State Parties (Gautier 2006). It is advice given to the Parties of the Protocol: we are more in the domain of a recommendation than in that of an obligation *stricto sensu*. Certain parties, however, rapidly deferred to this recommendation. We note that this measure stipulates a broad allocation of the finds: meteorites must be available for scientific objectives. Collection with mercantile goals is not formally prohibited, but implicitly condemned. There is certainly nothing in this text which can be interpreted as prohibiting collection by private expeditions or persons: these can be tolerated, but on the condition that they are auxiliary to scientific research.

The deferment to each State Party of the power of regulation is simply framed by an international directive provision taken by a group of States (the ATCM) in a solidly institutionalised framework. Among nations which have created national measures in order to preserve Antarctic meteorites, several deserve to be highlighted.

The United Kingdom makes it known that the relevant national authority (Secretary of State for Foreign and Commonwealth Affairs):

"*5. Shall not grant a permit for such activities unless it is satisfied that the activities will be undertaken "only for the purpose of scientific research"*

6. ... Permit conditions also expressly prohibit the sale…

7. It is the unequivocal view of the UK that Antarctic meteorites fall under the provisions of Article 7 of the Environmental Protocol. Further, UK Law expressly prohibits the non-

scientific collection of any mineral resources in Antarctica, including meteorites" (Antarctic Treaty Consultative Meeting, 2002).

Japan possesses more than 16000 Antarctic meteorites. The relevant national body was contacted in 2003 by a "science tourism" travel agency in order to look for meteorites. To oppose this initiative, the national legislature put in place a research permit delivered by the ministry for the environment for one sole reason: scientific research. This country remains very concerned by the development of expeditions with a mercantile aim and hopes other States Parties adopt similar laws (Antarctic Treaty Consultative Meeting, 2003).

The United States made known in 2003 that they had passed federal regulations, in application of the Madrid Protocol and the US Antarctic Conservation Act by adding to the "US Code of Federal Regulations" (CFR) the section 674 specifically dedicated to Antarctic meteorites. The spirit of this new legislation is categorical: "*No person may collect meteorites in Antarctica for other than scientific research purposes*" (Antarctic Treaty Consultative Meeting, 2002 and 45 CFR 674.4). It gives technical details on the rules of transporting and conserving them in order to minimise the risks of contamination, which are always detrimental to subsequent scientific analyses (Section 45 CFR 674.5). It is also requested that collected meteorites are subject to very precise scientific documentation, in particular a description of their physical characteristics. Another obligation was added (Section 674.5.3.v): to submit information on the classification of the rocks from the sky to a catalogue internationally recognised in meteoritic research, "such as the 'Catalogue of Meteorites' published by the Natural History Museum of London or the 'Meteoritical Bulletin' published by the Meteoritical Society".

In total, the Antarctic Treaty System is characterised by a legal technique that is very conventional from an international law viewpoint: a treaty (the 1991 Madrid Protocol) formulates, in one of its provisions (article 7), a prescription: all activity relating to mineral resources – and therefore to meteorites – must lead towards a single goal, as large as it may be: scientific research. The State Parties to this treaty, each with a discretionary margin of evaluation linked to its own national legal tradition, put to work the subscribed international obligation.

The collection of rules in public international law applicable to meteorites is, as we can see, complex. This is increased by transnational legal rules.

METEORITES AND TRANSNATIONAL LAW

We must not forget that there exists in International Relations and Politics particular kinds of Non Governmental Organizations (NGOs, for example: International Red Cross Committee (IRCC), International Olympic Committee (IOC)) that benefit explicitly or implicitly of a « laissez-faire » or a delegation of a quasi-legislative and regulation power from States. The Meteoritical Society – which result from a purely private initiative (Marvin, 1993) – has become one of these peculiar NGOs. Its legal nature implies the concrete power and

jurisdiction to set up a special *transnational law* « made of rules that are purely private in origin, which private powers (or persons) apply… in their reports inter se or *with States* » (Latty 2007; Daillier & al. 2009).

The Meteoritical Society

Scientists from the whole world who are interested in meteorites and in extraterrestrial matters all know the Meteoritical Society (MS), and are often members. Set up in 1933 as a non-profit corporation in the State of California, it is introduced by article 1 of its statutes divided in two distinct parts: Constitution which numbers five articles, and Bylaws which numbers nineteen. As following impartial aims of general interest:

"*Art. 1 …*

2 – The purpose of the Society shall be to promote research and education in planetary science with emphasis on studies of meteorites and other extraterrestrial materials that further our understanding of the origin and history of the solar system.

3 – The Society, in its members and activities, shall be an international organization."

The MS today is more than one thousand members strong, individuals who originate from 52 countries, who share a passion for the study of meteorites. The members of the association are scientists from the whole world, but also traders, collectors, and amateurs. The association exists through the contributions of its members and from donations of all kinds of which it is the beneficiary. As is typical in Anglo-American law, it can receive donations and legacies that can allow significant tax exemptions for the donors. Article 16 deserves to be quoted in its entirety:

"*Article 16 – Political limitation*

1 – No substantial part of the activities of the Society shall consist of carrying on propaganda, or otherwise attempting to influence legislation.

2 – The Society shall not participate or intervene in any political campaign (including the publishing or distribution of statements) on behalf of any candidate for public office."

A non-State player in international relations in the domain of astrophysics and an indispensable NGO with regards to meteorites, the MS explicitly disposes, based on article 5 of its statutes, of an *internal regulatory power*, with a precise procedure.[3] The council, a central and limited organ of the NGO, is configured in a way that ensures a rotation of responsibilities (article 3).

The MS NOMCOM and the MetBull

[3] "Art. 5 - 2 – The Council may enact, annul and amend Bylaws as appropriate and necessary for carrying out the Society's business." The Constitution can be only be amended by the Council, the final decision belongs to the members with a two-thirds majority stipulated.

Two Committees of the MS are particularly important regarding the legal system for meteorites. Firstly, there is the Meteorite Nomenclature Committee (NOMCOM), to which article 12 from the MS statutes' bylaws is dedicated. Its role is key for labelling an object as a meteorite. To force the point a little, we could consider that today what is officially defined as a meteorite is any object declared to be so by the NOMCOM. We are therefore in the presence of *an organ of an NGO which exercises national authority by delegation from US federal regulations, but also a global authority practically recognised by the community of researchers and persons interested by meteorites*. The general powers which are attributed to it cover all technical and scientific operations that are indispensable for the process, including the official name given which has to be used by Society publications[4]. This is a requirement, specifically for Meteoritics and Planetary Sciences and Geochimica and Cosmochimica Acta, for example.

The last update of the NOMCOM's provisions date from 2015. §2 of article 12, which regulates the composition of the committee, reveals a pronounced concern for diversification and internationalisation: researchers and museum curators must be represented, with the concern that countries who are the most active in meteorite research are present. It is above all §6 which interests a legal expert: it accords veritable internal regulatory authority[5] which is not just symbolic, though it might really be enforced only to members of the Society.

The question might arise in the case of the identification of a stone as a meteorite from an institution (national, private or other) other than the MS, and followed by a justified refusal from the NOMCOM. Such a case, classical in general international relations, would be quite difficult. The status of the stone would remain pending for the topical reason that it does not exist, on the matter of meteorites, any permanent instrument in charge of the settlement of disputes[6].

The 2015 revision served to specify the essential function of the NOMCOM: the approval of the name given to new meteorites. But above all, this article 12 § 6 clearly states the legal authority to elaborate and publish directives in order to establish standardized rules for classifying meteorites[7]. In application of this provision concerning regulatory authority, the NOMCOM adopted a very long, very technical and very detailed document (Meteoritical

[4] "Art. 12 – 1 – The NOMCOM shall be responsible for establishing guidelines for the naming of meteorites, for the approval of new names… and for dissemination of this information in the *Meteoritical Bulletin* and the *Meteoritical Bulletin Database*."

[5] "Art. 12 - 6 – The Committee shall formulate rules appropriate to its function. These rules shall be official following ratification by the Council."

[6] Connected with that question is the problem of validation from a third State out of the USA (or from an international organization such as UNESCO) of the *internal regulatory authority* of the MS. Usual state practice under international law relies on discretionary diplomatic recognition of non-governmental organizations (NGO) decisions and regulations (see for example : applicability on a State territory of the Olympic International Committee [OIC] or the Red Cross international Committee). A State recognition allows territorial implementation and practical efficiency of these decisions and regulations.

[7] "2015 Revision - B-4 "The NOMCOM creates rules for carrying out items 1 & 2 above [approval of new meteorite names & management of provisional names], "Guidelines for Meteorite Nomenclature" and publishes them on the Society Website and, from time to time, in the Meteoritical Bulletin."

Society 2019) which explicit addressees the members of the Society who wish to officially register the meteorites they have found. This document makes clear in nine points the prerequisite conditions for having a new meteorite approved.

During the last revisions of these "Guidelines", Point 9 was added: "*Meteorites found on celestial bodies other than earth.*" (Meteoritical Society 2019). Here the NOMCOM takes into consideration a new technological reality: observation from a distance and/or the collection of a meteorite duly identified on the surface of a celestial body by means of a machine or a robot.

Labelling, naming and classifying a meteorite must provide information for the global scientific community for whom it is of special interest. Publication is therefore indispensable, as it shows international functional recognition of an object determined to be a meteorite. A *Publication Committee* supervises the content and the publication of the journal "Meteoritics and Planetary Science" which integrates the "Meteoritical Bulletin" (MetBull) which can be regarded as a sort of official catalogue of meteorites. The *de facto* monopoly progressively put in place by (and to the benefit of) the MS is not contested, notably because of the reliability of and the speed in which the information is published as well as the indisputable quality of scientific service given to researchers from the entire world.

The MS Code of ethics

In the framework of its internal regulatory power, the Council – a central organ of the MS – wanted to draw up a *Code of Ethics*. This debate, initiated in 2005, still has not led to the adoption of a text which would have a consensus at the heart of the Council. The question was reactivated in 2006, when the Ministry of Commerce and Industry in the Sultanate of Oman requested to the president of the MS that the NOMCOM refuses to register meteorites illegally collected on its territory and bans scientific publications on them, and when they are not accompanied with an official export certificate. In April 2007, following discussions at the heart of the Council, the President of the MS officially replied that it is very respectful of the right of each State to protect its natural treasures, including meteorites, and that the NOMCOM has the responsibility to give a name to meteorites after they have been precisely described (including their place of discovery). He added that the MS cannot take responsibility itself to make the export rules of each nation respected. It will alert its members on the necessity to scrupulously respect the aforementioned rules.

This affair revealed a flaw in the authority of the MS. It can in effect supervise the conduct of researchers who are members of the Society: this is a normal internal regulatory prerogative of an organisation. But it has no hold on private meteorite hunters who are not members, who might be tempted to smuggle objects that are quite easy to hide because of their small size.

Discussions at the heart of the Council of the MS on this subject are very open. Certain members, culturally reticent about strict regulation, consider that all meteorites are in fact likely to be scientifically interesting: we must not exclude analysing, classing and conserving

them, unless they are of doubtful origin, i.e. smuggled out of a country. Or to put it another way, a rigorous mechanism with regards to the geographical origin of the stone or to its traceability would never be put in place: what counts is that as few meteorites as possible escape scientific analysis.

Despite this reticence and these objections, a reworked "Ethical Guidelines" project circulated in November 2014, was brought up at the Council meeting in March 2015 (Woodlands, Texas) and in 2016 (Berkeley, California). It is now considered as a position statement and states:

"*Members who recover, collect, trade, display or do research on meteorites should comply with all applicable national, state and local laws and regulations; international conventions and agreements; institutional and professional rules and codes; and rules of good scientific practice.*" [8]

The MS transnational rules

The MS is therefore very productive, and produces abundant transnational rules applicable to meteorites. We are indisputably in the presence of a NGO that is defending an area of general scientific interest on an international level. In our opinion, countries have neglected the work MS carries out as for other international intergovernmental organisations (see above). This explains that it now occupies, through its own initiative, an almost long-standing, self-appointed pre-eminent place. This learned society was invented from scratch, on the basis of a self-authorised statute, as an original regulatory body, and it invented a transnational legal package. We know that there are other domains in which non-governmental production of legislation defines specific activities, for example sports law or humanitarian law. At the heart of the MS, the Council and the NOMCOM play an essential role. The production of legal regulations is very centralised since the Council has, according to its statutes, the power to approve the rules on how the Nominating Committee functions[9], to adopt and revise the bylaws, and, in a general way, the collection of rules framing the activities of the Society's members. Only the NOMCOM has what we could describe as an autonomous regulatory power (Bylaws, art. 12 §1). Their internal operational rules must however be approved by the Council (Art. 12 §5).

From the point of view of its substantial authority (*ratione materiae*), the MS has stated the rules on the collection, conservation, classification, labelling, naming, storage, sampling and publication of meteorite data. Its authority is therefore narrow, but with great depth: nothing to do with meteoritic scientific knowledge escapes it. It seeks to exercise - and it exercises in international practice - a global authority of regulation and officialization. We should note however that the MS does not scientifically analyse meteorites itself. It considers recognising competent laboratories with well-established international reputations sufficient for

[8] https://meteoritical.org/society/governance/position-statement
[9] Bylaws, art. 1 §3.

guaranteeing the reliability of scientific observations. This process of analysis leads to a meteorite's classification and the storage of a specimen in an institution experienced in matters of conservation[10].

The addressees of the MS's rules and recommendations are its members[11]. Nations and intergovernmental organisations are not ranked as members, and are therefore not the addressees of the norms decreed by the Society. We can consider however that the circle of addressees of the MS' rules is extended to what we could refer to as "indirect addressees" or even "knock-on addressees". A meteorite hunter who works for himself, in order to trade them, will have to follow the NOMCOM's prescriptions if he wishes to see his find labelled. The sale price of a meteorite will be the direct function of its recognition and classification attested by the NOMCOM. In the same way as an individual who finds a stone in his garden can presume, with certain pieces of evidence, that he is in the presence of a meteorite. Besides any scientific consideration, he will only make hard cash from it if he proves that the object is indeed a fragment of a celestial body. This will proceed by an analysis carried out within a recognised laboratory, which will concretely apply the rules and recommendations of the MS to the stone. Anyone possessing such a rock from the sky is therefore a knock-on addressee of these rules.

From the point of view of spatial and geographical localisation, the aim of the MS' regulations is that they are applied to all meteorites, so that they avoid as much as possible the legitimate curiosity of interested researchers. Or more precisely, any rock for which the finder hopes to obtain official recognition comes under, as an object, the rules of the Society. They are most often found on the surface of the Globe, but also, we remind ourselves, on the surface of celestial bodies other than Earth.

The ensemble of these regulations is undeniably effective, because they are very globally respected by their addressees. There is a direct and immediate interest for this respect when seeking an official label, which functions in a way that is comparable to international recognition. Non-respect of the rules would result in the NOMCOM refusing to approve the name of a meteorite whose origin was suspect. In fact, scientists accede to these constraints, as it would not otherwise be possible to publish in "Meteoritics and Planetary Science" and other specialised journals work on a non-declared meteorite.

All of the above tends to show the regulatory consistency developed by the MS, in the application of its proclaimed goals and principles. The pre-eminence of the Council allows labelling of meteorites that is internationally enforceable, i.e. an *erga omnes* enforceability towards the global scientific community.

We therefore find ourselves in the presence of a convergence of international recognition. The MS recognises the expertise of certain scientific laboratories and the know-how of some museums in conserving specimens. At their end, they emit international scientific recognition

[10] Guidelines for Meteorite Nomenclature, revised Feb. 2015, art. 7 §1 d) & f).
[11] Art. 2 from the MS' Constitution, in its Statutes.

for rocks from the sky. The universal community of researchers of all nationalities recognises in turn the technical and serious nature, the rules and standards, and the mechanisms and procedures codified by the MS over the decades, in the form of a continuous process of regulatory production. Today there is hardly a substantial scientific dispute over the rules and practices of the MS. We are not aware of any group of persistent objectors. Researchers voluntarily and spontaneously apply rules that are considered relevant. Are we witnessing a partial and specialised transnational legal system, accepted as such by all interested professionals according to the methods which make us accept these as a customary process?

METEORITES AND NATIONAL LAW

It is difficult to carry out a systemic study of national legislation on meteorites according to the precepts of comparative law. The main reason is that nations are, as a whole, not interested in the legal dimension of a meteoritic phenomenon. For them it is a small detail of Space law. The national territory is only very rarely touched in a visible way: the event is more of a media than a legal matter. The research conducted for this article uncovered the legislation of around twenty countries containing provision especially devoted to meteorites.

National legislation on meteorites

The general interest of the scientific community is specialised and essential. From the point of view of the researchers, the important thing is to gather together a maximum number of specimens in order to analyse and class them to contribute to knowledge about the origins of our solar system (Lauretta & Mc Sween 2006). As soon as, in a given country, a sufficiently influential group of scientists exists, they will lobby the public authorities for measures to be taken in order to avoid the disappearance, degradation or deterioration of discoveries and finds. Scientists are calling for legislation on the collection and conservation of meteorites. They hope at the same time that such legislation will not pose an obstacle to international scientific cooperation, which is the everyday reality of all researchers.

The *economic interests are not negligible*, because meteorites have become commercial objects. For example, in Morocco, the amount for commercial dealings linked to meteorites is several million dollars per year. A quite distinctive market has developed, with buyers who are private collectors and museums, the latter wanting both to enrich their collections and contribute to new scientific analysis. This market varies in kind, and it is evidently rarity which determines the commercial value of these rocks. Meteorites considered the most precious can cost up to one thousand Euro per gram. Their sale can result in them ending up in public auction. This *economic law of meteorites* perspective is not dissimilar to uses and practices in the art market.

There remains a well-established point: exploiting the metals -which can be rare and precious- that meteorites contain, given the current state of techniques and taking into account their size, is not economically viable.

From a prospective point of view, it is a different case for asteroids whose size, volume and composition can allow us to envisage, in time, industrial exploitation. The President of the United States announced in December 2015 a new law, called the "Space Act" [12] which allows American companies to appropriate, exploit and sell the natural resources of celestial bodies, breaking with the 1967 Space Treaty. Until this law is applied, the Treaty has not, yet, been violated. We are however in a hypothesis -more in theory than in practice for now- which comes under the international responsibility of the State. In the same spirit, the Vice-Prime Minister of Luxemburg announced at a Press conference on 3rd February 2016, the intention of the authorities to put in place a legal framework allowing private companies to exploit the resources of Space, i.e. to land on large celestial bodies, possibly modifying their orbits, to bore them, to transform on site the primary materials they contain and to transport them to Earth. The State would take out financial shares in the commercial companies that have such an objective at the moment that they are legally registered in Luxemburg law.

We see here how we move from science fiction and utopia to the future of technology, while we keep in mind that the small size of meteorites keeps them apart from such a legal forecast.

States' power and jurisdiction

Legislative jurisdiction to States regarding meteorites obeys the usual rules of public international law. The general precept here is that of the power to legislate in the framework of *territorial jurisdiction*: each State will pass, if it so wishes, its own measures on meteorites which are found or which fall on a portion of territory that it controls. But it is no way an obligation: a State can clearly abstain from legislating. When a meteorite is localised in the middle of spaces which are not subject to any national sovereignty, then in this case a State's *personal jurisdiction* comes into practice: the activity of any natural or legal person is dictated by the law of the person's nation-state.

Let's not forget that when there are territories where sovereignty is disputed, the general rules of international law for disagreements are applied when the dispute touches on the legal status which secures the ownership of meteorites. Applying this general precept is not however an obstacle to special jurisdiction attributed by special international texts (in practice treaties): *lex specialis derogat lex generali*. In this way, the Treaty of Washington on Antarctica of 1st September 1959 put in place, as we have seen above, a special system, with well-stabilised institutional and regulatory dimensions. It incorporates in a very distinctive way, by its now well-established function, the general precept of territorial jurisdiction.

[12] "Spurring Private Aerospace Competitiveness and Entrepreneurship" Act of 2015 – Passed by the Senate on November 10th, 2015.

The Agreement Governing the Activities of States on the Moon and other Celestial Bodies signed in New York on the 18th December 1979 also puts into place, from the point of view which interests us here, a special international system. As we indicated above, Article 1 of the Agreement does not anticipate that the system of internationalisation of celestial bodies will be applied to meteorites. We easily deduce from this provision that the legislative authority with regards to meteorites is implicitly deferred to States.

We will finally be aware that the recognised constitutional freedom of nations will sometimes lead to plural national legislations. Federal states, within a federal State and sometimes even decentralised autonomous regions within a unitary State are able to adopt differentiated local legislation. This is the case of Canada, with Anglophone provinces with a common law tradition and the province of Quebec, with a civil law tradition is a particularly significant example of legal pluralism.

Diversity of national legislation

This is an undeniable given in international practice. When a State applies its legislative jurisdiction on meteorites, it can generally implement this jurisdiction in total freedom and sovereignty. But this national jurisdiction can also sometimes be framed by previous international engagements that often require the existence of national laws. When a nation applies its legislative jurisdiction on meteorites, or implements it in total freedom, or when this is framed by following international engagements, this most often require the existence of internal laws.

A particularly interesting case is that of *systematic* meteorite hunting. Foreign hunters often contact local colleagues or a corresponding institution. A convention is established which specifies how the discovered meteorites are shared. In this situation, the simplest way for interested scientists is that national authorities do not intervene. Certain countries, such as the Sultanate of Oman, are however shown to be more fastidious regarding their territorial sovereignty, and impose as a prerequisite a special licence for meteorite hunting.

The majority of meteorites from warm deserts come from the Sahara, a complex geopolitical zone shared between numerous countries. The majority of Saharan countries has rather restrictive legislation on the collection and exportation of meteorites. Morocco is the exception, in that today it does not have specific legislation. This legal situation, as well as the open and difficultly controllable geographical nature of this immense desert favour smuggling. The result is that the large majority of Saharan meteorites are put on the market in Moroccan territory. The Meteoritical Society, with their concern for rigorous labels, has in consequence suspected the geographic precision of Saharan meteorites for a long time and has created a particular classification for them: *North West Africa* (NWA). This suspicion had a perverse effect: duly documented Moroccan meteorites struggled to be recognised as such and were assimilated by the MS as NWAs, generating a veritable loss of resources for Morocco

(Larouci et al 2014). The Meteoritical Society has now put in place a classification system which allows the recognition of Moroccan meteorites as such.

The central question is evidentially that of *property*. The most recent legislative trend is to put in place an obligation to deliver the newly found or discovered meteorite to a public institution, -often a national museum which already has a collection, sometimes a university- with reasonable financial compensation for the finder, on the basis of market prices (Schmitt, 2002). The meteorite can even have the special status of "national asset" as it is the case in Mexico[13].

A typical situation is that of according the property deeds to the owner of the land of the fall or find. This is the case notably for Argentina (except the State of Chaco), the United States, Canada (except the Province of Quebec), Belgium, the Czech Republic and the United Kingdom.

In France, according to a venerable judgement of Aix en Provence Civil Court[14], a meteorite that crashed down into a field was said to have been incorporated into the ground, becoming its accessory: it therefore belonged to the owner of the field. Alongside jurisprudence, administrative and scientific use has been established: the discovered sample is shared between the owner and the finder. But the Muséum national d'Histoire naturelle (MNHN) is clearly always very interested, as a scientific institution in all new finds, in order to enrich its collection. The simplest thing therefore is an amiable agreement, in the form of a contract, by which each of the titleholders (owner of the field and finder) graciously cedes a significant portion of the fragment to the MNHN as was the case for the meteorite fallen in Draveil (Essonne) in 2011. A dispute can however always arise. This was the case for a meteorite found in the state-owned forest of Mont Dieu (Ardennes) in June 2010, by a private individual who had obtained verbal authorisation to search for meteorites with the help of a metal detector. Charleville-Mézières Civil Court judged that "*the meteorite, a product fallen from the sky, is clearly a thing without a master.*" The rights of the finder were unequivocal: he is therefore the owner of the discovered object (Billard 2014).

The Province of Quebec, within the Canadian federal State is the only province where the adage "Finders Keepers" applies, as it is influenced by the French legal tradition. In Japan, which has a mixed legal system (civil and common law), article 239 of the Civil Code stipulates that an object found without a previous owner is the property of the first person to establish concrete possession of the said object. This general rule applies to meteorites.

In most countries, *export* controls exist: exportation of a meteorite is granted case by case. Such a regime is supported by the idea that a meteorite is national treasure and that, in one way or another, its exportation impoverishes the collective heritage as stated by Algeria, Australia, Canada, Chile, France, Mexico, and New Zealand national legislations.

[13] Ley Général de Bienes Nationales, Articulo 6, fraccion XIX, 1994.

[14] Aix Civil Court, 17 Jan 1898, Toche vs. Descordes and Lejean. We can also mention a case from 1841, when a meteorite landed in Bourbon Vendée (today La Roche sur Yon), which gave ownership to the finder against the field's owner.

We cannot however forget that numerous States have not seen the need to create specific legislation for meteorites. When they judge it opportune to do so, national legal traditions and customs of national legislators often inspire analogue situations. This is why in New Zealand a meteorite is classed as an antique[15]. As far as national law technicians often feed on the analogy principle, a meteorite can also be assimilated to treasure, archaeological remains or even a fossil (Wahiche 2013). There is also recourse to more abstract categories: Charleville Mézières Civil Court considered a meteorite as a thing without a master, a *res nullius*. The notion of "common thing" (*res communes*) is probably useful for characterising a rock from the sky. Appropriation of a meteorite is thus organised by law, by conciliating freedom of scientific research and the freedom of commerce. The owner's rights can be subject to notable restrictions justified by the need for conservation, the nature of national heritage and the demands of research (Shaffer 2012; Kaul et al. 1999)

Within each State institution, "legal Do It Yourself" often prevails over the basis of interest - or disinterest- for the issue of meteorites. Administrative authorities as the usual authors of regulatory texts, the capacity of the national scientific community to effectively play the role of a pressure group, even media reports of an important meteorite shower: all these elements, and perhaps others, random and circumstantial, play their role in the decisions of governments to pass specific legislation.

This means that the question of harmonising nations' legislation, and the evolution towards a uniform law are almost as far as the edges of our solar system…

CONCLUSION

The complexity of the legal nature of meteorites is due to the fact that they fall within the range of public international law, transnational law and national law. It is not always easy to distinguish within the three aspects.

Definitively, we note the variability of legal rules applicable to meteorites depending onto which territory they fall or where they are found.

We note at the same time a trend towards regulatory uniformity in scientific analysis of meteorites, which frames the practices of researchers and regulates in part traders' activities. Key in that aspect is the Meteoritical Society, a NGO, that since the 1930's has framed the habits and customs of meteorites' nomenclature, classification and scientific studies.

The meteorite remains however a poorly defined legal object, because it can be viewed under many angles: as an object susceptible to private appropriation, as a "common thing" (*res communis*), or as an element of national heritage. And why not tomorrow, at the initiative of the Meteoritical Society, and followed by nations, as common heritage of mankind…

[15] Antiquities Act 1975 (consolidated 1990).

To help define the status of meteorites and possibly harmonize disparate legislation that does not help to the protection of meteorites, a first step would be to collect the variety of state and NGO regulations and legislations concerning meteorites. Such an effort could be led by the Meteoritical Society in collaboration with one or several centres of comparative law.

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