INTRODUCTORY COURSE

LESSON 2: Why We Study Medical Chemistry

ITS IMPORTANCE IN MEDICAL EDUCATION

By Prof. [Dr. of Med.] Charles McWilliams, © 2010
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All of us as medical doctors endured one or more semesters of college chemistry, inorganic and organic. We memorized formulas and tables, and if lucky, obtained a little laboratory experience. However, that generally does not translate into skills you could take to the field, and be able to procure medicines, laboratory reagents and wares, etc., out of grocery and hardware stores in times of crisis or emergency. One also would not have a general idea as to how raw, inorganic reagents are obtained, manufactured or produced, like muriatic acid (pool acid), chlorox, caustic soda (lye), etc. Or why ordinary, over-the-counter medicines got their names like Epsom or Glauber salts. And certainly one did not obtain any skill or knowledge of how to produce homeopathic medicines from scratch, whether by trituration or succussion. And one probably would not have a first hand understanding of how 6x translates into 1 ppm, and whether that amount would be a toxin or medicine, as in the case of thermometer mercury, chloroforum, or acidum nitricum. In other words, what was learnt was not genuine, useful chemistry, rather some odd form of *dumb-downed* chemistry, to ensure we become sacred customers of industry.

Our understanding of chemistry must start with history, for a man without knowledge of it, is a man without substance. Little known to so few is the importance electricity contributed to chemistry and a revolution that would change society forever. One man that was contributory in so many ways was Sir Humphry Davy, a British chemist and inventor. He finished his education under the Rev. Dr. Cardew. He is probably best remembered for his discoveries of several alkali earth elements like calcium and potassium, but also of chlorine and iodine.

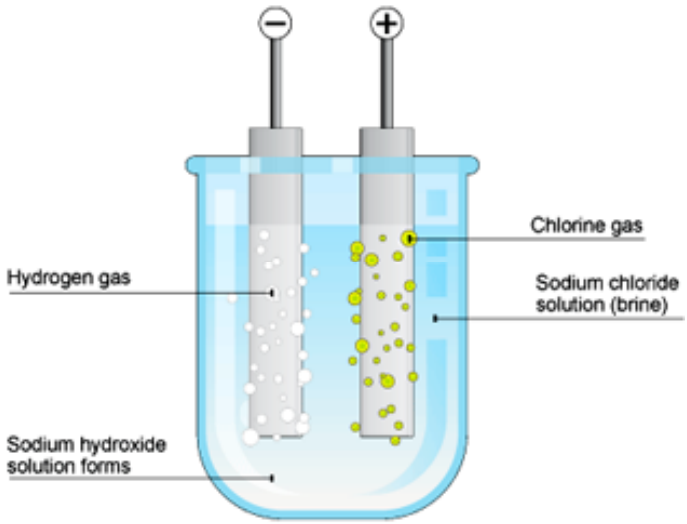
Long before Jimi Hendrix popularized *purple haze,* a man named Courtois added too much sulfuric acid to seaweed and a cloud of purple vapor rose. Courtois noted that the vapor crystallized on cold surfaces making dark crystals. Courtois suspected that this was a new element but lacked the funds to pursue his observations. However he gave samples to his friends. Louis Ampère (founder of the electrical *amp*) had given some of his sample to Humphry Davy. Davy did some experiments on the substance and noted its similarity to chlorine. Davy sent a letter dated December 10 to the Royal Society of London stating that he had identified a new element. Later it would be found in high concentrations in the thyroid gland, and further its essential ability to end apoptosis and prevent cancer. [And that is why Japanese women generally have lower breast cancer rates than those on the *western dietary,* they eat lots of seaweed!]

Davy was fascinated by the medical powers of airs and gases, making revolutionary discoveries. In 1812 Davy was knighted by the Queen. Davy's laboratory assistant, Michael Faraday, went on to enhance Davy's work and in the end he became a famous and influential scientist in electromagnetism.

Faraday gave us *faradic current,* an alternating and interrupted current capable of producing a mechanical reaction on muscles without a chemical effect. It facilitates muscle contraction when inhibited by pain also inhibits pain on the area treated, and is also useful in muscle re-education with some forms of paralysis. [Faraday caused a revolution in physiotherapy and natural healing. Rev. John Wesley, founder of the Methodist Church in the eighteenth century, was actually an early naturopath, and advocated the practice of electrotherapy and wholistic medicine.]

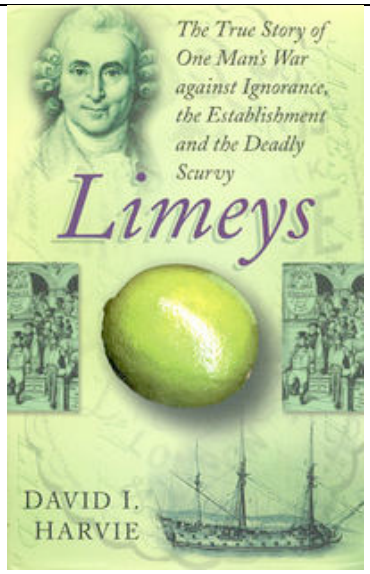
Davy was a pioneer in the all important field of electrolysis, using the newly invented chemical battery to split up common compounds and thus prepare many new elements not previously known. He went on to electrolyze molten salts and discovered several new metals, especially sodium and potassium, highly reactive elements known as the alkali metals. Potassium was discovered in 1807 by Davy, who derived it from caustic potash, also known as lye, leached from hardwood ashes. Before the 18th century, no distinction was made between potassium

and sodium, what we know now as the *eternal dual,* between the cell and lymph, between acidosis and health. Potassium was the first metal that was isolated by electrolysis and in the same year by passing an electric current through molten sodium hydroxide he isolated sodium. Davy went on to discover calcium in 1808 by electrolyzing a mixture of lime and mercuric oxide. He worked with electrolysis throughout his life and also discovered magnesium, boron, chlorine, iodine, and barium. Thus, Davy changed not only medicine and chemistry, but contributed significantly to developments in homeopathy, pharmacy and nutrition.

The process by which a compound breaks down when electricity is passed through it is called electrolysis. The electrolysis of molten sodium chloride produces sodium and chlorine. This rock salt is a useful raw material. It can be dissolved in water to make a very concentrated sodium chloride solution (brine), which then decomposes to form three useful products - a new solution and two gases - when electricity is passed through it. These products are: •hydrogen - useful as a fuel and in the manufacture of fertilizers and margarine •chlorine - useful for sterilizing drinking water and for making plastics such as PVC •sodium hydroxide - 'caustic soda' – useful for making household cleaners and soap	

Calcium, of course, had been known from the earliest times and lime-burning was carried out by the Romans. Of course it was not called *calcium,* that was coined in 1808 by Davy himself, from Latin *calx* or "limestone." The Romans used lime for building, indeed they were the innovators of lime and natural cement mortars. It was used throughout the medieval period making castles, buildings and fortresses. [It was Jimi Hendrix who popularized *castles made of sand*]. It was during the 16th Century that lime made its use as a general soil enhancer, and the liming of fields became common practise. But let's not confuse those British *limey's.* Sailors in the 1700s and before used to die of *scurvy* because they didn't know to take foods with them that were high in vitamin C. Eventually British sailors under naval surgeon Dr. Lind hit on taking lemons, and cases of scurvy went way down. Later they switched to limes because they

were cheaper, which was too bad because limes have less vitamin C than lemons. Sailors had to eat lots of limes, so they became known as *limeys*, since they so often put it in their afternoon rum drinks. Of course, eventually vitamin C was identified by Albert Szent-Györgyi, and given the scientific name "ascorbic acid". "A-scorbic" means "against scurvy". That too, would change nutritional practice forever.



Do we need another book on scurvy and its cure?

Much has been written of its effect on eighteenth century seamen. There are numbers of articles and books on the slow process of discovering its cause and cure. Not until 1919 was the mysterious element which Lind and later Blane and Trotter *felt* was present in citrus juices but could never identify, was discovered and named as vitamin C. It is as satisfying, in its way, as the solution to any murder mystery. It is sobering to to see the same problems and responses, the same competing views, so strongly urged, on causes and cures in the ninettenth century as in the eighteenth. Nor is the debate entirely over. In 2000 the National Scurvy Institute, in America, regarded vitamin C as an unproven cure for scurvy and some have claimed a scurvy gene exists. All this makes fascinating reading.

Now let's get practical on calcium. Chalk, limestone and marble are different crystalline forms of calcium carbonate which occur in mountain ranges and in oyster shells (Hahnemann's *calcarea carbonica*) and coral (calcium). Coral Calcium, today's market hype, is a salt of calcium derived from fossilized coral reefs. It is composed primarily of calcium carbonate (CaCO3), but with small amounts of magnesium and other important trace minerals. To absorb dietary calcium, the stomach must produce of course adequate hydrochloric acid, the only normal mineral acid in the body. Failing that form of calcium, one could add a small portion of calcium hydroxide (home depot cement) to distilled water and prepare *limewater*. Anybody can make it, by putting pure, clean, unslaked lime in pure water. Take a large bottle, and funnel into it enough lime to fill about one-fourth of its depth. Pour in water enough to fill it full, then cork and shake it. On standing, the clear lime-water will be ready for use. If all the lime is dissolved by its saturation; that is, contains as much as it will dissolve. Lime-water is often added with great advantage "to milk for babies, when they have sour stomach or diarrhea, as it is antacid and somewhat astringent." A tablespoonful may be put in a half pint of the child's food, so long as such an occasion exists. No harm will be done if

it should be taken in that way for days, or even weeks. Don't worry, it won't dry into cement, but it will act as an anti-diarrheal, as do all the calcium salts (magnesium of course is the opposite).


Johann Gottfried Rademacher

Now, in homeopathic parlance, *Aqua calcar*ea -- Lime-water-- (1/2 teaspoonful in milk) can also be used as a rectal injection for oxyuris vermicularis (pinworms). But let's not forget *Calcium chloratum* - Rademacher's Liquor--(1 part to 2 of distilled water, of which take 15 drops in half a cup of water, five times daily. Good for boils and *Porrigo capitis*, as well as *Vomiting of all food and drink*, with gastric pain. Also of import in impetigo, glandular swellings, and angioneurotic edema. *Rademacher's solution*, five-drop doses three times a day in water, is also *for those who are compelled to work, on an insufficient amount of sleep*. [If you get all that, calcium deficiency has diverse implications, and calcium chloride assists the chloride efficiency of digesting it!]

Of course, as a pre-digestive aid, and antacid, a chunk of coral calcium, egg shells or oyster shell, can be dropped into a bottle of vinegar to solubilize it, and now one has an excellent salad tonic. Again, cork and shake it. And the body has to obtain adequate vitamin D from sunshine, by its photon action on dermal cholesterol (synthesis is from 7- dehydrocholesterol), and thus small bowel uptake is complete.

So there you go, medicine from the field for sour stomachs, diarrhea, pinworms and calcium deficiencies. An understanding of field chemistry, acid, antacid, acidosis, alkalosis. A scoop of bagged cement and bottled water. Now you're fit for missionary service in the antacid arena. Now you understand calcium, make no bones about it!