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Chapter

William [Guillermo] Bowles: geographer and natural scientist in late eighteenth century Spain

PATRICK O'FLANAGAN

> The Enlightenment was a desire for human affairs to be guided by rationality rather than by faith, superstition or revelation, a belief in the power of human reason to change society and liberate the individual custom or tradition or authority; all backed up by a world increasingly validated by science rather than religion or tradition.[1]

Recently social scientists have been uncovering significant contributions by geographers and natural scientists to the understanding of places, regions and countries during the second half of the eighteenth century.[2] But, 'Enlightenment is itself a metaphor for a process of simultaneous unveiling and observation which privileges sight and seeing'.[3] Natural history and geography were often vehicles employed to advance these objectives. Natural history as a way of thinking and seeing interrupted existing networks of geographical and material relations among people, plants and animals: '… the system of nature overwrote local and peasant ways of knowing in Europe…'.[4]

As Withers has argued,

> There is now widespread recognition that essentialist questions about the nature of geography are inappropriate without attention to context – to the particular meanings the subject had in different times and places – and that there have been different sorts of geographical knowledge practiced and promoted at various times and in various settings.[5]

The Enlightenment and geography

There were in fact several different Enlightenments; each one cocooned within their respective nation states.[6] For Porter, the deepening of

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scientific knowledge about a region or state during the Enlightenment was exhibited along four distinctive dimensions: (1) exploration and appropriation via the tasks of locating, describing and charting; (2) certain places such as mines and forests were attributed discrete development potentials; (3) improvement, whereby particular societies could be 'developed' and acquire higher welfare levels through their own efforts; and (4) aesthetics whereby the representation of places could be assigned certain levels of attractiveness, ranging from sublime to noteworthy.[7] One could add the moral imperatives of civility and in relation to Bowles the scientific analysis of certain problems such as locust plagues or the formulation of scientific remedies to sort them out in a practical manner.

This was a period when so much was believed to be possible in Spain; when old ways could be substituted by new practices and where 'science' could provide answers and solutions to barriers or obstacles to development.[8] Coincident mainly with the eighteenth century, it was an era of unbridled optimism as revealed in the writings of Benito Feijóo (1676-1764), Martín Sarmiento (1695-1772) and Antonio Cernadas de Castro (1702-1777).[9] Learned societies, known as the *Sociedades de Amigos del País*, were established in regional centres throughout Spain at this period.[10] There was a mania for 'scientific' diagnosis; facts had to be assembled, structured, interrogated and analysed.[11] To this end various programmes of enquiry were instigated. In Spain, one of the most daring was the so called '*Catastro de la Ensenada*', named after the Marques (1702-1781) of the same name, who was its director. An extraordinarily ambitious enterprise, it was a national census (1750-1754) of the state's landesque capital and population; the productive assets of each parish including all lands, animals and trees and shrubs were included. Its outputs allow us gain a unique snap-shot understanding of conditions throughout Spain during the mid-eighteenth century. Others created geographic dictionaries.[12] Some of the surveillance activities were funded by state ministries, others by the learned societies and several by individual commitment and curiosity. The 'grand tour' was one such instance; Bowles's book constitutes another dimension.[13]

This short piece sets out to confirm the involvement abroad of Irish scholars in humanistic activities and scientific work in the context of the broad Enlightenment in eighteenth-century continental Europe. In particular, the humanistic elements of the major corpus of William (*Guillermo*) Bowles (1775), a native of County Cork, are considered. An attempt is made to specify his 'sites of enquiry', to evaluate his products and reports, to interrogate his 'findings' and, if possible, to contextualise them in Iberia. It is important to establish the nature of field training he acquired, in an effort to detail his 'ways of seeing' as

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'geographic practice'. To understand his approach to geography and natural science, we can deconstruct his interpretations of several sites that he visited and the topics he elected to explore. We can do likewise for the work he conducted on several important themes. To-date Bowles has been simply regarded as a natural scientist and geologist; this work confirms that his vision and legacy were much broader.

'Ways of seeing'

The following excerpts from the introduction to his book unambiguously sets out his specific purpose:

> I visited most of Spain's provinces and make/collect many observations about natural history… Madrid will witness the birth of a natural history museum which will house the most precious and rare natural objects; and also see a new Botanic Gardens with a chemical laboratory which will incite Spaniards to cultivate these sciences which are most beneficial for humanity [book's dedication]… My work consists of facts and reasonings: the former always certain; the latter less certain… I am content to deal with the appearance of things insofar as they are useful for the advancement of natural history, mining and the Artes [authors translations].

He sometimes contradicted himself noting that he does not deal with '… cities and other matters'. Most of his 'Introduction' is devoted to issues related to mining, mineralogy and geomorphology; nearly forty per cent of his book deals with non-physical 'natural history'. It is difficult to explain this paradox. He went a step further in this respect by employing theory, analytical reasoning, systematic sampling and comparative methods of explanation, especially when dealing with cultural and physical obstacles to change.

He constantly employed 'place' in various guises; as a site of learning, as a metaphor, as a location for the display and presentation of natural history and geography, as sites of classification and ordering, as locales for sustainable exploitation and management, often allocating places with cultural values by the assigning them with [adjectives] sublime/picturesque qualities. Places were ordered as a means of subjecting them to analysis: the most felicitous means of 'studying them' were suggested, be it classification, field observation, a map, or treatise.

The Irish diaspora in Spain in the eighteenth century and before

Bowles was an unlikely figure in the Irish diaspora in Europe. His migration was opportunistic like that of many of the merchants, mercenaries, missionaries, traders, artisans, and refugees that

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constituted the ragbag of Irish people migrating to Spain during the seventeenth and eighteenth centuries.[14] Institutionally, this flow was represented by the foundation of Irish Colleges in France, Italy, Portugal and Spain; and by the formation of Irish military regiments. Irish merchant communities and their retinues involved in trans-Atlantic trade were evident at Cadiz, Lisbon, Malaga, Seville and the Canary Islands.[15] From these contexts, A small Irish elite emerged from these contexts well positioned to act as administrators, even as prime ministers. Several governors also came from their ranks. Mostly originating from Catholic backgrounds, they fitted seamlessly into Spanish society. William Bowles was different; his origins were rural and Protestant; however like many of the other migrants he had no problems settling into distinguished social circles at Madrid.

Few foreigners are regarded as Spanish '*ilustrados*' (people of the Enlightenment), William [*Guillermo*] Bowles stands out as an exception. There were others too: the economist Bernardo Ward,[16] educationalist Pedro Sinnott and lexicographer Fr. Thomas Connolly.[17] Bowles's work has been largely ignored in both Ireland and Spain with the notable exceptions of Cornide in the early nineteenth century,[18] of Urteaga González (1997)[19] and more recently Recio Espejo (2006).[20] In Ireland, his achievements have been effectively forgotten and unacknowledged apart from recent references by Reynolds (1997)[21] and Reville (2001);[22] much earlier O'Reilly (1889-1901)[23] and Colgan (1911)[24] wrote brief notes on his work.

Bowles was described as 'naturalist' by Sánchez Espinosa[25] and Recio Espejo[26] (2006), as an expert in many disciplines and aspects of applied geology by Reynolds,[27] (1997) and as a famous Irish scientist (Reville, 2001).[28] Cornide immediately recognized his sterling contributions in the early nineteenth century as outlined in some of the following quotes:

> *Quantos objetos de semejante estudio no ha descubierto el sabio Bowles por casi toda España* (Cornide, 1803, 112) [How may critical objects have been discovered by the knowledgeable Bowles almost all over Spain.].[29]

Sin duda Bowles, fue el pionero en el estudio de la geografia fisica de España: … su obra … producto de diferentes viajes en la que predominan observaciones de historia natural, carece del enfoque sistemático (1803, 8; (Capel y Urteaga, 1983)). [Without a doubt Bowles was a pioneer in the study of the physical geography of Spain, … his work … being a product of different field journeys where observations on natural history dominate (authors translation)].[30]

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William [*Guillermo*] Bowles

Born in County Cork between c.1707 and c.1714[31] Bowles died in 1780 and was buried in the cemetery of *San Martín*, Madrid.[32] Little is known about his early life, except that he studied law in Ireland (plate 1). A document in Bilbao confirms his conversion to Catholicism shortly before his death (pers.com, Amelia Bilbao, 2002). He travelled to France in 1740 and remained there for about twelve years studying anatomy, chemistry, metallurgy and natural history. He also visited the German Hartz Mountains mines, then amongst the most up to date in Europe.

He '… liked good company, good food and plenty of drink'. He was a formidable humanist', and scientist; he was also a polymath and 'bon vivieur'. By all accounts, he was an excellent communicator and a keen and sound witness well able to verbalise his analyses and observations. Deeply interested in natural history, especially botany and zoology, his fields of work further extended into ethnology and cultural history (Sánchez Espinosa, 2002).[33] When visiting some of Germany's mining areas he married Anna R. Rustein, in 1756; born at Hamburg, she was twenty years his junior.

While in Paris, he befriended Antonio de Ulloa (1716-1795) who encouraged him to move to Spain and take up a contractual appointment in 1752 as national director of metal prospecting and also to lead a new commission for natural history established at the *Casa de Geografia* at *Calle Magdalena*, Madrid. He was appointed 'Royal Professor of Natural History' by king Ferdinand VI, the following year. He acted as consultant to the 'House of Geography', an institution recently established to develop Spain's natural resources. He was also contracted to establish a chemical laboratory and research the properties of various metals, besides being assigned to visit the regions and report on their mineral deposits. His German wife accompanied him on all his missions and her deposition after his death remains our main biographic source. She provided a valuable list of his network of friends and contacts, which included many of the luminaries of the Spanish Enlightenment including Ricardo Wall, a Spanish first minister of Irish origin.

Bowles's early perceptions of Spain were exceedingly negative. For him, Spaniards were all '… stupid, lethargic, poor, dirty, jealous and melancholy'.[34] In time his views appear to have altered, perhaps because of the bounteous salary he was paid, and he was quickly assimilated into Spanish society. His network of contacts from the first minister to a host of Enlightenment intellectuals exemplifies his integration into Spanish society.

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"***Introducción a la historia natural y a la geografia fisica de España*" Madrid, 1775** [35]
[Introduction to the natural history and the physical geography of Spain].

Running to some 600 pages, it forms Bowles's main achievement (plate 2). Sánchez Espinosa claims the book, written originally in French, was full of anglecisms and later was translated into *Castellano* and then published in Madrid (1775) with an 800 copy print run (2002).[36] This view is somewhat difficult to be sustain, yet Espiosa provides us with masterly detective work on many intricate aspects of the production of its several editions. Bowles lived in France for only twelve years and while he may have attained fluency in that language, it is doubtful that he could write his first book in French.

The second edition came out in 1782 and the print-run was 1,020 copies (plate 3).[37] Finally in 1789, the third edition was published (plate 4).[38] Editions were printed in French,[39] (plate 5) German[40] and Italian[41] making Bowles[42] one of the most published Irish scientists of his time.[43] His work appeared in quite a different format for the English speaking world. Dillon, his shadow writer, critically states in 1780 that the book was translated into French by the Viscount de Flavigny, '… who has everywhere followed the original text without any note or observation'. Bowles himself intimated that the book was initially drafted in English as '*Siendo yo estrangero, y no pudiendo escribir con tal qual propiedad, he fiado mis borradores a un Amigo…*' [*… being a stranger and lacking such writing flair, I trusted my drafts to a friend*] (quoted from Sánchez Espinosa, 2002, 261, author's translation).[44]

John Talbot Dillon, the Anglo-Irish hispanist, polymath and travel writer (1739-1805), relied heavily on Bowles's work in his *Travels Though Spain with a view to Illustrate the Natural History and the Physical geography of that Kingdom in a series of letters, interspersed with historical anecdotes written in the course of a late tour through that Kingdom*.[45] (plates 6 and 7)

Bowles's work formed the basis of Dillon's book. Dillon (1739-1805), an MP for Wicklow and Blessington, was a hispanist and had written about Cervantes. His book is structured as a series of letters based largely on Bowles's text giving an impression as if he [Dillon] had visited all 'the sites' and 'circuits' mentioned by Bowles.[46] Curiously, Dillon added further relevant information about various topics treated by Bowles and included a map (fig. 1). Disentangling Bowles from Dillon's work would be a time consuming exercise and beyond my purpose here.

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Dillon stated in his 'Introduction' that

> I have availed myself of this work as my chief guide with respect to the chief objects of natural history, without being a mere copyist in every minute detail.

Many sections of Bowles's work are omitted especially those dealing with overseas matters such as the Mexican mines and intricate rock chemistry. Dillon, then proceeded to arrange his [Bowles's] materials, '… in a proper manner' and organized his book into two parts. The first deals with, 'A journey to Madrid and a description of Northern Spain; part two treats of '… South of Madrid, Valencia and Catalonia…'. There is no evidence that the two authors ever met despite the extremely short gap (five years) separating the publication of their works. Dillon's book was briefly reviewed by Kimber.[47]



Fig. 1: 'New Map of Spain' by John Talbot Dillon, prepared by J. Page, London. Many but not all of the 'sites' visited by Bowles are inserted on this very eccentric and personal but often inaccurate map of the Iberian Peninsula.

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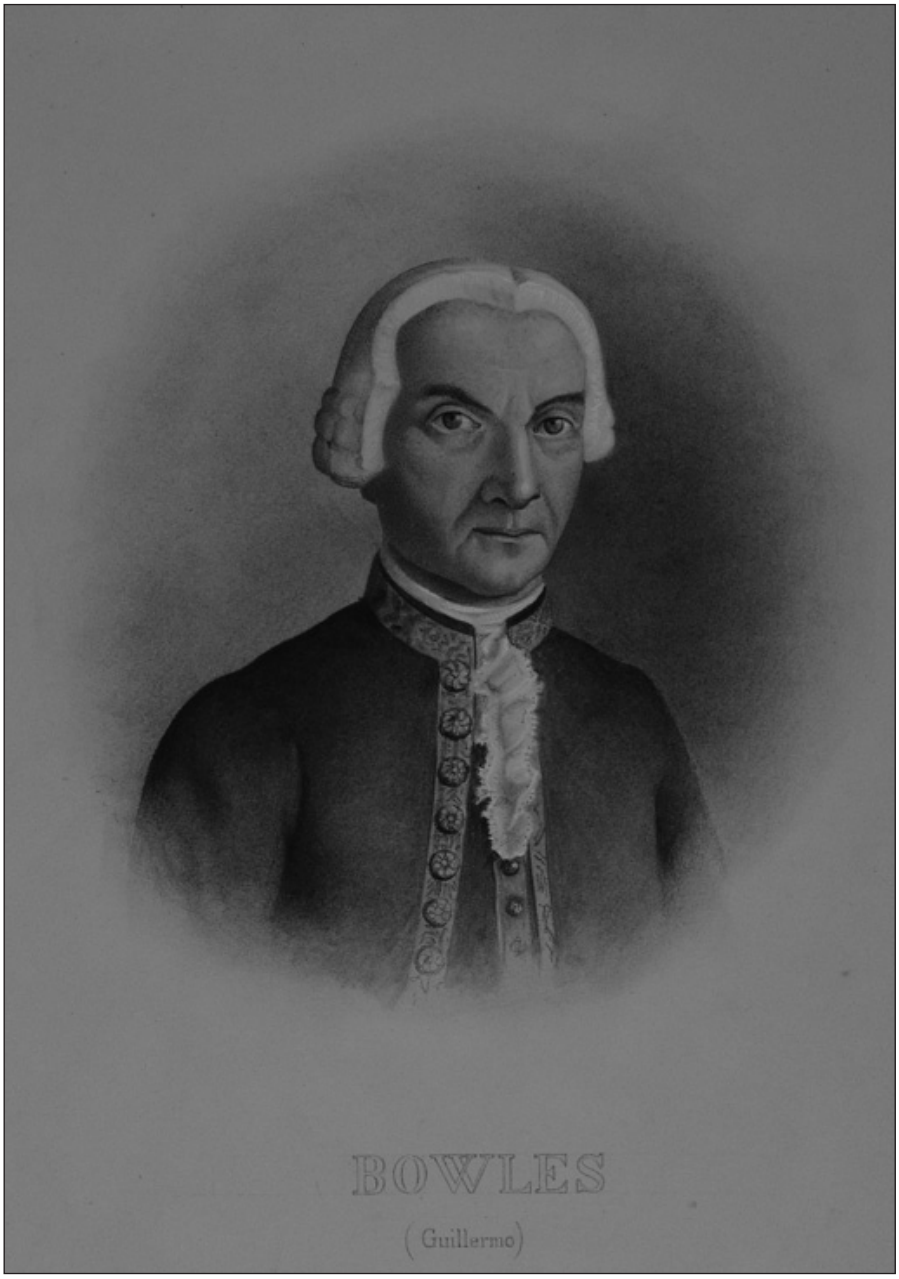
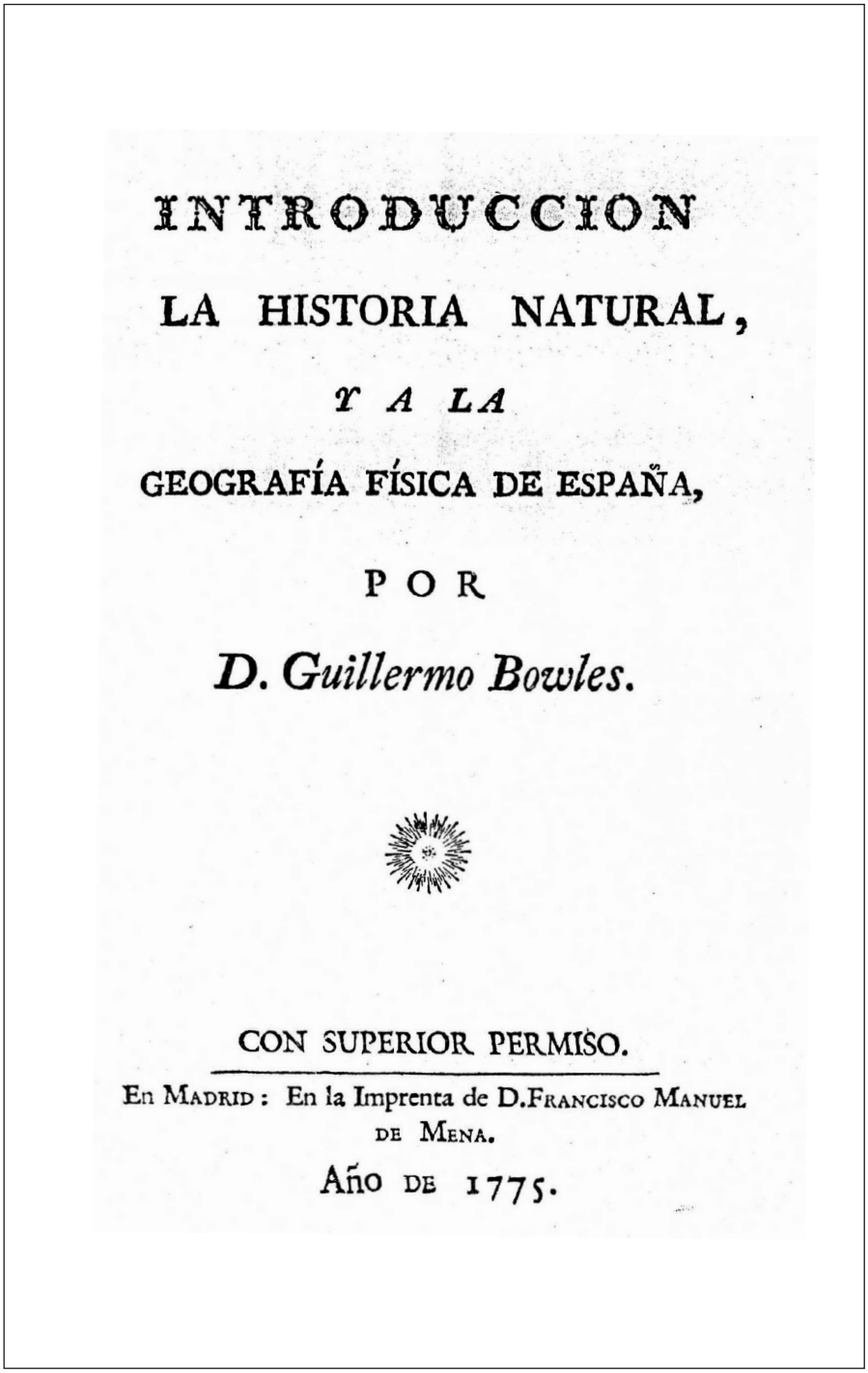


Plate 1: Guillermo Bowles portrait.
(Source: Mueso de Ciencias Naturales, Madrid. [Artist unknown, probably Antonio Mengs, 1728-1779]. I would like to thank Srta B. Muñoz López of the Archivo del Museo Nacional de Ciencias Naturales, Consejo Superior de Investigaciones Cientificas, Madrid for permission to reproduce this portrait, MS. No. ACN00A/004/00422.)

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INTRODUCCION

A

LA HISTORIA NATURAL,

Y A LA

GEOGRAFÍA FÍSICA DE ESPAÑA,

POR

D. Guillermo Bowles.

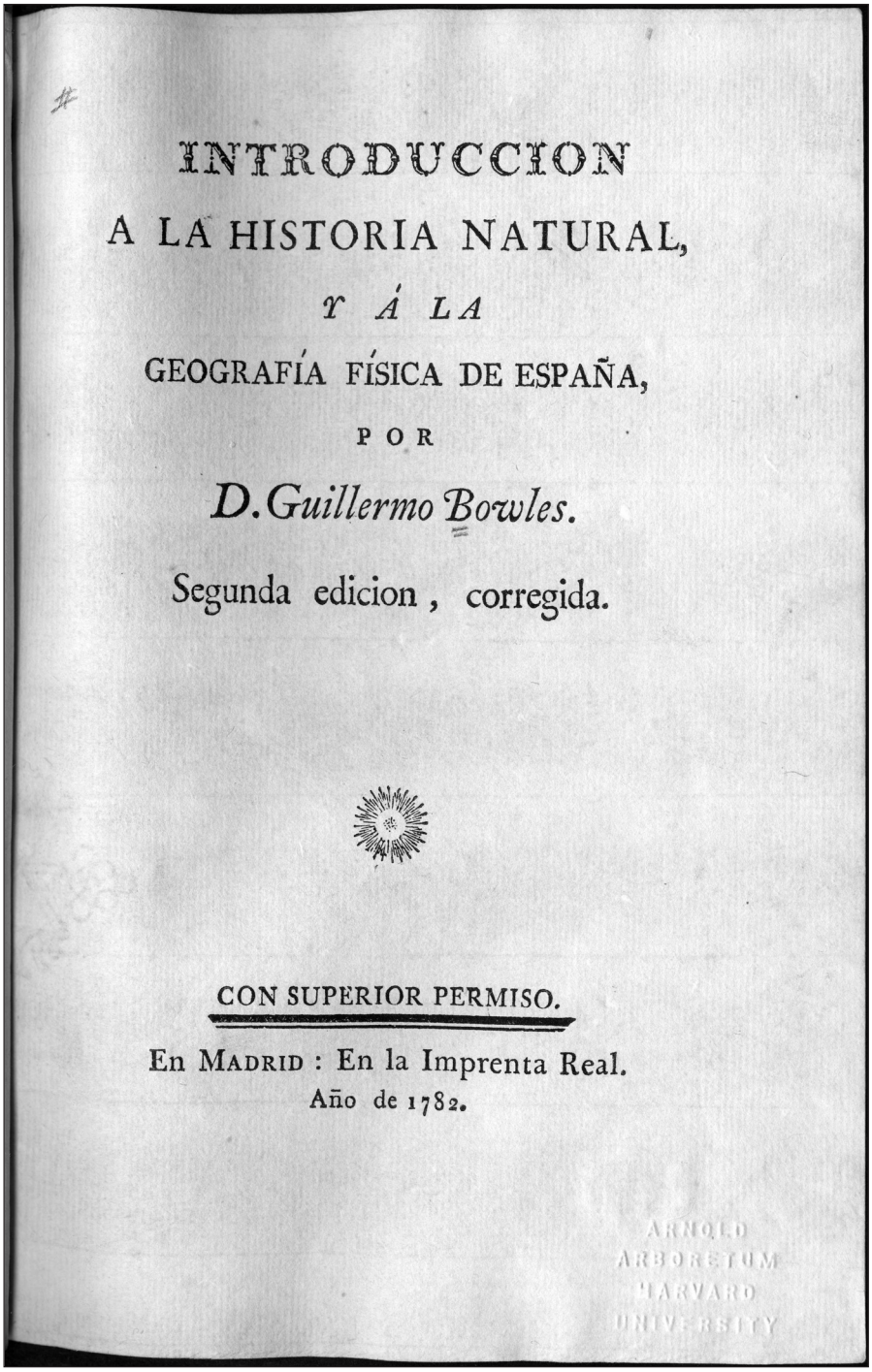
CON SUPERIOR PERMISO.

En Madrid: En la Imprenta de D. Francisco Manuel de Mena.

Año de 1775.

Plate 2: Title page of Bowles's book, 1775.

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INTRODUCCION

A LA HISTORIA NATURAL,

Y Á LA

GEOGRAFÍA FÍSICA DE ESPAÑA,

POR

D. Guillermo Bowles.

Segunda edicion, corregida.

CON SUPERIOR PERMISO.

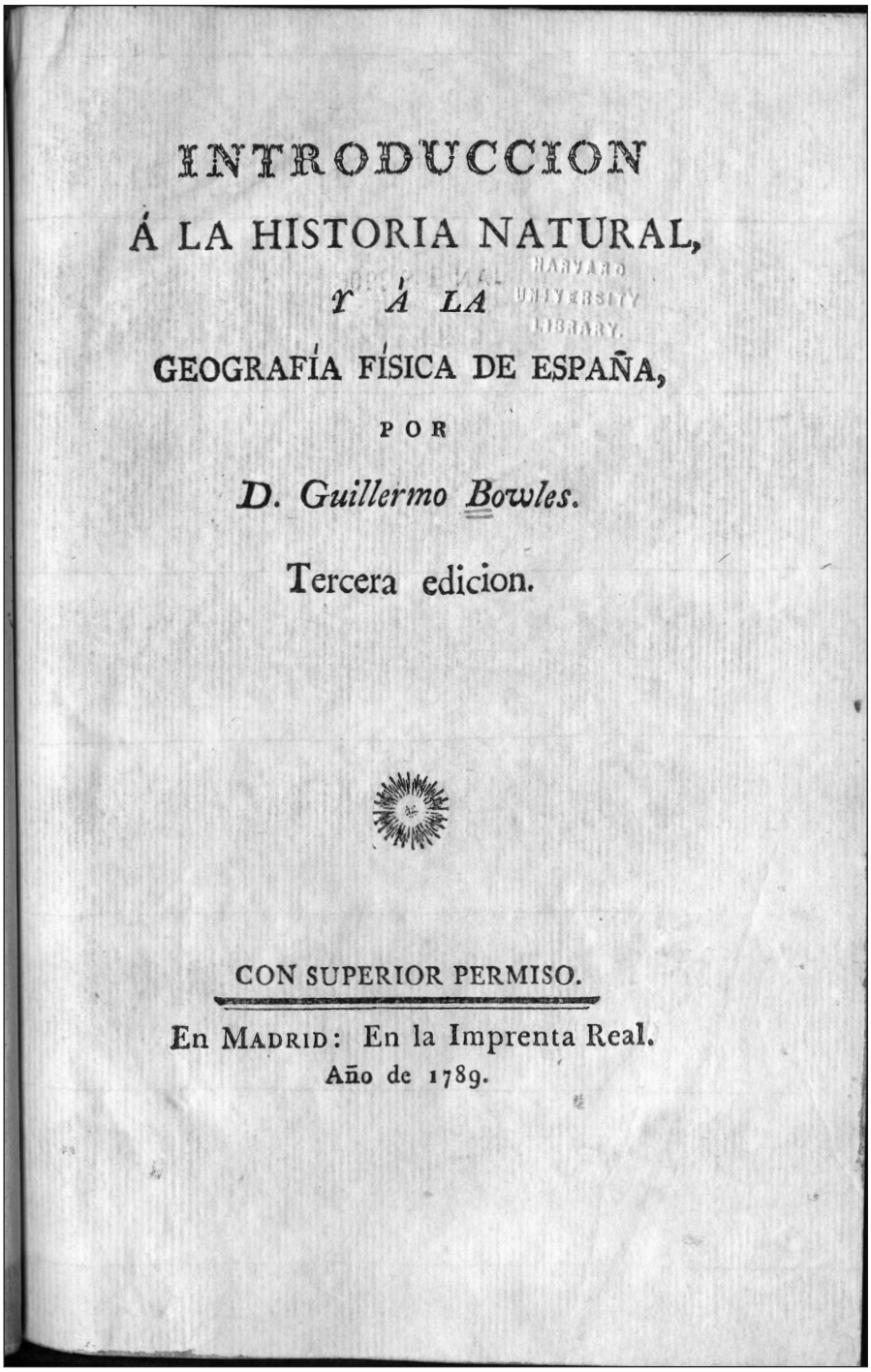
En Madrid: En la Imprenta Real.

Año de 1782.

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ARBORETUM
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Plate 3: Title page of *Introduccion a la historia natural*, second edition Madrid, 1782. (Source: Botany Libraries, Harvard University Herbaria)

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INTRODUCCION

Á LA HISTORIA NATURAL,

Y Á LA

GEOGRAFÍA FÍSICA DE ESPAÑA,

POR

D. Guillermo Bowles.

Tercera edicion.

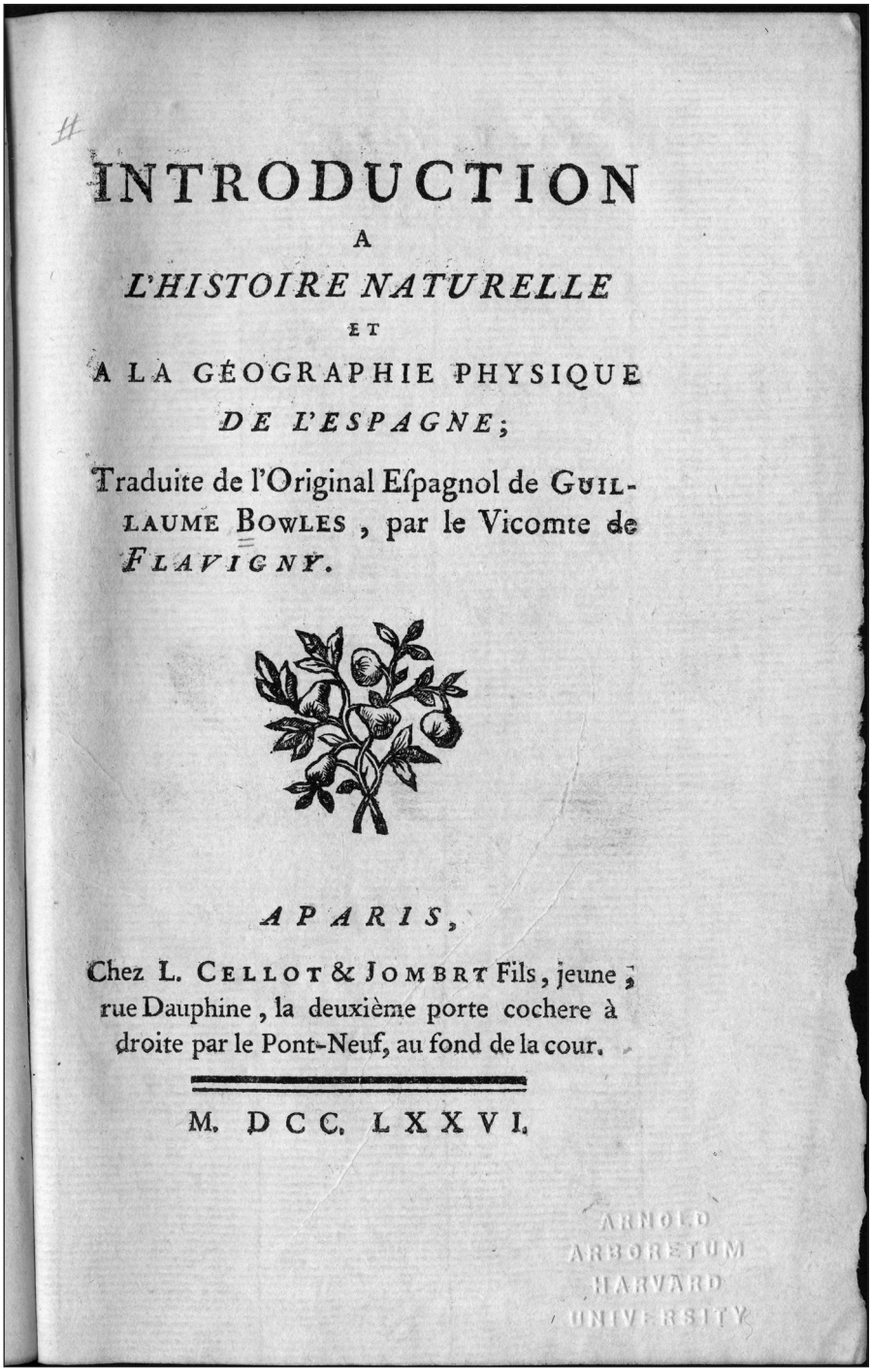
HARVARD UNIVERSITY LIBRARY.

CON SUPERIOR PERMISO.

En Madrid: En la Imprenta Real.
Año de 1789.

Plate 4: Title page of *Introduccion a la historia natural*, third edition, Madrid, 1789. (Source: Botany Libraries, Harvard University Herbaria)

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INTRODUCTION

A

L'HISTOIRE NATURELLE

ET

A LA GÉOGRAPHIE PHYSIQUE

DE L'ESPAGNE;

Traduite de l'Original Eſpagnol de GUILLAUME BOWLES, par le Vicomte de *FLAVIGNY.*

A PARIS,

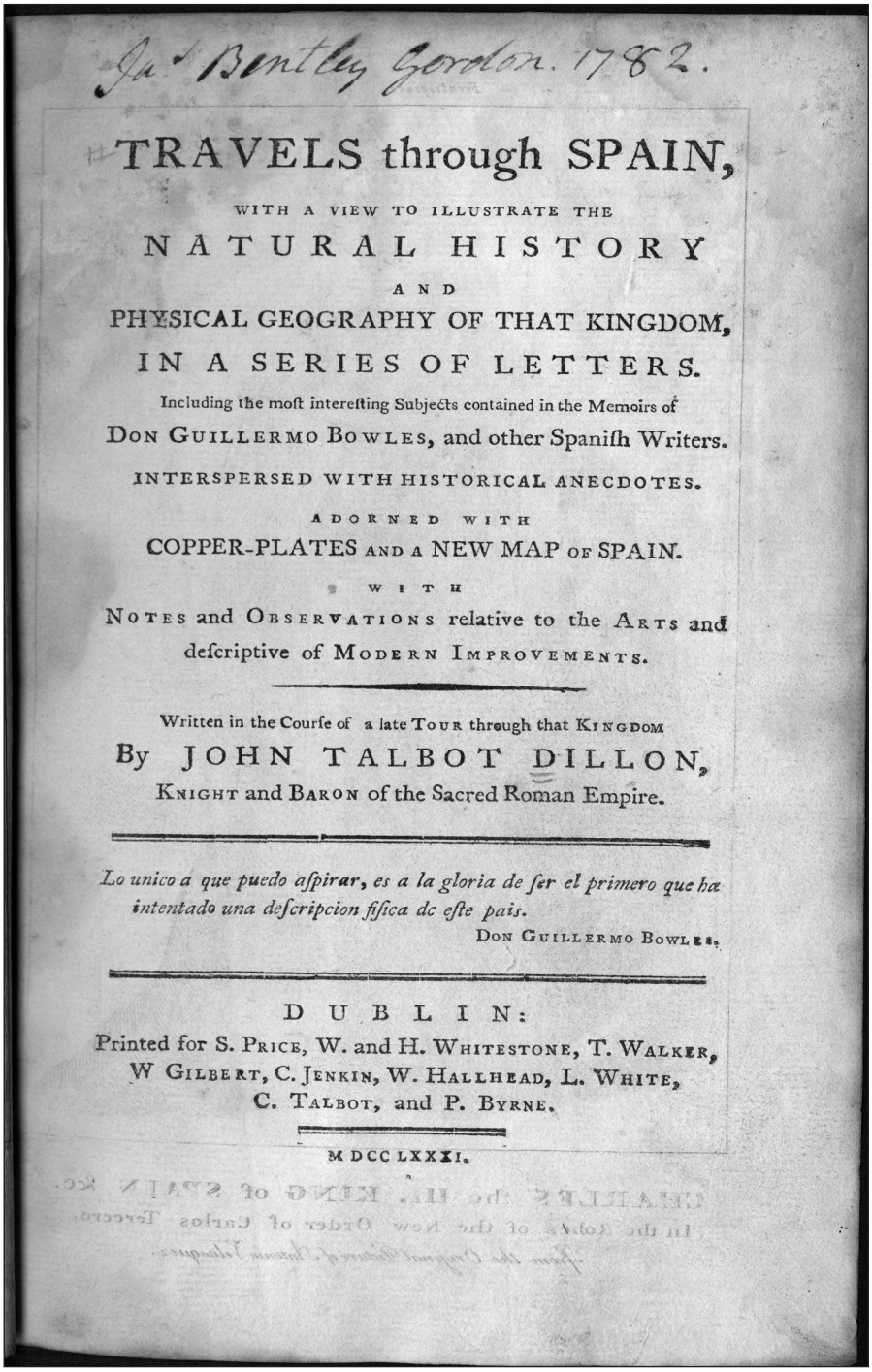
Chez L. CELLOT & JOMBERT Fils, jeune, rue Dauphine, la deuxième porte cochere à droite par le Pont-Neuf, au fond de la cour.

M. DCC. LXXVI.

ARNOLD ARBORETUM HARVARD UNIVERSITY

Plate 5: Title page of French edition *Introduction a l'histoire naturelle*, Paris, 1776. (Source: Botany Libraries, Harvard University Herbaria)

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Ja.s Bentley Gordon. 1782.

TRAVELS through SPAIN,

WITH A VIEW TO ILLUSTRATE THE

NATURAL HISTORY

AND

PHYSICAL GEOGRAPHY OF THAT KINGDOM,

IN A SERIES OF LETTERS.

Including the moſt intereſting Subjects contained in the Memoirs of

DON GUILLERMO BOWLES, and other Spaniſh Writers.

INTERSPERSED WITH HISTORICAL ANECDOTES.

ADORNED WITH

COPPER-PLATES AND A NEW MAP OF SPAIN.

WITH

NOTES and OBSERVATIONS relative to the ARTS and deſcriptive of MODERN IMPROVEMENTS.

Written in the Courſe of a late TOUR through that KINGDOM

By JOHN TALBOT DILLON,

KNIGHT and BARON of the Sacred Roman Empire.

Lo unico a que puedo aſpirar, es a la gloria de ſer el primero que hæ intentado una deſcripcion fiſica dc eſte pais.

DON GUILLERMO BOWLES.

DUBLIN:

Printed for S. PRICE, W. and H. WHITESTONE, T. WALKER, W GILBERT, C. JENKIN, W. HALLHEAD, L. WHITE, C. TALBOT, and P. BYRNE.

M DCC LXXXI.

Plate 6: Title page of *Travels through Spain* by John Talbot Dillon, Dublin, 1781. (Source: Botany Libraries, Harvard University Herbaria)

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(Source: Botany Libraries, Harvard University Herbaria)

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FRONTISPIECE, Charles the IIId. king of Spain, in the robes of the new order of Carlos Tercero, inſtituted the 19th of September, 1771.
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TRAVELS

Plate 7 (cont'd): Table of contents of *Travels through Spain.*
(Source: Botany Libraries, Harvard University Herbaria)

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Bowles's book

Journey transects, reports for various ministries, detailed thematic reports, results mainly of different commissions and personally conducted studies, some of which may have been made at his own expense, make up the contents of his book.[48] Although written expressively and concisely, several authorities have linguistic issues in relation to many words employed by him.[49]

Disaggregating Bowles's Iberian journeys carries some element of risk. Most of them were contracted for different purposes and he often digressed to observe or to solve new or old problems which he encountered. In this way, some of the circuits may have been patched up or structured, by him or his editor, to give the impression that they followed a strict chronological or chorological sequence. In fact months and even years might separate the completion of a full circuit; regrettably no firm dates are evident to validate them. Ordering the manuscript was done by his editor; the sequence of his nine major journeys between 1754 and c.1770 are of unknown chronology, so their position in the book has no particular significance.

TABLE 1:
Circuits and Trajectories of William Bowles

Almadén to Seville, Cadiz, Ronda, Cartagena, Alicante, Valencia.
Madrid to Almadén.
Teruel, Albarracin, Molina de Aragón.
Almadén, Merida, Talavera, Badajoz, Seville, Antequera, Malaga, Motril, Almeria, Cabo de Gata.
Valencia, Gandía, La Mingranilla, source of the Guadiana.
Madrid, Valladolid, Burgos, Vitoria, Bayonna.
Vizcaya, Bilbao.
Reinosa, source of the Ebro; Canal of Castille.
Bayonna, Pamplona, Madrid.
Pamplona, Roncesvalles, Saint-Jean-Pied-de-Port.
Madrid, Saragossa.
Valle de Gistau.
Monserrat.
Jaén, Linares, Alcalá la Real, Granada, Jaén.
El Escorial, San Ildefonso, Segovia.

Source: Sánchez Espinosa (2002), pp 262-3.

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Bowles provides a holistic perspective because of his training and experience and may be understood as an early geomorphologist, humanistic geographer and natural scientist. His work can be disaggregated under a number of headings and such a division clarifies his principal humanistic and scientific concerns. Although it might be argued that Bowles was primarily focused on mining issues, his realms of interest extended to a range of practical humanistic topics, where he provided, for the first time, detailed descriptions and explanations of topics ranging from damage caused by locusts to the problems associated with sheep transhumance. He also collaborated with cartographer Tomás López to produce an superb map of the *Señorío de Viscaya* [Seignory of Biscay] printed in 1769.[50] On his circuits he described in great detail the regions he traversed and the specific places which he visited. Often he estimated the potential of the mines and made detailled comments on the character of areas, their productive capacities and potentials and frequently, he digressed onto particular pet topics such as the locust plagues which devastated extensive areas of the south of the peninsula over the years 1754 and 1757.[51] Elsewhere, he supplies detailed accounts of farming and arboriculture in the '*Señorío de Viscaya*' adding precise portraits of the port city of Bilbao and that of Madrid with a discussion about its water supply problems.

TABLE 2:
Concerns of William Bowles

Places[1]	Descriptions[2]	Circuits[3]	Physical themes[4]	Biogeographical issues[5]
9	10	14	7	8

1. Visits to specific mines/deposits
2. Descriptions of particular places and/or regions
3. Identifiable itineraries
4. Studies of physical processes
5. Analysis of particular plant communities such as the woods of Reinosa or locust control

My task here is to present a number of his circuits as 'sites of investigation'. I detail his concerns and explain his 'ways of seeing', in relation to topics ranging from woodland, biogeography and sustainable arbouriculture, hydrological problems, regional analysis with especial emphasis on the Basque Country. Then I reflect on his

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suggested impacts of locust plagues and transhumance on different cultural landscapes, detail his geomorphological analyses of certain 'sites' or 'circuits' and consider his proposed differences between humanised landscapes and those that were not.

Woodland and sustainable silviculture

Plant associations, grazing and the management of rangelands, silviculture relating to supporting practices of sustainable forestry, ensuring supplies of wood for mining and for shipbuilding, reconstructions of former vegetational complexes throughr bog analysis, concerns with practises leading to de-forestation and degradation, the relationship between slopes, soils and plant types and the diffusion of New World plants were among his cardinal biogeographic interests. Bowles visited the Basque Provinces at least four times and may have resided there for longer. His was deeply impressed by iron mining, their iron works and knowledge of the chemistry of iron fabrication. Woodland conservation, exploitation and management were also themes that were of great interest to him, primarily because of the centrality of arboriculture in the lives of so many peninsular communities.[52] He noted that most Basques appreciated the nuances of woodland stewardship and, for him, Basque forest management practises were a template of best practice for the peninsula and beyond.

Three separate sections of his work are devoted to tree management; two of which relate to the Basque Provinces, one to Cantabria. The most detailed one involves all aspects of oak and chestnut production and is mainly directed to charcoal production in three distinctive types of monte: (a) natural woods – the rarest: with chestnuts oaks and great thickets of arbutus; (b) mixed natural and deliberately planted woods; and (c) 'farmed' woodlands. Some of these woods produced excellent timber for state naval shipyards, pit props and charcoal production.[53] Providing detailed descriptions of chronological sequences of management practices from nursery planting to coppicing and occasionally pollarding of timber to ensure uninterrupted supplies he was in awe of the superiority of Basque silvicultural skills. Bowles regarded their practices as a template for fine wood production, suitable either for charcoal production or shipbuilding.

Extracting information from Arriaga(n/d) as well as supplementing this *'Informe'* [report] with his own observations, Bowles proposed a series of criteria relating to optimum climatic and topographic circumstances for planting trees and for the production of high quality wood.[54] Stating clearly that his views exhibited his longer association with conditions of Atlantic Iberia, nonetheless, he made

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some telling oberservations in relation to woodland protection in different parts of the peninsula.

His final section on woods relates to the mountains of Burgos and Cantabria where he reflected on their excellent potential of timber production especially for the shipyards of Cantabria.[55] Here, in contrast to the *Señorio de Viscaya*, he set about highlighting often unsustainable methods of woodland care. He lamented the fact that the *hacheros* (hatched fellers) often striped entire areas to such a degree that further planting would be rendered impossible: so severe were recent woodlands felling that the regions once abundant 'natural' woodlands were extremely rare. Following the methods advocated by the French expert Buffon, he recommended more sensitive ways of woodland removal, especially drying and conservation to facilitate continuous production. Like others, such as Cavanillas and Cornide, Bowles was especially critical of felling practices in Galicia near the naval shipyards at El Ferrol, noting that some of the most productive royal woodlands were destroyed leaving the hillsides bare.[56] So voracious was the appetite of this arsenal, given the vast amount of wood used in constructing an average-sized vessel, that enormous areas were denuded rendering them infertile and almost useless.[57]

This section on woods, written, for an insider constituency, amounts to little less than a crude report comparing Basque with Cantabrian practices. There is a surreptitious juxtaposition of the two very different procedures to highlight wastage, even the citing of reports of other 'experts' to back up his narrative and recommendations. Perhaps he felt unable to openly critique certain silvicultural practices: his subtle rehearsal of de Arriaga's report as a damning supporting narrative was his 'way of seeing' and an avenue to champion his own proposals.[58] Bowles relied on the work of Linneus (1707-1778), and especially that of Duhamel de Monceu (1700-1782) (translated by Casimiro Gómez Ortega) and Conde de Buffon (1707-1782) in relation to sustainable forest management. He was capable of mining information from other peoples work as he did in respect of tree/wood quality. However, he was no plagiarist and he invariably cited his sources.

One of the most intractable problems associated with the peninsula was the shortage of water,which often resulted in drought and the general absence of vegetation, especially trees.[59] Bowles observed that even in areas deeply afflicted by drought, human ingenuity had arrested evaporation, conserved wooded landscapes, enclosed vegetable plots and even employed trees to act as sponges.

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Bowles's contribution to the understanding of the environmental consequences of locust plagues (*plagas de langosta*) is both novel and original.[60] Noting the scale of devastation that such episodes might instigate, Bowles was amongst the first to outline the life-cycle of locusts in an effort to identify when they are vulnerable and when would be the most opportune time to kill them.[61] Bowles was nevertheless a person of his time far from the sophisticated structure of modern science:

> …he did not just refer to the terrible destructive experience of these insects in Extremadura in 1754 and their rapid proliferation and diffusion to other provinces. He made a detailed examination of these insects characteristics, their habits and methods of propagation and their breeding centres…[62]

A measure of Bowles's contribution to the Spanish Enlightenment was the citation of his work by leading nineteenth century entomologists in Spain and throughout Europe.[63]

'Regional' geography

Close observation is evident of farming practices in selected areas and especially in the Basque Country. More than one fifth of his book is dedicated to detailed descriptions of a series of places on the peninsula. For reasons that this writer is unaware of, more than sixty percent of this total is devoted to various themes in the Basque Country involving farming, forestry, the economic foundations of the Biscayan economy, descriptions of Bilbao and comparisons with Ireland. It is worthwhile then to follow Bowles on his particular circuit of the Basque Country as many of his observations are original and perceptive.

His work here deals with some of the major iron mines and iron products in the province preceding the two itineraries (1799 and 1801) by the geographer Von Humboldt.[64] He made visits to the famous sword making facility beside the mines at Mondragón, the mines at Somorrostro and at del País. He recorded time/distance differentials were: Mondragón to Legazpia (six hours); Legazpia to Villafranca (five hours) and Villafranca to Tolosa (three hours).

The *Señorio de Viscaya* was, in his estimation, densely populated, prosperous with farmsteads (*caserios*) covering hills up to their summits; planted woods of arbutus, holm and sessile oaks were abundant and heathers of all kinds formed dense zones of heath. On lower slopes, there was

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> … symphony of types of apples trees, delicious peaches and four different types of pear trees, nut trees, figs, gooseberries and an immense variety of vegetables. There were many cows and small but strong oxen, some goats and few sheep.

Basque settlement patterns, land ownership and community

Bowles presented a detailed account of how the land on each Basque farm/holding (*heredad*) was prepared, sowed with crops and finally harvested, referring in the process to the various farm implements employed for different tasks. The cycle of cultivation on the best arable lands extended over five years: namely, three consecutive crops of wheat; the fourth year, barley or rye and finally flax. Then followed a fallow year converted into pasture. In spite of the high productivity of the land, it was often necessary to import wheat from Castile, or by sea. Likewise meat had to be imported as there was little land available for permanent pasture.

Our author was deeply impressed by the presence of solid houses; each one with a *baxo* for stables and cellars, a store for agricultural implements, above this *el principal* a space for living and a *desvan*: an attic/loft for storage of grains and fruits. In the past, all the floors, including and above the living quarters, were of wood, at the time of his visit, they were of stone. All of the houses boast of an oven, their *huerta* for kitchen crops, their arable land, were/are made of orchards and their unimproved land (*monte*) for rough grazing and the supply of bedding and firewood.

On a traverse from Orduña to Bilbao 'six leagues distance', he remarked that it looked like an extended and uninterrupted settlement with many new solid and well constructed houses and none abandoned. He was amazed by the capacity of the land to support so many people. Bowles believed that Basque rural civilization had an extended continuity and heritage over many generations principally due to the tradition of long term family association (*echejaunas*) between individual farm houses and their holdings.

Bilbao, Cadiz and Madrid were the cities that attracted his attention. Bowles's wrote about Bilbao in superlative terms. Airbrushing any negative attributes, notably its climate, his treatment of this city reflects and substantiates his personal regard for it. His additional confirmation of the distinctiveness of the Basque Country, with comparisons and contrasts with Ireland, was a means of bolstering and justifying his predilections for everything Basque. Although he mentions the presence of many small ports and a sea filled with fish,

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nothing is written about fishing or the fish re-export trade. Neither were Irish residemt merchants and the mainly Irish tanning community at Bilbao referred to.[65]

Systematic geography

A concise analysis of long-range merino sheep transhumance is provided by Bowles with accounts of how movements of flocks of 10,000 sheep were organised and the nature of the routes taken. More than ten pages of text are devoted to this important and critical topic. Working in the field, often in remote and inhospitable places, Bowles came across vast flocks of sheep in transit. He distinguishes between the two leading types of sheep on the peninsula: those that were involved in transhumance and those that were not. The wool produced by the animals is strikingly different; the transhumants produce a high quality product and the others only manage to yield coarse wool. This section is an excellent example where he blends his knowledge of chemistry, natural science and geography to combine with popular and traditional practices, the knowledge of which he garnered in the field.

Wool production was once one of the main pillars of the Castilian economy.[66] The Mesta, first described by Klein (1920), was a royal recognised production cartel that has had an inordinate influence on the formation of Castiles and Extremadura's cultural landscapes through the seasonal appropriation of vast swathes of land, known as *cañadas* or *veredas*, acting as sheep walks and drove roads across which the flocks moved.[67] More than that, these activities brought economic development, employment and much prosperity to some of the most isolated communities of rural Spain. Yet damage and destruction were constantly wrought to many settled communities along their path.

He encountered enormous flocks at Molina de Aragón now in the province of Guadalajara. In charge of these flocks of 10,000 and more was a *mayoral* and some fifty shepherds of different ages and experience and even pay rates; each had his own dog. Many dogs were Irish wolf hounds – *lebreles*, imported to Spain.[68] The tonic of these movements involved animals on the way to the winter pastures (*dehesas*) of Extremadura from Leon. Travelling between six and seven leagues a day, the journey took some forty days to complete. Then on the pastures on which they grazed, some twenty-five quintals for each 1,000 animals was spread taking exceptional care that they were not limestone ranges. Soon to transfer to sandstones ranges, the animals then gave birth. Over the winter months shepherds carried out various tasks such as cutting tails, branding animals, removing horns and finally castration. April witnessed a mass

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movement northwards to summer pastures where the sheep were shorn and the fleeces collected. In this section, he made several important suggestions in relation to improving the quality of the fleeces and the wool and the need for regulations to control the movements of these enormous flocks.

Biogeography of the peninsula

In another section, different to the rest of his book, Bowles relies on his experience in travelling around the peninsula to address aspects of its crop geography and vegetation cover, although he admitted that 'botany' is not one of his strengths. This part is largely based on his recollections and he often emphasised the role of industrial crops and the establishment of relationships between plants and human well-being. Here his work is tilted particularly towards the Basque Country and the north. Nevertheless, all his circuits are interspersed with comments and descriptions of their human geography. He dealt with a flora then little known outside the peninsula such as the mastic tree (*Pistacia lentiscus*) and the excellent effects of the incense made from it. He does likewise for the carob (*Ceratonia siliqua*) and the pistaccio (*Pistacia terebuntus*), all commonly grown and exploited in the Valencia region.

He wrote about the properties of a variety of industrial plants, used in textiles dyeing such as woad (*Isatis tintoria*), indigo (*Indigofera tintoria*) and zumaque (*Rhus coriana*) for tanning, indicating where they occured and how they were to be employed. Further more, he extoled the virtues of certain plants as remedies for particular illneses such as the gayuba (*Arctotoaphylos uva-urs*) as a cure for urinary tract infections, Pimpinela (*Pimpinella anisium),* caraway (*Carum carvi*), cumin (*Cuminum cyminum*) and santloina (*Santolina elegans*) a recognised cure for gout. He also dealt with the cotton fields of Valencia and he noted that much alfalfa (*Medicago sativa*) was also grown there. Esparto (*Macrocholoa tenacissima*) is also widespread in the south and dry areas of Spain and now utilised to make many woven items of canvas and aloes (*Aloacae*), which can be used for making ropes, string and horse reins.

Regional differences in potatoe cultivation and usage are accorded extensive treatment noting they were first introduced into Galicia, spreading quickly across the peninsula and even to Ireland where, he asserted, they had become the exclusive food for most people. He also observed that potato flour mixed with wheat(half and half) made a fine bread that lasted for fifteen days before getting hard.

Special attention is placed on the cultivation methods and harvesting of saffron and, for once, Bowles actually mentions the region of San

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Clemente in La Mancha where the bulbs continuously produce for five years, then are replaced by wheat for at least twenty years. Once again, employing a comparative perspective, he notes how hemp and flax have contributed to wealth creation in Ireland, whereas in Spain, despite excellent growing conditions, their commercialization had been largely neglected.

As an inveterate traveller on the peninsula, not only was he familiar in a practical manner with issues such as soil fertility and basic soil processes but he was keenly aware of the use and importance of fertilisers, the fragility of woodland ecosystems and the need for woodland nurseries to promote sustainable practice.[69]

The perspective of an enlightened person often culminated in a more romantic and sensitive characterization of landscape. Bowles was no different: he separated the 'natural' landscape from the 'cultural' landscape. The 'natural' was rough and unkempt; the 'cultural' was expressed in manicured enclosed cropped fields or improved common lands made both desirable and beautified (*hermoseado*) by human activities. For him, the untamed landscape instilled danger, fear and horror.[70]

Natural history

Landforms, rates, types and forms of erosion, geo-histories of buildings in cities, towns and villages, mines, mining methods, conditions of the miners, especially at Almadén's mercury mines, were key concerns. Miners there were convicts who had probably stared the fire which had damaged the mines and he had been despatched to report on their rehabilitation. A recent appreciation by leading Spanish scholars refers to Bowles as the 'precursor' of modern Spanish geomorphology.[71] They note his advanced and innovative 'reasonings' including his deployment of a basic Davisian model cycle of erosion to explain the development of the Tajo depression and many more critical contributions.[72] Bowles's work epitomised an enlightened realization of the dynamic nature of human/nature interactions and the energetic force of change:

> Las montañas, los valles, y toda la material está en un perpetua rotación y círculo de movimiento imperceptible, que empezó quando la Providencia quiso, y acabará quando ella quiera.
>
> [The mountains, the valleys, and all the material is in constant and almost imperceptible circular movement, which begins when providence desires and ends when likewise desired (Authors translation)].

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John Dillon modified and extended Bowles's work for English speaking readers and anybody wishing to visit Iberia. Dillon's book, which was essentially an English version of Bowles's work, enabled English speaking people could now begin to appreciate the complexity of Spain through it natural history as a form of geographic practice without leaving their drawing rooms.

Bowles wrote a 'geographic natural history' derived from his travels, observations and collections. His plans for displays and analysis together contribute to an understanding of place and region, to public education, as solutions of resource exploitation conundrums, as well as making a practical contribution to the welfare of local and regional residents and in some cases to the wider Spanish empire. His intellectual formation owes much to French Enlightenment figures whom he frequently cites. His 'ways of seeing' reveal concerns with realism, precision of expression and recording. He adopts a systematic position concerning description and collection for instance in relation to locusts damage. In addition, he sometimes deploys comparative methods in his explanations of physical processes.

His work was largely directed at many different constituencies. Its principal contents were originally conceived as detailed reports for different arms of government (I cannot confirm if these reports are extant). Additional material was later collected by the author often at his own expense and in his own time. There are new reports about issues of interest to him and justifications for some of his lifestyle choices. It is a public statement and account of his lifework materialising in the foundation of a natural history museum and 'laboratories' where science can be explored 'at hand'.

In this way, Bowles efforts and his oeurve responds to many of the criteria laid out by Porter[73] in relation to the multifaceted appreciation of Iberia's regional complexity by bringing rafts of new information about different places, processes and problems into the public domain, not least his notion of '*la tierra hemoseada*' – cultural landscapes delivered through the work of society[74]. Essentially Bowles's book is a pot-pouri: there is material there for several audiences and constituencies: some sections remain raw reports, others are manicured for different audiences outside Spain, more are specific recommendations for improvement. There is 'geography' and 'natural science' there for fellow travellers and for Spanish policy makers, politicians and those at 'court' at Madrid.

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References

1. D. Outram, *The Enlightenment*, (Cambridge, 1995), p.3; *idem*, 'On being Perseus. New knowledge, dislocation and Enlightenment exploration', in D. Livingstone, and C. Withers (eds), *Geography and Enlightenment* (Chicago, 1999), pp 281-98.
2. Livingstone and Withers, *Geography and Enlightenment*; C. Withers, *Placing the Enlightenment. Thinking geographically in the age of reason* (Chicago, 2007).
3. C. Withers, 'Geography, natural history and the eighteenth-century Enlightenment: putting the world in place', in *History Workshop Journal*, 39 (1995), pp 136-63, p.142.
4. Ibid., p.143.
5. Withers, 'Geography, natural history', p. 6; *idem*, 'Encyclopaedism, modernism and the classification of geographical knowledge' in *Transactions of the Institute of British Geographers*, NS, 21 (1996), pp 363-98. Misquoted by Withers, it should be vol. 20 1996, pp 275-98.
6. R. Mayhew, *Enlightenment Geography. The political language of British Geography, 1650-1850* (London, 2000).
7. R. Porter, 'Afterword' in Livingstone and Withers, *Geography and Enlightenment*, pp 415-32 and Withers, *The Enlightenment* (London, 2001).
8. J. F. Quintanilla, *Naturalistas para una corte ilustrada* (Aranjuez, 1999).
9. J. Reguera Rodríguez, *La obra geográfica de Martín Sarmiento* (León, 2006); *idem Territorio ordenado, territorio dominado. Espacios políticos y conflictos en la España de la Ilustración* (León, 1995); R. Otero Pedrayo, *El Padre Feijóo, su vida, doctrina e influencias* (Orense, 1972).
10. C. Freixa, 'Imágenes y percepción de la naturaleza en el viajero ilustrado', in *Scripta Nova*, 42, Revista Electrónica de Geografía y Ciencias Sociales (Universidad de Barcelona, 1999); *idem*, *Los Ingleses y el arte de viajar, Serbal* (Barcelona, 1993) and O. F. G. Sitwell, *Four centuries of special geography* (Vancouver, 1993); B. M. Stafford, *Voyage into substance: art, science, nature and the illustrated travel account 1760-1840* (Cambridge, MA, 1984).
11. J. Puerto, 'La ciencia durante la Ilustración y la guerra de la independencia', in *Annales de la Real Academia de Farmacia*, 75 (e), (2009), pp 527-67.

19—O Flanagan:01—Anvil.qxd 14/08/2012 10:49 Page 27

12. H. Capel, 'Los Diccionarios geográficos de la ilustración' in *Geocrítica*, 31 (1981), pp 1-48 and *idem*, *La Física Sagrada* (Barcelona, 1985).
13. A. Morales Moya, 'Notas para una geografía cultural de la ilustración española' in N. Ortega Cantero, (ed.), *Estudios sobre el paisaje español* (Madrid, 2002), pp 43-56; Frexia, 'Imágenes y percepción'.
14. O. Recio Morales, *Ireland and Spain, 1600-1825* (Dublin, 2010); P. O'Flanagan and J. Walton, 'The Irish community in Cadiz during the eighteenth century', in H. Clarke, J. Prunty and M. Hennessy (eds), *Surveying Ireland's past. Multidisciplinary essays in honour of Anngret Simms* (Dublin, 2004), pp 89-119; A. Bilbao Acedos, *The Irish community in the Basque Country c.1700-1800* (Dublin, 2003).
15. P. O'Flanagan, *Port cities of Atlantic Iberia* (Aldershot, 2008).
16. Recio Morales, *Ireland and Spain*.
17. T. Bergman, 'Correspondence of the lexicographer Thomas Connolly OP (1783-93), in the Archivo General de Simancas' in *Archivium Hibernicum*, lxiii (1980), pp 299-323.
18. José Cornide, *Ensayo de una descripción física de España*, 1803 (ed.), H. Capel y L. Urteaga (Barcelona, 1983).
19. L. Urteaga González, *Ideas medioambientales en España en el siglo XVIII* (Torrejón de Ardoz, 1997).
20. José Manuel Recio Espejo, 'Guillermo Bowles: un naturalista por la España de mediados del siglo XVIII' in *Boletín de la Real Academia de Córdoba de Ciencias, Bellas Letras y Noble Artes*, 150 (2006), pp 69-80.
21. G. A. Reynolds, 'William Bowles (1720-1780), Eurogeologist' in *European Geologist*, 5 (1997), pp 67-70.
22. W. Reville, 'William Bowles, unrecognised Irish-born scientist' in *Irish Times*, 12 May, 2001.
23. J. P. O'Reilly, 'Notes on the history of the Irish wolf-dog', P.R.I.A., i (1889-1901), pp 333-39.
24. N. Colgan, 'William Bowles in Spain' in *Irish Naturalists Journal*, vol. xx (1911), pp 1-5.
25. G. Sánchez Espinosa, 'La obra del naturalista Guillermo Bowles y la política editorial del gobierno ilustrado' in *Dieciocho*, 25, 2 (2002), pp 225-79.
26. Recio Espejo, 'Guillermo Bowles'.
27. Reynolds, 'William Bowles'.
28. Reville, 'William Bowles'.
29. Cornide, *Ensayo*, p.112.
30. Ibid., 'Introducción'.
31. Sánchez Espinosa, *La obra del naturalista*.
32. Reynolds, 'William Bowles'.
33. Sánchez Espinosa, 'La obra del naturalista'; F. J. Puerto Sarmiento, *La ilusión quebrada. Botánica, sanidad y política científica en la España ilustrada* (Madrid, 1988).
34. Reville, 'William Bowles'.
35. Guillermo Bowles, *Introducción a la historia natural y a la geografía física de España* (Madrid, 1775).
36. Sánchez Espinosa, 'La obra del naturalista', p.255.
37. Guillermo Bowles, *Introducción a la historia natural y a la geografía física de España, por D. Guillermo Bowles* (Segunda edición, corregida, en Madrid: en la Imprenta Real, Año de 1782).

19—O Flanagan:01—Anvil.qxd 14/08/2012 10:49 Page 28

38. D. Guillermo Bowles. *Introducción a la historia natural y á la geografía física de España* (tercera edición corregida, en Madrid: en la Imprenta Real, Año de 1789); A. Gomis, 'La divulgación de la historia natural en la España del siglo XVIII', in VV.AA, (ed.), *Actas de la VIII Congreso de la Sociedad de las Ciencias y las Técnicas* (Madrid, 2004), pp 201-18.
39. G. Bowles, *Introduction a l'histoire naturelle et a la geographie physique de l'Espagne; Traduite de l'Original Espagnol de Guillaume Bowles, par le Vicomte de Flavigny* (Paris, L. Cellot et Jombrt Fils, 1776).
40. G. Bowles, *Einleitung in die Natureschiche und physiklische Erdbeschreibung von Spanien; aus dem Spanischen Original emit Anmerking von Prof Dieze. Aus d. Engl.mit den ubkichen Nachricken von Bowles* (Leipzig, 1778).
41. G. Bowles, *Introduzione alla Storia naturale e alla Geografía fisica di Spagna di Gugielmo Bowles pubblicata e commerentata dal Cavalliere D. Giusseppe Niccola d'Azara* (Parma: dalla Stamperia Reale, 1783, 2 vols).
42. M. Valera Condel, *Proyección internacional de la ciencia ilustrada española publicada en el extranjero: 1751-1830* (Murcia, 2006).
43. A. Lafuente, *A. Los mundos de la ciencias en la ilustración española, CSIC* (Madrid, 2003).
44. Sánchez Espinosa, 'La obra del naturalista', p.261.
45. J. Talbot Dillon, (Knight and Baron of the Sacred Roman Empire), *Travels Through Spain with a view to Illustrate the Natural History and the Physical Geography of that Kingdom in a series of letters, interspersed with historical anecdotes written in the course of a late tour through that Kingdom* (London, 1780). Between 1780 and 1784, this book, published in both Dublin and London, went through five editions/revisions and a German edition appeared in 1782. Much of it is culled from Bowles although Dillon provides fulsome acknowledgments. The jury is out in relation to a charge of plagiarism.
46. Dillon, *Travels Through Spain*.
47. Kimber, 1780.
48. Sánchez Espinosa, 'La obra del naturalista', p.262.
49. D. Diez de Revenga Torres y M.A. Puche Lorenzo**,** 'Preocupaciones lingüísticas y mecanismos léxicos en la obra de Guillermo Bowles', *Dynamis* (2007), pp 187-210.
50. G. Bowles y T. López, Manuscritos, noticias de sus naturales, y en particular las de Mr. Guillermo Bowles/ Por el Geógrafo D. Tomás \López. Pensionista de S.M. ….. Escala: 1:237,000. Also published, T. Lòpez ¿(1790), in T. López, 'Atlas particular de los Reynos de España, Portugal e islas adyacentes', vol. 1ª, no. 42; *idem*, Mapa de M.N and M.L, Señorio de Viscaya compuesto sobre algunos Mapas Manuscritos, noticias de sus naturales, y en particular las de Mr. Guillermo Bowles/ Por el Geógrafo D. Tomás \López. Pensionista de S.M. ….. Escala: 1:237.000 (Madrid, 1769).
51. G. Bowles, *Historia natural de la langosta en España y modo de destruirla, con la instrucción de Real y Supremo Consejo de Castilla, dirigida a los pueblos para exterminar esta terrible plaga* (Madrid, 1825).
52. ICONA, (ed.), Mapa forestal de España (Madrid, 1990-1994).
53. E. Bauer Manderscheid, *Los montes de España en la historia* (Madrid, 1980).
54. J. De Arriaga, (n.d), Informe (no title) Sec de Estado y de Despacho de Indias y Marina (quoted in Bowles, 1775, p. 347).
55. C. Aedo, *El bosque en Cantabria* (Santander, 1991)**.**
56. L. Urteaga, *La tierra esquilmada: las ideas sobre la conservación de la naturaleza en la cultura española del siglo XVIII* (Barcelona, 1987).

19—O Flanagan:01—Anvil.qxd 14/08/2012 10:49 Page 29

57. Bauer Manderscheid, *Los montes*.
58. G. Bowles, (n.d.), Discurso sobre el formato y cría de árboles, ms (1?) 760, Archivo de Simancas, Secretaria Marina, leg.573.
59. Bowles, 1775 and 1825.
60. A. Buj Buj, 'Control de plagas de langosta y modernización agrícola en la España de la segunda mitad del siglo XIX', in *Geocrítica*, 95 (1992), 67 pp; A. Buj Buj, *El estado y el control de plagas agrícolas. La lucha contra la langosta en la España contemporánea* (MAPA, Madrid, 1996).
61. A. Buj Buj, 'La plaga de langosta. Permanencia de un riesgo milenario', in *Scripta Nova*, Revista electrónica de geografia y ciencias sociales (Barcelona, 2008).
62. A. Buj Buj, pers com. 2011.
63. B.A. Ramírez, *Diccionario de bibliografía agronómica y de toda clase de escritos relacionadas en la agricultura* (Madrid, 1865).
64. M. Cuesta Domingo and S. Rebock (coord.), *Alexander von Humbolt, Estancia en España y viaje americano, Real Sociedad Geografica de España and C.S.I.C.* (Madrid, 2008).
65. Bilbao Acedos, *The Irish community in the Basque Country*; Anon? 'A curious paper from Spain, relating to the Sheep and Sheep-walks of that country', and "Merino sheep", *The Gentlemen's Magazine*, for 1764, pp 203-5, signed W. B. Quizá ¿? Yet I am informed that it came from Mr. Boles.
66. C. Rahn Phillips and W. D. Phillips, *Spain's Golden Fleece: wool production and the wool trade from the Middle Ages to the nineteenth century* (Baltimore, 1997); P. O'Flanagan, T. Lasanta Martínez and M. Errea Abad, Restoration of sheep transhumance in the Ebro Valley, Aragon, Spain', *Geographical Review*, vol. 101, 4 (2011), pp 556-75.
67. J. Klein, *The Mesta: a study in Spanish economic history* (Cambridge, Mass, 1920).
68. O'Reilly, 'Notes on the history'.
69. Urteaga, *La tierra esquilmada*.
70. idem.
71. M. Gutiérrez Elorza and A. Pérez González, 'Geomorfología en España', in tierra.rederis.es/Cuaternario y Geomorfologia/…/cuaternario 3(1-4)_007-.pdf. (1996).
72. M. Gutiérrez Elorza (ed.), *Geomorfología de España* (Madrid, 1994); E. Martínez de Pisón, La primera Geomorfología española, pp. 81-107 of J. Gómez Mendoza et al., *Geógrafos y naturalistas en la España contemporánea. Estudios de historia ciencia natural y geográfica* (Madrid, 1995).
73. Porter, 'Afterword'.
74. Urteaga, *La* tierra *esquilmada*.