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AUTOBIOGRAPHY

OF

GEORGE CHRISTIAN HOFFMANN,

LL.D., F.I.C., M.M.S., F.R.S.C.

1906 (2)

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FORMERLY ASSISTANT DIRECTOR OF, AND CHEMIST AND MINERALOGIST TO, THE GEOLOGICAL  
SURVEY OF CANADA, AND CURATOR OF THE MINERALOGICAL AND LITHOLOGICAL  
SECTION OF THE MUSEUM OF THAT INSTITUTION.

George Christian Hoffmann was born in London, England, on the 7th of June, 1837. He received his early education in his home and in private academies in England, and continued the same in Darmstadt, Germany, at first by private tuition under Hofrat (Aulic Councillor) Friedrich Haas—Professor in the Gymnasium there, and afterwards at the Groszherzogliche Provinzial-Realschule in that town.

On his return from Germany, 1853, he became a matriculated student at the Royal School of Mines, Jermyn Street, London, at that time under the Directorate of Sir Henry T. de la Bèche, C.B., F.R.S., where he received instruction under—A. W. (afterwards A. W. von) Hofmann, LL.D., F.R.S., in chemistry; John Percy, M.D., F.R.S., in metallurgy; Warrington W. (afterwards Sir Warrington W.) Smyth, M.A., F.R.S., in mining and mineralogy; George G. Stokes (afterwards Sir George G. Stokes, Bart.), M.A., D.C.L., LL.D., F.R.S., in physics; Andrew C. (afterwards Sir Andrew C.) Ramsay, LL.D., F.R.S., in geology; Thomas H. (afterwards the Right Hon. T. H.) Huxley, D.C.L., LL.D., F.R.S., in natural history; and the Rev. R. Willis, M.A., F.R.S., in applied mechanics. Having followed out the course of study prescribed at this Institution and, in addition, taken a special course of instruction in assaying in the Metallurgical Laboratory under Dr. John Percy, connected with it, he then, purposing to devote his attention more especially to chemistry, further prosecuted his studies at the Royal College of Chemistry, Oxford Street, London, under Professor A. W. Hofmann, where, after having gone through a systematic course of chemistry extending over several years, and subsequently acted for two years in the capacity of a

Junior Assistant, he was ultimately appointed by Professor Hofmann to the position of Assistant in his Research Laboratory, which post he held for some years.

It was no long after his relinquishment of the same, that he — on the 30th May, 1861, left England for Natal, South Africa, where he was for over three years engaged under Dr. Robert James Mann, F.R.A.S., Superintendent-General of Education in Natal,— for the first three months in carrying out the general preparations for the Natal contributions to the International Exhibition of 1862, and subsequently in divers work of a scientific nature.

At the close of this period he availed himself of an opportunity which then presented itself of visiting Mauritius, with a view of acquiring some knowledge of the Flora of that island and, in furtherance of that design, he there passed close upon ten months, and after that proceeded to Melbourne, Victoria, Australia, where he arrived in October 1865.

Shortly after his reaching Melbourne, he was appointed to take charge of the Phytochemical Laboratory attached to the Melbourne Botanic Garden, which was at that time under the Directorate of Dr. Ferdinand Mueller, M.D., Ph. D., LL.D., F.R.S. (afterwards Baron Sir Ferdinand von Mueller, K.C.M.G., et cætera). This position he retained for rather more than five years, when he relinquished the same and returned to England, with the intention of afterwards proceeding to Germany and there taking up the Study of Medicine. On his arrival in England, however, circumstances led him to question the advisability of his carrying out this design and he therefore, in lieu of so doing, after a brief stay, went to Canada.

Somewhat closely following his arrival in that country, he became a member of the Staff of the Geological Survey of Canada, at that time under the Directorate of Alfred R. C. Selwyn, F.R.S., F.G.S. (afterwards Dr. Alfred, R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S.),—at first (1872-79) as Assistant Chemist and Mineralogist, then (1879-80) as Acting Chemist and Mineralogist, subsequently (in 1880) as Chemist and Mineralogist, and later on (in 1883) he was further appointed an Assistant Director of the Survey. His occupancy of these several positions extended over a period of close upon thirty-five years, that is to say, up to the first of April, 1907, when, in pursuance of his application for retirement, and the granting of the same, his connection with the Survey ceased.

In 1879 he was elected a Fellow of the Institute of Chemistry of Great Britain and Ireland; in 1885 he was made an Honorary Member of the Pharmaceutical Association of the Province of Quebec, Canada; in 1888 he was elected a Member of the Mineralogical Society of Great Britain and Ireland; and in 1895 Queen's University, Kingston, Canada, conferred upon him the degree of Doctor of Laws, *honoris causâ*. He is also one of the twenty original Fellows who constituted the Section of Mathematical, Physical, and Chemical Sciences, of the Royal Society of Canada, at the time of its formation in 1882, a status conferred upon him by the then Governor-General of Canada, His Excellency the Right Honourable the Marquis of Lorne, now His Grace the Duke of Argyll, K.T., *et cætera*, the Founder of the Society.

He is the author of numerous reports published in the Reports of Progress and Annual Reports of the Geological Survey of Canada, and also of many 'papers' on chemical and mineralogical subjects appearing in other scientific publications, as is more precisely referred to in the ensuing pages.

While in charge of the Phytochemical Laboratory attached to the Melbourne Botanic Garden, Victoria, Australia, he carried out, among other, the undermentioned work, the detailed results of which are given in the publication or publications cited at the close of each separate 'inquiry.'

1. An inquiry into the tanning properties of the barks of certain Victorian native trees and, in connection with this, the determination of the percentage of tannic acid and gallic acid in the bark of respectively—*Acacia penninervis* (Sieber), *A. suppersa* (F. von Mueller), *Angophora intermedia* (De Candolle), *Banksia serrata* (Linnæus), *Brachychiton populneum* (R. Brown), *Eucalyptus amygdalina* (Labillardière), *E. corymbosa* (Smith), *E. longifolia* (Link), *E. obliqua* (L'Heritier), *E. Stuartiana* (F. von Mueller), *Eugenia Smithii* (Poiret), and of *Pittosporum undulatum* (Ventenat).—See "Report on the Vegetable Products exhibited in the Intercolonial Exhibition of 1866-67," pp. 39, 40. By Dr. Ferd. Mueller, F.R.S., Melbourne, 1867.

2. An investigation into the amount of potash contained in, respectively, the leaves, branchlets and branch-wood, and trunk-wood, of certain trees indigenous to Victoria, Australia, namely,—*Acacia decurrens* (Willdenow), *Banksia Australis* (R. Brown), *Casuarina quadrivalvis* (Labillardière), *C. suberosa* (Willdenow),

*Eucalyptus globulus* (Labillardière), *E. melliodora* (A. Cunningham), *E. obliqua* (L'Heritier), *E. rostrata* (Schlechtendal), *E. viminalis* (Labillardière), and *Melaleuca ericifolia* (Smith).—See "Report of the Government Botanist and Director of the Botanic Garden, for 1862-69," pp. 14, 15. By Ferd. von Mueller, M.D., F.R.S., Melbourne, 1869.

3. A series of experiments in reference to the quantities of pyroligneous acid, pyroxilic spirit (wood-spirit), tar and charcoal, obtainable by the destructive distillation of the trunk-wood of the following trees, indigenous to Victoria, Australia, namely,—*Acacia melanoxylon* (R. Brown), *A. mollissima* (Willdenow), *Angophora intermedia* (De Candolle), *Banksia Australis* (R. Brown), *Casuarina quadrivalvis* (Labillardière), *Eucalyptus globulus* (Labillardière), *E. leucoxyton* (F. von Mueller), *E. obliqua* (L'Heritier), *E. rostrata* (Schlechtendal), and *Melaleuca ericifolia* (Smith).—See "Report on the Vegetable Products exhibited in the Intercolonial Exhibition of 1866-67," pp. 22-27. By Dr. Ferd. Mueller, F.R.S., Melbourne, 1867.

4. An inquiry into the suitability for paper-making of certain fibrous substances, and coincidently the preparation of samples of paper from the same, afforded by the undermentioned plants indigenous, with but three exceptions, to Victoria, Australia, namely,—the bark of, respectively, *Acacia penninervis* (Sieber), *Eucalyptus amygdalina* (Labillardière), *E. corymbosa* (Smith), *E. globulus* (Labillardière), *E. goniocalyx* (F. von Mueller), *E. leucoxyton* (F. von Mueller), *E. longifolia* (Link), *E. obliqua* (L'Heritier), *E. rostrata* (Schlechtendal), *E. Stuartiana* (F. von Mueller), *Melaleuca ericifolia* (Smith), and of *Melaleuca squarrosa* (Smith);—the foliage of *Casuarina leptoclada* (Miquel), and of *Casuarina quadrivalvis* (Labillardière); and the following grasses, rushes, and allied plants, that is to say,—*Cyprus lucidus* (R. Brown), *C. vaginatus* (R. Brown), *Dichelachne erinita* (J. Hooker), *Heleocharis acuta* (R. Brown), *H. sphacelata* (R. Brown), *Juncus vaginatus* (R. Brown), *Lepidosperma gladiatum* (Labillardière), *Musa Banksii* (F. von Mueller), *Phormium tenax* (Forster), *Scirpus lacustris* (Linnæus), *S. maritimus* (Linnæus), *Stipa semibarbata* (R. Brown), *Typha angustifolia* (Linnæus), *Xanthorrhoea minor* (R. Brown), *Xerotes longifolia* (R. Brown), and *Oedogonium*.—See "Report on the Vegetable Products exhibited in the Intercolonial Exhibition of 1866-67," pp. 27-34. By Dr. Ferd. Mueller, F.R.S., Melbourne, 1867; also, "Catalogue of the Victorian Exhibits to the Sydney Intercolonial Exhibition of 1870," pp. 58 and 63, on which latter page is given an extract

from a Report of the Paper Manufacturers in England on some of the paper samples prepared in connection with the above inquiry.

5. The preparation of a series of fibres—estimating, in some cases, the amount of fibre afforded by the plant from which it was obtained and, in all instances determining their relative tensile strength—from the following plants, either natives of, or introduced into, Victoria, Australia, namely,—*Abutilon striatum* (Dicks), *A. venosum* (Lemaire), *Agave Americana* (Linnæus), *Arundo conspicua* (Forster), *A. Donax* (Linnæus), *Boehmeria nivea* (Hooker), *Brachychiton populneum* (R. Brown), *Canna edulis* (Ker), *Cordylina Australis* (Endlicher), *C. indivisa* (Kunth), *Cyperus vaginatus* (R. Brown), *Dianella longifolia* (R. Brown), *Helocharis sphacelata* (R. Brown), *Hibiscus splendens* (Fraser), *H. Syriacus* (Linnæus), *Juncus vaginatus* (R. Brown), *Morus alba* (Linnæus), *Phormium Colensoi* (Hooker), *P. tenax* (Forster), *Phragmites communis* (Link), *Pimelia pauciflora* (R. Brown), *Plagianthus pulchellus* (Asa Gray), and *Yucca gloriosa* (Linnæus).—See "Catalogue of the Victorian Exhibits to the Sydney Intercolonial Exhibition of 1870," pp. 57 and 60-63, Melbourne, 1870.

6. A series of experiments on the dyeing properties of the colouring matters contained in the barks of the following trees or shrubs, indigenous to Queensland, Australia, namely,—*Acacia harpophylla* (F. von Mueller), *Alstonia constricta* (F. von Mueller), *Chionanthus picrophloia* (F. von Mueller), *Croton insulare* (Bail- lon), *Erythroxylon Australe* (F. von Mueller), *Guettardella putami- nosa* (Bentham), *Melodorum Leichardtii* (Bentham), *Petalos- tigma quadriloculare* (F. von Mueller), *Rhamnus vitiensis* (Bent- ham), and *Xanthoxylon brachyacanthum* (F. von Mueller); as also in the bark from the root of *Sarcocephalus cordatus* (Miquel)— also a native of Queensland, as well as in that from the root of *Morinda tinctoria* (Noronha)—from New Caledonia.—See "Report on the Vegetable Products exhibited in the Intercolonial Exhibition of 1866- 67," pp. 47-48. By Dr. Ferd. Mueller, F.R.S., Melbourne, 1867.

7. The preparation of a series of essential oils from, among others, the following trees indigenous to, or growing in, Victoria, Australia, that is to say, from the foliage of, respectively,— *Agonis flexuosa* (De Candolle), *Angophora intermedia* (De Can- dolle), *A. subvelutina* (F. von Mueller), *Eucalyptus calophylla* (R. Brown), *E. cornuta* (Labillardière), *E. marginata* (Smith), *Eugenia Smithii* (Poiret), *E. Ventenatii* (Bentham), and *Melaleuca*

stypeloides (Smith); and from the blossoms of *Pittosporum undulatum* (Ventenat).—See "Catalogue of the Victorian Exhibits to the Sydney Intercolonial Exhibition of 1870," p. 54, Melbourne, 1870.

In addition to the foregoing, he likewise carried out a not inconsiderable amount of miscellaneous work, among which may be mentioned:

8. The preparation of samples of tea from the leaves of plants of *Thea Chinensis* (Sims) grown in the Melbourne Botanic Garden; the preparation of opium from the capsules of plants of *Papaver somniferum* (Linnæus) cultivated in the Melbourne Botanic Garden; the preparation of picric acid from the resin of *Xanthorrhoea Australis* (R. Brown), a native of Victoria and Tasmania; and the preparation of snuff from plants of *Myriogyne minuta* (Lessing), a weed common to Australia and possessing remarkable sternutatory properties.—See "Report on the Vegetable Products exhibited in the Intercolonial Exhibition of 1866-67," pp. 34, 35, 37 and 38. By Dr. Ferd. Mueller, F.R.S., Melbourne, 1867. Also, an analysis of *Haloenemum australasicum* (Moquin-Tandon), one of the principal littoral plants of Victoria, Australia, with reference to its employment as a source of soda; and a determination of the percentage of iodine in the large leathery native sea-weed *Durvillaea potatorum* (Areschoug).—See "Report of the Government Botanist and Director of the Botanic Garden for 1868-69," pp. 14 and 15. By Ferd. von Mueller, M.D., F.R.S., Melbourne, 1869.

During his connection with the Geological Survey of Canada, he has brought out a series of twelve reports entitled "Chemical Contributions to the Geology of Canada" and, in continuation of the same, a further series of seven reports under the designation "Report of the Section of Chemistry and Mineralogy." These several reports appear, respectively, in—"The Report of Progress of the Geological Survey of Canada" for 1874-75, pp. 313-319; 1875-76, pp. 419-432; 1876-77, pp. 489-512; 1877-78, pp. 1-14H; 1878-79, pp. 1-25H; 1879-80, pp. 1-21H; 1880-81-82, pp. 1-16H; 1882-83-84, pp. 1-44M and 1-19 MM; and are continued in the "Annual Reports (New Series) of the Geological Survey of Canada,"—a continuation of the above mentioned publication, for 1885 (vol. i), pp. 1-29 M; 1886 (vol. ii), pp. 1-42 T; 1887-88 (vol. iii), pp. 1-58 T; 1888-89 (vol. iv), pp. 1-68 R; 1889-90-91 (vol. v), pp. 1-72 R; 1892-93 (vol. vi), pp. 1-93 R; 1894 (vol. vii), pp. 1-68 R; 1895 (vol. viii), pp. 1-59 R; 1896 (vol. ix), pp. 1-53 R;

1898 (vol. xi), pp. 1-55 R; 1899 (vol. xii), pp. 1-64 R; and 1900 (vol. xiii), pp. 1-67 R. His latest "Report of the Section of Chemistry and Mineralogy"—that for 1903-05, of some seventy-one pages, was issued as a 'separate.'

The above mentioned reports,—making in all some nine hundred and eighty large octavo pages, contain:—

1. Analyses and descriptions of a very great number of minerals, very many of which,—some forty-six species and seventeen varieties of species, had not previously been identified as occurring in Canada. The species in question, comprise—Allophane, Altaite, Alunogen, Anglesite, Arsenic (native), Arsenolite, Bismite, Bournonite, Calamine, Cerussite, Chalcantithite, Clinocllore, Cyanite, Danalite, Datolite, Faujasite, Fibroferrite, Gersdorffite, Harmotome, Hisingerite, Hübnerite, Hydromagnesite, Ilvaite, Lepidolite, Lepidomelane, Leucite, Löllingite, Mascagnite, Metacinnabarite, Monazite, Natron, Newberyite, Pyrocrase, Sal-ammoniac, Samarskite, Schorlomite, Smaltite, Smithsonianite, Stilpnomelane, Stromeyerite, Struvite, Tellurium (native), Tetradyomite, Uraninite, Uranophane, and Xenotime; whilst the varieties referred to, together with a few minerals near to known species, embrace—Andradite, Baddeckite (a new variety of muscovite), Chrompicotite, Cookeite, Damourite, Danaite, Edenite, Fuller's earth, Iron (native, terrestrial), Lampadite, Meymacite, Sericite, Souesite (a new occurrence of a native iron-nickel alloy), Sphaerosiderite, Tetrahedrite (plumbiferous), Voigtite, and Woodtin.

2. Descriptive notes on numerous minerals from localities in Canada, where they were not previously known to occur.

3. Analyses of a very considerable number of fossil fuels—including peat, lignitified wood, lignite, lignitic coals, coals of the Carboniferous as well as of Cretaceous and Tertiary age, anthracitic coals, semi-anthracites, and anthracite—from various parts of the Dominion, that is to say from, among others, the province of Nova Scotia; the districts of Alberta, Assiniboia, and Athabasca, and the Yukon district, in the North-West Territory; and the province of British Columbia.

4. A great many analyses of natural waters (with the object of ascertaining their suitability for domestic, manufacturing, or irrigation purposes, or possible therapeutic value, as the case might



be)—including river-waters, lake-waters, the waters of natural and artificial springs, and of salt-springs, occurring in various parts of the Dominion. Among the foregoing may be mentioned an analysis of the water—of the Assiniboine and of the Red river, in the province of Manitoba; of the Saskatchewan river, taken near the mouth of Big-stone river, in the district of Saskatchewan, of the Churchill river and of Reindeer Lake, in the district of Athabasca, and of the Bow, Elbow, Highwood and Sheep rivers, and of Fish creek, in the district of Alberta, in the North-West Territory; of Goodenough lake, in the district of Lillooet, province of British Columbia; and of a series of natural salt-springs occurring in the province of Manitoba and in the district of Saskatchewan, North-West Territory.

5. A lengthy series of analyses of limestones and dolomites from localities in various parts of Canada, carried out for the purpose of ascertaining their individual merits for structural purposes, suitability for the manufacture of lime or of hydraulic cement, or employment for metallurgical and other uses.

6. Numerous complete analyses of calcareous marls from various points in the provinces of Quebec and Ontario, showing their relative value for use as a fertilizer, for the manufacture of an artificial Portland cement, and other purposes for which this material is ordinarily used.

7. Analyses, complete or partial, of a large number of iron-ores, copper-ores, lead-ores, and manganese ores, from various parts of the several provinces of the Dominion.

8. Many analyses, in regard to nickel and cobalt content, of samples of pyrrhotite, pyrite, et cætera, from localities in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia, and the North-East and North-West Territories,

9. A very lengthy series of assays of ores, for gold and silver, from nearly all parts of Canada, that is to say, from localities in the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, and in the North-East and North-West Territories.

10. Analyses of certain rock specimens from—Cape Breton, Halifax and Guysborough counties, in the province of Nova Scotia; the Ottawa river and Lake Keepawa in Pontiac county, in

the province of Quebec; Lake Wicksteed and Lake Temiscaming, in the district of Nipissing, province of Ontario; and Lake Kootenay, in the West Kootenay district of the province of British Columbia.—As likewise,

11. The results of very many miscellaneous examinations, including the examination and, in many instances, partial analysis of samples of—Barite, Bituminous sand-rock, Bituminous shales, Carbonaceous shales, Cementstones, Chromic iron-ore, Graphite, Graphitic shales, Iron-ochres, Iron-sands, Mineral tar or maltha, Phosphatic sandstone nodules, Phosphatic shale, River sands, Saline deposits, Sandstones, Silts, Talc and Zinc-blende.

Other work carried out by him in connection with the Survey, includes a—

(a) "Report on Canadian Graphite,"—With analyses of certain varieties of Canadian graphite and a comparison of these, in so far as composition and relative combustibility are concerned, with that of Ceylon and other foreign graphites.—See "Report of Progress of the Geological Survey of Canada" for 1876-77, pp. 489-512.

(b) "Report on Canadian Apatite,"—With analyses of a series of Canadian apatites and a comparison of the same with those of some well-known foreign apatites. Ibid. for 1877-78, pp. 1-14H.

(c) "Report on the Coals and Lignites of the North-West Territory, Canada,"—Embodying the results of a series of proximate and ultimate analyses of the fuels in question, and giving a proposed method of classification of the same. Ibid. for 1882-83-84, pp. 1-44M;—and the preparation of a

(d) "Calalogue of Section 1 of the Museum of the Geological Survey of Canada, embracing the systematic collection of minerals, the collection of economic minerals and rocks, and specimens illustrative of structural geology." A special publication of the Geological Survey of Canada. Ottawa: S. E. Dawson, Queen's Printer, 1893. Royal 8 vo., pp. 256, with folding plan of room.

Apart from which, he is also the author of the following 'papers':

(a) "The Eucalypts of Australia" (in which reference is made to the essential oils, kino and manna, et cætera, obtained

therefrom, and suitability of the bark of certain species of the same for paper-making), with an appendix on the essential oils of certain species of the genus *Melaleuca*, and other indigenous Victorian plants. A 'paper' read before the Montreal College of Pharmacy, February the 6th, 1873. Mitchell and Wilson, Montreal, Canada, 1873, 8vo., pp. 39, with two plates.

(b) "On a specimen of Canadian Native Platinum." Transactions of the Royal Society of Canada, Vol. v, Sec. 3, pp. 17-22 1887.

(c) "On the hygroscopicity of certain Canadian Fossil Fuels." *Ibid.*, Vol. vii, Sec. 3, pp. 41-55, 1889.

(d) "Annotated List of the Minerals occurring in Canada." *Ibid.*, Vol. vii, Sec. 3, pp. 65-105, 1889. A reprint of the same will also be found in the Annual Report of the Geological Survey of Canada, New Series, Vol. iv, pp. 1-67T.

(e) "On a peculiar form of Metallic iron found in Huronian quartzite on the north shore of St. Joseph island, Lake Huron, in the province of Ontario, Canada." Transactions of the Royal Society of Canada, Vol. viii, Sec. 3, pp. 39-42, 1890.

(f) "On a remarkable occurrence of Xenotime in Canada." American Journal of Science, Fourth Series, Vol. v, p. 235, 1898.

(g) "Baddeckite, a new variety of Muscovite." *Ibid.*, Vol. vi, p. 274, 1898.

(h) "On the occurrence of Polycrase in Canada." *Ibid.*, Vol. vii, p. 243, 1899.

(i) "On some new mineral occurrences in Canada" (namely, that of Danalite, Lepidolite, Newberyite, Schorlomite, Spodumene, Struvite, and Uranophane). *Ibid.*, Vol. xi, p. 149, 1901.

(j) "On some new mineral occurrences in Canada" (namely, that of Datolite, and Faujasite). *Ibid.*, Vol. xii, p. 447, 1901.

(k) "Souesite, a native iron-nickel alloy occurring in the auriferous gravels of the Fraser, province of British Columbia, Canada." *Ibid.*, Vol. xix, p. 319, 1905.