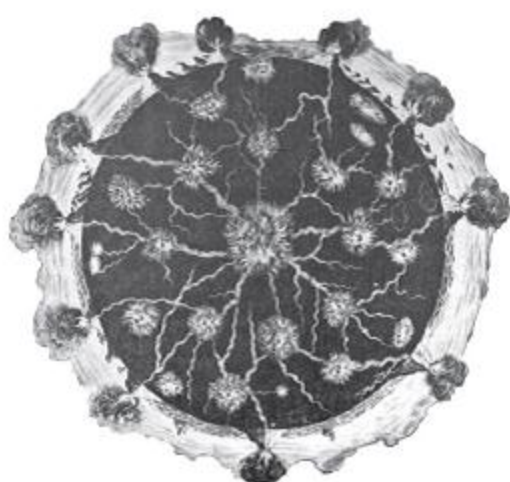


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HESS logo. Athanasius Kircher's (1602–1680) '*Systema ideale prophylaciorum*'—imagined view of subterranean fires and surface volcanoes, from *Mundus subterraneus*, 1678, Vol. 1, between pp. 186 and 187.

Front-cover image. First geological map of the Province of Moscow by Fischer von Waldheim (1830–1837). Red = Limestone; Yellow = Gypsum; Darker yellow (now faded and indistinct) = Sandstone; Blue = Ferruginous alluvium.

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LETTER FROM THE PRESIDENT

The History of Earth Sciences Society was formed in 1982 as an international organization devoted to promoting interest and scholarship in the earth sciences by (to quote our constitution) “publishing”, “organizing meetings”, and “supporting the efforts of other associations displaying similar interests”. Membership was to be, and is, open to all interested persons.

Over the course of thirty years, the chief accomplishment of the Society has been the creation and maintenance of *Earth Sciences History*, an issue of which appears before you now. Largely owing to the energies and commitment of five editors: Gerald Friedman, Mott Greene, Gregory Good, Patrick Wyse Jackson, and now David Oldroyd, the journal has increasingly become the preferred forum for articles on a wide range of topics in the history of the earth sciences. Our current editor David Oldroyd this year completes his second three-year term as editor, and all of us who read the journal or publish in it are grateful to him for his masterful stewardship of its tradition.

The world of publishing is now in a state of what can only be called revolutionary upheaval owing to the advent of digital technology. Fortunately *Earth Sciences History* has passed successfully into the new age. Not only is the journal now published in both print and online editions but also the contents of the journal can be searched going back to the first issue published in 1982. The Society has a contract with Metapress, an electronic content management company, to provide this service. We thank Emma Rainforth, our former treasurer, for working to negotiate our contract with Metapress on behalf of the Society. Another aspect of the digital revolution has been the creation of the worldwide web. We thank Kerry Magruder for putting a great deal of time in the last two years creating a robust web presence for us, a task which our present secretary Warren Dym has now ably taken on. Emma Rainforth also undertook the necessary negotiations to enable *Earth Sciences History* to be listed with Web of Science and thereby join the citations game.

One aspect of the original charter for the Society suggested as its purpose organizing meetings. Given the existence of other organizations such as national geological societies, societies devoted to the history of science, and international bodies such as INHIGEO, there has been little effort to create an additional structure for regular meetings. However, the Society has organized the occasional meeting and it welcomes the co-sponsorship of meetings. For example, it is presently co-sponsoring two historical sessions to be held at the 125th anniversary meeting of the Geological Society of America. (For more on this see our website: www.historyearthscience.org.) We would welcome co-sponsorship of meetings with other societies. Persons interested in co-sponsoring such collaborative meetings should write to our program officer Paul Lucier. And, of course, papers coming out of the various meetings devoted to our subject may always be submitted to *Earth Sciences History*.

Ours is intended to be an international organization. We have tried to keep subscription prices low, especially in the institutional category, to facilitate this end. Our editors have traditionally worked with those for whom English is not a first language in bringing their papers to fruition.

Again, welcome to the Society if you are a new member; and a deep nod of recognition and gratitude to those who have been members for many years.

Cordially
Sandra Herbert
President 2013–2014

NOTE FROM THE SECRETARY

It is my pleasure to invite you to visit HESS's updated website at: <http://www.historyearthscience.org/>. There, among other important matters, you will find information on how to join the Society and receive *Earth Sciences History*, access searchable contents, and order back issues. We are also interested in expanding the 'Of Interest' page, so please email us at: membership@historyearthscience.org with suggestions for new links, including meetings and online resources.

Warren Dym
Secretary and Web Manager

NOTE FROM THE TREASURER

The Treasury of the History of Earth Sciences Society is managed with two goals in mind. First, our primary obligations are to our members and institutional subscribers. As treasurer, I try to respond as quickly as possible to requests, within the limitations of small society that cannot maintain all of the services expected of businesses. The second goal is to main a sufficient fund in our banking accounts to support at least a year of publication in case of some unforeseen problem. Our "rainy day" fund is reserved for that use. Our current combined balance is sufficient to meet this goal.

In the past the treasurer submitted a report at the end of each fiscal year, in the second issue of the journal. I shall reinstitute this practice in the next issue.

EDITOR'S INTRODUCTION

DAVID OLDROYD

The Branagan Symposium in Brisbane, 2012

The 34th International Geological Congress was held in Brisbane in August 2012. It was a 'sumptuous' event held in the magnificent new convention centre by the Brisbane River, which was fortunately not in flood as it had been in 2011. For this occasion, the International Commission on the History of Geological Sciences (INHIGEO) organised several sessions, which were well attended and contained a considerable number of interesting papers. I had the pleasure to organise the session on biographies and invited the presenters to offer their papers to *Earth Sciences History*. Nine of them took up the offer. Thus the papers published here can, in a sense, be regarded as the 'proceedings' of that session. But they do not, in any sense, belong to the 'grey area' of publication: they have been peer reviewed like any other papers appearing in this journal.

The idea of organising such a session arose as a way of paying tribute to the work of the doyen of studies on the history of geology in Australia, David Branagan, long retired from the Department of Geology and Geophysics at Sydney University. But he has for much of the latter part of his career devoted his considerable energies to studying the history of geological work in Australia, on which topic (and many others) he is a walking encyclopaedia. His most important work in this field is a definitive biography of Australia's most renowned geologist, Professor Edgeworth David: *T. W. Edgeworth David A Life: Geologist, Adventurer, Soldier, and 'Knight in the Old Brown Hat'* (National Library of Australia, Canberra, 2005, 648 pp.). The volume has received considerable critical acclaim and was short-listed for the Prime Minister's annual award for books on Australian history.

David Branagan's interest in the history of geology was stimulated by a former colleague at Sydney University, the petrologist Thomas Vallance, who had amassed a large and valuable collection of early and rare geological books and travel writings and wrote extensively on the history of Australian geology. To honour Vallance's memory, in 2012 the Earth Science History Group of the Geological Society of Australia established a medal named after him, to be awarded every four years for notable contributions to the study of the history of geology in Australia. It was presented for the first time at the Brisbane Congress, appropriately by Professor Vallance's widow, Hilary (see below).

In fact, not many historians of geology, *per se*, have authored biographies (and even fewer have written autobiographies) though many have written relatively short pieces of a biographical nature in a huge variety of publications. So the occasion of the Brisbane Congress and David Branagan's receipt of the Vallance Medal seemed to provide excellent reasons for one of the historical sessions to be focused on the theme of biography. The session was well attended and, I think, produced a valuable crop of papers. I presented the first paper myself. It simply consisted of data about biographies and autobiographies that I had culled from a wide variety of sources and which I tabulated and to some degree analysed. More on this anon.



Papers from the Symposium

To be candid, not many of those attending the meeting (myself included) have actually published a book-length biography. But **Léo Laporte** has—on the work of George Gaylord Simpson. Indeed most of Léo's historical work has been on Simpson. So I was pleased to invite him to present the keynote address for the session; and his item is published first in the present collection. It describes the history of what he actually did when he wrote Simpson's biography. Of course, history never repeats itself, so Léo's account will not serve as a 'template' for other people's studies. But it is interesting to see what was entailed in writing such a book, which had the advantage of enabling the author to meet and get to know his subject and receive information directly from him. Whether this enabled Simpson to 'fashion' the narrative to his own liking I do not know. If he did, that raises the question of whether this or is not desirable. (I'm *not*

suggesting here that Laporte's biography *did* get afflicted by this problem, but am following through a thought suggested in Marianne Klemun's paper: see below.)

After Laporte's interesting contribution, the papers that follow are presented in the order in which they were finalised for publication. The retired American historian of geology, **Kennard Bork**, a former Secretary General of INHIGEO, writes an engaging and judicious account of the life and work of the French mineralogist, industrial scientist and stratigrapher Alexandre Brongniart, whose name is often bracketed with that of Georges Cuvier and remembered for their collaborative mapping of the Paris region on biostratigraphic principles. Bork presents Brongniart as a staunch empiricist, as can be seen from the words 'facts first' in the title of the paper. But he also went beyond fact collecting and sought to educe significant theoretical notions in such fields as biostratigraphy and the development of the geologic column.

Our next offering comes from **Ana Carneiro** and her former student **Teresa Mota** from Portugal. They have both long been interested in the early history of professional geology in Portugal through the establishment of its geological survey in the nineteenth century (but which subsequently fell on hard times in the earlier years of the twentieth century). The situation for early geology in Portugal was atypical for Europe as there was virtually no amateur interest in geology in that country, so that surveyors were either recruited from other parts of Europe, went overseas to train, or learnt the craft of surveying on the job. The early surveyors mostly had a background in engineering but the early geological work in Portugal also involved archaeological investigations. Mota and Carneiro make a comparative study of three of the early surveyors/geologists: Joachim Delgado, Francisco Sousa, and Carlos Teixeira. Following a useful exegesis of some of the recent literature on biographical work in the history of science, they proceed to take their three chosen figures as 'pegs' on which to hang a valuable account of the early history of geology in Portugal—which so far as I am aware is one of the few countries in Europe—other than Greece and some small countries (including the Vatican!)—that has not produced any book-length biography of a geologist. This fact is perhaps causally linked, in part at least, to the lack of an early Portuguese indigenous amateur tradition in geology. Or the two phenomena have some common cause, the nature of which I do not speculate about here. (But see later.)

The next paper is offered by another recently-retired American historian of geology **Kenneth Taylor**, who is presently INHIGEO's President. Professor Taylor's researches have largely focused on and around the life and work of the eighteenth/nineteenth-century French naturalist, physical geographer, cartographer, encyclopaedist and Government inspector of manufactures, Nicolas Desmarest. Taylor has already written many articles on him, and they would, if suitably synthesised, surely provide the basis for a major biography. So I'm pleased to learn that he is now working on one in his retirement. In the paper published here, Taylor discusses some hitherto previously unremarked features of the *Géographie-Physique*, which formed an important part of the *Encyclopédie méthodique* (the successor to Diderot and d'Alembert's *Encyclopédie*). Desmarest was the principal author of *Géographie-Physique*, though the work was not completed until after his death. Taylor examines this work in considerable detail, to the extent that he offers a substantial contribution to an understanding of the later years of Desmarest's career. He draws attention, incidentally, to the significant amount of plagiarism that went on as the aging Desmarest sought to compile an encyclopaedic account of 'physical geography', as that subject existed in the early years of the nineteenth century.

There follows a longish paper by **Wolf Mayer** about the life and work of the English-born Australian geologist, William Benson (who secured a chair at Dunedin in New Zealand in the later part of his career). Benson's name is probably not very well

known outside Australasia, and he may not warrant a biography like David B.'s life of T. W. E. David. But Benson's work certainly deserves historical attention, such as is provided by Mayer's detailed paper. Benson was a fine map-maker, as can be seen by the samples of his work provided in this study. Particularly notable was his work on the spilites (a name coined by Brongniart by the way) and serpentinites of northern New South Wales and the mapping of a long fault zone where such rocks crop out. It should be mentioned that David B. led and organized an excellent geological–historical field excursion from Sydney to Brisbane in the week before the IGC in Brisbane. The group spent a night at Nundle (see pp. 61, 62, 64, and 65) and inspected some of the rocks studied by Benson. Mayer's paper will probably be the definitive biographical account of Benson, as he may not receive the 'reward' of a full biography. It may be mentioned here that one of Thomas Vallance's main interests in geology was the study of spilites.

The next two papers by **Steven Rowland** and **Zoya Bessudnova** refer to two famous early Russian geologists: Mikhail Lomonosov and Grigory (Gottself) Fischer von Waldheim respectively. Rowland knows Russian having spent a period in Russia during his postgraduate work and is thus well placed to do historical work on Lomonosov in English. This polymathic genius has been hailed as a supporter of the mechanical philosophy and a 'harbinger' of Lavoisier's 'new chemistry', a founder of stratigraphy, as well as the discoverer of the atmosphere of Venus. He thought of heat as a form of motion but also entertained a wave theory of light and foreshadowed the principle of the conservation of energy. In addition, he was a poet, grammarian, and philologist, and produced artistic mosaics. Some of Lomonosov's works are available in English (including Rowland's GSA translation *Treatise on the Strata of the Earth*, 2012) and there are English translations of two of Lomonosov's Russian biographies. Readers will enjoy Rowland's candid account of the polymath's early life and adventures, even if he was not a wholly admirable character.

Dr Bessudnova has been working on a life of Fischer von Waldheim for some years and her paper will (I hope) serve as a 'prequel' to her full biography. Fischer was a German by birth, and was trained as a scientist there, but migrated to Russia and, in effect, he founded geology as a significant area of study in his adopted country. He too was a man of many parts (but not so many as Lomonosov!) and helped establish geology as a science subject at Moscow University. He was also active in the establishment of the Moscow Society of Naturalists and the early natural history museums in Moscow. Dr Bessudnova discusses his achievements as a museum curator at a difficult time in Russian history when Moscow was temporarily occupied by Napoleon's soldiers and many museum specimens were lost. Her paper also discusses Fischer's survey and mapping of the Province of Moscow, his palaeontological work, and his studies in entomology and palaeobotany. In comparison with Lomonosov, Fischer is little known in the West outside Germany and this paper should partly remedy that situation.

The last two papers in this collection come from Austria, and are more interesting from a theoretical perspective than the other papers in the present collection. **Marianne Klemun** (a professor of history at the University of Vienna) approaches the study of the history of geology from the standpoint of a professional historian rather than that of a geologist turned historian of geology, as is more commonly the case amongst readers of *Earth Sciences History*. She is sensitive to the many theoretical problems that attend the writing of biographies and brings them to the attention of would-be writers of geologists' biographies. Perhaps with the idea of appealing to geologists at a geological congress she likens the process of writing a biography of someone's life, and interpreting it, to that of a palaeontologist examining a fossil and from its remains trying to divine its original nature, character, and mode of existence.

Can a biographer 'bring his or her subject to life' or is the original 'essence' forever lost? Also, just as an organism is inevitably changed by the processes of fossilisation, so too is a person's original nature changed by reason of the vagaries of the processes of preservation of documents. And here, of course, there is a difference between the writing of a biography and the work of (say) a palaeoecologist. For the subject of a biography may seek to shape his or her future image and reputation by the *selective* preservation of documents and artefacts. So the writing of a biography cannot be completely objective and secure in its accuracy, even if that is the intention and there are no (overt) political, theological, or ethnic factors in play. I therefore recommend Klemun's paper as a 'cautionary tale' for would-be biographers!

Finally we come to Johannes Mattes' most interesting paper on the work of two early twentieth-century 'cavers' in Austria. He shows how two Austrian speleologists, one a young soldier who died on the Russian front in the First World War and the other a young woman who died in a caving accident quite early in life in the 1920s, have received entirely different, and inconsistent, recognitions by posterity. After the War with the defeat of German and Austrian forces there was a need to create heroes and the young Alexander von Mörk fulfilled this requirement most satisfactorily, and a cave that he had investigated was turned into a kind of shrine in his memory. His caving achievements, as described by Mattes, seem to have been relatively modest, though of course he died young.

By contrast (again according to Mattes' account), a young woman schoolteacher, Poldi Fuhrich, undertook some extremely impressive cave explorations, but in the 1920s her efforts, and those of other women of her era, were accorded relatively little recognition. And when she died in a tragic fall, one commentator (in Germany) rather callously drew attention to the fact that she had not been using a safety rope (she should have known better!). Mattes shows that at that period women tended to be sidelined by the Austrian caving community. And when her portrait was painted it represented her as a quasi-masculine figure. She became remembered as a 'manly' personality—a kind of honorary man! However, after the War and with the rise of the feminist movement Fuhrich's reputation was resurrected and she is now accorded a kind of heroic status, whereas, I gather, relatively little attention is now given to von Mörk.

The case clearly illustrates the social and political uses that scientific biographies may play. Writing biographies is not always, and arguably is never, a socially and politically neutral activity. This is a worthwhile generalisation to bear in mind, regardless of the quality a biography may have in other respects.

*A preliminary analysis of biographies and autobiographies of geologists*¹

Having undertaken the task of gathering authors to contribute to the 'Branagan Symposium' I thought it would be interesting to assemble some data about the biographies and autobiographies of geologists and see what generalisations, if any, might become apparent. Accordingly I embarked on a 'fishing expedition', seeking to find what fish there were in the sea. And then I tried to suggest possible explanations of the data that I compiled.

I started by going through my own library. Then I trawled through the heroic bibliographical collection assembled by the late William Sarjeant (*Geologists and the History of Geology: An International Bibliography from the Origins*, 5 vols and 4 supplementary vols), which covered texts from the beginnings of geology to 1993. I only considered printed books and excluded journal articles, obituaries, and edited

¹ The information that follows was presented as an introduction to the 'Branagan Symposium'.

collections of papers about several different geologists. I then began to make enquiries about countries for which I had little or no information, using the address lists of INHIGEO Members as potential sources of information. This yielded some useful additions, especially for Russia. Thereafter I topped up the information I had collected by using Google and Wikipedia. It is clear that my search was not comprehensive but the results were nonetheless interesting and I think worth reporting. Many of the ‘geologists’ I included had in fact attracted bibliographic attention chiefly by virtue of their work as explorers, philosophers, *etc.*, or in other branches of science such as botany. My criteria for inclusion in the lists were thus quite liberal. With these caveats I offer the following data, generalisations and thoughts.

The following table exhibits the heads under which I listed the data (taken up to 2010) and gives examples from the beginning of the alphabet:

Name	Author(s) of book	Title of book	Date	Type
Abbe (G)	Auerbach	<i>Ernst Abbe: Sein Leben, sein Wirken, seine Persönlichkeit . . .</i>	1922	Biography
Abbe (G)	Günther	<i>Ernst Abbe, Schoepfer der Zeiss-Stiftung</i>	1946	Biography
Āboltiņš (Lv)	Alika & Briežkalns	<i>Profesors Ojārs Āboltiņš</i> (in Latvian)	1997	Biography & bibliography
Agassiz, A. (US)	Agassiz, G.	<i>Letters and Recollections of Alexander Agassiz</i>	1913	Autobiography & correspondence
Agassiz, A. (US)	Tharp	<i>Adventurous Alliance: The Story of the Agassiz Family of Boston</i>	1959	Family biography
<i>Etc.</i>				

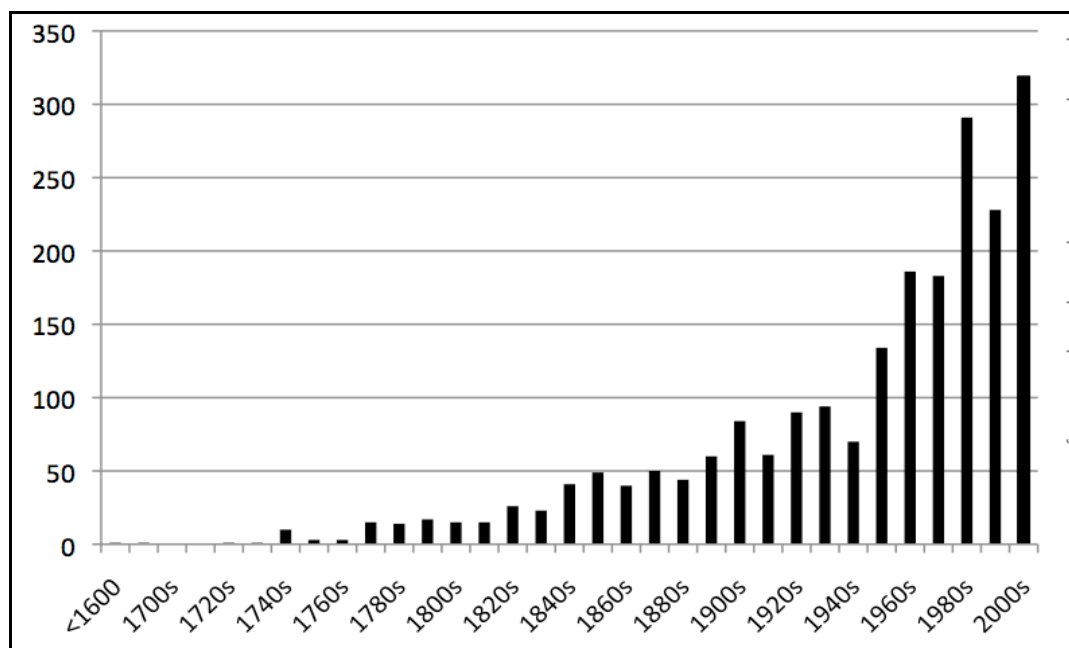
My next task was to list the ‘counts’ by decades, and venture some explanations for the results yielded by that manoeuvre.

The table that I constructed (see below) clearly reveals the extent of my reliance on Sarjeant’s work. Nevertheless, one can see the influences of certain events of world historical importance, in the form of wars and economic ups and downs. Needless to say, the numbers keep increasing because there are constantly more geologists to be written about. I also represented the data graphically—as follows. (Again we see the extent of my reliance on Sarjeant’s labours.)

Decades	Number of Publications	Comments
<1600	1	
17th C	1	
1700s	0	
1710s	0	
1720s	1	
1730s	1	
1740s	10	
1750s	3	
1760s	3	
1770s	15	Industrial Revolution, Scientific expeditions
1780s	14	Industrial Revolution, Scientific expeditions
1790s	17	Industrial Revolution, Scientific expeditions
1800s	15	Napoleonic Wars (1799–1815)
1810s	15	Napoleonic Wars (1799–1815)
1820s	26	
1830s	23	American ‘Panic of 1837’
1840s	41	
1850s	49	
1860s	40	

1870s	50	
1880s	44	
1890s	60	'Long Depression'
1900s	84	
1910s	61	World War I (1914–1918)
1920s	90	
1930s	94	Great Depression
1940s	70	World War II (1939–1945)
1950s	134	
1960s	186	
1970s	183	'Oil shock'
1980s	291	
1990s	228	Last year of Sarjeant bibliographies
2000s	319	

These data could also be presented graphically as follows, showing the number of publications identified for different decades.



Next I classified the items by ‘kind’ or ‘genre’, as follows:

Biography	1,265
Autobiography/travelogue	328
Autobiography	213
Life and letters	97
Biography for younger readers	41
Joint biography	40
Correspondence	31
Fictionalised biography	26
Biography, travel	25
Biography, autobiography	18
Biographical articles making a book	10
Family biography	7
Joint autobiography	4
Interviews (autobiographical)	4
Autobiography, correspondence	4
Biography, bibliography	4

Joint autobiography	4
Romantic biography	4
Biography and texts	3
Photobiography	3
Autobiography for younger readers	3
Joint biography for younger readers	2
Diary	2
Collective biography	2
Popular biography	2
Comic	2
Autobiographies, travelogue	1
Hagiography	1
Metabiography	1
Total	2,137

Then I looked for the most ‘popular’ authors. Here one sees the influence of fame in non-geological fields, as, for example, in the case of Darwin, Linnaeus, Teilhard de Chardin and Swedenborg. It is also immediately apparent that nationalism plays some role in these publications—as, for example, in the cases of Mawson, Miller, Domeyko (claimed by Lithuania, Belarus, Poland and Chile!) and Staszik. Also being a notable explorer/traveller, writer, philosopher, theologian, woman, *etc.* is a significant ‘plus’. Persons judged (by me!) to have had geology as the main string to their bow have their names indicated in bold.

**Numbers of Biographies/Autobiographies for the most ‘popular’ authors
(with names of *bona fide* geologists in bold)**

DARWIN [evolutionary theory, geology]	105	BUFFON [natural history, cosmology, age of Earth]	17
HUMBOLDT [travel, ‘universalism’, biogeography, <i>Kosmos</i>]	73	CUVIER [palaeontology , comparative anatomy]	17
POWELL [geology , exploration]	40	HUXLEY [evolution, anatomy, education, philosophy, agnosticism]	17
FRÉMONT [exploration, botany, controversial politics]	38	LEONARDO [art, anatomy, inventions]	17
STENO [anatomy, theology, ‘sanctity’, geology]	31	VERNADSKY [mineralogy , crystallography, biosphere, noosphere]	17
LINNAEUS [botany, taxonomy]	26	DOMEYKO [geology , philanthropy, politics, Chilean history]	17
NANSEN [exploration, oceanography]	26	GOETHE [literature, optics, travel, pantheism, philosophy]	15
MAWSON [exploration, geology]	21	LAMARCK [evolutionary biology, botany]	14
TEILHARD DE CHARDIN [theology, palaeontology]	21	LEICHHARDT [exploration]	14
ANNING [palaeontology , autodidact, female, working class]	21	LYELL [geology , travel]	12
MILLER [journalism, Scottish nationalism, Church politics, science popularisation, palaeontology]	18	SWEDENBORG [theology, religious mysticism]	11
J. R. FORSTER [travel, natural history, ethnology, revolutionary politics]	18	STASZIC [Polish nationalism, politics, education, philanthropy, geognosy]	10

The data may be of interest regarding notable geologists who have not (so far as I am aware) been ‘honoured’ by ‘proper’ biographies—for example, Lapworth, Wadia, Sederholm, Jeffreys, *etc.* Since biographies may reasonably be regarded as an aspect of the ‘reward system’ of science it would be desirable that such persons and others should

be the subject of ‘proper’ biographies—not just obituaries.²

Finally, and perhaps controversially in the result, I listed the data by country according to the ‘diligence’ of their geologists and their biographers/autobiographers, calculating this factor simply by dividing countries’ populations by the number of tabulated texts and arranging the resultant numbers. Thus:

Country	Country Type	Number of Publications ³	Population (present)	‘Diligence’ (persons/publication)
Switzerland	Small, European	45	1,203,000	26,730
Scotland	Small, European	92.5	5,222,000	56,450
Russia	Large, European	169	143,100,000	84,670
Lithuania*	Small, European	24	3,193,000	133,000
Sweden	Small, European	67	9,490,000	141,600
United Kingdom (incl. N. Ireland)	Medium, European	393	62,260,000	158,400
Norway	Small, European	29	5,005,000	172,500
England and Wales	Medium, European	300.5	54,820,000	182,400
Germany	Medium, European	373.5	81,830,000	219,100
Latvia*	Small, European	8	2,070,000	258,700
Denmark	Small, European	20.5	5,580,000	272,100
Hungary	Small, European	36	9,962,000	276,700
Ireland	Small, European	14.5	4,588,000	316,400
New Zealand	Medium, European heritage	12.5	4,433,000	354,600
France	Medium, European	177	65,350,000	369,200
Australia	Medium, European heritage	54.5	22,880,000	419,800
Belarus	Medium, European	18.5	9,461,000	511,400
Austria	Small, European	14	8,452,000	603,700
Italy	Medium, European	96	60,780,000	633,100
Estonia	Small, European	2	1,318,000	659,000
Romania	Medium, European	27.5	19,040,000	692,363
USA	Large, European heritage	395	313,400,000	793,400

² Should any reader be interested to see my complete list with a view to seeing where there are obvious ‘gaps’ I shall be happy to supply copies of the tables on request.

³ If an author was associated with two countries, each country is scored 0.5 for each of his or her publications.

Japan	Large, Asian	16	127,700,000	798,100
Canada	Medium, European heritage	42.5	34,770,000	818,100
Poland	Medium, European	38.5	38,500,000	1,000,000
Czechia (+ Slovakia)	Medium, European	15.5	15,950,000	1,029,000
Netherlands	Small, European	12	16,730,000	1,394,000
Belgium*	Small, European	6	10,950,000	1,825,000
Mexico	Large, Hispanic	6	112,300,000	1,872,000
Ukraine	Medium, European	14	45,640,000	3,260,000
Armenia	Small, European	1	3,269,000	3,269,000
Kenya*	Medium, African, all authors European	10.5	38,610,000	3,677,000
Bulgaria	Small, European	2 (collections)	7,599,000	3,750,000
Chile	Medium, Hispanic	4.5	17,400,000	3,867,000
China	Very large, Asian	34	1,347,000,000	3,962,000
Argentina	Medium, Hispanic	7	40,110,000	5,739,000
Libya	Small, African, Muslim	1	6,423,000	6,423,000
Spain*	Medium, European	7	46,200,000	6,600,000
Turkey	Medium, Middle East, Muslim (but Ataturk revolution)	10	74,720,000	7,472,000
South Africa	Medium, African, partly European heritage, all authors of European heritage	6.5	50,590,000	7,783,000
Israel*	Small, Middle East, Jewish (a 'young' country)	1	7,859,000	7,859,000
Khazakstan	Medium, Central Asia, Muslim	2	16,720,000	8,365,000
Brazil	Large, Hispanic	2	192,400,000	9,620,000
Finland*	Small, European	0.5	5,406,000	10,810,000
Croatia & Serbia	Small(ish), European	1	11,400,000	11,400,000
Persia (Iran)	Medium, Middle East, Muslim	6	76,310,000	12,720,000
Tunisia	Small, African, Muslim**	0.5	10,760,000	21,530,000
Venezuela	Medium, Hispanic	1	27,150,000	27,150,000

Uzbekistan	Medium, Central Asia, Muslim	1	29,120,000	29,120,000
Egypt	Medium, Africa, Muslim	1	81,920,000	81,920,000
India	Very large, Asia, principally Hindu	3	1,210,000,000	403,300,000
* Anomalous (<i>i.e.</i> , not located in the list where one might expect a country to be in the list).				
** The single author is Italian.				
NB No known publications from Portugal, Greece, Slovenia, Cyprus, Iceland, Monaco, Luxembourg, the Vatican, Africa (other than authors of European heritage), most countries of South and Central America, nearly all Muslim countries, Southeast Asia, most of the Middle East. All the publications from Persia (Iran) refer to Avicenna.				

These results are interesting, albeit obviously of limited accuracy. They suggest, what is already well known, that geology is a science of European origin, which has been taken up with enthusiasm by the residents of North America and Australasia. The leading countries have been Switzerland, Russia, the United States, the United Kingdom, Scandinavia (excluding Finland), Germany, France, and Italy. Scotland more than ‘pulls its weight’ in the United Kingdom. Switzerland probably heads the list because of its exposure to French, German and Italian influences, its political stability and economic prosperity, and its exceptionally striking scenery and geological interest. Geology has been transplanted successfully to China and Japan, but not yet to India, in only a modest way to South America, and virtually not at all to Central America (excepting Mexico), Africa, the Middle East, Central and Southeast Asia. When I say ‘transplanted’, I mean as a *cultural* tradition, not a *technical* activity or practice. The Baltic States stand well, but perhaps in part because I have some enthusiastic correspondents there. Finland is ‘disappointing’. Spain stands lower on the list than might be expected, in part, I think, because of the country’s religious tradition, its tragic political history in the twentieth century, and the decline of its earlier empires and the zeal for exploration. That applies even more so to Portugal, which has generated no biographies or autobiographies of geologists and possibly reflects the long-term social and economic effects of the Lisbon Earthquake. I should mention that for some time I had no input from Romania and Bulgaria until I successfully made some personal contacts there (via Greece). By contrast, Greece itself had nothing to offer except the contact in Bulgaria—which led me on to Romania. For Russia, the position would have been quite different had it not been for one most helpful correspondent.

Putting the inferences another way altogether, I suggest that the data reveal that geology as a cultural tradition is a product of the European Enlightenment, the Romantic Movement, and the Industrial Revolution (with its concomitant explorations and colonisations), all of which occurred chiefly in northern Europe rather than the southern parts of the continent. Geology successfully been transmitted to China and Japan as a cultural activity, but not to other parts of the world—apart from South America to a modest extent.

There is also, I fear, a large elephant in the room. Although they have rich traditions in mathematics and astronomy, Muslim and Hindu countries and peoples have not embraced geology except for pragmatic reasons—not for love of Nature, personal satisfaction, intellectual curiosity, national pride, or whatever.⁴ (In saying this it may be that the fact that I have only limited contacts with the Muslim world and India, which

⁴ In India, D. N. Wadia would be an obvious exception, but he does not appear to have any book-length biography.

limitation may have skewed my results—but probably only to a small extent.) Turkey is a partial exception to the generalisation, but it had the Ataturk Revolution, which sought to introduce European ideas and practices to the country, though in recent years it appears to be reverting to its traditional cultural roots.⁵

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⁵ As a footnote I may mention that a Turkish acquaintance of mine in Australia recently wrote the first biography of Darwin for publication in Turkey. The book was written, and the type-setting and layout work were done, when the money for the book from a Turkish bank suddenly became ‘unavailable’. So my acquaintance informed the publisher that he would publish the book in electronic form and distribute it on the web without charge. Curiously, the money for the book’s publication miraculously reappeared and the work was successfully published in 2010. And as I understand it has now been favourably reviewed and has sold well in Turkey. This illustrates the ongoing influence of the Ataturk Revolution in Turkey—and also the effort of its present Government to prevent the dissemination of ‘subversive’ Western ideas in that country.