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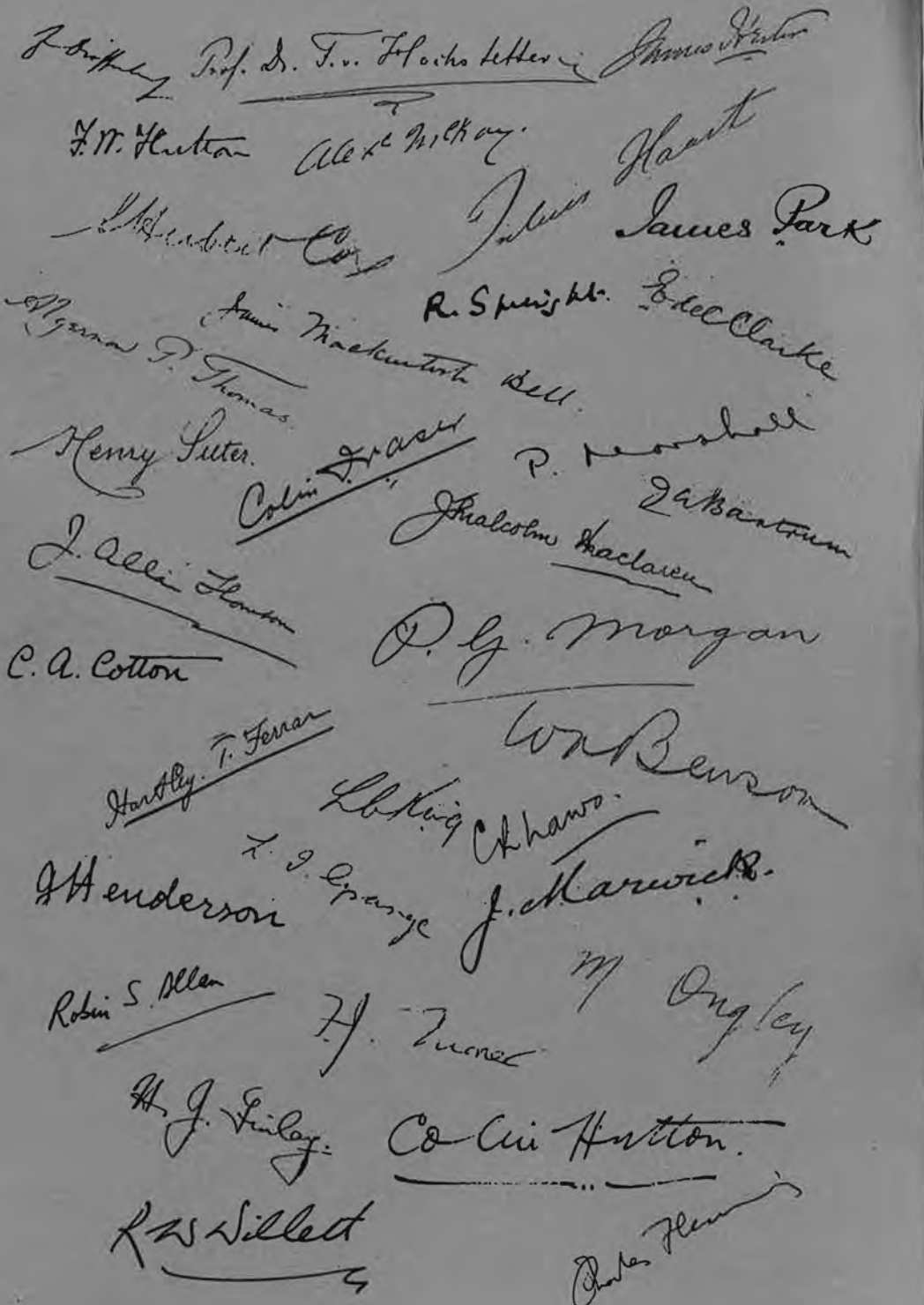

[Bone digging] has some danger, enough to give it zest and probably about as much as in the average engineered big-game hunt, and the danger is wholly to the hunter. It has uncertainty and excitement and all the thrills of gambling with none of its vicious features. The hunter never knows what his bag may be, perhaps nothing, perhaps a creature never before seen by human eyes. Over the next hill may lie a great discovery! It requires knowledge, skill, and some degree of hardihood. And its results are so much more important, more worth while, and more enduring than those of any other sport! The fossil hunter does not kill; he resurrects. And the result of his sport is to add to the sum of human pleasure and to the treasures of human knowledge.

– George Gaylord Simpson

EDITORIAL

This issue of the Historical Studies Group Newsletter is a milestone issue in that it marks the beginning of our tenth year of publication. Our first issue was published in September 1990. It is also significant in that it is the first issue of the new century and the new millenium. And this creates a problem. Some of the articles in this (and future) issues were prepared up to three years ago and may make reference to "last century" i.e. nineteenth century. Readers will have to make their own mental adjustment when reading such articles.

Subscriptions for 2000 are now due and a notice is sent with this newsletter. Please make your cheques payable to HISTORICAL STUDIES GROUP.

The Hector LIbrary at the Museum of New Zealand recently disposed of its geology journals to other New Zealand institutions. Whilst this is symptomatic of the present attitude to geology in this country (?and throughout the world) it is also symptomatic of the lack of a sense of history amongst New Zealand scientists. Many of the early volumes of the Hector Library journals belonged originally to Gideon Mantell and carry his signature and sometimes his annotations. They are therefore of significance in the history of geology.

Worse things have happened. As far as New Zealand's documentary scientific heritage is concerned the attitude too often has been "if it is old it must be out of date so throw it away". Much has already been lost but all members of the Historical Studies Group should work to stop the rot. Time is running out.

Alan Mason
75A Argyle St.
Herne Bay
Auckland

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Our Introductory Quotation

George Gaylord Simpson (1902-84) was Vertebrate Paleontologist at the American Museum of Natural History from 1929 to 1959. He made a close study of South American fossil mammals and our quotation comes from Attending Marvels, his account of a collecting expedition to Patagonia published in 1934.

Science, politics and religion in early nineteenth century Scotland — Patrick Matthew, natural selection, and a New Zealand connection

Analysis of the contributions made by nineteenth century scientists, with the benefits of hindsight, is a rewarding field of enquiry. Few fields of scientific endeavour have captured popular imagination as vividly as evolution. For most people the name of Charles Darwin is synonymous with evolution by natural selection, though of course the truer picture is of a tangled skein of progress with many threads of contribution, over a century or more. This piece looks at one of the threads, Patrick Matthew, in his early nineteenth century Scottish intellectual setting, and briefly at his New Zealand connection.

Matthew (1790 — 1874) was a successful commercial orchardist in Scotland, a highly intelligent, well-educated, practical man. His story is a good example of the interplay of politics, religion, intellectual activity, and knowledge based on practical experience. His interests were wide-ranging and forward-looking. He was keenly aware of European politics and their impact on Britain. He looked ahead in matters such as the condition of the working classes, and was an early member of the Chartist movement (early trade unions). He was staunchly opposed to the "law of entail" — single-line inheritance of title and property — and a firm believer instead in opportunity for, and reward of, ability. He believed that emigration to North America, Australia and New Zealand was greatly in the best interests of the working classes, and published a book extolling it in 1839, in part as a solution to widespread unemployment in Britain. He also believed, and this was an outcome of his evolutionary views, that the various "savage" races would disappear in the face of competition from the "superior" western people.

As a practising orchardist, Matthew was an everyday user of breeding and re-combination techniques. The majority of basic breeds of cattle, sheep, pigs, poultry, fruit, flowers and vegetables had been developed by trial-and-error breeding in the eighteenth century. Mutations (sports, or variations) were well known, and the fact that they were heritable — for example the 6-toed condition in cats was well-known to Erasmus Darwin, Charles' grandfather (and himself probably the pioneer of evolutionary views), in mid century. The key word in breeding circles was "selection". The whole business was about selecting the traits one wanted, and breeding out those one didn't want.

As an aside, Charles Darwin made extensive use of information from plant and animal breeders, and so he was quite at home with the term "selection". Yet when he put it in the title of the famous book, *On the Origin of Species by Means of Natural Selection or the Preservation of*

Favoured Races in the Struggle for Life, his publisher Murray wanted to remove the word because he had never heard it!

Scotland in the late eighteenth and early nineteenth centuries was an intellectual dynamo, especially in the fields of geology and paleontology (Hutton, Playfair, Lyell, Jamieson). Change of life forms and assemblages with time, and some concept of the enormity of that time, were becoming widely known. In Britain the dead hand of the clerical establishment still lay heavy on most scientists (especially those in official positions), whereas across the Channel following the French Revolution of 1789 that dead hand had been to some extent removed, and there was a ferment of activity in paleontology (Lamarck and Cuvier, to name just two). Patrick Matthew was well-travelled, and had business interests in Europe, so he was aware of that activity.

The single most critical aspect of Patrick Matthew in his context is probably his atheism. He was quite unshackled by religious pre-conceptions. He observed that most organisms over-reproduce to the tune of a thousand-fold or more, and reasoned correctly that this fact generates intense competition for survival, which would automatically tend to select those individuals which are best suited to the circumstances of the day. He had probably read Malthus on the subject. And he knew about natural genetic-based variation and its heritability, extinct organisms, and the great length of geological time. As he said later in the century, he came to his conclusions about evolution and natural selection "...without an effort of concentrated thought...". It just seemed obvious to him.

In the 1820's Matthew was concerned that Britain's naval supremacy was at risk because of unsound breeding and selection practises in the Crown oak forests. So he wrote a book called *On Naval Timber and Arboriculture; with critical notes on authors who have recently treated the subject of Planting (1831).* However, he had many other bees in his bonnet, so he threw in an appendix comprising ruminations on six diverse matters of politics, economics, sociology and science. One of these, Note B, is three pages long, and begins as follows:

> There is a law universal in nature, tending to render every reproductive being the best possibly suited to its condition that its kind, or that organized matter, is susceptible of, which appears intended to model the physical and mental or instinctive powers, to their highest perfection, and to continue them so. This law sustains the lion in his strength, the hare in her swiftness, and the fox in his wiles. As Nature, in all her modifications of life has a power of increase far beyond what is needed to supply the place of what falls by Time's decay, those individuals who possess not the requisite

strength, swiftness, hardihood, or cunning, fall prematurely without reproducing — either a prey to their natural devourers, or sinking under disease, generally induced by want of nourishment, their place being occupied by the more perfect of their own kind, who are pressing on the means of subsistence. The law of entail, necessary to hereditary nobility, is an outrage on this law of nature which she will not pass unavenged .....

The remainder of the three pages is a diatribe on the law of entail, and the fact that it was (still is) in direct contravention of the natural law, with potentially dire consequences for mankind.

Note F begins as a discourse on the Holocene history of the Firth of Tay, but evolves into a discussion of the definition of species and variety:

Throughout this volume we have felt considerable inconvenience, from the adopted dogmatical classification of plants, and have all along been floundering between species and variety, which certainly under culture soften into each other. A particular conformity, each after its own kind, when in a state of nature, termed species, no doubt exists to a considerable degree. This conformity has existed during the last 40 centuries *[this is a reference to mummified animals of that age from Egypt].* Geologists .... discover an almost complete difference to exist between the species or stamp of life, from one epoch from that of every other. We are therefore led to admit, either of a repeated miraculous creation; or of a power of change, under a change of circumstances, to belong to living organised matter. .....The derangements and changes in organised existence, induced by a change of circumstance from the interference of man, affording us proof of the plastic quality of superior life, and the likelihood that circumstances have been very different in the different epoches, though steady in each, tend strongly to heighten the probability of the latter theory.

He then surmises that because of widespread limestones and coals, past oceans and atmospheres may well have been different in composition from the present, and asks:

Is the inference then unphilosophic, that living things which are proved to have a circumstance-suiting power — a very slight change of circumstance by culture inducing a corresponding change of character may have gradually accommodated themselves to the variations of the elements containing them, and without new creation, have presented the diverging changeable phenomena of past and present organised existence.

Turning to erosion and the destruction of mountains, and in an apparent reference to the unconformities separating Cuvier's various unrelated faunas in the Paris Basin, he says:

> [erosion] intervened between and divided these epoches, probably extending over the whole surface of the globe, and destroying all living things, must have reduced existence so much, that an unoccupied field would be formed for new diverging ramifications of life, which, from the connected sexual system of vegetables, and the natural instincts of animals, to herd and combine with their own kind, would fall into specific groups, these remnants, in the course of time, moulding and accommodating their being anew to the change of circumstances, and to every possible means of subsistence, and the millions of ages of regularity which appear to have followed between the epoches, probably after this accommodation was completed, affording fossil deposit of regular specific character.

Thus, early hints at catastrophism, vacant ecological niches, evolutionary radiation, punctuated equilibrium and sequence stratigraphy.....

Following further ruminations on the relations between gradual [evolutionary] change and new creation, Matthew poses the questions:

> do they [changes] arise from the admixture of species nearly allied producing intermediate species? *[convergence, or the blending inheritance notion]*. Are they the diverging ramifications of the living principle under modification of circumstance? *[evolutionary radiation]*. Or have they resulted from the combined agency of both? Is there only one living principle? Does organised existence, and perhaps all material existence, consist of one Proteus principle of life capable of gradual circumstance-suited modifications and aggregations, without bound under the solvent or motion-giving principle, heat or light? *[whatever that meant!]*. There is more beauty and unity of design in this continual balancing of life to circumstance, and greater conformity to those dispositions of nature which are manifest to us, than in total destruction and new creation *[the latter a reference to Cuvier's theory of repeated extinctions followed by totally new creations]. [And in a reference to Linnæus' theory of origin of species by hybridisation]* .....It is improbable that much of this diversification is owing to commixture of species nearly allied, all change by this appears very limited, and confined within the bounds of what is called Species; the progeny of the same parents, under great difference of circumstance, might, in several generations, even become distinct species, incapable of co-reproduction.

Returning to the process by which evolution occurs —

> [as a result of]..... the extreme fecundity of nature ..... it is only the hardier, more robust, better suited to circumstance individuals, who are able to struggle forward to maturity, these inhabiting only the situations to which they have superior adaptation and greater power of occupancy than any other kind; the weaker, less circumstance-suited, being prematurely destroyed. .....those only come forward to maturity from the strict ordeal by which Nature tests their adapation ..... and fitness to continue their kind by reproduction.

Matthew then clearly links that law of nature to the fact that species of plants and animals display a uniformity of characters which is "the very best possible adaptation ..... to its condition ..... and when alteration of circumstance occurs, thus changing in character to suit these as far its nature is susceptible of change".

He refers to the need for experiment to sort out the various possible causes of variation in individuals of the same species, saying that "the variation of the family, as well as of the individual, must be embraced by our experiments".

There is a further page of comment and thought, including the fact that prior to the advent of man there had been no dominant species, rather "a pretty fair balance of powers of occupancy — or rather, most wonderful variation of circumstance parallel to the nature of every species, as if circumstance and species had grown up together". [interdependence of species and ecological niche]. Man, however, had already in 1830 brought about the extinction of many species, and created "a number of varieties or even species which ..... cannot maintain their ground without his culture and protection".

This piece ends with a note that man ..... "has now acquired a dominion over the material world, and a consequent power of increase, so as to render it probable that the whole surface of the earth may soon be overrun by this engrossing anomaly, to the annihilation of every wonderful and beautiful variety of animated existence, which does not administer to his wants principally as laboratories of preparation to befit cruder elemental matter for assimilation by his organs." Prophetic words indeed, written 170 years ago.

There is more, scattered through the text of the book. Speaking of the survival of the fittest among plants ..... "thus affording, at the same time, a continual selection of the strongest, best circumstance-suited, for

reproduction." ..... Matthew notes that ..... "Man's interference, *by preventing this natural process of selection among plants,* has increased the difference in varieties .....". Following which, he notes that the selection process applies also in primitive man.

All in all, Patrick Matthew's statements, scattered in various locations in his book, amount to a comprehensive summary of all that we recognise today as the central tenets of evolution by natural selection. Ernst Mayr notes that, of the many pre-Darwin authors who achieved some degree of insight into evolution, Matthew was by far the most advanced. However, Matthew did not provide chapter and verse by way of examples, as Darwin did, neither did he follow up his 1830 statements. He was more concerned with European politics and emigration, as well as his business interests.

Only one of the reviewers of the *Naval Timber* book commented specifically on the evolutionary aspects, and then only in rather obscure terms: J.C. Loudon, an influential horticulturalist and Editor of the *Gardeners' Magazine,* wrote in his magazine of the appendix, "This may be truly termed, in a double sense, an extraordinary part of the book. One of the subjects discussed ..... is the puzzling one of the origin of species and varieties — and if the author has hereon originated no original views (and of this we are far from certain) he has certainly exhibited his own in an original manner."

The timing of the publication and first reviews of *Naval Timber* .... (early 1831) and the sailing of Charles Darwin on the *Beagle* (late 1831), combined with the fact that Darwin subscribed to various gardening magazines, have lead to speculation that Darwin may in fact have been aware of Matthew's views on evolution during the voyage of the *Beagle* and in the preparation of *Origin of Species.* The descendants of Patrick Matthew, in Scotland, New Zealand and Germany, firmly believe that Darwin plagiarised his views. Darwin, however, always claimed not to have been aware of Matthew's views prior to 1860.

Matthew's views on evolution sank without trace as far as the scientific establishment was concerned. Thirty years later, however, Matthew read in the *Gardeners' Chronicle* a report headed *The Origin of Species,* which was based on Thomas Huxley's editorial of the same title in *The Times,* and which followed, of course, from the publication of Darwin's book. Now aged 70, Matthew was galvanised into action, and bombarded the *Gardeners' Chronicle* and Charles Darwin with claims of his priority in the matter of evolution by natural selection. Darwin obtained Matthew's book, and maintained a polite and rather distant correspondence with him. A brief acknowledgment of Matthew's prior

statement appeared in some later editions of the *Origin,* but Darwin always pleaded ill-health, and the two men never met.

Alfred Russell Wallace, Darwin's famous co-proposer of evolution, became, like Darwin, aware of Matthew's prior claim, and, also like Darwin, gave him scant consideration. When the British Association for the Advancement of Science held its meeting in Dundee in 1867, Matthew submitted no fewer than nine papers for presentation, not all of them on natural selection. However, only two were accepted, and there is no record of what they were. Matthew was sufficiently outraged to write a letter of complaint to the *Dundee Advertiser.*

A later acknowledgment of Matthew's contribution arose through the German branch of the family. Matthew bought a property in Germany which was managed by one of his sons, who remained there and became progenitor to a large group of descendants. Notes provided by them were the basis for an article in German (May 1911). A translation of this article was the basis for a contribution to the British Association meeting the following year (Calman 1912).

On the whole, Matthew has certainly not received due recognition from scientists. As mentioned, Mayr recognises his extraordinary contribution, but the *Encyclopædia Britannica 1974 edition* does not mention him. There are few accolades for being ahead of one's time.

In many other respects, Patrick Matthew was an extraordinary man. His total atheism was most unusual at the time, and it lead to the Perth library banning his book, and to significant ostracism of his family. He was a frequent contributor to the Dundee Advertiser on all manner of subjects, and a vigorous promoter of emigration. The New Zealand connection arises from the latter. Matthew was convenor, promoter and chairman of the Scots—New Zealand Land Co. of the late 1830's, whose 36-page brochure urged Scotsfolk to emigrate. His 1839 book *Emigration Fields* also highlighted New Zealand, but the shipload of immigrants who came to Cornwallis in the Manukau Harbour under the auspices of the company were disillusioned, and cheated by land agents, and the settlement failed.

Four of Matthew's sons emigrated in the early 1850's. Two of them, Charles and James, arrived in New Zealand in May, 1854, having journeyed by way of California, South America, South Africa, St. Helena and south Australia. They brought with them a selection of plants from these locations. Cousins were already established at Waiwera, so the plants were established there, before the brothers bought land in the first Omaha sale in 1855, and established what is claimed to have been the first extensive, exotic commercial nursery in Australasia. Patrick

Matthew organised shipments of commercial orchard species to the two brothers. They supplied the ports of New Zealand and southeast Australia, and their imports of exotic plant species to the Warkworth-Mahurangi area pre-dated Sir George Grey's. The family were good friends of Grey, and exchanged plants.

This article is based mostly on material in two books on Patrick Matthew written by Dr W.J. Dempster, a Scottish surgeon (1983, 1996), and on information supplied by the great granddaughter of Patrick Matthew, Mrs Errol Jones, who lives in Warkworth. Copies of *Naval Timber* ..... are now exceedingly rare, and Mrs Jones has donated her copy to the Auckland Public Library.

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Peter Ballance

* *

It was the custom of the students at the University to 'drop in' occasionally and listen to the prelections of other professors than those whose classes they were attending. Following this custom, I beheld Sir William Hamilton, whom I had been taught to regard as the most distinguished philosopher of the day. Too feeble to lecture, he was wheeled into his class-room, and his discourses were read for him by an assistant who sat at his side.

-from Sir Archibald Geikie's 1924 autobiography, 'A Long Life's Work'.

MORE ABOUT THE THAMES MINER'S GUIDE

Garry J.Tee
Department of Mathematics, University of Auckland

Alan Mason and Larry Harrington discussed **The Thames Miner's Guide**, which was published anonymously at Auckland in 1868, and they mention the facsimile edition published by Capper Press at Christchurch in 1975.

Another facsimile edition has been published, by Kiwi Press at Christchurch in 1996.

Alan Mason and Larry Harrington cited my paper [Tee], in which I shewed that the book was written by Edward Clarke (born 1839), assisted by Captain Frederick Wollaston Hutton (1836-1905). Clarke was then sub-editor of the Auckland newspaper the *Daily Southern Cross*.. "Edward Clarke's wife Ellen died of consumption at the age of 32, on 19 September 1875 at her father's home in Mangere. Edward Clarke does not seem to have been involved in the arrangements for her burial, but the notices of her death in the *New Zealand Herald* and the *Daily Southern Cross* describe her as the wife of Edward Clarke. Her death notice in the Auckland Register of Births, Deaths and Marriages describes her as 'wife of a Rate Collector'." [Tee, p.10].

Since then I have found a notice published in the *Auckland Provincial Government Gazette* on 1872 September 6, announcing that Edward Clark had been appointed as Collector of Rates for the Hamilton Highway District. That Rate Collector probably was our Edward Clarke, since the spelling of names was still fairly flexible at that period.

By June 1875, Edward Clarke was in deep disgrace with his relatives in England [Tee, p.10], he does not seem to have been involved in the arrangements for his wife's burial in September 1875, and when he visited his sister in England in December 1877, his uncle Isaac P. Evans coldly refused to meet him [Tee, p.12]

Perhaps Edward Clarke's disgrace from 1875 onwards was related to his professional duties, as Collector of Rates for the Hamilton Highway Board?

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AUGUSTUS KOCH (1834-1901)

Artist to Ferdinand von Hochstetter

(With a note on the Vienna Exhibition of 1873)

Items 2152 and 2153 of Claren Kidd's recently published and very useful catalogue of New Zealand geological maps (Kidd, 1996) are

2152 Koch, A. 1876. **Map of colony of New Zealand,** 1 in. = 14 miles.
1 sheet, 160 x 114, lithographd, coloured and pasted on canvas, compiled from official sources of Public Works Department, insert map showing railways and telegraphs, New Zealand.

2153 Koch, A. 1864. **Plan of the province of Hawke's Bay, New Zealand showing a sketch of its geological formation,** 1:760,320.
London: Waterlow & Sons.1 sheet, 93 x 88 cm, coloured lithograph. larger map "Plan of the province of Hawke's Bay, New Zealand", shows hachured topography, land ownership and limited areas of geology.

The name of Koch is not a prominent one in New Zealand geology but at the time of his death in 1901 he was the last surviving member of Hochstetter's expedition through the southern part of the Auckland Province in 1859.

Augustus Karl Frederick Koch was born in Berlin on 25 March 1834, the son of a wool merchant and carrier. At the age of 12 he entered the Royal Academy of Arts. Later he studied Art, Science, and Anatomy at the University, graduating B.A. in August 1850.

When the European political upheaval of 1848 reached Berlin, students made common cause with the people and on 18 March, the 13 year old Koch was at the barricades in the streets of Berlin for fifteen hours. As a result of that encounter 1300 soldiers and 400 civilians lost their lives.

Augustus Koch in 1889
- Photo Kay and Eden 1983

On doctor's advice to remove to the seaside, Koch left Berlin in July 1851 and travelled through the Mediterranean. This left him with a taste for the sea and for the next seven years he travelled the world as a seaman. In 1855 he made his first voyage to New Zealand, calling at Auckland and New Plymouth. He was back in Auckland in June 1858, this time to settle permanently in New Zealand. He brought with him a small lithographic printing press which he claimed to be the first in New Zealand, and, within six to eight weeks of his arrival, the following advertisement began to appear in the two Auckland newspapers –

A. KOCH

Lithographic Artist and Designer

Shortland St.

His main work consisted of auction plans and he produced the first map of the city of Auckland. He was one of the first in New Zealand to use the process of printing photographs from negatives (obit., Evening Post 31 December 1901.)

In December 1858 the Auckland Provincial Government engaged Koch to accompany Hochstetter as artist and meteorologist on his South Auckland journey. Hochstetter (1867, p.330) mentions one episode involving his artist. Whilst the party was on the north side of Kawhia Harbour, a Mr. Charleston "expressed the wish, that my artist, Mr. Koch, would paint his house and garden, with the liberal remark, that he was not particular as to a pound or two, if only the apples in the garden were painted quite nice and red".

In the course of the journey, Koch made over seventy drawings of native carvings and painted a number of landscapes. He also assisted Hochstetter in the preparation of a large scale map (2 miles to inch) of the southern part of the province. (Turnbull Ms 0653-1, p.27; Hochstetter and Petermann, 1864, p.50)

On 28 May 1859, an Auckland newspaper, The New Zealander, reported –

> We have had the pleasure of inspecting a portfolio of very accurate and artistic sketches – many of them on a very large scale – taken by Mr. Koch in the districts visited by the expedition, and many of which we hope to see lithographed.

Koch's sketches were displayed at Hochstetter's lecture on 'The Geology of the Province of Auckland' at the Mechanics' Institute on 24 June 1859 (The New Zealander, 29 June 1859).

On 27 July, The New Zealander reported on the presentation of an

address and testimonial to Hochstetter in the same Mechanics' Institute on 25 July. The "elegant decorations" included -

> the minute and singularly accurate pen-and-ink drawings by Mr. Koch of Native carvings and "pahs" and of several of the most striking of the landscapes of the Waikato, of Taupo and other lakes, and of Geysirs.

Hochstetter must have taken Koch's sketches with him when he left New Zealand as they were later on display in the Colonial Museum at Vienna (Turnbull Ms 0653-1, p.27) and he used a number of them in his "New Zealand" (Hochstetter 1867).

In the latter part of 1859 Koch accepted the position of Chief Draughtsman in the newly formed Province of Hawkes Bay and shortly after his arrival he supervised the erection of the first meteorological station in Napier.

Koch was an exhibitor at the New Zealand Exhibition held in Dunedin in 1865. The Hawke's Bay section of the Catalogue (Anon. 1865, p.15) lists -

> 148. Koch, August , Government Draughtsman, del.- Map of Province of Hawke's Bay, shewing purchased lands by private individuals, land still in the hands of the natives, and Government land open for selection.
>
> 149. Koch, August, Government Draughtsman, del.- A small map, shewing the geological features of the Province

The first map won an Honorary Certificate from the jurors (Anon. 1866, p.248) and both maps together make up item 2153 of Kidd 1996.

Item 214 of the Fine Arts section of the catalogue is a portrait in crayons by Koch (Anon. 1865, p.93).

In the 1860's Koch was 'back at the barricades' but this time he was thousands of miles from Berlin. During the land wars he served for six years in the Napier Volunteer Corps. For his service in an expedition against Te Kooti in the Ureweras in 1868 he received the New Zealand War Medal.(Gudgeon, 1887, p.xviii). However the list of medallists given by Gudgeon indicates that Koch was merely one of four thousand who received the award

In 1870 Koch left Napier in an unsuccessful attempt to make a fortune as a mining surveyor in the Thames Goldfields.

In November 1871 the Engineer in Chief of the Public Works Department invited Koch to join his staff in Wellington. Amongst Koch's early assignments was the preparation of two maps for the

New Zealand Court at the International Exhibition held in Vienna in 1873 (See Concluding Note) In the Catalogue (Anon 1873, Appendix, p.9) these maps are described –

> Topographical Map of New Zealand, on scale of 12 miles to inch, showing surface features, forests, railways, telegraphs, roads, and other public works, political and tribal boundaries etc. Compiled from official information in the Public Works Department, by Auguste Koch.
>
> Geological Map of New Zealand, on scale of 12 miles to one inch, showing the distribution of the formations, illustrated by 12 geological sections through different parts of the islands. Compiled by James Hector, M.D., F.R.S., Director of the Geological Survey of New Zealand, from official information in the Geological Survey Department, and drawn by Auguste Koch.

In the Koch file at the Alexander Turnbull Library (Ms 0653-2) are newspaper cuttings of unknown origins and dates which tell us that the topographical map was published in London under the supervision of E.G.Ravenstein whilst the geological map, on a small scale, was published in 1873, also in London, but very few copies were issued.

The published geological map itself (Hector 1873) states the scale as about 33 miles to the inch and, significantly, is described as –

> Geological Sketch Map of New Zealand. Constructed from official Surveys and the Explorations of Dr. F. von Hochstetter, Dr. Julius Haast and Others, by James Hector, M.D., F.R.S.

Both maps were again exhibited at the Philadelphia Centennial International Exhibition of 1876 (Anon, 1877, p.36).

The topographical map seems to have been the basis for later geological maps (McLernon, 1975, p.749). The geological map is described by Willett (1959, p.3).

In addition to his work with maps (The Alexander Turnbull Library has 19 of these) Koch supplied drawings for many government publications. He contributed several drawings to Volume 25 (1893) of the Transactions and Proceedings of the New Zealand Institute.

Arising from his art training in Germany, Koch became involved in the Wellington art scene (Platts, 1980). He was on the Council of the New Zealand Academy of Fine Arts from 1889 to 1894. (Kay and Eden 1983, p.193).

He was also prominent in the early years of the Masonic Order in New Zealand and was connected with the Thorndon School for thirty years, twenty years as chairman of the school committee. (Obit. Evening Post 31 December 1901).

On 11 April 1860, at the residence of the bride's father in Auckland, Koch married Eizabeth Bain * who predeceased him by 17 years. Koch died on 30 December 1901 and was survived by three sons and three daughters.

.....

A Note on the Vienna International Exhibition of 1873

In 1872 the New Zealand Government decided that the country would be represented at The International Exhibition to open in Vienna on 1 May the following year and on 15 November 1872 the New Zealand Agent-General in London, I.E.Featherston, wrote to Ferdinand von Hochstetter requesting his assistance in preparing the New Zealand displays. Four days later Hochstetter replied saying "I would with pleasure undertake to do anything for a land to whose esteemed inhabitants I am so much indebted". (Anon. 1873, p.6)

Official correspondence on the New Zealand participation in the exhibition is given in Anon. 1873 and 1874 and makes frequent mention of Hochstetter's contribution. He took control of the natural history specimens and set up the moa skeletons sent by Haast. After the Exhibition had closed, the New Zealand Government, through Hochstetter, presented the specimens displayed to various institutions in Vienna (Anon.1873, p.13).

Haast (1884, p.209) gives more personal information on Hochstetter's work for the New Zealand exhibits -

> As the New Zealand exhibits arrived very late, Hochstetter worked day and night to get them ready; the more so as the three Moa skeletons, sent by the Canterbury Museum, and a large collection of bird skins had first to be articulated and mounted. After five weeks' incessant labour, with five assistants, the whole was at last, by the end of June ready to be placed in position, nearly two months after the opening of the exhibition.

Also displayed in the New Zealand Court were 48 photographs of New Zealand scenery which had been taken by D.L.Mundy during a visit in 1869/70 (Bagnall, 1980, p.686). Fourteen of the scenes were of the geothermal areas (mainly Rotomahana). These were later published with commentaries by Hochstetter (Mundy 1875). Hochstetter's contribution to this book was his last publication on New Zealand geology

* The New Zealander, April 14 1860.

Most of the exhibits in the New Zealand Court were sent from this country but a smaller number were accumulated from British sources by the New Zealand Agent-General in London, I.E.Featherston. One of the British donors was W. Lauder Lindsay whose contributions included "17 geological and other maps" (Robinson, 1873, p.212). Lindsay had spent several months in New Zealand in 1861-2 and had written the first account of Otago geology (Lindsay, 1862).

.....

Acknowledgments

Most of the information on Koch's life has been obtained from two sets of handwritten autobiographical notes held by the Alexander Turnbull Library as follows –

1. Koch, Augustus. Papers 1859-1880. MS-Papers-0653

2. Koch, Augustus. Rough draft of A.Koch's life. 1834-1901. MS-Papers-3840.

I am grateful to the Library for their permission to use information from these papers.

The New Zealand Academy of Fine Arts kindly gave permission to reproduce the photograph of Koch in Kay and Eden, 1983.

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Alan Mason

* * * * * * * * * * * * * * * * * * *

> Aug. 30th, -(1820)- Wednesday. At anchor on the south-east side of the Island of Moto-corea. ....At noon we went on the island.....we ascended the top of a high round hill, which rises in the centre of the island, and which we found to be hollow. The crater was perfect, and in it, as well as on the sides of the hill, were a profusion of cinders and burned stones
>
> 31st, Thursday. ...we went up the arm of the sea, called Towrerree, which leads into the river Wycotta: and after following its course about five miles, the boat arrived at Magoia.....The adjacent country was flat, with the exception of a high round hill, which formed the pah, and which presented the same volcanic appearance as that already noticed in the Island of Moto-corea.
>
> - Cruise, 1823 : pp 225,6.

With the help of Simmons (1980) we can identify Cruise's place names. 'Moto- corea' is, of course, Motukorea (Brown's Island). 'Towrerree' would be Taurere on West Tamaki Head so the "arm of the sea" would be Tamaki Estuary. 'Wycotta' is , presumably, Waikato. 'Magoia' is Mokoia, now Panmure. The "high round hill" is therefore Mt. Wellington.

Cruise visited the Hauraki Gulf on the 'Prince Regent' - the channel between Waiheke and the mainland was once known as Prince Regent's Inlet. However, he was not the first to identify one of the Auckland volcanoes. Two weeks earlier on Monday, 14 August 1820 Samuel Marsden was at "Mogoea" and visited Mt. Wellington -

> Near the settlement there is a very high hill,which commands a very extensive prospect. Its top and sides have every appearance that it is the production of some volcanic eruption. On the east side the flat land for the distance of near a mile is covered with stones of various dimensions, very hard, of a dark grey colour, full of holes, and some of them appear very much burnt.
>
> Elder, 1932, p.280.

Marsden was in the area again in November 1820 and visited Brown's Island on Saturday, November 4 -

> The whole island has the appearance of a volcanic eruption. In the middle of it the land is high. I went to the summit, where I found the mouth of a volcano in the shape of an egg when cut in two; the mouth may be about a quarter of a mile in circumference, and I

> estimated its depth at 300 feet as I went to the very bottom. The level land at the foot of the hill is very rich. It is all covered with porous stones which apparently have been burned
>
> - Elder, 1932, p.313

On Thursday November 9 : "Wishing to ascertain whether the River Manukou did unite with either the Mogoea River or the Wyeteematta" Marsden walked from Panmure to Onehunga and after going through what is now Epsom "we passed through very stony ground; the stones were very porous and the whole surface of the land was broken into irregular hills by some volcanic eruptions."

After visiting Manukau Heads on Friday, Marsden left, on Saturday, for the Kaipara -

> After leaving Manukou we walked overland to the banks of the Wyeteematta, a distance of about eight or ten miles. Our road lay over the summit of the very high round hill called Wyedakka from the summit of which there is the most extensive prospect. The western and eastern shores are in view; several rivers, forests, and mountains are also to be seen, with Point Rodney and Cape Colville at the entrance of the Thames. On descending the hill Kowhow called us on one side to see a deep cavern which had the appearance of a mouth of a volcano. He told us the cavern was very deep. The whole hill appeared to be a volcanic production, and the stones around the botttom had a similar appearance.
>
> - Elder, 1932, p.316.

In a foot note, Elder says that Wyedakka would be "Wai-o-raka, Mount Albert" but (Simmons 1980) gives 'Waioraka' as the name of a swamp to the south of Mt. Albert. Mt. Albert, itself, is 'Owairaka'.

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Alan Mason

FRENCH NAMES ON CAMPBELL ISLAND

Garry J.Tee
Department of Mathematics, University of Auckland

Robin L. Oliver has written an interesting account of the French scientific expedition to Campbell Island in 1874 [Oliver]. The primary purpose of observing the Transit of Venus on 1874 December 9 was, unsurprisingly, frustrated by the weather at Campbell Island. But the expedition's doctor and naturalist Henri Filhol (1843-1902) published much scientific information about Campbell Island.

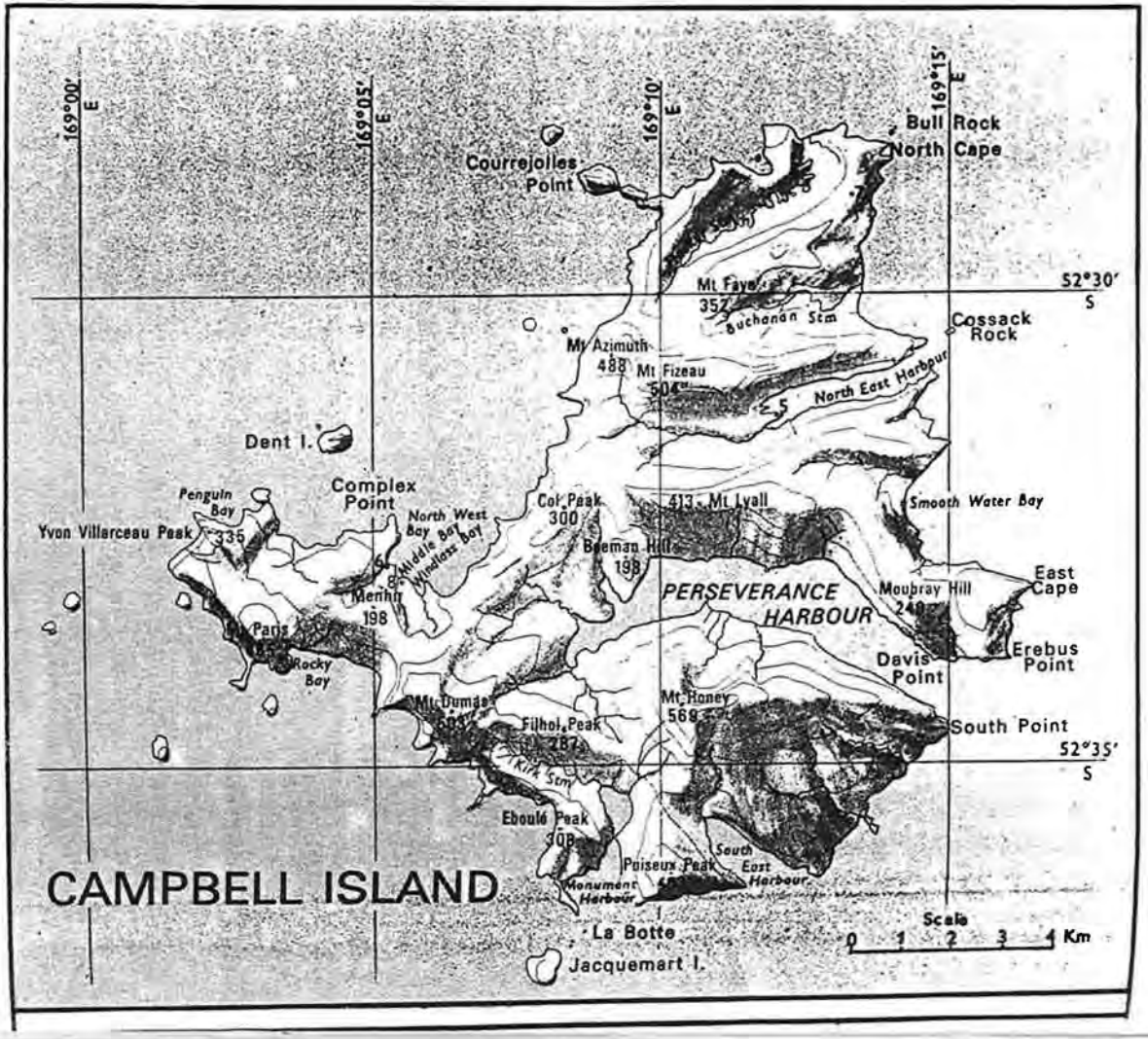
An account of the expedition was given by Ian S. Kerr in his book about Campbell Island [Kerr, pp. 38-41]. The leader was A Bouquet de la Grye of the Hydrographic Office of the French Ministry of Marine, and his description of Campbell island has a familiar ring: "*L'aspect de la terre était triste ... tout était gris sur la terre, gris dans le ciel et dans la mer.*" [Kerr, p.39]

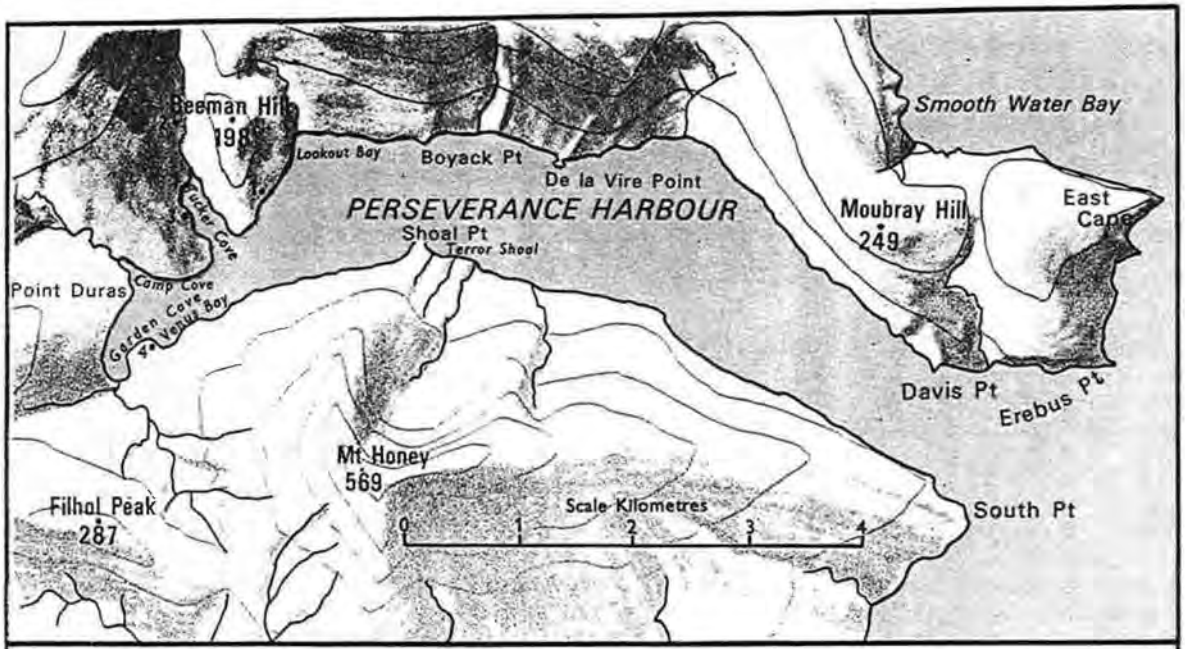
"The drawings and illustrations in Filhol's report included a map of Campbell Island which resulted from a survey by the naval officers. This chart has been the basis of all subsequent British Admiralty charts of the island" [Kerr p.41]. When Robin Oliver was at Campbell Island in 1944 on the "Cape Expedition" (codename for coastwatchers) he found Filhol's geological report to be very valuable for his own geological survey, even though he did not have the French map [Oliver, p.10].

That 1874 expedition is commemorated by several place-names on Campbell Island, which were probably bestowed by members of the expedition. Two maps are reproduced here, from the end-papers to [Kerr].

Courrejoles Point was named after Th. Courrejolles, "a naval officer, who was in charge of the photographic equipment" [Kerr, 38-39], or "the ship's bosun in charge of sailors" [Oliver, p. 10]. De la Vire Point, in Perseverance Harbour, was named after the expedition ship the transport frigate *La Vire* [Oliver, p.8]. Point Duras, at the head of Perseverance Harbour, was named in honour of the technician M. Duris (or Duras?), who died of typhoid fever on September 23 and was buried on the point opposite Venus Cove, the base for observation which was named after the Transit of Venus [Kerr, p.39]. Filhol Peak (287 m) honours Henri Filhol, and Jacquemart Island honours M. Jaquemart, commander of the expedition ship. [Oliver, p.8]

Mt. Fizeau (504m) honours the physicist Fizeau, Puiseux Peak (403m) honours the mathematician Puiseux, and Mt. Dumas (503m) honours the President of the Commission [Oliver, p.10].


169°00' E
169°05' E
169°10' E
169°15' E
52°30' S
52°35' S
Courrejolles Point
Bull Rock
North Cape
Mt Faye
357
Buchanan Stm
Cossack Rock
Mt Azimuth
488
Mt Fizeau
504
North East Harbour
Dent I.
Complex Point
Penguin Bay
Yvon Villarceau Peak
335
North West Bay
Middle Bay
Windlass Bay
Col Peak
300
413 Mt Lyall
Smooth Water Bay
Beeman Hill
198
Menhir
198
PERSEVERANCE HARBOUR
Moubray Hill
East Cape
Erebus Point
Davis Point
Paris
Rocky Bay
Mt Dumas
Filhol Peak
287
Mt Honey
569
South Point
Kirk Stm
Eboulé Peak
308
Poiseux Peak
South East Harbour
Monument Harbour
CAMPBELL ISLAND
La Botte
Jacquemart I.
Scale
0 1 2 3 4 Km



Key

1. Beeman Station
2. Tucker Camp (Cape Expedition)
3. Old Farm Homestead
4. French Observatory 1874
5. Whaling Station 1911–14
6. Whalers Hut
7. Sorensen Hut
8. Bivouac Hut, Middle Bay

Contour interval 100m
Heights in metres

Drawn by the Department of Lands & Survey

Mt. Faye (352m), Yvon Villarceau Peak (336m), Menhir (198m), Mt. Paris (455m), Eboulé Peak (308m) and the strait La Botte were presumably named by members of that French expedition

Captain James Clark Ross had named various places on Campbell Island in 1839, during his Antarctic expedition on HMS *Erebus* and HMS *Terror*. Erebus Point and Terror shoal, in Perseverance Harbour, were named after his ships. Mt Lyall honours the ship surgeon and naturalist Dr Lyall, and Hooker Stream honours the other ship surgeon and naturalist Dr Joseph Dalton Hooker (1817-1911), who became President of the Royal Society.

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From the Art Souvenir of the New Zealand Exhibition, Christchurch, 1906

A NEW ZEALAND BEACH BOULDER.

This huge marble is a well-known object on the Opotiki Beach, and was formed either by glacial or volcanic agency in the long gone ages.

DOCTOR DON AND THE FIORDLAND VOLCANO

This is not an adventure story for young geologists of all ages

The New Zealand Mining Journal which was published in Dunedin from 1896 to 1908 is today unknown to most New Zealand earth scientists. It had a chequered history, starting as a monthly called "New Zealand Mining Journal and Financial Guide (with which is incorporated the Southern Economist". By 1900 it was "New Zealand Mining and Engineering Journal and Financial Guide with which is incorporated the Southern Economist". In 1901 it became a weekly called "New Zealand Mining, Engineering and Building Journal and Contractors' Gazette (with which is incorporated The New Zealand Gold Dredging News)'.

We had seen odd copies in the past so on a visit to the Alexander Turnbull Library in May 1994 we took the opportunity of searching their run of volumes 1-4, 1896-99 for items of geological interest. We had barely started when, in the very first issue, Vol.1 No.1, 2 March 1896 (Anon. 1896a, page 11), we found -

> "The Degree of Doctor of Science has been conferred upon Mr. J.R.Don, lecturer on geology to the University of Otago, making the second time that the degree has been granted to a New Zealand graduate. Since taking his B.Sc. degree in 1889 Mr. Don has been engaged upon the work for which the Doctor's degree has been granted, viz.: " The genesis of auriferous deposits from a chemical point of view."

The University of New Zealand Graduate List (Anon., 1939) informs us that its first D.Sc. went to Charles Chilton, a biologist, in 1893 so Don's, in 1896, would have been the first on a geological topic (although it was awarded in chemistry).

The New Zealand Mining Journal gave us further information on Don's D. Sc. on page 76 of volume, 3 July 1898 (Anon., 1898a). His thesis ran to several hundred printed pages and was published, in condensed form, in the Transactions of the American Institute of Mining Engineers (Don, 1898) under the title "The Genesis of Certain Auriferous Lodes". We shall be talking more about Don's paper at the end of this article.

Our next find in the Journal was on page 262 of volume 2 (Anon., 1897a) which carried the following report -

> "The reported outbreak of volcanic activity at Mount Totuko, near Milford Sound, has been partially confirmed by the evidence of the Captain of the s.s Herald. On the last voyage of that boat from Greymouth to the Bluff he ran close to land to view the mountain, and found volumes of smoke arising therefrom. Mount Tutoko is 9200

feet in height, snow clad at this time of the year for some three or four thousand feet from the summit, and bushed near the base. That the smoke seen can arise from a bush fire is hardly possible, the bush being too wet to burn for so long a period as that which elapsed between the outbreak and this last inspection. The absence of any coal measures which may have become ignited in the vicinity of the mountain together with the fact that the outburst was ushered in by earthquakes and thunder and lightning, according to the accounts of the officers of the Hinemoa, all seem to favour the conclusion that the phenomena is due to volcanic action."

The Journal, as was to be expected, then went on to cast doubt on the report -

"Mount Totuku forms part of the mass of rock to which Hutton gave the name of Manipouri formation. This formation extends from Big Bay to Preservation Inlet: The rocks are archaean, and probably equal in age to any in the world. The only signs of past igneous action beyond the metamorphism is to be found in the numerous dykes and veins which traverse the formation, and even many of these are probably the result of segregation. There is an almost total absence of volcanic rocks anywhere in the neighbourhood, an exceptional indication of their presence being a basaltic scoria formed on the shores of Lake Te Anau. Volcanic outbursts have been known to occur where previous action had never been suspected; but it doubtful if such an instance as the eruption of Mount Totuku, occurring in a formation which has remained quiescent from the earliest geological times, has ever before been recorded, and seems almost incredible."

Our final item of interest in the New Zealand Mining Journal was found on page 383 of volume 2 (Anon. 1898a) -

"The Waitaki Boys' High School, under the Rectorate of Dr. Don, has issued a prospectus for the present year, illustrated with photographic reproductions. The ability and capacity of Dr. Don as an instructor is unquestionable - and more especially is this the case in all departments of Science. The school is provided with a chemical laboratory, and Geology is a subject of the curriculum. As a preparatory school for youths intended for a professional career in either mining, engineering, or agriculture, this establishment offers advantages equal to any in the colony."

Dr. Don the school teacher was obviously worthy of further study so we went to the centennial history of the school (Tyrell, 1983). Chapter 3 of this history is devoted to Don who was Rector of the school from 1897 to 1906

At Waitaki, Don was an innovator and today, when the Earth Science Education Group of our Society is so active in promoting the introduction of earth science into the school curriculum, it is surprising to read of Don's work at Waitaki a century ago.

Dr J. R. Don, M.A., D.Sc.

-: Tyrell, 1983

At a time when Latin was compulsory in curricula, even at tertiary level, Don regarded it only as tool to train 'alertness of mind'. As Tyrell puts it (1983, p.47) "The School had swung violently from an emphasis on the classics to the primacy of the sciences."

In his first annual report, Don discussed his proposed curriculum and stated (McDonald, 1958, p.111, 112) -

> ".....I should like to add Geology, because in this subject the student finds the generalisations of chemistry and physics applied to that most attractive of all subjects, the study of the world around him. Geology will give him a new interest in chemistry and physics because it widens his outlook and gives him an interest in outdoor nature in what may be called the poetical side of his scientific training...."

In 1901 Don erected a building at the school which contained a chemistry labororatory and a room to house the six hundred rocks and fossils which he had collected.

It is not surprising that among Don's students at Waitaki were several who were later prominent in New Zealand geology. One of the first two Waitaki boys to win university scholarships, in 1902, was A.M.Finlayson whose promising career in geology was cut short in the First World War. (Watters, 1984 and 1994).

In the school's prize list for 1905 the names Marwick and Ongley are prominent (Tyrell, 1983, pp. 51,2) The dux position was won jointly by R.C. and M. Ongley and the Form Five Geology Prize went to Marwick. M. Ongley was again dux in 1906 and 1907 (McDonald, 1958, p.392)

In later life, Marwick was to make the following comment (Fleming, 1979, p.61) -

> "I had the good fortune to have Geology for three years, a privilege probably unique in New Zealand secondary schools.....The field excursions taken by Rector J.R. Don to such outstanding natural features as the Moeraki

Boulders amd the pillow lava at Boatman's Harbour were a real joy, leaving a lifelong impression."

.Don and Waitaki students on a geology field trip. Perhaps the young Jack Marwick and the young Mont Ongley are in this group.

Don's enthusiasm for geology evidently spread to the staff. G.H. Uttley, who had taken an arts course at Otago University, joined the staff in 1903; a year after graduating M.A.. Whilst at Waitaki he took a science course in Geology and in 1922 gained a D.Sc. for his work on the stratigraphy of North Otago (Marwick 1961, p.93)

In our search for information on Don we had noted a reference to him in An Encyclopaedia of New Zealand under the heading 'Tutoko, Mount" (Wood, 1966)

? Mount Tutoko - this sounded familiar although the spelling was different from what we had seen in the New Zealand Mining Journal (Anon. 1897a) so we read further.

Wood told us that Mount Tutoko, at 9042 feet, is the highest peak in Fiordland and is generally considered to have been named by Hector - (another geological connection) - in 1863 after Tutoko, a chief who lived at Martin's Bay. Wood's article also mentioned that amongst the names associated with its early exploration was that or J.R.Don.

So,hot on the trail we went to John Hall-Jones' Early Fiordland (Hall-Jones, 1968) and on page 162 we read -

"In 1897 William G. Grave MA, LLB, a master at Waitaki Boys High School, made his first visit to Fiordland

with Dr. J.R.Don, rector of the school, his brother, William Don, and A.C.Gifford, a master at Wellington College. There had been reports suggesting that Tutoko was a volcano and on New Year's Day 1898 they set out from Milford to investigate."

We were back at the Fiordland Volcano !!

Grave's report on the 'volcano' is given in his exploration journals (Crozier, 1950, pp.23,4) -

"In 1897 I took part in my first exploring expedition. In that year, steamers passing along the western coast of Otago reported that Mt. Tutoko, a peak over 9000 feet high, near Milford Sound, was in eruption. At the same time came a report from Martin's Bay, further up the coast, that the settlers had found volcanic ash in their water barrels; while Sutherland of Milford Sound produced pumice that he declared had been brought down by the Cleddau River which drains the slopes of Tutoko."

From Milford, Grave's party went up the Cleddau Valley and

"about four miles up, where a stream comes in from the north, we obtained our first view of Tutoko, the monarch of this region. We gazed with astonishment. From its summit a long dark streamer rolled away, like the smoke from a mighty factory chimney. "Certainly, it is a volcano" we cried.....We afterwards found not the slightest sign of volcanic activity about the mountain."

In introducing Grave's account of this Tutoko expedition, Crozier, who was Grave's daughter, states (Crozier, 1950, p.23)

"It was through his association with Dr. Don that Grave became interested in geology, an interest which developed and added to the purpose of his later trips"

Don was one of the pioneers in Fiordland exploration. He made his first trip to the area in 1889 with a group of training college students (Hall-Jones, 1968,p.138) The photograph on the left, from Hall-Jones' book, is of Don on that trip when his party became the first on the Milford Track.

.....

John Robert Don was born in 1860 at Gisborne, Victoria, Australia, one of the ten children (five girls and five boys) of

John Don, goldminer, and his wife Janet Nicol. Both parents came from Scotland where his father was a stonemason who contracted for bridges and culverts. Don came to New Zealand in 1880 and after teaching at several Dunedin primary schools he was vice-principal of the Training College from 1895 to 1897 when he moved to Waitaki Boys' High School (Anon. 1919 ; Don 1998 ; Ng 1993).

Whilst in Dunedin, Don attended Otago University part-time. He graduated B.A. in 1886, M.A. in 1887, B.Sc. in 1889 and D.Sc in 1896. During this period he was Demonstrator in Chemistry and Lecturer in Geology at the University. He was elected F.C.S in 1898 and F.G.S. in 1900. After retiring from Waitaki, for family and health reasons, in 1906, Don spent three years travelling overseas and following his return he was appointed an inspector of schools in Otago in May 1909. Don, who had suffered from heart trouble for some time, died in his sleep on 23 March 1919, the day after his son returned from war service overseas. He was survived by his two sons and one daughter. His wife had died in 1906. (Anon. 1919).

In 1898 Don was an unsuccessful applicant for the foundation chair of chemistry and physics at Victoria University College (Don ?1898). As a New Zealander the odds were against him from the start, such was the thinking in those days. His application which provided full information on his academic career was supported by testimonials from a number of people. All of them extolled Don's ability as a teacher and that from Professor Shand included the statement (Don ?1898, p.23)

> "I regard Dr. Don as the most brilliant and successful student yet sent out from Otago University."

In this application Don provided information on his doctorate thesis, "On the Genesis of Auriferous Lodes from a Chemical Point of View". The examiners were Vernon Harcourt, Professor of Chemistry at Cambridge, and Henry Miers, Professor of Mineralogy at Oxford. Here is an extract from their report -

> "Mr. J.R.Don's paper, or rather book, is a record of most patient and most excellent work. The account of the work done, in its order and clearness, and the admirable plates and diagrams which accompany it leave nothing to be desired.....The paper is a most careful and valuable contribution to the subject of the origin of ore deposits. ....Mr. Don is undoubtedly well entitled to the Degree of Doctor of Science." (Don ?1898, p.29)

The thesis ran to several hundred printed pages and even in its condensed published version it occupied 105 pages of the Transactions of the American Institute of Mining Engineers (Don 1898), exceptionally long for a journal article.
The Secretary of the American Institute of Mining Engineers took the unusual step of providing a two page introduction to Don's

article. We print below the first paragraph of that introduction

> "This paper, under the title of "The Genesis of Auriferous Lodes from a Chemical Point of View, Illustrated by Analyses of Samples Taken from the Chief Auriferous Area of New Zealand, Victoria and Queensland, by John R. Don, D.Sc., M.A., Lecturer on Geology in the University of Otago, N.Z.," was submitted by the author with the frank confession that its length, covering several hundred printed pages of the Transactions of the Institute would preclude its acceptance for publication in full. But the great value of the original work which it records rendered its rejection on that ground highly undesirable; and, after correspondence with Dr. Don, it was agreed that the Secretary should condense the paper, subject to the author's approval, omitting what was not essentially connected with the original work reported. In the discharge of this laborious and difficult duty, the Secretary's chief trouble has been his regret to cut out the acute criticisms and admirable theoretical and historical summaries of Dr. Don on the general subject of the science of ore-deposits. It should be added, that the original paper has been returned to the author, with full permission to publish it through any other medium (due mention being made of the first publication by the Institute of portions thereof), and a cordial expression of the hope that the treatise, as a whole, may be thus published, to the advantage of science. The Secretary begs to add, that many of the portions necessarily omitted from this condensed version would constitute, in his judgment, interesting and valuable separate contributions."

In his introduction, the Secretary then goes on to summarize the first three chapters of Don's manuscript which had been deleted from the published version because of space considerations.

Don's paper had been read by title at the February 1897 meeting of the Institute in Chicago and at the Atlantic City meeting a year later (Don 1898) communications in discussion of the paper were presented. Here are extracts from the discussion -

> S.F.Emmons, Wahington, D.C. : I desire to bear my humble testimony to the great value of Dr. Don's paper to the science of ore deposits, the thoroughness and accuracy of his work, and the immense amount of care-taking and tedious labour which it represents. The only regret with regard to it is that it could not have been published in full. No more important paper in its line has ever appeared in the Transactions.
>
> Arthur Winslow, Kansas City, Mo. : Dr. Don's work, even as presented in the abridged form of his Institute paper, is a notable example of painstaking, conscientious research, for which the author deserves great credit. The field and

literary work alone must have been very great; but, in addition, the investigation involved many experiments on a large scale, and the testing and assaying of over 400 bulky samples, with more than 100 other assays and analyses, which to any one familiar with such tasks, seems a stupendous labor.

George F.Becker, Washington, D.C. : Dr. Don's paper is an extremely important contribution to mining geology, and worth the vast amount of labor which it has manifestly cost. I trust that the paper in the Transactions will prove to be only a preliminary abstract, and that the entire memoir will soon appear.

Finally, at the Buffalo Meeting of the Institute in October 1898, Don gave his response to the discussion (Don 1899). In his first paragraph, Don remarks -

"An investigator works practically alone and under many discouragements, at this end of the world; and nothing has encouraged me so much in my research as to find my work appreciated by men whose wide knowledge of the subject and whose eminent services to science entitle their opinions to my deepest respect."

The surprising thing is that Don's paper, only his third, should be so comprehensive and so well received in the United States yet it seems to have been his last apart from a pamphlet on Volumetric analysis (Bagnall, 1969, p.49). It is equally surprising that a person with such obvious potential should spend the final ten years of his life as a school inspector and with a total lack of interest in scientific research.

On 12 November 1895 Don was elected Treasurer of the Otago Institute (Anon. 1896b, p.759) and on 10 November 1896 President (Anon. 1897b, p.630.), but he resigned shortly afterwards when he moved to Waitaki (Anon. 1898c, p.574). He took no further active part in the Institute and the membership lists as published in the Transactions and Proceedings of the New Zealand Institute tell us that from 1914 on he was not even a member.

After moving to Waitaki in 1896, Don continued to lecture in geology at Otago University for a year or so on a part-time basis (Morrell 1969, p.83). Then in 1898 he was on the mining and metallurgical committee for the Otago Jubilee Industrial Exhibition (Anon. 1898b, p.319).

The Annual Reports of the Otago School of Mines give us an indication of Don's zeal at the time for the subject of geology (Ulrich 1896, p.15; 1897, p.16; 1898, p.21). For example, from the 1896 report -

"The lecturer in general geology, Dr. Don, infused much interest and enthusiasm for the science amongst the ten

students of his class by making four field excursions with them during the session - the best kind of practical instruction in geology, and which, no doubt, greatly contributed to the excellent results of the recent examinations in the subject, comprising six first-class and four second class passes.....Mr. Don very liberally paid the greater portion of the travelling expenses connected with these excursions....."

and from the 1898 report -

"The class in general geology was during the past session conducted by the lecturer, Dr. Don, with the same if not greater enthusiasm than in former years, and afforded the students both excellent instruction and pleasure..."

In all three years, Don personally financed field trips and the purchase of equipment

The year 1898 was a turning point for Don. From then on his interest in geology was restricted to his teaching at Waitaki and following his resignation from there in 1906 it played no part in the remaining 14 years of his life.

What happened to Don the scientist? What happened to the encouragement given to his research mentioned in his statement at the Buffalo Meeting of the American Institute of Mining Engineers (above).

Warwick Don, a great-nephew of J.R.Don, has thrown light on these questions by drawing our attention to J.R.Don's lifelong dedication to education (private communication). This dedication would have been his motiviation in applying for the position of Rector at Waitaki Boys' High School in 1896. Regarding the appointment Tyrell (1983, p.46) comments -

"Obviously Waitaki had gained a Rector of great accomplishments who seemed by his previous career too distinguished a man for the school as it was in 1897"

From his arrival in New Zealand in 1880 Don devoted the remaining forty years of his life to education at all levels from primary school to university. His university studies which covered 14 years from his first enrolment in 1883 to a doctorate in 1896 were all taken part-time as he continued his teaching career and Warwick Don suggests that "he sought higher academic credentials in order to enhance his status within education". All of the 25 testimonials which Don submitted in support of his application for the Chair of Chemistry and Physics at Victoria emphasize his outstanding ability as a teacher.

With Warwick Don's comments in mind our attention turned once more to J.R.Don, teacher.We found the following in his obituary in the Otago Witnes (Anon 1919) -

"A man of high scholastic attainments and one intimately associated with the cause of education, Dr. Don's death causes a deep gap in his profession and his loss will be keenly felt by his co-workers for the intellectual advancement of the community. He was ever kindly disposed, yet a strict disciplinarian, a man of broad human sympathies, and the possessor of a warm understanding of the child mind and its requirements."

Facts indicating his ability as a teacher are given by The New Zealand Journal of Education (Anon 1909a) -

"During the period 1887-94, as assistant master in the Normal School, Dunedin, he presentd 445 pupils in the sixth standard, 440 of whom passed.....Remarkable as was his success in primary school work, his secondary school work was even better. When he took charge at Waitaki there were only 37 boys in attendance, of whom 5 were boarders; when he retired , in 1905, the number enrolled was 119, of whom 65 were boarders from all parts of New Zealand."

According to Tyrell (1983, page 52) Don was on sick leave for a lengthy period in the latter part of 1905 and all the following year until he finally resigned on 5 June 1906. It is significant that in 1906 enrolments dropped to 86 of whom 34 were boarders (Tyrell, 1983,page 47)

Although he had been encouraged in his research by the reception given to his paper on the genesis of auriferous deposits (Don,1899, above) the energy and enthusiasm that he applied at Waitaki would have left no time for research.

Also significant in this debate are the circumstances of Don's resignation from Waitaki in 1906. In the middle of the previous year his wife (Elsie Herd - Don 1998) had developed a terminal illness and this, together with the pressure of his work led to a breakdown of his own health. Following the death of his wife on 22 July 1906, Don spent three years abroad on what Tyrell (1983, page 54) describes as "a recuperative holiday". However other accounts tell us it was far from a holiday. For example the New Zealand Times, (Anon, 1909b), says that Don -

"travelled in many parts of the world - notably in the East - and was for some time in Europe. While there he learned all that was possible concerning modern methods of technical instruction. He was for some time at the world-famed technical colleges at Charlottenburg, in Berlin; at Dresden and Leipsic, and at Munich and Cologne. He visited the schools at Halifax, Leeds, Manchester, and Birmingham (in England), Aberystwyth (Wales), Vievirde and Hasselt (Belgium), and the schools in Holland and Switzerland."

On his return to New Zealand early in 1909, Don once more took up a position that was greatly inferior to that warranted by his ability and qualifications. He became an inspector for the Otago Education Board and he remained in that position until his death ten years later. Continuing ill health may also have been a factor in his decision to take up this final employment.

Throughout his life Don placed his own studies second to his work as a teacher and it is for his ability as a teacher and for his contribuition to education in Otago that he is remembered today.

Acknowledgments

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Alan Mason

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The 'Fiordland Volcano' was not the only eruption to be recorded from an unlikely locality during the nineteenth century. Don Gregg in Society Newsletter 108. 1995. quoted an article from the Wellington Independent of 24 November 1855 which incorporated a letter sent to the New Zealand Spectator by one Alexander T.Allen reporting a volcano in the Kaikouras. That same letter was reprinted by the Southern Cross. an early Auckland newspaper. on 7 December 1855 and in doing so the Southern Cross added its own comment:

> "The following letter. to the editor of the 'New Zealand Spectator', announcing the discovery of a volcano at the Kaikoras. will be read with interest. and will give an air of truthfulness to the report which was in circulation some time since regarding the existence of a similar phenomenon."

In its issue for Friday 20 December 1895. the New Zealand Herald reported another sighting of a volcano -

Reported Eruption on the East Coast

Captain F.Canese of the New Zealand Shipping Company's steamer Te Koa . which arrived from Wellington yesterday. reports that on Wednesday morning. when a few miles to the northward of Tolaga Bay. he observed what appeared to be a volcanic eruption some miles inland. The Te Koa was about ten miles off the land at the time. and the attention of Captain Canese was attracted by a large column of smoke and fire which suddenly shot up into the air to a tremendous height. It had all the appearance of a sudden rush of steam. smoke. and flame. the latter of a variety of colours. Captain Canese does not think it was a bush fire. but inclines to the idea of a volcanic eruption. The direction in which it was seen would be somewhere about the Urewera Country.

ANOTHER GREAT MIND LOST TO GEOLOGY

Herbert Hoover (1874-1964) can be regarded as the most successful geologist of all times – he became President of the United States of America (1928-32).

A foundation student at Stanford University in 1891, Hoover initially intended to major in Mechanical Engineering but in 1892 he changed to Geology which he studied under John Branner. In the 1894 summer vacation he worked for the U.S.Geological Survey (for $20 a month) under Waldemar Lindgren who later founded the journal Economic Geology. In later life Lindgren was to declare "Never have I had a more satisfactory assistant". It was in his senior year that Hoover met his future wife, Lou Henry, one of the first women to study Geology at Stanford.

After graduating in May 1895 , Hoover spent another field season with Lindgren and then in October that year headed for the gold-mining country in the foothills of the High Sierras north east of Sacramento. However, work was short and Hoover eventually took a job pushing an ore car on the night shift in the lower levels of a mine. " A man could not start any lower on the ladder." His daily wage for ten hours a night, seven days a week, was two dollars. But as his later life was to demonstrate, Hoover was a man who could not be kept down for long and by August 1896 he was earning $2000 a year as a mining engineer and by March the following year he was on his way to Western Australia to earn $10,000 a year with Bewick Moreing & Co.

About this time, Hoover was debating whether to become an academic geologist or a business-oriented mining man. He finally chose the latter career but many of his early publications in mining journals reflected his scientific bent and interest in geology.

Bewick Moreing provided management and engineering services to mines in different parts of the world and whilst in their service Hoover made four visits to New Zealand in the early 1900's. A further New Zealand connection came in 1909 and 1910 when Hoover initiated a geological survey of the Kalgoorlie Goldfield. The work was carried out by a New Zealander, Malcolm Maclaren (Mason, 1994) assisted by another New Zealander, J. Allan Thomson (Mason, in Stevens 1998)

As a 'business-oriented mining man' Hoover was eminently successful, financially and technically, but beneath it all he remained a scholar and in 1907 his old geology teacher, John Branner invited him to deliver a series of lectures to Stanford's geology and mining students. These lectures came out later in book form as Principles of Mining which remained in print until 1967.

PRINCIPLES OF MINING

VALUATION, ORGANIZATION AND ADMINISTRATION

COPPER, GOLD, LEAD, SILVER, TIN AND ZINC

BY

HERBERT C. HOOVER

Member American Institute of Mining Engineers, Mining and Metallurgical Society of America, Société des Ingénieurs Civils de France, Fellow Royal Geographical Society, etc.

FIRST EDITION
FIFTEENTH IMPRESSION

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GEORGIUS AGRICOLA

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AND

LOU HENRY HOOVER

A. B. Stanford University, Member American Association for the Advancement of Science, The National Geographical Society, Royal Scottish Geographical Society, etc., etc.

Published for the Translators by
THE MINING MAGAZINE
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1912

After the 1906 San Francisco earthquake Hoover offered Professor Branner $1000 to publish an earthquake investigation and in 1910 he offered to finance Branner's geology expedition to Brazil.

Hoover's main contribution to mining and geology scholarship must be the translation into English of Agricola's De Re Metallica which was first published, in Latin, in 1556. A huge volume. De Re Metallica was the first comprehensive work on mining and metallurgy.

Up to the attempt by Hoover and his wife. Agricola's medievaL Latin had been regarded as 'untranslatable' and it certainly proved difficult for the two Hoovers but for over five years they grappled with it sentence by sentence. It was finally published in 1912 in an ornate volume which sold for the ridiculous price of $5 which hardly covered the binding. It is now in the rare book category selling for several thousand dollars

At the start of the First World War, Hoover was at the peak of his professional career in the mining industry but he then made a sudden change of direction which culminated in the presidency of the United States of America.

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Alan Mason

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Charles Lyell, 1797–1875

Eduard Suess, 1831–1914

510. — La plus grande, la plus longue et la plus importante crevasse se trouvait du nord au sud, bien visible et déjà large à l'aurore du septième jour, n'empêchait pas la communication des eaux d'un côté à l'autre. Cette crevasse aura été peut-être [illegible] largeur; elle divisait la terre presqu'à moitié dans la direction indiquée. On pouvait pressentir qu'une séparation inévitable et inexorable; que la masse la plus grande [illegible] en raison de sa pesanteur, et que la [illegible] serait repoussée à une distance [illegible] un équilibre proportionnel.

511. — La masse la plus forte [illegible] est restée.

Nous ne savons pas de quel nom on appelait à l'époque du sixième jour, le continent de cette masse; après Noé on l'appela, comme de nos jours, l'Asie, l'Afrique et l'Europe.

La grosse masse partielle, dont la crevasse [illegible] au sud de l'aride, était à l'ouest, et dans l'écartement [illegible] qu'elle a subi, sa surface s'est portée plus à l'ouest encore; cette masse forma elle-même un grand continent, que nous appelons aujourd'hui l'**Amérique**.

Arthur Holmes, 1890–1965

Alfred Lothar Wegener, 1880–1930

Sir Harold Jeffreys, 1891–1989

Preuves de la formation de l'Amérique.

Sommaire. — Les faits toujours appuyés de leurs preuves, 522. — *Preuves physiques*; correspondance des caps et des golfes, 523. — Preuve tirée du système des volcans, 524. — Nomenclature des principaux volcans, *note* U, *id.* — Tremblement de terre de Lisbonne, 525. — Tremblement au Pérou, 526. — Cataclysme au Kamtschatka, 527. — Cataclysmes partiels; effets à attendre du prochain cataclysme général, 528. —

Portraits from 'The Dark Side of the Moon' by Robert Muir Wood

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