

KNOWLEDGE MANAGEMENT OF PLANT TAXONOMY: A LEGAL NARRATIVE ANALYSIS

Sir David Attenborough's name was imparted to an ancient Burmese damselfly that lived 100 million years before his time. The objective of this paper is to find out why official scientists apply such famous foreign names in traditional locales. Indigenous farmers' rights lacked any such significant father figure. The UPOV model statute for Plant Breeders' rights appears to have overwhelmed farmers' rights. The question is why the internationally organized Plant Breeders' Acts appear to have overridden the local farmers' rights. We propose that names, such as Attenborough's, were used to create so much international monetary value to a plant, using a kind of deifying process, that any local statutory rights appended to that name would have the paramount force of something resembling imperial law. The famed and ennobled European naturalist Linnaeus occupied an essentially deified rank as the dispenser of pragmatic solutions to official botanists' legalistic problems, even in far-flung local areas. He made new imperial laws of plant taxonomy, effectively overriding local farmers' rights, and influencing later worldwide statutory plant breeders' rights laws.

I. INTRODUCTION

The world-famous Sir David Attenborough (Sir David) was recently imparted to an ancient damselfly, paradoxically, that lived 100 million years before Sir David's time. Now named *Mesosticta davidattenboroughi* using the Linnaean system of organism denomination, scientists discovered the Damselfly in Burma's Kachin Province, preserved in amber from the mid-Cretaceous period of the dinosaurs.¹ Thus, the objective of this article is to find out why scientists use such famous foreign names in traditional locales.

Sir David's image was so renowned; the reader could even regard him as a deified figure. In this context were the competing and effectively indigenous farmers' rights, lacking any such significant father figure. They are a right to seeds, to traditional knowledge, to equitable benefit sharing and to participate in decision making.² Lindsay J. Falvey discerned the link between the roles of small-land-holding farmers and assuring continuity of food production and

¹ *A 100-Million-Year-Old Damselfly has been Named after Sir David Attenborough*, BREAKINGNEWS.IE, <http://www.breakingnews.ie/discover/a-100-million-year-old-damselfly-has-been-named-after-sir-david-attenborough-802233.html> (last updated Aug. 16, 2017).

² *International Treaty on Plant Genetic Resources for Food and Agriculture*, FOOD AND AGRICULTURE ORGANIZATION OF THE NATIONS (Jan. 9, 2000), <http://www.fao.org/3/a-i0510e.pdf> [referring to Article 9.2, hereinafter FAO Treaty].

security.³ However, responsibility for enacting the Farmers' Rights concept, under the FAO International Treaty, rested upon national governments.⁴

With these farmers' rights somewhat unsuccessful, the International Union for the Protection of New Varieties of Plants (UPOV) model statute for Plant Breeders' rights appears to have been almost universally recognized, adopted and locally legislated.⁵ The Protection of New Plant Varieties Act 2004, Act 634, (Malaysia), for example, only slightly departs from UPOV 1991.⁶ The Protection of New Plant Varieties Act set out the rights, limitations and duties of a holder of these statutory rights. The key section, Scope of Breeder's Right, arguably removes farmers' rights. It includes the following: (a) producing or reproducing; (b) conditioning for the purpose of propagation; (c) offering for sale; (d) marketing, inclusive of selling; (e) exporting; (f) importing; (g) stocking the material for the purposes mentioned in paragraphs (a) to (f).⁷

Thus, the question arises as to why the internationally organized plant breeders' Acts appear to have overridden the local farmers' rights. Argument tries to show that the use of names, similarly to that of Sir David, were used to create so much international worth to a plant's international name, using a kind of deifying process, that any local statutory rights appended to that name would have the paramount force of something resembling imperial law.

This article employs a historiographic method of legal narrative analysis, by which the work seeks to uncover underlying motives and developments over time. Its aim is to inform those formulating modern legislation. The work is an exegetical discussion of botanical nomenclature history, based on the most authoritative scholarly evidence available. The article is structured to begin with a section examining ancient sophisticated oratorical methods for introducing new law, to account for the deifying process. Then argument moves to a critical analysis of plant breeders' rights legislation, followed by a legal narrative analysis of the origins and development of the binomial classification system in plant taxonomy.

The research will show that the famous and ennobled European naturalist Linnaeus occupied an essentially deified rank as the dispenser of pragmatic solutions to official botanists' legalistic problems, even in far-flung local areas. He appointed lesser figures to both stabilize and spread and confirm his work,

³ See generally LINDSAY J. FALVEY, *SMALL FARMERS SECURE FOOD: SURVIVAL FOOD SECURITY, THE WORLD'S KITCHEN AND THE CRUCIAL ROLE OF SMALL FARMERS* (Thaksin University Book Centre in association with Institute for International Development, Australia, Songkhla, Thailand, 2010).

⁴ FAO Treaty, *supra* note 2.

⁵ International Union for the Protection of New Varieties of Plants, established by the International Convention for the Protection of New Varieties of Plants adopted Dec. 2, 1961, revised Nov. 10, 1972, Oct. 23, 1978, and Mar. 19, 1991 [hereinafter UPOV].

⁶ *Protection of New Plant Varieties Act 2004*, Act 634, (Malaysia), 2004.

⁷ *Id.*, sec 30.

so that his innovations seemed just, plausible and with clear consequences to plant monetary values. In short, he made new imperial laws of plant taxonomy, effectively overriding local farmers' rights, and influencing later worldwide statutory plant breeders' rights laws.

II. THE CRITICAL SOPHISTICAL CONTEXT OF PROPOSING A LAW

Progymnasmata were ancient sophistical oratorical exercises, graded cumulatively into ascending degrees of difficulty. Introducing or attacking a law was a sophistical progymnasmata exercise at the most difficult degree. The word "progymnasmata," indicating sophistical graded oratorical exercises, first occurred in chapter twenty-eight of *Rhetoric for Alexander*,⁸ most probably penned by Anaximenes of Lampscaus⁹ in the fourth century BCE. It was preserved within Aristotle's works. Some progymnasmata exercises were incorporated into Aristotle's *On Rhetoric*. The progymnasmata exercise of "defend" or "attack a law," also known as "introduce a law," was more of a declamation than a typical progymnasmata exercise, more of a *hypothesis* than a *thesis*.¹⁰

Classical pleaders structured their arguments as declamations, analyzing either a historical or a legal problem and developing a pragmatic argument in response to the identified problem. They adapted their argument to a specific audience with a definite need to know the consequences elaborated in their argument.¹¹ An expert pleader trained in judicial rhetoric carefully constructed the declamatory argument.¹² Thus, "introduce a law" was an exercise in outlining and attributing causation, in respect of a law.

Quintilian discussed the elaboration of introducing a law such that arguments should be categorized into those relating to sacred, public, or private rights.¹³ The elaborator should commend the law by the three grades of, in ascending order of gravity, (a) because it is a law, (b) because it is public,

⁸ P. Chiron, *A COMPANION TO GREEK RHETORIC* 90 -106 (Ian Worthington ed., 1st ed. 2007).

⁹ Richard C. Jebb, *ANAXIMENES: THE ATTIC ORATORS FROM ANTIPHON TO ISAEUS* 98, *Vol. 2* (Macmillan, London, 2d ed., 1893).

¹⁰ George A. Kennedy, trans., *PROGYMNASMATA: GREEK TEXTBOOKS OF PROSE COMPOSITION AND RHETORIC* xiv, 11, 121 (Atlanta Society of Biblical Literature, Atlanta, 2003).

¹¹ Chaim Perelman, *Pragmatic Arguments*, 34 *PHILOSOPHY: THE JOURNAL OF THE BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES* 18, 18 (1959); MICHAEL MENDELSON, *DECLAMATION, CONTEXT, AND CONTROVERSIALITY* 92 (*Rhetoric Review*, vol. 13, no.1 1994).

¹² Mendelson, *supra* note 11, at 93.

¹³ QUINTILIAN, *INSTITUTES OF ORATORY* para. 33 (G. Bell & Sons, London, John S Watson, trans., Book 2, 1892).

(c) because it is made to promote the worship of the gods.¹⁴ Rebuttals might be based on the rectitude and standing of whoever proposed the law, or the proposal's procedural validity, or whether it opposed any law still in force.¹⁵ People would ask if the law was consistent, or whether it should refer to past times or to individual people. The most common inquiry was whether the proposed law was proper or expedient.¹⁶ The term proper ought to include consistency with justice, piety and religion. The heading of justice ought to be discussed within more than one point.¹⁷ Expediency often became a question of whether the law could be enforced.¹⁸

Introducing a law was a public promotion of a deity-related proposition, or a directive that apparently was ratified either by a deity or a lawgiver of similarly great prestige. Otherwise, it would be a mere fictitious image of truth. It was elaborated pragmatically in the dual contexts of justice and enforceability of its objects. The argument must show clear lines of causation of its future consequences, its plausibility enhanced by the orator presenting as personally committed to it.

III. PLANT BREEDERS' RIGHTS LEGISLATION

Arguably causing plant breeders legislation to overwhelm farmers' rights, the World Trade Organization's agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), mandates member states to protect plant varieties either by their patents regime, by a *sui generis* system, or using both systems. Most satisfy this requirement through UPOV Convention-compliant statutes.¹⁹ World Trade Organization member states must acknowledge the making of new plant varieties, upholding them as intellectual property rights. The 1991 UPOV convention confers such rights upon an individual breeder.²⁰

The UPOV system of plant variety protection arose with the International Convention for the Protection of New Varieties of Plants, adopted by a Paris Diplomatic Conference of 2nd December 1961.²¹ The former colonial states of the United Kingdom, the Netherlands and Germany created the international basis for recognition of these plant breeders' intellectual property rights.²²

¹⁴ *Id.* para. 34.

¹⁵ *Id.* para. 35.

¹⁶ *Id.* para. 37.

¹⁷ *Id.* para. 38.

¹⁸ *Id.* para. 39.

¹⁹ UPOV, 1991 Act, *supra* note 5.

²⁰ Karin Fister, Iztok Fister, Jana Murovec, & Borut Bohanec, *DNA Labelling of Varieties Covered by Patent Protection: A New Solution for Managing Intellectual Property Rights in the Seed Industry* 26 *TRANSGENIC RESEARCH*, 87, (2017).

²¹ UPOV, 1991 Act, *supra* note 5.

²² *Id.*

Farmers and growers had preferred a more accurately defined group of plant nomenclature, from within a species, which they called a “plant variety.” The UPOV Convention defines a plant variety as a grouping of plants within a single botanical taxon of the lowest rank.²³ This definition suggests a plant variety must be recognizable by its characteristics, as visibly different from other plant varieties, and remaining unaffected by propagation.

Each UPOV member state must register a new plant’s “denomination” of variety when it issues the new variety’s title of protection. The breeder chooses the new variety’s denomination; however, it must satisfy all the criteria in the 1991 UPOV Act. It must be different from all other denominations used by other members of the Union for the same, or any closely related species; it must not be liable to mislead or cause confusion concerning the nature of the variety or identity of the breeder; it must enable the variety to be identified; no rights in the denomination shall hamper its free use as the variety denomination (even after expiry of the breeder’s right); prior rights of third persons must not be affected and such rights can require a change of the variety denomination; it may not consist solely of figures, unless this is an established practice. The breeder must submit the new denomination to all members of the Union and, unless unsuitable within any particular jurisdiction, all the members of the Union will register the submitted denomination.²⁴

Chapter VI of the UPOV Guidance for the Preparation of Laws instructs legislative draftspersons, in states’ legislatures, to model their Plant Breeder Acts sections on denomination, under the following headings and descriptions: (a) Designation of varieties by denominations; use of the denomination;²⁵ (b) Characteristics of the denomination;²⁶ (c) Registration of the denomination;²⁷ (d) Prior rights of third persons;²⁸ (e) Same denomination in all members of UPOV;²⁹ (f) Information concerning variety denominations;³⁰ (g) Obligation to use the denomination; and ³¹ (h) Indications used in association with denominations.³² This virtually ensures close similarity of the various states’ legislation. The term “denomination,” in the International Code of Nomenclature for Cultivated Plants, is described as a single genus or hybrid

²³ *Id.* Art. 1(vi).

²⁴ *Id.* Art. 20.

²⁵ *Id.* Art. 20(1).

²⁶ *Id.* Art. 20(2).

²⁷ *Id.* Art. 20(3).

²⁸ *Id.* Art. 20(4).

²⁹ *Id.* Art. 25.

³⁰ *Id.* Art. 20(6).

³¹ *Id.* Art. 20(7).

³² *Id.* Art. 20(8).

genus.³³ Such codings were based on old taxonomies and drafted by botanists themselves.

IV. PLANT NAMES

A. Taxonomic Norms

Botanical nomenclature and taxonomy are concerned with the naming and classification of plants. Herbalists, cooks, and physicians always needed to identify and differentiate various plants. In the 18th and 19th centuries, there was an expansion in world trade in plants.³⁴ Confusion, created by this increasing trade flow of plants, increased demand for developing a general science of order, that would make sure when "confronted with the same individual entity, everyone will give the same description, and inversely, given such a description everyone will be able to recognize the individual entities that correspond to it."³⁵

The remarkable success of the resultant taxonomy and nomenclature schema was that official botanists worldwide willingly adopted its norms and prescribed procedures. The 1867 Paris First International Botanical Congress formally adopted the International Code of Botanical Nomenclature as the global standard for plant classification and naming.³⁶ The latest version of it is the Melbourne Code, adopted at the 2017 Nineteenth International Botanical Congress.

Thus, plant taxonomy comprises three associated activities: (a) "identification", referencing a plant within a previously named and classified set; (b) "classification", collating plants into sets perceived by differences and similarities; and, (c) "nomenclature," naming these sets of plants following rules based on agreed norms.³⁷ The taxonomists' classification scheme is a hierarchy of taxonomic categories, operating like a "box-within-a box."³⁸ The

³³ C.D. Brickell, et al., *International Code of Nomenclature for Cultivated Plants*, ACTA HORTICULTURAE (Oct. 2009), http://www.actahort.org/chronica/pdf/sh_10.pdf [hereinafter ICNCP] (referring specifically to Article 6(2)).

³⁴ Anna Pavord, *THE NAMING OF NAMES: THE SEARCH FOR ORDER IN THE WORLD OF PLANTS* 26 (Bloomsbury Publishing, London, 2005).

³⁵ Michel Foucault, *THE ORDER OF THINGS* 134 (Tavistock Publications, London, 1970).

³⁶ David Gledhill, *THE NAMES OF PLANTS* 4 (Cambridge University Press, Cambridge, 3d ed., 2002); Brad Sherman, *Taxonomic Property*, 67 *CAMBRIDGE L. J.*, 560-584, 156 (2008).

³⁷ Judith E. Winston, *DESCRIBING SPECIES: PRACTICAL TAXONOMIC PROCEDURES FOR BIOLOGISTS* 9 (Columbia University Press, New York, 1999).

³⁸ John McNeill, *Nomenclature of Cultivated Plants: A Historical Botanical Standpoint*, ACTA HORTICULTURAE (2004), https://www.lib.teiep.gr/images/stories/acta/Acta%20634/634_2.pdf.

plant world hierarchy is graded into “Divisions; Classes; Orders; Families, Genera (genus), and Species ... While all of these categories are important, the species plays a special role, as it acts as the empirical or basic unit of classification.”³⁹

Above the level of species, there is agreement about taxonomic categories, however, there is less agreement about dealing with plant sub-species,⁴⁰ essentially the domain of local farmers. Many different names have been given to taxons, below the level of species. These include cultivars, subspecies, forma, sub-forma, varieties, and sub-varieties. This disagreement is because cultivated plants have mostly not fitted well within official botanical taxonomy.⁴¹ Thus, naming and classifying cultivated plants has a separate body of rules and procedures, stated in the International Code of Nomenclature for Cultivated Plants.⁴² Since Carolus Linnaeus’s (Linnaeus) time, taxonomists have used morphological or physical correspondences and dissimilarities to distinguish and classify.⁴³ These physical attributes remain the principal criteria for plant classification.⁴⁴

One of the International Code of Botanical Nomenclature precepts is the Rule of Priority, which states, after 1753, when a plant has two names, the valid name is the first to be published. De Candolle advocated for the application of the priority principle in the mid nineteenth century. It was adopted at the 1867 Paris First International Botanical Congress and has remained in all subsequent botanical codes.⁴⁵

To be published validly, the taxon’s name must be published in a recognized scientific publication, only by distribution of printed matter to the general public, or at least to botanical institutions with libraries accessible to

³⁹ CHARLES JEFFREY, AN INTRODUCTION TO PLANT TAXONOMY 17 (Academic Press, London, 1968).

⁴⁰ J. Hawkes, *Infraspecific Classification: the Problems*, in INFRASPECIFIC CLASSIFICATION OF WILD AND CULTIVATED PLANTS 1 (B. Sykes, ed., Oxford University Press, Oxford, 1986).

⁴¹ Jeffrey, *supra* note 39, at 91.

⁴² International Code of Nomenclature for Cultivated Plants, *supra* note 33; Sherman, *supra* note 36, at 567.

⁴³ See generally Carolus Linnaeus, SYSTEMA NATURÆ (Laur. Magnus Hojer, Uppsala, 10th ed., 1758).

⁴⁴ Sherman, *supra* note 36, at 568.

⁴⁵ See Alphonse de Candolle, GÉOGRAPHIE BOTANIQUE RAISONNÉE (Masson, Paris, 1855) (Notating that in 1855 de Candolle published Géographie Botanique Raisonnée. This brought together the data being collected by the contemporary world expeditions. It explained living organisms within their environment and why plants were distributed geographically the way they were. This book had a significant impact upon Harvard botanist Asa Gray. A. Hunter Dupree, Asa Gray, American Botanist, Friend of Darwin, Johns Hopkins University Press, Baltimore, 1988, pp. 235–236).

botanists.⁴⁶ The code also regulates the name's valid form.⁴⁷ Excluding local farmers, it also requires the name to be in Latin, complying with the binomial nomenclature system fathered by Linnaeus in the eighteenth century. Thus, each species is given a binomial name, the first word of which is the its genus (common noun), and the second word a specific (trivial) epithet (adjective or possessive noun).⁴⁸

Before the binomial system, names often had epithets for the species' descriptive features, and whenever a species was inserted into a new genus, its name also changed.⁴⁹ This system became unmanageable, with growth in world plant names. Linnaeus' system overcame this problem, because the binomial name designated, rather than described, the plant. The binomial system thus separated official plant naming from local farmers' classification. It separated nomenclature from taxonomy. A name would therefore, remain the same, even when a plant's characterization changed. This successfully stabilized plant names,⁵⁰ ignoring indigenous farmed local variations.

Another important principal in the International Code of Botanical Nomenclature is the "type method," in which a name is attached permanently to its nomenclatural type. This is the element, which validates the description of the publication of a name.⁵¹ Taxonomists have described the type method "as a legal device to provide the correct name for a taxon."⁵² The type is a nomenclature expedient, fixing a botanical name to a specific taxon. It requires taxonomists to attach a new species' name to a single individual representative of that species, the so-called "type specimen." For it to be valid, publication must include the type's name and the institution or herbarium where the type is held.⁵³

Linnaeus wrote, in 1737, that the generic name had the same value on the market of botany, as a coin had in the commonwealth, as long as it became known.⁵⁴ So that botanical names could function as descriptions, there must be

⁴⁶ *International Code for Botanical Nomenclature (Saint Louis Code)* 138 REGNUM VEGETABILE (W. Greuter et al. ed., Koeltz Scientific Books, Königstein, 2000), Art. 32.1(a).

⁴⁷ *Id.* Art. 16-27.

⁴⁸ *Id.* Art. 23.1.

⁴⁹ McNeill, *supra* note 38, at 30.

⁵⁰ Sherman, *supra* note 36, at 569.

⁵¹ C. Stace, *PLANT TAXONOMY AND BIOSYSTEMATICS* 213 (Format Books, New York, 2d ed., 1989).

⁵² S. Jones and A. Luchsinger, *PLANT SYSTEMATICS* 45 (McGraw-Hill, New York, 2d ed., 1986).

⁵³ *International Code of Botanical Nomenclature (Saint Louis Code)*, *supra* note 46, Art. 37- 38.

⁵⁴ Carolus Linnaeus, *CRITICA BOTANICA* (Conrad Wishoff, Leiden, 1737), at 204, in S. Müller-Wille, *Nature as Marketplace: The Political Economy of Linnaean Botany*,

no restrictions on the name's use, except only to ensure the name was stable. Thus, the name must be universally available for use.⁵⁵ This is now reflected in the UPOV rule that after a variety's denomination is registered, no rights accruing from it shall prevent its free use with the variety.⁵⁶

The Director of the Kew Royal Botanic Gardens stated that increasing worldwide trade in cultivated plants, together with stronger legal protection of new cultivars, demanded that names be precise, accurate and stable.⁵⁷ One of the pre-conditions for a grant of protection for plant variety rights was that the application must articulate a denomination, or genus, for the new variety.⁵⁸ When a name was registered, plant variety rights law dictated that the name must be applied as the plant's generic name,⁵⁹ eliminating any possibility for registration of now value-less local indigenous farmed species.

B. Plant Names

Plant taxonomy and systematics is the official study of plant family relationships that underlie nomenclature. Closely related plants are grouped together.⁶⁰ The basic unit of nomenclatural denomination for classifying organisms is the Latin binomial. By pruning Latin descriptions, in many instances to two words, Caspar Bauhin took some first important steps towards the modern binomial system, in his 1623 "Pinax Theatri Botanici."⁶¹ Linnaeus, enobled Carl von Linné in 1757, further developed this scheme in the early 18th century. It was Linnaeus who proposed the fundamental rules for naming plants, first, in 1737 in his "Critica Botanica," and then, in 1751, in his "Philosophia Botanica." In his 1753 "Species Plantarum," Linnaeus advanced the system by consistently using a one-word "trivial name" together with a generic name. The trivial name is now known as a specific epithet, or specific name. Linnaeus retained many of Bauhin's genus names, but the description was reduced to a single word.⁶² Before the mid 18th century, plant names were usually polynomials, consisting of a string of several words.

35 HISTORY OF POLITICAL ECONOMY 154, 158 (2003); Sherman, *supra* note 36, at 570.

⁵⁵ International Code of Nomenclature for Cultivated Plants, *supra* note 33, Art. 28.3.

⁵⁶ UPOV, *supra* note 5, Art. 13.

⁵⁷ Hawkes, *supra* note 40, at 6.

⁵⁸ UPOV, *supra* note, Art. 20(7).

⁵⁹ Sherman, *supra* note 36, at 581.

⁶⁰ T F. Stuessy, PLANT TAXONOMY: THE SYSTEMATIC EVALUATION OF COMPARATIVE DATA (Columbia University Press, New York, 2009).

⁶¹ G. Bauhin, PINAX THEATRI BOTANICI (Ludovici Regis, Basileae, 1623).

⁶² Carolus Linnaeus, *SYSTEMA NATURAE* (Theodor Haak, Leiden, 1735); Carolus Linnaeus, *CRITICA BOTANICA*, *supra* note 54; Carolus Linnaeus, *Philosophia botanica* (R Kiesewetter, Stockholm, 1751); Carolus Linnaeus, *Species plantarum* (Laurentius Salvius, Stockholm, 1753).

European botanists, in the 1500s, including Matthias de L'Obel,⁶³ Andrea Cesalpino⁶⁴ and Caspar Bauhin,⁶⁵ attempted to classify plants according to morphological features of the plant, like leaf shape and fruit characteristics. After good beginning, there was scope for improvement.⁶⁶ In 1700, Joseph Pitton de Tournefort published "Institutiones Rei Herbariae,"⁶⁷ listing about 10,000 plants, including all the plants known to European botanists. Tournefort grouped plants into 698 genera based mostly on flower and fruit parts and giving his reasons.⁶⁸ Swedish-born Linnaeus then enlarged Tournefort's work, and changed the way botanists approached grouping and naming plants, by publishing his landmark book "Species Plantarum" in 1753.⁶⁹

Linnaeus made two substantial innovations to taxonomy and nomenclature. First, he developed a scheme for grouping plants into a genus, based on flower parts.⁷⁰ Second, he determined that all plants should be described by two Latin names. The first word of each binomial is the name of the genus, followed by a second word that is the specific epithet.⁷¹ Linnaeus established his "Systema Naturae" (1735),⁷² based on twenty-four groups arranged by the number and shape of the plant's male stamens.⁷³ It introduced a new official system for the classification of plants, the so-called sexual system.

German critic Johann Georg Siegesbeck, Demonstrator of the Botanical Garden at St. Petersburg, published in December 1737 the "Epicrisis," in which he attempted to refute Linnaeus's sexual system, unsuccessfully, with a weak scholarly case. Siegesbeck was so upset by, as he put it, "the immorality" of the Linnaean system, that he openly taunted Linnaeus, asking whether God really would allow that twenty men or more (i.e., the stamens) have one wife in common (i.e., the pistil) or that the wedded man, apart from his legitimate

⁶³ Mathias de L'Obel & Pierre Pena, *STIRPIUM ADVERSARIA NOVA*, (Thomae Purfoetii, Londinium, 1571).

⁶⁴ Andrea Cesalpino, *DE PLANTIS LIBRI XVI* (Apud Georgium Marescottu, Florentiae, 1583).

⁶⁵ Bauhin, *supra* note 61.

⁶⁶ Robert L. Geneve, *Plant Names*, UNIVERSITY OF KENTUCKY DEPARTMENT OF HORTICULTURE (May 11, 2017), <http://www.uky.edu/Ag/Horticulture/Geneve/teaching/PLS220/plantnames.pdf>.

⁶⁷ Joseph Pitton Tournefort, *INSTITUTIONES REI HERBARIAE* (È Typographia Regia, Parisiis, 1700).

⁶⁸ William T. Stearn, (1960), *Notes on Linnaeus's Genera Plantarum*, In *CAROLUS LINNAEUS, GENERA PLANTARUM*, (3 *Historiae Naturalis Classica*, Weinheim 5th ed., 1754).

⁶⁹ Carl von Linné, *SPECIES PLANTARUM* (Ray Society, London, 2013) (1753); CARL VON LINNÉ, *SPECIES PLANETARIUM* (Ray Society, London, 2014) (1753).

⁷⁰ Linnaeus, *Systema Naturae*, *supra* note 62.

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

wife, have concubines in the shape of the nearby flowers.⁷⁴ Siegesbeck concluded, “that God would never allow such abominable unchastity among his innocent plants, his dearest little creations!”⁷⁵

Linnaeus’ 24 groups were subdivided into classes according to the number of female pistils and styles.⁷⁶ Kuntze changed hundreds of genera and thousands of species names, by picking up dozens of ignored Adansonian names and authenticating these within the Linnean nomenclatural system. Kuntze was followed by a group of North American botanists, who had been working under their own Codes.⁷⁷ Eventually, Latin binomials (Genus and species) became the standard for naming plants. Official botanists who disliked a particular name would simply assign it another one. Also, as newly described plants could be assigned multiple names without botanists realizing it, there was thus a need for consistency,⁷⁸ such need generally satisfied by agreed codification.

C. Paris Code

In 1867, the International Botanical Congress appointed Alphonse de Candolle to draft a Code of Nomenclature. The Paris Code was the result, as the framework for the modern international code for naming plants. It established the Rule of First Priority, stating that the oldest, or first published name was the accepted name.⁷⁹

D. Vienna Rules

The 1905 International Botanical Congress, in Vienna, responding to more episodes of professional botanists’ disarray, redrafted the Paris Code. The resultant Vienna Rules⁸⁰ made two major changes. First, it set 1753, the date Linnaeus’ “Species Plantarum” was published, as the starting date for priority.

⁷⁴ *Id.*

⁷⁵ Heinrich C. Kuhn & Eckhard Keßer, *The Polemics between Carl Linnaeus and Johann Georg Siegesbeck*, Scricciolo, http://www.scricciolo.com/linnaeus_polemic.htm (last visited Jul. 22, 2017).

⁷⁶ Linnaeus, *Systema Naturae*, *supra* note 62.

⁷⁷ P. G. Parkinson, *Adanson's Generic Names for Plants: Status and Typification*, 36 *TAXON*, 87-97 (1987); Thomas A. Zanoni, *OTTO KUNTZE, BOTANIST. I. BIOGRAPHY, BIBLIOGRAPHY AND TRAVELS*, 32 *BRITTONIA* 551-571 (1980).

⁷⁸ Geneve, *supra* note 66.

⁷⁹ A. de Candolle, *LOIS DE LA NOMENCLATURE BOTANIQUE* (Masson, Paris, 1867).

⁸⁰ INTERNATIONAL BOTANICAL CONGRESS BRUSSELS, BELGIUM & J BRIQUET, *RÈGLES INTERNATIONALES DE LA NOMENCLATURE BOTANIQUE ADOPTÉES PAR LE CONGRÈS INTERNATIONAL DE BOTANIQUE DE VIENNE 1905/INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE ADOPTED BY THE INTERNATIONAL BOTANICAL CONFERENCE OF VIENNA 1905*, (G Fisher, Jena, 2nd edn., 1912).

The first name validly published after 1753 became the accepted name. Second, several hundred old European names were conserved by a suspension of the Rule of Priority because of their common usage.

E. Personality Bases for Naming

A need existed for a common code for naming the increasing number of crops selected for their superior characteristics for cultivation.⁸¹ At the 1910 International Botanical Congress, a subcommittee, led by Rendle, drafted the International Code of Nomenclature for Cultivated Plants.⁸² The International Code of Nomenclature for Cultivated Plants 1953, was a combined effort of the International Botanical Congress, Stockholm 1950, and the International Horticultural Congress, London 1952. Ratified in 1930, it allowed naming for both botanical and cultivated varieties.⁸³

The majority of plant names are Latinized Greek words. The Renaissance resurgence of learning in Europe was a rediscovery of knowledge and included the Greek texts by Theophrastus⁸⁴ and Dioscorides.⁸⁵ During the Renaissance, a European university education included the Greek and Roman classics.⁸⁶ Classical deified figures appear in many plant names as tributes to Greek Mythology. Examples include: Narcissus the youth who fell in love with his own reflection. *Asclepias* was an easier basis of plant names to remember, as it commemorated Asclepias the Greek god of medicine.⁸⁷

As a major commemoration, Linnaeus (1707-1778), by now known as the "Father of plant taxonomy,"⁸⁸ was an individual of complexity, self-conscious and self-important, viewing himself alternately as the great reformer of botanical science, or as an insignificant, disregarded individual resembling the small plant, *Linnaea borealis*, with which he chose to commemorate himself. In his autobiography, Linnaeus concluded that "God had been with him [sc.

⁸¹ Geneve, *supra* note 66.

⁸² William T. Stearn, *Proposed International code of nomenclature for cultivated plants*, 77 J. ROYAL HORTICULTURAL SOC'Y, 157-173 (1952).

⁸³ Geneve, *supra* note 66.

⁸⁴ THEOPHRASTUS, *DE HISTORIA PLANTARUM* (Venetiis Aldus Manutius, Romanus, 1497).

⁸⁵ DIOSCOURIDES, 2000, *DIOSCOURIDES: DE MATERIAL MEDICA* (IBIDIS Press, Johannesburg, South Africa, T. A. Osbaldeston, trans., 2000).

⁸⁶ Geneve, *supra* note 66.

⁸⁷ E.M. Berens, *The Myths and Legends of Ancient Greece and Rome* 172, 173 (Harper Collins, London 2016).

⁸⁸ Zhi-Qiang Zhang, Hans-Joachim Esser and Maarten JM Christenhusz, *Phytotaxa 100: The rise of a major journal in systematic and taxonomic botany*, 100 PHYTOTAXA 1 (2013).

Linnaeus], wherever he had gone, eradicating his enemies and making for him a great name, as great as those of the greatest men on earth.”⁸⁹

Plant names that commemorated historical figures in botany were a favored group. An awareness of personal mortality motivated Linnaeus to honor himself and fellow botanists in some plant names. In "Critica Botanica," he wrote that he felt generic names formed to perpetuate the memory of a botanist of excellent service should be preserved religiously.⁹⁰ Most commemorative names are categorized into the following: (a) Botanists, physicians, or scientists, patrons or friends of botany; (b) Gardeners or botanic garden directors; (c) Herbalists; or, (d) Plant collectors. Many portraits in this era depicted people holding plants, where the plant was a commemorative for that individual.⁹¹ These plants acted as symbols of the wealth and status of the subjects.

F. Herbals and Herbalists

The strong association between official botany and official medicine is demonstrated in the theoretical term, the Doctrine of Signatures. This fifteenth to seventeenth century theory asserted that God created everything in the physical world for human benefit and all had a specific purpose relative to humankind. God imparted a "signature" on plants as pointers to how to use the plant in medicine.⁹² In the 16th Century, European science was still interwoven with superstition. Men like Phillip von Hohenheim known as Paracelus, in Northern Europe, and Giambattista Porta (1535-1615), in Italy used astrology with the Doctrine of Signatures to ascribe medicinal properties to plants.⁹³ Nicholas Culpepper (1616-1654) also popularized the notion of the Doctrine of Signatures. In his herbal, still in print today, he wrote: "by the icon (or image) of every herb, man first found out their virtues.”⁹⁴

The Doctrine of Signatures attributed the plants' form or location as a clue to their medicinal uses. Many common names like bone set, eye-bright,

⁸⁹ Kuhn & Keßer, *supra* note 75.

⁹⁰ Carl von Linné and J. Browallius, CAROLI LINNAEI CRITICA BOTANICA IN QUO NOMINA PLANTRUM GENERICI, SPECIFICA, ET VARIANTIA (Lugduni Batavorum, Apud Conradum Wishoff, 1737).

⁹¹ Geneve, *supra* note 66.

⁹² Jacob Boehme, SIGNATURA RERUM, OR THE SIGNATURE OF ALL THINGS (J Ellistone trans. and pref., Gyles Calvert, London, 1651).

⁹³ Lawrence I. Conrad, Michael Neve, Vivian Nutton, Roy Porter & Andrew Wear, THE WESTERN MEDICAL TRADITION, 800 BC - 1800 AD (Cambridge University Press, Cambridge UK, 1st ed. 1995).

⁹⁴ N. Culpepper, CULPEPPER'S COMPLETE HERBAL: A BOOK OF NATURAL REMEDIES OF ANCIENT ILLS 24 (Foulsham, London, 1880).

liverwort, and heart's ease reflected their uses.⁹⁵ The Doctrine of Signatures "is primarily a symbolic device used to transfer information, especially in preliterate societies."⁹⁶ The doctrine uses Mandrake (*Madragora officinalis*) as a favorite example, with its resemblance to a whole person.⁹⁷

John Gerard (1545-1612) was the most recognized of these European herbalists. His popular herbal was called the "Herball or Generall Historie of Plantes," and is still in print.⁹⁸ Gerard's contributions were from his experiences as a gardener. However, most of Gerard's herbal was plagiarized. His "Herball or Generall Historie of Plantes" was a reformulated version of Dodoens' herbal, published forty-three years earlier. He hired Matthias de L'Obel as his consultant, correcting more than 1000 errors in it.⁹⁹ A portrait of Gerard depicts him holding a potato plant. Thus, the first description of the potato from the new world appears in his herball.¹⁰⁰ Linnaeus decided to commemorate Gerard with the genus, *Gerardia*.¹⁰¹ Indigenes, who had already described the plant orally and had made selections for improvement over countless generations, thereby became victims of biopiracy.¹⁰²

G. Plant Collectors

The most noted collector in the 18th century was John Bartram (1699-1777) with his son William Bartram (1739-1823). Eventually becoming the King of England's official botanist in the Colonies, John Bartram introduced many plants into Europe and established the first botanic garden in North America.¹⁰³ John Bartram's work in sending seeds from North America to European gardeners was assisted by his association with English merchant Peter Collinson, a fellow Quaker and a member of the Royal Society of London. Bartram's Boxes, as they then became known, were sent regularly to Collinson, every autumn, for wide distribution in England. In the boxes were generally

⁹⁵ R.B.F. Frazer, L.R.C.P. & S.Ed., *Roger Bacon and Thirteenth Century Medicine*, 2 BRITISH MED. J. 40 (1934).

⁹⁶ Bradley C. Bennett, *Doctrine of Signatures: An Explanation of Medicinal Plant Discovery or Dissemination of Knowledge?* 61 ECON. BOTANY, 246-255, 246 (2007).

⁹⁷ Geneve, *supra* note 66.

⁹⁸ *Id.*

⁹⁹ John Gerarde, *THE HERBALL OR GENERALL HISTORIE OF PLANTES* (Bonham & John Norton, London, 1597).

¹⁰⁰ LUCILLE H. BROCKWAY, *SCIENCE AND COLONIAL EXPANSION: THE ROLE OF THE ROYAL BOTANIC GARDENS* 39-40 (Yale University Press, New Haven and London, 2002).

¹⁰¹ Linnaeus, *CRITICA BOTANICA*, *supra* note 54.

¹⁰² Vandana Shiva, *BIOPIRACY: THE PLUNDER OF NATURE AND KNOWLEDGE* (South End Press, Boston, 1997).

¹⁰³ Geneve, *supra* note 66.

100 or more varieties of seeds, and sometimes dried plant specimens and natural history curiosities. John Bartram was thus at the center of a lucrative business, focused on the transatlantic transfer of plants. In 1764, John Bartram sent two boxes of the plant rarities to Collinson, requesting that he present one to King George III.¹⁰⁴

William Bartram followed in his father's footsteps as a pioneering plant collector, continuing and maintaining his father's Philadelphia botanic garden.¹⁰⁵ The Bartram's Garden is the oldest surviving botanic garden in North America.¹⁰⁶ William was an accomplished naturalist illustrator, and his book "Travels through North and South Carolina, Georgia, East & West Florida," gave him a wide celebrity status for his interactions and descriptions of native American culture.¹⁰⁷

V. CONCLUSION

Introducing a law was a public promotion of a deity-related proposition, or a direction that apparently was ratified either by a deity or a lawgiver of similarly great prestige. It was elaborated pragmatically in the dual contexts of justice and enforceability of its objects. The orator enhanced its argument's plausibility by presenting as personally and religiously committed to it. Argument demonstrated several such figures of eminent prestige, such as Linnaeus.

Plant breeders' intellectual property rights and the system of plant variety protection provides for registration of a new denomination of plant variety, a plant grouping within a single botanical taxon of the lowest known rank. The denomination of a registered plant variety is used when the plant variety is offered for sale on a commercial basis and any person who markets the propagating material of a variety protected within the territory of its jurisdiction is obliged to use the denomination of that variety. This denomination corresponds to the genus in the old taxonomical naming systems. This statutory naming system tends to eliminate local indigenous farmers' rights and reduce the value of their work.

Thus, botanists responded to the desire for a general science of order with the creation of a global standard in plant classification and naming. The standardizing of plant names imparted a stability that served a purpose in

¹⁰⁴ J. M. Edelstein, *America's First Native Botanists*, 15 Q. J. CURRENT ACQUISITIONS, LIBRARY OF CONGRESS 51-59 (1958).

¹⁰⁵ Geneve, *supra* note 66.

¹⁰⁶ Joel T. Fry, *John Bartram and His Garden: Would John Bartram Recognize His Garden Today?* In AMERICA'S CURIOUS BOTANIST: A TRICENTENNIAL REAPPRAISAL OF JOHN BARTRAM, 1699-1777, 249 MEMOIRS OF THE AMERICAN PHILOSOPHICAL SOCIETY 155-183, (Nancy E. Hoffmann & John C. Van Horne eds., American Philosophical Society, Philadelphia, 2004).

¹⁰⁷ William Bartram, *Travels through North and South Carolina, Georgia, East & West Florida* (James and Johnson, Philadelphia, 1791).

facilitating world trade in plants. The International Code of Botanical Nomenclature, that set 1753 as the starting point for plant name priority, honored the work of Carolus Linnaeus and brought attention to a system of naming plants with only two Latin names. Official names thus probably swept away local indigenous names. He became the botanist's essentially deified figure. Any system, or systemic amendments, attributed to him would be enhanced by his personal piety and plausibility.

In his system, binomials would rise to feature in plant taxonomy and systematics, the study of plant family relationships that underlie nomenclature. Closely related plants were grouped together, naming patterns reflected such relationships.

Linnaeus made two substantial innovations to taxonomy and nomenclature. First, he developed a scheme for grouping plants into a genus, based on flower parts, rather than the indigenous systems based on their practical use. Thus, the denomination of modern law came from him. Second, he determined that all plants should be described by two Latin names. The first word of each binomial is the name of the genus, followed by a second word that is the specific epithet. Their consequences being lucrative world trade, these pragmatic innovations were, in essence, new laws.

Eventually, Latin binomials, developed by Linnaeus, became the world standard for naming plants, suggesting his deified status as sufficient for this kind of "professional" legislation. Confusion was still arising from the practice of botanists who, in simply disliking a particular name, would assign it another one. Also, newly described plants could be assigned multiple names without botanists realizing it. Therefore, official botanists clamored for some consistency, in other words for some rules, arguably reflecting an official desire for justice and enforceability of objects. The Rule of First Priority was critical to stabilizing plant names. There needed to be a starting point and agreement among taxonomists, and this procedural addition satisfied the requirement for showing clear lines of causation of future consequences to Linnaeus' collection of innovations.

Latin names conveyed points of interest about honored historical figures, referred to as deified figures in the rules of introducing new laws, and transmitted in the form of Greek and Roman language, myth and culture. Linnaeus intended plant names to carry recognition for the achievements of official botanists and other people involved in botanical endeavors. In this way, he himself appointed effectively lesser deified figures, to carry on and confirm his rule-making work.

The Doctrine of Signatures pointed to how a plant would be used in official medicine, based on the idea that God had imparted a signature in the physical characteristics of plants. Consequently, some plant names still reflected aspects of this pre-binomial system of classification in official botany and official medicine. Allowing the deified old rules to subsist within his innovations must have served Linnaeus' legislative purposes of maintaining links with the mythical past and its antique gods.

Like his unoriginal work, Gerard's hidden hand in pragmatically describing a potato plant, would long be remembered, even if indigenes already described the plant orally and made selections for improvement over countless generations were forgotten. Therefore, plant names now instead commemorated the European official and ennobled botanists, wealthy merchants, eminent collectors and friends of these people involved in a lucrative transoceanic transfer of seeds and plants.

In this process's finality, the ennobled Linnaeus, with a now world-famous image based on essentially religious conviction, had moved to occupy an essentially deified position as the dispenser of pragmatic solutions to official botanists' problems. He worked toward the goal of creating monetary value in the Latin plant names' genus, while devaluing the indigenous farmers' traditional rights in species names. He appointed lesser figures to both stabilize and spread his work, in such a way that his innovations seemed just, plausible and with clear beneficial consequences for officialdom and trade. In short, he succeeded in overwhelming farmers' traditional rights with new foreign imperial laws.

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