Past as Prologue: Roman Law and the Interpretation of International Space Law Governing the Use of the Moon and Other Celestial Bodies

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Abstract—This article argues that the Roman legal concepts of *res nullius* and *res communes* can be fruitfully applied to the legal regime created by the Outer Space Treaty (OST) in order to articulate a legal, Treaty-compliant basis for the extraction of natural resources from the Moon and other celestial bodies. The first section of the article scrutinises the text of the OST, which mandates that the acquisition by States or their authorised actors of property rights in outer space must not involve any claims of territorial sovereignty. The second section proffers Roman legal ideas as a potential solution to this quandary. Applying Roman

* Harris Manchester College, University of Oxford. I am most grateful to the OUULJ Editorial Board for all their hard work, and extend my sincere thanks to the Associate Editors whose many constructive comments on earlier drafts rendered this article fit for publication. I would also like to thank those who have endured rather more discussion of space law than they bargained for at breakfasts, lunches, and dinners. All errors and omissions remain my own.

legal thought to the vexed question of celestial resource extraction, this article advocates for the recognition of lunar resources as appropriable *res nullius*, enabling their use while safeguarding the status of celestial bodies as 'the province of all mankind.'

Introduction

After more than 50 years, humankind is poised to return to the Moon. A transformative new era of lunar activity is imminent, as rapidly advancing technological capabilities will enable the exploration and use of the Moon by public and private actors from across the globe.[1] Whereas the scramble to reach the Moon in the 20th century was driven by great power rivalry and a quest for national prestige, commercial interests in the 21st century, particularly in the mining and extraction of resources, are projected to be the principal drivers of lunar exploration and use.[2]

There is however a serious problem: as Section I of this article will demonstrate, the legality of the exploitation of lunar resources remains an open, unsettled question. The foundational document of space law, 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 (hereafter referred to as the 'OST'), establishes the broad contours of the

[1] 'Which Firm Will Win the New Moon Race?' *The Economist* (London, 25 January 2023) 77.

[2] The Moon is rich in resources not easily obtained on Earth, such as Helium-3 and numerous rare earth metals. While a discussion of the specific mining opportunities afforded by the Moon is beyond the scope of this paper, it is worth noting that, at present, water is easily the most important lunar resource. The Moon is estimated to contain 'at least' 600 million metric tons of water ice on or near the surface of its north pole alone, the exploitation of which would be essential for the long-term sustainment of human life on the Moon. See Bill Keeter, 'NASA Radar Finds Ice Deposits at Moon's North Pole' (*NASA*, 2 March 2010).

legal landscape in outer space, but makes no direct mention of space resources and contains no explicit provisions regarding their exploitation.[3] Without legal certainty, it is unlikely that profitable lunar ventures will ever get off the ground. What is needed is a coherent legal framework that permits the extraction of resources from the Moon and other celestial bodies and is consistent with the fundamental principles of the OST.

Enter Roman law. It is the contention of this article that the interrelated Roman legal concepts of *res nullius* and *res communes* can contribute a great deal to the ongoing debate concerning the legal status of celestial bodies and their resources. Specifically, it will be argued that these two mutually reinforcing concepts of Roman law, when applied to the legal regime created by the OST, resolve latent interpretational ambiguities and encourage the designation of lunar resources as *res nullius* susceptible to legal and treaty-compliant exploitation, while preserving the inalienable *res communis* status of the Moon itself.[4] In addition, it is submitted that Roman legal concepts can function as valuable heuristic tools which can fruitfully be used to evaluate fundamental issues pertaining to the legal status of outer space and its natural resources.

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[3] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Outer Celestial Bodies (entered into force 10 October 1967) 610 U.N.T.S. 205.
[4] The Moon's inalienable *res communis* status is enshrined by Article II of the OST. See Section IB, below. The relationship between *res communis* (modern international law) and *res communes* (Roman law) is discussed in Section IIA.

I. Property Rights on the Moon under the OST

The OST is the indispensable point of departure for any discussion of property rights in outer space. More than half a century after it came into force, the foundational instrument of space law still stands as the single most important international convention governing human activities in outer space, for it establishes the basic contours of the celestial legal order, and enjoys near-universal recognition among space-faring States.[5] Articles I and II of the OST establish, respectively, two 'guiding principles': (1) outer space is free for exploration and use by all States; (2) outer space, including celestial bodies, is not subject to 'national appropriation' by any means.[6] These principles are regarded by authoritative commentators as having become customary international law.[7] However, as Lisk notes, the overarching principles enumerated in Articles I and II are

[5] Ram S. Jakhu, 'Evolution of the Outer Space Treaty' in Ajey Lele (ed.), *Fifty Years of the Outer Space Treaty: Tracing the Journey* (New Delhi 2017) 13.

[6] David E. Marko, 'A Kinder, Gentler Moon Treaty: A Critical Review of the Current Moon Treaty and a Proposed Alternative' (1993) 8(2) Journal of Natural Resources and Environmental Law 293, 299.

[7] Francis Lyall and Paul B. Larsen, *Space Law: A Treatise* (2nd edn, Routledge 2018) 64. The designation of a rule as customary international law both reflects and reinforces its normative strength. The UN regards a principle or rule as customary international law if widespread state practice demonstrates consistent adherence to it, and if that adherence comes to be motivated by a belief among States in the obligatory nature of that principle or rule. See Michael C. Wood, 'Second Report on Identification of Customary International Law' (New York, 2014) UN A/CN.4/672, 72-74.

'incredibly general' and their 'exact scope and application remains in question'.[8]

In this section, Articles I and II will be discussed in turn and together, in order to establish the purpose and nature of the legal regime that the OST brought into being, and the extent to which proprietary rights are permitted on celestial bodies. It will be argued that despite its ambiguity, on balance the OST broadly favours the use of outer space, including its exploitation. It will be seen that such rights as the Treaty permits States to exercise in space are over persons and things, not territory. The prohibition against claims of territorial sovereignty in space and on celestial bodies places significant limitations upon the nature and scope of proprietary rights, but does not preclude them altogether. In the next section, the contention will be advanced that Roman legal doctrine is capable of reconciling the tension between the Treaty's purpose, and the restrictions it imposes.

A. Article I – The Object and Purpose of the OST: Freedom of Exploration and Use

Article I, paragraph 1 of the OST is programmatic, and clearly establishes the treaty's fundamental object and purpose. It declares that '[t]he exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries … and shall be the province of all mankind.' The next sentence contains important provisions clarifying the nature of this principle: 'Outer space …

[8] Joel Lisk, 'Review Essay: Space Law: A Treatise By Francis Lyall And Paul B Larsen Routledge, 2018' (2018) 39(2) Adelaide Law Review 453, 460.

shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.'

As Hertzfeld has aptly observed, 'it is not the physical domain of outer space . . . but the activity itself, the "exploration and use" of outer space, which is addressed.'[9] In this connection, the full title of the Treaty should again be recalled: it is the 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies'. The commonplace shortening of the title to 'Outer Space Treaty' is certainly expedient, but the programmatic emphasis on exploring and using outer space must not be overlooked. Establishing that all States have the freedom to explore and use outer space, and laying down certain foundational parameters to govern such exploration and use is, plainly, the principal object and purpose of the Treaty. It is submitted that cognisance of the overarching objectives of the OST – which are clearly articulated by both the title and the opening clause – adjures a purposive, use-friendly approach to the interpretation of the Treaty's other provisions.

B. Article II – The Nature of the Legal Regime Established in Outer Space

Article II of the OST is the most contentious provision of the entire Treaty, for it lays down a fundamental rule in terms which

[9] Henry R. Hertzfeld, Brian Weeden, and Christopher D. Johnson, 'How Simple Terms Mislead Us: The Pitfalls of Thinking about Outer Space as a Commons' [2016] IAC-15 - E7.5.2 x 29369, 3-4.

leave the scope of its application indeterminate.[10] It succinctly declares that '[o]uter space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.' The apparent simplicity of this statement belies its ambiguity, and two questions naturally arise in connection with Article II: what is meant by the prohibition of 'national appropriation', and what are the implications of this non-appropriation principle for the legal status of outer space and its resources?

It is evident that, in broad terms, Article II forbids any extension of territorial sovereignty into outer space.[11] In addition to barring 'national appropriation' by means of traditional public international law methods of acquisition ('claim of sovereignty', 'occupation', 'use'), a tellingly categorical catch-all coda is appended to Article II – 'or by any other means.'[12] However, it is precisely the sweeping nature of Article II's language which makes ascertaining the precise scope of application of Article II's prohibition on 'national appropriation' difficult.[13]

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[10] For a summary of the myriad interpretations advanced in connection with Article II, see Stephan Hobe, 'Adequacy of the Current Legal and Regulatory Framework Relating to the Extraction and Appropriation of Natural Resources' (2006) McGill University IASL & IISL Workshop on Policy and Law Relating to Outer Space Resources) 204-213.

[11] See Ogunsola O. Ogunbanwo, *International Law and Outer Space Activities* (first published 1975, Springer, 2013) 77.

[12] See Ian Brownlie, *Principles of Public International Law* (5th ed., OUP, 1998) 129-130 for an overview of the traditionally acknowledged means of territorial acquisition in public international law.

[13] The fact that the phrase 'national appropriation' is scarcely encountered elsewhere in international law makes interpretation of this article yet more difficult. As Hobe memorably put it, the phrase 'national

What is it, exactly, that cannot be appropriated? Specifically in relation to celestial bodies including the Moon, does Article II only prohibit their appropriation *en bloc*, or does this prohibition also extend to the resources of celestial bodies? We shall return to this crucial question shortly, in subsection C. For the present, however, it is important to emphasise the fact that Article II categorically prohibits any State from extending its sovereign territory into outer space.

This is hugely consequential. To understand the profound effect of Article II on the legal status of outer space, a brief summation of the way in which international law divides the world (or rather, the cosmos) is necessary. In spatial terms, international law recognises four regimes: (1) territory subject to the sovereignty of a State or States; (2) territory not formally subject to the sovereignty of any State which possesses a special status of some sort (such as, historically, UN trust territories); (3) *res nullius*, which in modern international law connotes territory 'legally susceptible to acquisition by States but not as yet placed under territorial sovereignty'; (4) *res communis*, which refers to an area available for use but which cannot be made subject to the sovereignty of any State.[14] The latter two categories are derived from Roman law, and shall be discussed at length in Section II of this article.

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appropriation' contains the 'mysterious mix of a private law concept, "appropriation", and a public law concept, "national".'
See Stephan Hobe, 'Adequacy of the Current Legal and Regulatory Framework Relating to the Extraction and Appropriation of Natural Resources in Outer Space' (2007) 32 Annals of Air and Space Law 121.
[14] Brownlie (n 12) 105.

Before the OST came into force, the presumptive status of outer space, under general international law, was bifurcated. Outer space, in the sense of deep space, was regarded as *res communis*, because the acquisition and exercise of sovereignty over a domain that is infinite, intangible, and ever-expanding is conceptually impossible; celestial bodies, on the other hand, were regarded as *res nullius*, being theoretically capable of appropriation by States.[15] Article II upended this presumption. Today, on account of the status of this provision as customary international law, all States are obliged to regard the Moon and other celestial bodies as *res communis*.[16]

C. Articles I and II: Ensuring the Rights of Exploration and Use of the *Res Communis*

To understand why the Moon and other celestial bodies were designated as *res communis* by Article II, we must return to Article I, which establishes the object and purpose of the OST. The overriding objective of the OST is to enshrine that the exploration and use of outer space is a right enjoyed equally by *all* States. Any claim of sovereignty over the Moon or other celestial

[15] See Bin Cheng, 'The Legal Status of Outer Space and Relevant Issues: Delimitation of Outer Space and Definition of Peaceful Use' (1983) 11 Journal of Space Law 89, 91, which delves into the presumptively bifurcated status of outer space and celestial bodies before the OST came into force. See also Zachos A. Paliouras, 'The Non-Appropriation Principle: The Grundnorm of International Space Law' (2014) 27(1) Leiden Journal of International Law 37, 42.

[16] That outer space, including the Moon and other celestial bodies, is to be regarded as *res communis* is universally acknowledged by scholars. This was also the understanding of the national representatives who drafted the 1967 OST: see Carl Q. Christol, *The Modern International Law of Outer Space* (first published 1982, Pergamon) 45ff.

bodies by one or more States would contravene this foundational goal, rendering the exploration and use of outer space no longer the 'province of all mankind'. Thus, in light of the central object of the OST, it is clear that the purpose of Article II 'is to prevent any exclusive claim to outer space and celestial bodies in order to allow the use of these areas as *res communis*.'[17]

Having established that under Article II all areas of outer space are regarded as *res communis*, in order to ensure that their exploration and use is open to all States, we can now return to the question of whether the prohibition of 'national appropriation' applies to the natural resources of celestial bodies. Much necessarily hinges upon the meaning of the term 'use', which is left undefined by the Treaty despite its manifestly central importance.[18] Does 'use', as employed in the Treaty, encompass and countenance the exploitation of a celestial body's natural resources? To attempt an answer to these two interrelated questions, it is necessary to turn to the Vienna Convention on the Law of Treaties.[19] Article 32 states that, where the meaning of a term or provision is ambiguous, '[r]ecourse may be had to supplementary means of interpretation, including the preparatory work of the treaty'.

To begin with, it is notable that the UN General Assembly resolution which established the Committee on the

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[17] Hobe (n 13) 123.

[18] The 'use' of outer space is mentioned repeatedly, throughout the OST. This term is to be found in the full title, the preamble, and in Articles I, II, III, IX, X, XI, and XIII.

[19] Vienna Convention on the Law of Treaties (entered into force 27 January 1980) 1155 U.N.T.S. 331.

Peaceful Uses of Outer Space (UNCOPUOS), responsible for drafting what became the OST, referred to the 'exploration and exploitation of outer space'.[20] During debate concerning the final wording of the treaty in July 1966 (by which time the term 'use' had come to replace 'exploitation'), the French representative expressed the view that 'use' is to be construed as equivalent to 'exploitation', a position which was supported by several other representatives; unfortunately, his recommendation that the legal subcommittee should define the terms 'exploration' and 'use' in the final treaty was not taken up.[21] In essence, what exactly was meant by 'use' was left to later determination by state practice. Yet in the absence of any explicit reference to the exploitation of natural resources in the OST, the legal basis for Treaty-compliant exploitation of space resources remains murky, and essentially unarticulated.

We can conclude that Article II prohibits any claims of territorial sovereignty in outer space, thereby designating the Moon and other celestial bodies as *res communis*. We can also conclude that an appropriately purposive interpretation of this provision does not prohibit the appropriation of natural resources found on celestial bodies, so long as territorial sovereignty is not claimed or conferred over the areas where such use takes place. This requirement imposes substantive limits on any property regime which may be implemented in outer space, precluding a

[20] 'International Co-Operation in the Peaceful Uses of Outer Space' (12 December 1959) UNGA Resolution 1472 (XIV): 'Recognizing the great importance of international cooperation in the exploration and exploitation of outer space.' Note, in the very name of the committee, the centrality of 'use'.

[21] The views of the French representative are quoted in Christol (n 16) 39-40.

territorial basis for claims of rights of ownership. This prompts three interrelated, fundamental questions – what is sovereignty, what is property, and can the latter exist without the former?

D. Property Rights Without Territorial Sovereignty?

What constitutes sovereignty? Sovereignty may be understood as the comprehensive complement of rights, duties, and powers which a State, *de jure*, holds over persons, things, and territory, to the exclusion of other States.[22] Exclusive ownership of territory is fundamental to the exercise of territorial sovereignty, but is not a *sine qua non* for the exercise of sovereign control over persons and things. As Judge Max Huber wrote in the influential *Island of Palmas Case* (1928) between the Netherlands and the United States:

> 'International law . . . [has established the] principle of the exclusive competence of the State in regard to its own territory, in such a way as to make it the point of departure in settling most questions . . . [T]erritorial sovereignty belongs always to one, or in exceptional circumstances to several States, to the exclusion of all others. The fact that [certain] functions of a State can be performed by any State within a given zone is, on the other hand, precisely the characteristic feature of the legal situation pertaining in those parts of the globe which, like the high seas or lands without a master, cannot [*res*

[22] Brownlie (n 12) 106.

> *communis*] or do not yet [*res nullius*] form the territory of a State.'[23]

Where territorial sovereignty does not or cannot exist, as in outer space, States may still, as Judge Huber indicates, perform certain sovereign functions and exercise certain sovereign rights, and this extra-territorial competence over persons and things is encompassed by the concept of 'jurisdictional sovereignty'.[24] Article VIII of the OST explicitly grants States jurisdiction in the following terms:

> 'A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body . . . is not affected by their presence in outer space or on a celestial body, or by their return to the Earth.'

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[23] See United Nations Reports of International Arbitral Awards (1947) 2, 838-9.

[24] See Martin Dixon, Robert McCorquodale, and Sarah Williams, *Cases & Materials on International Law* (6th ed., OUP, 2016) 281ff. The authors describe jurisdictional sovereignty as a broad-ranging concept which includes that 'part of the exercise of its sovereignty' which a State exerts over persons (both natural and legal). It is this 'personal' aspect of jurisdictional sovereignty, and specifically its extra-territorial dimension – which Article VIII of the OST explicitly grants to signatory States operating in outer space – that concerns us in this article.

Thus, Article VIII establishes that States are competent to exercise jurisdiction over persons and things in outer space. Furthermore, States Parties are under a positive obligation to ensure that entities subject to their jurisdiction comply with the provisions of the OST, by virtue of Article VI:

> 'States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental or non-governmental entities … The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.'

While the question of the extent to which the provisions of the OST apply to private actors, writ large, is beyond the scope of this paper, it is submitted that the Treaty's provisions indirectly apply to all private actors whose activities are authorised by States Parties. This is due to the important provisions to be found in Articles VIII and VI, which establish that States Parties retain extra-territorial jurisdiction over persons and objects launched into outer space, in order to ensure that all activities conducted in outer space are carried out in conformity with the provisions of the Treaty.

Property is conventionally understood, in the context of public international law, as consisting of a fourfold 'bundle of

rights'.[25] These are the right to possess, to right to use, the right to exclude, and the right to transfer.[26] Just as sovereignty can be broken down into constituent elements (the most salient being territorial sovereignty and extra-territorial jurisdiction over persons and things subject to state-control), so too can the rights of property be conceptually partitioned. In international law, the exercise of all four proprietary rights over territory confers 'absolute title', a status tantamount to territorial sovereignty, which is precluded by the OST's designation of outer space as *res communis*.[27] However, as Ogunbanwo observes, 'the prohibition of absolute title does not mean that States are prohibited from exercising any rights' in outer space.[28]

By virtue of the prerogatives of jurisdiction and control over persons and space objects granted to States by Articles VIII and VI, it follows that certain property rights – embodied by the explicit retention of '[o]wnership of objects launched into outer space' (Article VIII) – already exist in outer space. Can States' continuing jurisdictional sovereignty over persons and objects launched into outer space form the basis for the exercise of property rights over natural resources which said persons and

[25] Ezra J. Reinstein, 'Owning Outer Space' (1999) 59 Northwestern Journal of International Law and Business 72.
[26] ibid.
[27] Brownlie (n 12) 146. At a minimum, the right to exclude is inimical to outer space's *res communis* status. In addition to Article I, see also Article XII of the OST: 'All stations, installations, equipment, and space vehicles on the Moon and other celestial bodies shall be open to representative of other States Parties to the Treaty'.
[28] Ogunbanwo (n 11) 69. The precise nature of those rights which are permitted in outer space shall be dealt with in Section II.

objects might acquire therein, without contravening the OST? That is the critical question.

E. An Affirmative Answer in Search of An Appreciable Justification

Numerous commentators, not to mention States, have answered this question in the affirmative, without providing a persuasive legal basis for this claim.[29] In recent years the United States of America, the world's pre-eminent space-faring power, has made a concerted effort to forge consensus around the position that the extraction of natural resources from celestial bodies is an OST-compliant activity which does not violate Article II's prohibition of 'national appropriation' and claims of extra-terrestrial territorial sovereignty. The chosen instrument of the United States for the process of building consensus around its position regarding the exploitation of natural resources in outer space is the 2020 Artemis Accords, a non-binding plurilateral agreement which seeks to establish a framework for cooperation in the exploration and use of the Moon and other celestial bodies.[30] The provisions of the Artemis Accords are explicitly rooted in the

[29] See Carl Q. Christol, 'Article 2 of the 1967 Principles Treaty Revisited' (1984) 9 Annals of Air and Space Law 217ff.

[30] Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of The Moon, Mars, Comets, and Asteroids for Peaceful Purposes (13 October 2020). See Rossana Deplano, 'The Artemis Accords: Evolution or Revolution in International Space Law?' (2021) 70(3) Int'l & Comp LQ 799, 800: 'The intention of the United States is to gather consensus around its interpretation of the Outer Space Treaty with regard to the exploitation of the Moon's resources.' As of writing, 33 States have signed the accords, including the following major space-faring nations: France, Germany, India, Japan, Mexico, South Korea, the United Kingdom, and the United States.

OST, with the clear intent being to build upon, rather than replace, the principles which international space law's founding document established. With this in mind, the contents of Section 10, paragraph 2 of the Artemis Accords must be regarded as a significant step towards the formation of a consensus in support of the position that the exploitation of natural resources on celestial bodies does not contravene the non-appropriation principle laid down by the OST:

> 'The Signatories emphasize that the extraction and utilization of space resources, including any recovery from the surface or subsurface of the Moon, Mars, comets, or asteroids, should be executed in a manner that complies with the Outer Space Treaty and in support of safe and sustainable space activities. The Signatories affirm that the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty.'

As the United States and its international partners, including the United Kingdom, continue their efforts to forge a global consensus around this position and establish new rules of customary international law permitting the extraction of natural resources from the Moon and other celestial bodies, it will be necessary to articulate and defend the legal basis for their interpretation of Article II of the OST.

F. Conclusion: The Need for a Practicable Legal Theory

The OST does not prohibit the acquisition and exercise of property rights over natural resources in outer space, nor does it explicitly recognise them. The development of a legal regime governing the exploitation of natural resources in outer space was essentially left to State practice, with the caveat that such a regime must not lead to the extension of territorial sovereignty into outer space. In order for any legal regime developed by States to attract the *opinio iuris* necessary to establish a definite norm of customary international law permitting the exploitation and ownership of natural resources in outer space, it is necessary for it to be grounded in a coherent legal theory that delineates the relationship between space resources and the domain of outer space itself. This theory must be capable of justifying the position that the recognition of property rights over outer space resources, by a State on behalf of those falling under its jurisdiction, does not *ipso facto* constitute a claim of sovereignty in outer space. It is at this point that Roman law enters the picture, and offers just such a theory.

II. Thinking With and Through Roman Law

Classical Roman law articulated a sophisticated and multifaceted approach to what Rose refers to as 'nonexclusive property', formulating many different categories of such property in response to various social, economic, and above all, practical

considerations.[31] Broadly speaking, the various Roman legal categories of nonexclusive property all connote those things which were available to all, and subject to the exclusive control of none. A diverse range of property concerns that are often 'blithely lumped together as 'the commons' in our own legal and economic thinking' were given sustained, nuanced, and differentiated treatment by the Roman jurists.[32] In this section, it will be submitted that consideration of the ways in which Roman law dealt with the disposition of 'nonexclusive property' and its concomitant resources can yield important insights into the current and future state of the legal regime in outer space, and could provide the theoretical basis for the establishment of a new customary norm of international law. Classical Roman law may be ancient, yet '[t]he ideas it reflects remain evergreen, despite changing times and shifting structures.'[33]

Specifically, at issue in the ensuing discussion are the Roman legal concepts of *res communes* and *res nullius*, and the applicability of these concepts to celestial bodies and their

[31] Carol M. Rose, 'Romans, Roads, and Romantic Creators: Traditions of Public Property in the Information Age' (2003) 66 Law & Contemp Probs 89, 91. Rose identifies the Roman categories of nonexclusive property as *res nullius*, *res communes, res publicae*, *res universitatis*, *res divini iuris*, and *res extra commercium* (92-109). Only the first two will be dealt with in this article, yet the intellectual dexterity of the Roman approach to this topic, exemplified by the sheer number of categories, is important to note.

[32] ibid.

[33] L. F. E. Goldie, 'Title and Use (and Usufruct) – An Ancient Distinction Too Oft Forgot' (1985) 79 American Journal of International Law 689, 691.

resources.[34] It will be argued that the Roman legal concepts of *res communes* and *res nullius* convey three fundamental propositions of salutary value when considering the present and future state of the legal regime governing the use of celestial bodies. The first is that *res communes* and *res nullius* are interrelated: in Roman law they are not opposites, but mutually reinforcing corollaries. The second is that the right to access and appropriate natural resources from *res communes* is not just an aspect of these spaces, it is the principal purpose underlying this legal category. In other words, *res communes* exist in order to guarantee uninhibited, universal use-rights with respect to natural resources. The third proposition concerns the conditions of ownership that Roman law attached to the appropriation of natural resources from *res communes*. For any property rights to become vested, actual control over the resources in question had to be demonstrable and ongoing.

A. The Containers and its Contents: Distinguishing Roman Law from International Law

It is necessary to begin with a matter of semantics. The terms *res nullius* and *res communis* carry distinct connotations in the context of Roman and international law. Despite this, it is submitted that the Roman conceptions of *res communes* and *res nullius* may profitably inform our understanding of their international law descendants. This is because the principal distinction lies in the

[34] Note that modern international law invariably refers to *res communis*, whereas scholarly discussions of the relevant Roman legal concept render it as *res communes* or, alternatively, *res communes omnium*. For the sake of clarity and in deference to convention, this article will use the term *res communes* when discussing the Roman legal concept, and *res communis* when discussing its international legal descendant.

conception of the relationship between the concepts of *res communis* and *res nullius* – each concept, *qua*, functionally resembles its Roman antecedent. Whereas in modern international law these two concepts are conceived of as diametrically opposed territorial designations, in Roman law *res nullius* is closely related to *res communes*.[35] It is submitted that the modern, oppositional understanding does not preclude the application of Roman legal ideas regarding *res communes* and *res nullius* to the issue at hand, because such application does not necessitate any change to modern international law definitions either of *res communis* or *res nullius*. What Roman law facilitates is an approach to *res communis* spaces which is informed by an understanding of their original purpose – to enable the extraction of the *res nullius* resources contained therein. Such an understanding provides a conceptual basis for the extraction of resources in a manner which accords with the provisions and purpose of the OST.

With one notable exception, *res nullius* in Roman law refers not to territory but to things, of natural origin, which are susceptible to acquisition. The *Institutes of Justinian*, drawing heavily on the work of the Classical Roman jurists, describes the legal status of *res nullius* by way of example, writing that '[w]ild animals, birds, and fish, that is to say all creatures which the land, the sea, and the sky produce, as soon as they are caught by any one become at once the property of their captor'.[36]

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[35] For the international law definitions of *res nullius* and *res communis*, and the oppositional rather than complementary understanding of their interrelationship, see Brownlie (n 12).

[36] *The Institutes of Justinian* 2.1.12 (trans. J. B. Moyle, 5th ed., Project Gutenberg, 1913) 37.

Things capable of designation as *res nullius* are derived from spaces that closely map onto those classified as *res communes* in Roman law. Again, the *Institutes*: 'the following things are by natural law common to all [*res communes*] – the air, running water, the sea, and consequently the seashore.'[37] The inextricable connection of *res communes* and *res nullius* in Roman Law is apparent, as is the divergence of the latter concept from its territorial connotation in modern international law.[38] But what of the exception alluded to above? In a seemingly esoteric excursus Gaius, the famous jurist of the 2nd century, wrote that '[a]n island arising in the sea (a rare occurrence) belongs to the first taker.'[39] Yet upon reflection, this seeming exception in fact confirms the general rule that things produced by or contained within *res communes* spaces – be they fish, precious stones, or entire islands – are, *ipso facto*, *res nullius* and therefore capable of appropriation in Roman law.

What are we to make of this connection? In one sense, it is evident that both *res communes* and *res nullius* are conceived of as 'common' to everybody, the former in perpetuity, the latter until the moment of appropriation. As Capurso has eloquently argued,

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Likewise, '[p]recious stones, and gems, and all other things found on the seashore, become immediately by natural law the property of the finder': *Institutes* 2.1.18.

[37] ibid 2.1.1.

[38] As for *res communes*, its basic meaning in international law has not substantively diverged from its Roman private law origins, although the legal persons to whom it applies (States, rather than individuals) are of course different.

[39] *The Digest of Justinian* 41.1.7.3 (trans. Alan Watson, Vol. 4, Penn Press, 1985).

these two Roman legal concepts can together be regarded as a 'complex category, made up of two things in one':

> 'The first one – the "container" – [is] the physical domain at large: the air, the flowing waters, the seas and the seashores [*res communes*]. The second one – the "content" – [is] the set of all things that [can] be found in that domain, such as birds in the air, fish in the sea or pebbles on the seashore [*res nullius*] … [all of which are] susceptible to appropriation once seized.'[40]

This attractive way of thinking about the interrelation of *res communes* and *res nullius*, with the former as a non-appropriable 'container' full of appropriable 'contents', merits consideration as a model applicable to celestial bodies and their natural resources. Article II of the OST establishes that celestial bodies are *res communis*, and therefore not subject to appropriation; Article I establishes that the fundamental purpose of the legal regime created by the Treaty is to enshrine the freedom of all States to explore and use outer space. A great deal of scholarly literature regards these two provisions as fundamentally in tension with one another, with the non-appropriation principle being seen as potentially prohibitive of the most obvious use of outer space – the exploitation of its natural resources.[41] Yet Roman law encourages us to view the non-appropriability of a *res communis*

[40] A. Capurso, 'The Non-Appropriation Principle: A Roman Interpretation' (2018) International Aeronautical Congress, Bremen 4.
[41] See, for example, N.D. Cooper, 'Circumventing Non-Appropriation: Law and Development of United States Space Commerce' (2009) 36(3) Hastings Constitutional Law Quarterly 457.

space and the appropriability of its resources as inherently concomitant concepts.

B. Where the Wild Things Are: The Purpose of *Res Communes*

For a long time, the conventional view taken by scholars has been that the Romans created the legal category of *res communes* simply in order to group together all those spaces that are practically difficult or impossible to appropriate, such as the sea and the sky.[42] This misses the mark, overlooking the instrumental purpose underlying the designation of a space as *res communes*. In a word, the rationale behind *res communes* is fundamentally to guarantee common usage and facilitate economically productive activity. As Frier observes, non-legal lists of 'common property' assembled by various Roman writers are known to include things such as sunlight, the wind, and fire; such an approach is never found in Roman legal texts addressing *res communes*, which are concerned with the practical uses for these spaces such as fishing, fowling, and pearling.[43] Chardeaux has persuasively argued that '[u]sage common to all, being the *goal* of the norm of inappropriability, is at the heart of the *res communes* regime.'[44]

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[42] This view is still sometimes reflected in contemporary scholarship. See Rose (n 31) 93: '*Res communes* encapsulates what might be called the Impossibility Argument against private property: the character of some resources makes them incapable of … exclusive appropriation.'

[43] B. Frier, 'The Roman Origins of the Public Trust Doctrine' (2019) 32 Journal of Roman Archaeology 644.

[44] M.A. Chardeaux, *Les Choses Communes* (LGDJ, 2006) 6. Translation my own.

Roman law's designation of the seashore as *res communes* brings this point home. The seashore is, of course, perfectly susceptible to appropriation. Wealthy Romans were exceedingly fond of seaside villas (Cicero had at least six) and, like today's tycoons, considerably less keen on public beaches.[45] Yet the Roman jurists consistently maintained and over time developed the idea that the seashore was *res communes*, and therefore freely accessible to all legal persons for a broad range of uses.[46] These uses included the building of structures, with the caveats that, in recognition of the non-appropriability of the seashore, no enduring title to the land beneath the structure was granted, nor could such buildings interfere with the public's use-rights.[47] As the great 3rd century Roman jurist Ulpian wrote: 'the sea and its shores are common to everyone, like the air . . . [therefore] no one can be prohibited from fishing'.[48] Perhaps the most telling indication of the instrumental purpose behind the *res communes* legal concept comes from Celsus who – in a passage remarkably

[45] Regarding Cicero's seaside villas, see B. C. Fortner, 'Cicero's Town and Country Houses' (1934) 27 Classical Weekly 177ff. Disagreement between Roman jurists and propertied elites over the legal status of the seashore is implicit in an offhand comment made by Cicero: '. . . when question arises about shores, which you jurists all claim are public property . . .' See Cicero, *Topics* (trans. H. M. Hubbell, CUP, 1949) 407.

[46] For an account of how the *res communes* concept developed over time, see M. Schermaier, '*Res Communes Omnium*: The History of an Idea from Greek Philosophy to Grotian Jurisprudence' (2009) 30 Grotiana 20.

[47] *Digest* (n 39) 41.1.14; 41.1.50: 'one [intending to build on the seashore] should be physically prevented, if he builds to the inconvenience of the public.'

[48] *Digest* (n 39) 47.10.13.7. That Ulpian felt compelled to discuss, in the rest of this passage, the legal remedies available to those who were illegally barred from exercising their right to use the seashore demonstrates that the *res communes* concept did not simply acknowledge reality, it sought to shape practice.

redolent of the OST's programmatic Article I declaration that the exploration and use of outer space is the 'province of all mankind' – wrote that 'the sea is for the common use of all mankind.'[49]

The *res communes* concept is not some sort of default depository for spaces that do not readily lend themselves to appropriation. The designation of an area as *res communes* has an instrumental, purposive function, which is to guarantee that rights of access and use can be freely enjoyed by all. At this point, it should be recalled that Article II of the OST modified the presumptive legal status of celestial bodies from *res nullius* (in the sense imparted to that term by international law) to *res communis*. Confronted with a dilemma analogous to that which the Roman jurists faced with respect to the seashore, the drafters of the OST chose to enshrine the non-appropriability of celestial bodies. The purpose behind designating celestial bodies as *res communis* was manifestly to prevent exclusive territorial claims from being made, in order to ensure that all could explore and use celestial bodies. Yet the question of whether the extraction of natural resources constitutes a licit use is left open by the OST. The Roman jurists were clear-eyed about the sorts of use which *res communes* spaces are meant to facilitate: the extraction and exploitation of natural resources. Presented with the provisions of the Treaty and the nature of celestial resources, a Roman jurist would be in no doubt that such resources are ripe for the taking.

[49] *Digest* (n 39) 43.8.3 – *maris communem usum omnibus hominibus*. The very next sentence from this passage assimilates the status of the seashore to that of the sea, and specifies that 'the use of the shore or the sea' cannot be impaired.

C. The Contingent Conditions of Ownership

Res communes spaces, in the Roman conception, were established to ensure the susceptibility of the *res nullius* natural resources contained therein to claims of ownership. How, then, was ownership actually acquired over those objects classified as *res nullius* in Roman law? The answer is simple, straightforward, and appealing. The full complement of property rights over *res nullius* were available, but they only vested upon the assumption of actual control over the thing in question.[50] The Roman playwright Plautus illustrated the essence of this notion more than 2,000 years ago, in words that still intuitively resonate today:

> 'Look, you wouldn't call any particular fish in the sea mine, would you, as long as it's in the sea? But those that I catch, supposing I do catch any, are mine. They're my property, and no one else can put a legal claim to them or demand a share of them. I sell them all on the market, in public, as my own stock. Right? Of course I do. For the sea is unquestionably common to all persons.'[51]

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[50] *Digest* (n 39) 41.1.5: 'The question has been asked whether a wild animal, so wounded that it may be captured, is already ours . . . [t]he majority opinion is that the beast is ours only if we have actually captured it.' See also *Digest* (n 39) 41.2.3: 'Once an animal strays, so that it cannot be found, it immediately ceases to be ours.'

[51] Plautus, *The Rope* (trans. E. F. Watling, Penguin, 1964) 131-2. For further information on the extraordinarily close connection between law and comedy on the Roman stage, and Plautus' intimate familiarity with Roman law, see E. Karakasis, 'Legal Language in Plautus with Special Reference to *Trinummus*' (2003) 56 Mnemosyne 194.

In this passage, the essential features of Roman law's approach to the extraction of *res nullius* natural resources from *res communes* spaces are laid bare. On the basis of his common right to access and use the sea, the fisherman is able to acquire full rights of ownership over any fish which he may capture. However, the acquisition of these rights is wholly contingent upon the removal of the fish from the *res communes* and the continued exercise of control.[52] Until that moment, it continues to be *res nullius*, capable of appropriation by anyone. In other words, there cannot be property rights over resources *in situ*. The great value of this rule for the articulation of an OST-compliant legal framework governing the exploitation of natural resources on celestial bodies is that it creates a distinction between the acquisition of property in things, and the *de facto* appropriation of territory. By necessitating that resources must be physically extracted from the *res communis* in order for property rights to vest, it becomes impossible to claim territory under the guise of claiming resources.[53] By virtue of this rule, the non-appropriable legal

[52] The Roman jurists were much interested in the legal status of *res nullius* resources which were brought under control, and then lost in some way. See *Digest* (n 39) 41.1.44, where Ulpian, noting his disagreement with Pomponius, opines that 'a fish, wild boar, or a bird which escapes from our power will become the property of anyone else who seizes it. [Pomponius, however] thinks that such a thing remains ours [ie does not return to its former *res nullius* status] so long as it can be recovered.' For an illuminating discussion of this passage, and its reverberations in subsequent legal history, see T. Finkenauer, 'On Stolen Swine, Fished Fisherman, and Drowned Dogs' (2011) 7 Roman Legal Tradition 30.

[53] An interesting question, which lies beyond the scope of this paper, is whether the exhumation of resources from beneath the surface of celestial bodies is sufficient for said resources to be deemed 'removed' from the *res communis* and subject to property rights.

status of the 'container' is upheld, without conceptually or practically impeding the exploitation of its 'contents'.

III. Conclusion: The Possibilities and Shortcomings of Roman Law in Outer Space

How can Roman law refine and inform our understanding of the issues which must be addressed by any OST-compliant legal regime purporting to establish a new norm of customary international law permitting the exploitation of celestial resources? Three propositions drawn from Roman law have been put forward in this article. The first is to paradigmatically shift assumptions about the relationship between the non-appropriability of *res communis* spaces and the appropriation of natural resources. By regarding the latter as fundamentally enabled by the former, a more expansive view of use-rights is encouraged. The second is to regard the integral relationship between the 'container' and its appropriable 'contents' as the defining feature of the *res communis* concept. Interpreting legal concepts and categories in terms of their instrumental purpose and practical utility, as the Romans did, is imperative, lest the debate concerning the OST and the exploitation of natural resources loses sight of the Treaty's ultimate goal: to facilitate the exploration and use of outer space. Finally, the rule of Roman law that *res nullius* natural resources cannot be owned until they are removed from their environment and brought under actual control is to be commended, as an indispensable means of

maintaining the non-appropriability of the *res communis* itself, a principle that must be upheld for any legal regime to be consistent with the OST.

It is submitted that these concepts all hold much promise, and ought to be considered in connection with future efforts to interpret the OST, and articulate the legal basis for the establishment of rules and norms permitting the exploitation of natural resources on the Moon and other celestial bodies. However, one must also consider the shortcomings of the Roman law approach. In the first place, the Roman legal model of natural resource exploitation is predicated upon the tacit assumption that such resources are essentially unlimited; Roman law has no conception of sustainability and makes no provisions concerning the regulation of *res communes*, other than those which guarantee open access and freedom of use. We cannot share this assumption of Roman law, nor the concomitant *laissez-faire* attitude to regulation; the legal regime governing the exploitation of natural resources on celestial bodies must take environmental considerations into account, and provide for the safe, sustainable development and use of such resources.[54] In addition, the rights of exploration and use enshrined in the OST are not unqualified; the Treaty sensibly mandates the establishment of national licensing regimes and the active supervision of space activities over which States have jurisdiction, in order to ensure safety and Treaty compliance.[55] These considerations make it clear that the wholesale reception of Roman legal doctrines into the space law regime, even if such a thing were plausible, would not be advisable. Rather, in the spirit of Roman law, we should adopt a

[54] See Reinstein (n 25) 74ff.
[55] See Articles VI and VIII of the OST.

practical, instrumental attitude toward those Roman legal principles that are useful in the articulation of new norms and new rules governing the extraction and utilisation of natural resources on the Moon and other celestial bodies.