

Physician contributions to nonmedical science: Abraham Gesner, inventor of kerosene

W.E. SWINTON

The name Gesner is well known and can be found in most histories of science, especially biological science. Conrad Gesner was a leading naturalist in the 16th century, and the Canadian Gesners are said to descend from him. They came via the United States. Colonel Henry Gesner was a native of Rockland county, New York, a royalist and an officer of the British army, so that quite early in the conflicts with the states he and his family decided to settle in the Annapolis Valley — though he lost all of his property through this loyalty. (Incidentally, though he and some of his fellow loyalists were strongly supported by the Duke of Wellington and others in their hopes of compensation, nothing was ever paid to them by the British government.) It thus happened that Abraham Gesner — physician, chemist and geologist — was born in the Annapolis Valley, near Kentville, May 2, 1797.

The young man had few advantages except for his interest in natural history and a desire for knowledge. His local schooling in a delightful countryside helped these interests, but at the time a young man would enter the university Abraham Gesner became an adventurer. Between ages 18 and 21 he visited the Caribbean and West Indian islands. Although he was twice shipwrecked on these travels, he managed, like Charles Darwin, to make important observations on tropical vegetation, corals and volcanoes. No doubt he made some money on these voyages, or else his family had prospered in the meantime, for his interest turned to medicine and he was able to go to London.

Here he spent 5 years in Guy's and St. Bartholomew's hospitals. Indeed, he would also be in St. Thomas's, for until 1825 Guy's and St. Thomas's were joined for teaching and administrative purposes. Young Gesner must therefore have come under the influence of famous teachers, for Sir Astley Cooper and John Abernethy were in these hospitals. He did not, however,

pursue only medicine but took advantage of the London facilities to study chemistry and geology in some depth.

By 1824 he was qualified with an MD and back in Nova Scotia and had commenced practising at Parrsboro on the north side of the Minas Basin. The choice may have been fortuitous but it was certainly fortunate, for the area is one of considerable geological interest, and this may have directed the course of his subsequent years. While practising medicine, he took the opportunity of making field studies in the district, and these must have been sufficiently important and sufficiently known to impress provincial administrators. In 1835 he was asked to

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augurate and conduct the geological survey of New Brunswick, and he carried out his duties assiduously until 1842, when quarrels between government officials caused the work to be discontinued.

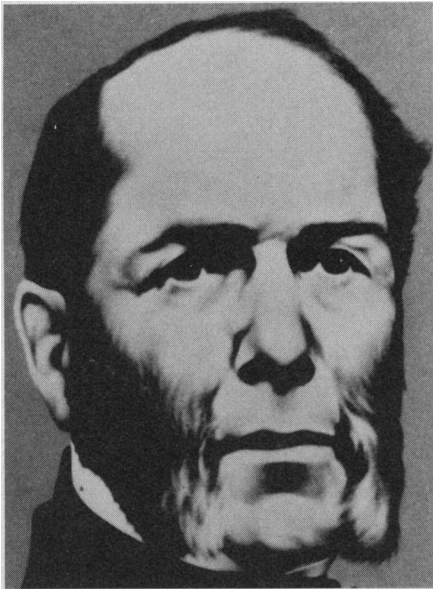
His geological knowledge must have been considerable, for in 1836 he had produced a substantial volume on the geology and minerology of Nova Scotia, with new maps of Nova Scotia and Prince Edward Island. This, published in both Halifax and London (England), was for some years a standard guidebook.

During his survey of New Brunswick, four reports of the survey were published in St. John. He was also amassing a collection of minerals, rocks and fossils that he hoped might be the basis for a provincial museum. This

was for some years in the St. John Mechanics' Institute and is now in the New Brunswick Museum.

His experiments were interrupted in 1846 when he was asked to do a geological survey of Prince Edward Island. This was accomplished with two publications, "Prince Edward Island and its Resources" and "Report on the Geology of Prince Edward Island", both issued in 1847. It was in Charlottetown in 1846 that he gave his historic demonstration of heating coal in a retort and gathering a fairly clear, thin liquid that would burn in a lamp. However, he was not yet ready for the final stages in this development. In 1847, he was back in New Brunswick writing up its attractions "with notes for Emigrants, comprehending the early History, an account of the Indians' Settlement, Topography, Statistics, Commerce, Natural History, Geology, social and political state, and contemplated Railways of the Province." This comprehensive report, published in London in 1847, was nearly 400 pages in length. This astonishing energy was continued for the next few years, during which he continued his studies on bitumen of Trinidad and other West Indian islands under the direction of Lord Dundonald (Thomas Cochrane, 10th Earl, 1775-1860), whom he also conducted on a tour of the coasts of Nova Scotia, Newfoundland and Labrador to observe the geology of their coastlines and fisheries.

By now he was lecturing on natural science. His fame must have been widespread, for he was soon to enter, perhaps unknowingly, into the history of science. The modern science of geology, with all its implications for human health and wealth, had been developed by James Hutton, MD in the late 18th century. Hutton's prosy descriptions were made more palatable by the publication at the beginning of the 19th century (1802) of a commentary on his work by John Playfair, an Edinburgh professor of mathematics and physics. Yet it was the later, and justly



New Brunswick Museum, L. Russell
Abraham Gesner . . .

famous, "Principles of Geology" by Charles Lyell that changed the world's thinking. The three volumes of this historic work were published between 1830 and 1833. Darwin sailed on HMS Beagle with the first volume, received the second in South America and was much influenced by them. In 1852, Sir Charles Lyell, a Scotsman educated for the law at Oxford but who had long abandoned that profession for geology, was invited to give some lectures in Boston; after these he made a more than complimentary visit to Canada. He saw Niagara Falls, of course, but one of his main purposes was to visit the Maritimes. Here he asked Gesner to be one of his guides; the other was Sir William Dawson, geologist and principal of McGill. They visited Joggins in the Cumberland Strait, on the Bay of Fundy.

Here there was a famous fossil forest, with many tree trunks exposed. Some of these were hollow and contained the skeletons of carboniferous amphibians, though they were not all recognized as that at the time. Gesner had published a geological account of Joggins in 1836, so his expertise and knowledge of this considerable coal-measure region must have pleased the distinguished visitor. Lyell's diaries have been published, and their only references to Gesner are two — one, that he was a valued guide to the region, and the following paragraph:

After the Joggin, we were taken to see a wonderful bed or vein of asphaltum, the subject of a hotly contested lawsuit — a vein of 1 to 11 feet thick, of pure pitch coal, or something like it, traversing fractured coal measures. It is too puzzling to attempt an account of it. As Gesner has consulted me, and the other party Dawson, we are trying to persuade them to com-

promise the suit. About £3000 pocketed already by the lawyers. The chief point being, whether it be a bed of coal which passes by a crown lease, or of asphaltum or some mineral which would not pass.

This letter from Lyell to his father-in-law, Leonard Horner, a former president of the Royal Society of London, was written Sept. 12, 1852 from Government House, Fredericton. Gesner's fame does not, however, rest upon his competence as a field geologist or on his success as a consultant. After his failure to persuade the people of St. John to found or nourish a museum, he returned to the Annapolis Valley and purchased the family farm from his father. Here he practised medicine and experimented with electromagnetism and the distillation of coal. The last of these studies was important. The Scotsman, James Young (1811-1883), had already in 1848 established the possibility of extracting paraffin from mineral oil and peat, which led to a widescale manufacture of both liquid and solid paraffins. Whether Gesner was spurred by this, one cannot say, but in that same year he had sold the farm back to his father and left for Sackville and Halifax. In 1852 his experiments on the extraction of a product similar to paraffin were sufficiently advanced for him to patent kerosene. Being a scholar as well as a chemist, he had first proposed the more-truly Greek name keroselaion (wax-light), which was cumbersome. It led to keroselene and then to kerosene. The flame from this oil was light yellow, brighter than from the slightly heavier paraffin and was to illuminate the homes of America with a new brilliance. But financial support for an extensive production was not available in the Nova Scotia whose mineral resources Gesner had done so much to develop, so in 1854 he was compelled to move to New York, where he gave his patents to the North American Gas Light Company, which in return employed him as its consultant chemist.

This company had great advantages in the bituminous coal and oil shales available to it in the United States, which were used by the New York City and Boston companies. By 1857, kerosene was available in considerable bulk in Montreal and Toronto. By 1860, this availability had spread to Newfoundland. The social consequences of the development and distribution of kerosene are immense, but fortunately they have been well described.

That Gesner realized the importance of his discovery is clear, and it says much for his moral outlook that, apart from the details of his patents, he did not conceal his methods or results. His demonstration in Charlottetown had been public. In 1861 he wrote "A prac-



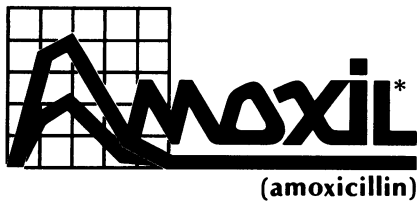
National Museum of Man
...lighted the continent

tical treatise on coal, petroleum and other distilled oils", which was published in New York and London. A second edition was published after his death by his son, G.W. Gesner. In 1861 Gesner also published, in the *Journal of the Geological Society of London*, a comprehensive account "On Elevations and Depressions of the Earth in North America".

He had now two manufacturing plants in New York City and had lived there for 10 years, but the call of Canada was strong, and in 1862 he was back in Nova Scotia describing the gold fields of the province. In his years in the Maritimes, he had done immense work to study and make public their attractions and resources. His many reports, books and scientific papers form a contribution to Canada that seems to have brought its own reward, for of official rewards I find no records. He contributed largely to the knowledge of geology and resources in the Maritimes, and there is no doubt that he played a considerable part in opening up these resources and attracting the immigrants needed for their development.

Around the world he must have been known as a writer and as a scientist, for his books and papers were numerous and published in Canada, the United States and Britain. He was a member of several scientific societies and an honorary member of some.

The American Civil War might seem to have passed him by, for he was busy in New York in its earliest phase, though there is no doubt that his product would play its part. Coal oil — Gesner's kerosene — was the domestic lamp fuel of North America by 1864. That was the year its discoverer was invited to be professor of natural his-



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USUAL DOSE:

ADULTS 250 mg every 8 hours

CHILDREN 25 mg/kg/day in divided doses every 8 hours

In severe infections or infection associated with organisms where sensitivity determinations indicate higher blood levels may be advisable: 500 mg every 8 hours for adults, and 50 mg/kg/day in divided doses every 8 hours for children may be needed. This dosage should not exceed the recommended adult dosage.

Infections of the lower respiratory tract due to streptococci, pneumococci, penicillin-sensitive staphylococci and H. influenzae:

USUAL DOSE:

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CHILDREN 50 mg/kg/day in divided doses every 8 hours

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tory at Dalhousie University but this recognition was too late; Abraham Gesner died at Halifax April 29, 1864.

This kind of life, compared with the literary life of physicians, may seem pedestrian — slowly accumulating facts and producing statistics and reports. Why should this be exemplary in a physician?

The answer is perhaps little to do with the profession or the medical life in general, but many medical men have been (and are) acute observers. The time of Gesner's education was partly responsible. Medical education, with its long list of anatomical terms and the strongly botanical aspect of materia medica, meant that the doctor had to have a good memory and a fairly broad natural knowledge. For the chemist, and even the physicist, a medical education was the gateway to his science. William Morris, the Victorian poet, could talk of "the majesty that from man's soul looks through his *eager* eyes", and education reversed the pro-

cess so that some men, through their eager eyes and receptive minds, saw the majesty of nature and its creation. Francis Parkman, the Victorian educator of much influence, pleaded for the direction of popular education — "to the development of its (the mind's) powers of observation, comparison, analysis and reasoning, to strengthening and instructing the moral sense and leading it to self-knowledge and consequent modesty."

Such must have been the education of Abraham Gesner, for he helped to develop the riches of nature for his fellow men, and in inventing a new source of illumination he transformed the home life of a nation and helped a thousand with eager eyes to use (not just burn) the midnight oil.

Although for many years his memory seems to have been forgotten, it is fitting and gratifying that the monument at his grave in Camp Hill Cemetery was erected by Imperial Oil Ltd. in 1933.■

Journal cover contest shows Canadian physicians have photographic talent

It's fairly conventional, when announcing the winner of a reader contest of some kind, for the editors to say how tough the competition was and how nearly the losers came to being winners.

Our readers only have to look at our front cover to know that the standard of our festive season picture contest was indeed high. And we can honestly say that there were other photos that gave the winner a close run.

None the less, the judges (*CMAJ* editorial staff, reinforced by Ottawa artist John Ball who designs many of our regular covers) were unanimous in picking "Antipollution, stars of Bethlehem" by Dr. Christian Hamel, a Pointe Claire pediatrician. Dr. Hamel submitted three photographs, all of them superb. Mr. Ball says of the cover photograph that it offers a great deal of depth and texture, besides expressing very well the festive theme.

Of the many entries, there were perhaps half a dozen worth honourable mentions. From Hazelton BC, Dr. Millie Cumming, a general practitioner, offered two delightful slides of pyjama-clad youngsters at parcel opening time. Madeleine Dover sent from Montreal a photo of awesome technical competence of a pair of lighted candles. Dr. Desmond Dwyer offered a fun picture of a friend's wife surprised in the act of getting a pair of diamond earrings; think of an expressive face, an unexpectedly lavish gift and an alert pho-

tographer and you can imagine the result would be good. It was, and had we been selecting a runner-up Dr. Dwyer might have made it. He's a busy general practitioner in the oil sands region.

But then, Dr. A.W. Hindmarsh of Saskatoon might have made runner-up too. He ventured out into the frosty outdoors with his Topcon and shot a delightful picture of hoar frost on a tree branch. Saskatchewan doctors will know the name, of course; he is a former president of the division.

From London, Ontario came a picture by Dr. Abraham Langdon, a general surgeon. Dr. Langdon used the texture of cross-country ski tracks and blended them beautifully into a composition of trees, shadows and distant figures. And from Montreal, a particularly imaginative concept was by Major Alex Steele, a resident in pathology at McGill, who took a handcrafted model of the Madonna and child and lit it to give a mystic effect to the Infant Jesus.

The final honourable mention goes to Dr. O.J. White, an orthopedic surgeon in Moncton, NB, who offered a really charming picture of his daughter with her Christmas baby brother, well composed and lighted.

Our thanks to these doctors and the others who also entered. The contest was useful and instructive — and if our readers like the idea, maybe we'll do it again.■