ACCURACY OF INFORMATION: Claude Émile Jean-Baptiste Litre

EM9507: The Globe and Mail, April 7, 1995, page A28

The metric system

This is the 200th anniversary of the birth of the metric system, in France.

- The system has seven fundamental, or base, measures. Many metric units are named for famous scientists (Newton, Coulomb and Kelvin) and one is named for a wine merchant – Claude Emile Jean-Baptiste Litre.
- Use of the system has spread internationally. In 1897, for instance, Britain passed a statute legalizing metric measures for trade and abolishing the penalty for using or having in one's possession a weight or measure of that system.

Sources: Collier's Encyclopedia, Encyclopedia Britannica (1911).

REFERENCE: Collier's Encyclopedia, Macmillan Educational Company, New York, and P.F. Collier, Inc., London & New York (1987), Volume 16, page 69 states that *The liter, a metric unit of volume or capacity, is named for a founding father of the metric system, Claude Emile Jean-Baptiste Litre, whose family sold wine in the first litre (liter) bottles to bear the name.* (The same statement appears in the 1992 edition, Volume 16, page 69.) [Waterloo Public Library call number: 031 Col V. 16 1987]

In view of the item reprinted above from the *Social Studies* section on the back page of Section A of *The Globe and Mail*, the following information is of interest; it is from an article, by Linda J. Howe, entitled *'Pleasure is performing' for 37-year teacher* about Professor Ken Woolner at the time of his retirement from the Department of Physics at the University of Waterloo.

EM9516: University of Waterloo Gazette, May 17, 1995, page 1

[Prof. Woolner] remembers with glee one scientific hoax he helped perpetrate. He and chemistry professor Reg Friesen are "responsible for adding one person to the grand sweep of history" – Claude Émile Jean-Baptiste Litre.

Litre was "born" during a crippling blizzard in a hotel room in Ottawa, in December 1977. But his creators told the world he had been born February 12, 1716 in France. Litre even had a list of scientific accomplishments that Woolner created. For ten years, much of the world believed it all.

The idea for Litre was Friesen's, Woolner says. It originated with a technical quibble: Some chemists wanted to make the abbreviation of the litre measurement to be "L" instead of "l," to avoid confusion with the figure 1. "But the rules of nomenclature of the Conférence Générale des Poids et Mesures require that upper-case letters be reserved for units which are named for individual scientists," Woolner says. "Since no such person existed for the litre mea- surement, it seemed reasonable one should be invented."

Woolner wrote a study of Litre for the April 1978 issue of *Chem 13 News*, a science publication from Waterloo geared mainly for high school teachers.

"I realized that drama, revolution and romance were all very good, but the joke would be better if the article came across as a piece of sober historical research," Woolner wrote ten years later. "The idea was to give a straightforward account with correct dates and accurate historical details, but with one person added to the great stream of history. So that's how I wrote it."

And over the years other scientists filled in missing sections to Litre's biography. "It was clear that a great deal of innocent pleasure was being had by one and all," Woolner says.

Information about Litre started appearing in international publications, and even made the CBC radio program "Quirks and Quarks." Eventually the deception had to be put to rest.

1 Outline, in point form, lesson(s) relevant to data-based investigating (or empirical problem solving) that can be learned from the articles reprinted above.

- Describe brefly the *danger(s)* you consider are involved in this type of scientific hoax.

Five other articles, which provide further information about this matter, follow in chronological order in this Figure; the reader should consult the original source for the illustrations in the first article. The assistance of Prof. Lewis J. Brubacher, Department of Chemistry, University of Waterloo, in providing copies of the articles is gratefully acknowledged. The article from *CHEM 13 News* is reprinted for teaching purposes at the University of Waterloo with the kind permission of the copyright holder.

CHEM 13 News, September, 1988, Number 178, pages 43-45

One of the most memorable articles we ever carried in CHEM 13 NEWS was Ken Woolner's short biography of Claude Émile Jean-Baptiste Litre. We reprint it here, complete with introduction, illustrations and final Editors' note as it appeared in our April 1978 issue. Be sure to read Ken's followup article, *The Litre Story*. Ken calls himself a physicist but revels (some would say, mucks about) in science history. We are also informed that Ken's grandfather, who loved to pull off public spoofs, was the cause of the phrase (now corrupted), "to pull the Woolner" over someone's eyes.

(*continued overleaf*)

CLAUDE EMILE JEAN-BAPTISTE LITRE (1716-1778)

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(Reprinted from CHEM 13 NEWS, *April, 1978)*

(In celebration of the 200th anniversary of the death of this great investigator, the Conférence Générale des Poids et Mesures has decided to use his name for the SI unit of volume. The official abbreviation will be L, following the standard prescription of using capital letters for units named for individuals.)

Claude Émile Jean-Baptiste Litre was born on February 12, 1716, in the village of Margaux in the heart of the Médoc region of France. His father was a manufacturer of wine-bottles, as had been his grandfather and great grandfather. Indeed, Litre bottles had been a vital adjunct of the Bordeaux wine industry since the 1620s. This family tradition of concern for the problems of liquid containment, and knowledge of the properties of glass, was undoubtedly a major influence upon Litre's later work on the measurement of volume.

By the age of 16, Litre had demonstrated a budding mathematical talent, and he was sent to Paris to study with Pierre de Maupertuis (1698-1759), who became his scientific mentor.

The most important scientific controversy of the 1730s concerned the correctness of the Newtonian theory of the Earth. According to Newton (1642-1727), the figure of the Earth should be an oblate spheroid, bulging at the equator and flattened at the poles, this shape being a centrifugal effect of the Earth's rotation. The Académie des Sciences decided to test the theory by measuring the curvatures of the Earth's surface at the equator and in the far north. Accordingly, in 1735 the great geographer La Condamine (1701-1774) led a surveying expedition to Peru, and in 1736 Maupertuis mounted a similar expedition to Swedish Lapland. The young Litre was invited to join the expedition as Maupertuis' assistant.

In Sweden, the liaison between the French party and Swedish officialdom was handled by Anders Celsius (1701-1744), the profes- sor of astronomy at the University of Uppsala. Celsius travelled to Lapland with the expedition as the official representative of the Royal Swedish Academy, and during the summer of 1736, Litre and Celsius became firm friends. There is no doubt that Celsius' preoccupation with precise measurement, and his dedication to the centigrade division of measured quantities, had a profound influence on Litre's later decision to pursue a career as a scientific instrument-maker.

The next 15 years of Litre's life are shrouded in mystery. Presumably he returned to Paris after the successful completion of the expedition, and it is generally believed that he established his instrument making business in 1740. But very little hard information is available. There is one unsubstantiated report that he visited New France and attempted to repeat the Lapland measurements, and another account that has him back in Bordeaux, perfecting his glass making techniques! The paucity of information on this period of Litre's life, and the wide divergences and inconsistencies between the few "facts" that are available, has proved very frustrating for historians of the period. If any reader of CHEM 13 NEWS has good information to offer, the editors would be delighted to receive it.

There is, however, no doubt at all that by 1751 Litre was very well established. In September of that year Guillaume Rouell (1703-1770), the famous demonstrator in chemistry at the Jardin du Roi, gave a public lecture on *Les Méthodes de Chimie* which was nothing less than a detailed demonstration of Litre's chemical glassware. By the end of the year Litre's business had quadrupled! Over the course of the 1750s, Litre completely out-stripped his competitors, and owned a virtual monopoly on all chemical apparatus. Through the '60s and early '70s, Litre's laboratory equipment became a tradition in France, and perhaps contributed as much to "La Révolution Chymique" as did Lavoisier (1743-1794) himself.

Not that Litre may be compared to Lavoisier as a chemist – indeed Litre always claimed to be completely ignorant of the subject! But he was much more than a very successful businessman. By the time he was 40, he had made his fortune, and he left the running of his business to others, while he devoted himself to what has proved to be his lasting claim to fame – the accurate measurement of volume.

Before Litre, no one had ever made an accurate cylinder of clear glass, and yet his cylinders varied in internal diameter by less than 0.1% over their whole length. And no one, before Litre, had so precisely graduated a cylinder of glass – into tenths, hundredths, and sometimes even thousandths! His graduated cylinders, and his burettes (he invented the device, and its name) were coveted by chemists all over Europe.

His major written work, the *Études Volumétriques* of 1763, was translated into English in 1764 by Joseph Priestley (1733-1804), and into German in 1767 by Karl Wilhelm Scheele (1742-1786). In the preface to his translation, Priestley praised Litre's work as a consummate example of the fact that, "... all things (and particularly whatever depends upon science) have of late years been in a quicker progress towards perfection than ever."

Litre visited England in 1765 to receive a special gold medal struck in his honour by the Royal Society. In return, he donated to the Society a set of his graduated cylinders. Unfortunately these cylinders did not survive the experiments of Sir Humphry Davy (1778-1829), who made nitrogen trichloride in them in 1812.

Litre's later years were spent basking in the fame and adulation heaped upon him by the savants of Paris, and spiced by an unending sequence of patent litigations against German, Veneian, and Bohemian glass-makers. Although he was the recipient of every civil honour that France could bestow, Litre was never admitted to the Académie des Sciences, even though he made apparatus for all the Académiciens, and was regarded as a friend by many of them. It is rumoured that Litre was kept out by the politicking of Lavoisier, who did not want the aristocratic atmosphere defiled by a "fournisseur." Litre refused to allow himself to be upset by this lack of official recognition by the scientific establishment. Indeed, it seems that Litre never allowed himself to be upset by anything – he was a patient, phlegmatic individual, not given to argumentation. He was abstemious, hard-working, and in the best of health when he was cut down prematurely on August 5, 1778, during the cholera epidemic of that year.

In his *Études Volumétriques* Litre had chosen, for his standard volume, a measure very close to the old *flaçon royal* of Henri IV, introduced in 1595 to standardize the taxation of wine. However, he recognized the arbitrariness of this unit, and suggested that in any rationalized system of units, volume could be specified in terms of a standard mass of a standard liquid. He suggested mercury. But Litre's dream of a rationalized system of units did not start to materialize until 15 years after his death, when the mathematician Lagrange (1736-1813) was appointed to head a commission to draw up such a system. And in 1795 the metric system was born.

Litre's method of specifying volume was adopted, although the commission decided to use distilled water rather than mercury as the standard liquid. The chemist Antoine de Fourcroy (1755-1809), who had studied instrument-making in Litre's factory before his great work on nomenclature with Lavoisier, was apparently the first to suggest that Litre's name be used for the unit of volume.

(*continued*)

ACCURACY OF INFORMATION: Claude Émile Jean-Baptiste Litre (continued)

(Editors' note: Ken Woolner tells us that the details of Litre's life are very hard to establish, and most of this account was inferred from the general literature of the period. Apparently Litre did not keep a journal, the correspondence with Celsius has been lost, and of course chemical glassware does not last, so there are no extant examples of Litre's skill. Perhaps our readers can help to flesh out this sketch.)

Chemical & Engineering News, January 14, 1980, page 64

Chance reader rounds out life of Claude Litre

K.M. Reese

A recent issue of the *International Newsletter on Chemical Education*, published by the International Union of Pure and Applied Chemistry, carried a brief biography of Claude Émile Jean-Baptiste Litre (1716-78), the chap the liter was named after. Author K. A. Woolner of the University of Waterloo, in Ontario, Canada, remarked that the details of Litre's life were hard to come by and that 15 years of it (1736-51) were "shrouded in mystery."

Martin Paul of Merrick, N.Y., saw the newsletter and wrote to its editor, D.J Waddington of the University of York, in England, that he was in a position to fill the gap. He did so, and a copy of his letter has been obtained from William Spindel at the National Academy of Sciences.

Litre, according to Paul, went to Sandwich, on Cape Cod, in 1736 to serve as consultant to an infant glass works. While there he met Josiah Barrel, a local cranberry magnate, who was struggling to design a vessel for measuring his produce. The common measure of dry capacity at the time was the bushel basket, but the cranberries kept falling between the slats. Anyway, Litre and Barrel put their heads together and created the cranberry barrel.

Eventually, Litre married Barrel's only daughter. The couple had a daughter, born in Sandwich and named Millicent. The milliliter, says Paul, almost certainly was named after her.

Later Litre made a fortune manufacturing chemical apparatus in France, according to Woolner. During the 1760s and early 1770s he enjoyed virtually a monopoly in the field. His graduated cylinders and burettes in particular were coveted all over Europe.

Litre's passion was the accurate measurement of volume. His masterwork, *Études Volumétriques*, was published in 1763. He was never admitted to the Académie des Sciences, owing, it is said, to politicking in high places. However, in 1765 he was given a gold medal struck in his honor by England's Royal Society. In return, Litre gave the society a set of his graduated cylinders. Sadly, the cylinders did not survive the experiments of Sir Humphry Davy, who made nitrogen trichloride in them in 1812.

CHEM 13 News, September, 1988, Number 178, pages 45-46

THE LITRE STORY

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Claude Émile Jean-Baptiste Litre was born during a crippling blizzard, in a hotel room in Ottawa, in December of 1977. Reg Friesen and I were there on an expedition to visit a few high schools, hoping to find out why their students seemed to perform much better than the average on UW's prize exams, the CHEM 13 NEWS Exam and the SIN Test. Not that we found out anything of the sort, of course, but we were well received, and enjoyed our visits immensely, especially at the school where we had the salutary experience of taking over the morning classes of teachers who were snowed in at home!

The idea for Litre came from Reg, who told me that a group of U.S. chemists (I believe) had proposed that the common abbreviation for the unit of volume should be changed to "L", on the grounds that the "l" then in use was confusing for both readers and typists. But the rules of nomenclature of the Conférence Générale des Poids et Mesures require that upper-case letters be reserved for units which are named for individual scientists, and since no such person existed for "L", it seemed reasonable that one should be invented. Reg sugges- ted that I should write a "biography" for the April issue of CHEM 13 NEWS, and over the course of an evening (which included, I think I recall, most of a bottle of scotch) we generated much of the substance of an 18th century life, full of drama, revolution and romance.

When I actually sat down to write the article (a month or so later, after quite a few reminders from Reg), I realized that drama, revolution and romance were all very good, but the joke would be better if the article came across as a piece of sober historical research. The idea was to give a straightforward account with correct dates and accurate historical details, but with one person added to the great stream of history. So that's how I wrote it, and I thought it came out very well. Given the possibility that some readers might miss the joke simply by not recognizing the significance of the fact that the article appeared in the April issue of the magazine, I made sure that the captions to the illustrations were obviously funny, and I left a 15-year gap in Litre's life so that others could contribute to the story.

The immediate response to the article made me feel very good indeed. Several readers went along with the game, filling in some of my missing details, particularly on the life of Litre's daughter Millie. I also found that I had been "scooped" by Bruce Dodd of the Canadian Government Specifications Board, who had published a "Research Note" on Marco Guiseppe Litroni in the June 1977 issue of *Standards Engineering*. The link between Litroni and Litre was provided in 1979 by Steve Marriott of the British Standards Institution, who speculated that the name "Litre" was adopted by Litroni when he settled in France after a mafia-induced flight from his native Tuscany! The best pseudo-historical contributions came from T.J. Kukkamäki of the Helsinki Geodetic Institute, (a genuine expert on Maupertuis' expedition to Lapland), who provided detailed evidence to show that Litre had stayed on in Sweden after the rest of Maupertuis' party had returned to France in 1737. In September 1979, the article was reprinted in IUPAC's *International Newsletter on Chemical Education*. Editor D.J. Waddington received some further contributions to the Litre story, which he shared with us. It was clear that a great deal of innocent pleasure was being had by one and all. My article was a success.

There is a special corner of Hell reserved for failed humorists, and the first indication that a place was being prepared for me came as early as November 1978, when a college librarian wrote from California requesting "... any information and sources you have used in the preparation of this most interesting article." A rash of similar

(*continued overleaf*)

requests was triggered by the *International Newsletter* version of the article, which had all my words but had omitted the illustrations and their captions, which didn't fit into the newsletter's format. The Big Event which turned my "spoof" into a "literary hoax" came in January 1980, when a precis of the article appeared in *Chemistry International*, another IUPAC newsletter. This rewrite was based on the *International Newsletter* version of the article, and stripped the thing right down to the essentials of Litre's life, leaving a very good piece of reportage marred only by the fact that the writer actually took the original seriously!

Unfortunately, it was the *Chemistry International* version which seems to have been most widely read, and this was the version which, together with the editor's apology for not recognizing the hoax, made it into Robert Weber's *More Random Walks in Science*. The *Chemistry International* version got Litre on to the radio, on the Canadian Broadcasting Corporation's science magazine show, *Quirks and Quarks*. It was also the version which the editors of *The New York Times* so roundly castigated as they indignantly "put the deception to rest!"

All things considered, the creation of Litre provided me with a great deal of amusement for a number of years, and didn't do any real harm, although I did hear that he'd made it into a textbook! My only regret is that it seems that one should only ever write one fictional biography. (Even Rayburne, the only classic exponent of the genre, was never able to repeat the success of his full-length biography of Thos. Crapper.) Which is a shame, since in the course of writing the Litre piece, I thought of several individuals who really should have some sort of biographical memorial. (It's very hard to stop, once you've started!) As my own personal contribution to this special issue of CHEM 13 NEWS and its readers, I offer the following capsule sketches, upon which you might like to expand.

Rodrigues d'Ombreija – Sixteenth-century Portuguese navigator who brought the parasol from China.

Thomas Flange – Foreman in Stephenson's factory, whose invenion made it possible for us to have railways rather than grooveways.

Sir Horace Rajendra Bungaloo – Knighted by Queen Victoria for his contributions to domestic architecture.

Bratislav Parseč – Turn-of-the-century director of the Prague Observatory.

REQUIESCAT IN PACE

The man who lies here, deceased,
Was trained as a Catholic priest.
With help from St. Peter
He invented the litre,
That infamous Claude Jean-Baptiste.

(Found engraved on a tombstone in a Waterloo cemetery by Gerry Toogood of UW's Chemistry Department. Apparently, Litre's body was among those sent overseas for burial when the 1778 cholera epidemic produced more victims than French cemeteries could handle. Note the new evidence that Litre studied theology, possibly during the "15-year gap" from 1736 to 1751)

EM8901: Winnipeg Free Press, February 28, 1989, page 1

Phoney Litre evaporates

Canadian professors created metric father over scotch

The Canadian Press

KITCHENER, Ont. – He was a giant of science who left shoes that were impossible to fill.

His name was Claude Emile Jean-Baptiste Litre (1716-1778), French maker of wine bottles and father of the metric litre, revealed to the modern world in a 1978 edition of a University of Waterloo magazine.

But he left a trail that led modern scientists nowhere because he was a phantom, a joke. He never existed.

Yet this fantasy child of two university professors, conceived over glasses of scotch, fooled scientific journals, the *New York Times* and the CBC.

"It was fun just to sit back and watch as the thing developed," recalls Ken Woolner, now an associate physics professor, who created Litre with Reg Friesen, assistant dean of science.

It began when Friesen heard the 16th General Conference on Weights and Measures was considering changing the abbreviation of litre from l to L.

'It seemed reasonable'

Since capital letters are used for units named after individuals, "it seemed reasonable that one should be invented," Woolner said.

So Jean-Baptiste Litre was born with an article in the April 1978 edition of *Chem 13 News*.

The report was called a "masterly account" with "an abundance of corroborative detail" by one Australian journal.

But most scientists got the joke. Some joined the fun, creating a daughter for Litre, named Millie, said Woolner.

The prank unravelled when a summary of the article made its way into a newsletter of the International Union of Pure and Applied Chemistry, prompting mixed reactions.

"It is assumed that communications from established scientists are sincere," said the miffed editor of *More Random Walks in Science*, an anthology published by The Institute of Physics in Bristol and London.

A local high school teacher recently wrote to *Chem 13 News* complaining that until he read Woolner's explanation, he had been teaching his students about Litre.

Chemical & Engineering News, May 8, 1995, page 63

More on metres

SIR: As an active proponent of the metric system since 1940, I welcome the letter of James G. Van Oot (Going metric – properly, C&EN, Feb. 6, page 36). May I add a few points and clarify some others?

.....

Litre is the only correct spelling because it is named after the father of volume, Claude Litre. Such was his passion for the accurate measurement of volume that he named his daughter Millicent (C&EN, Jan. 14, 1980, page 64).

Kenneth A. Hooton
Sierra Vista, Ariz.