

# Classics of Science: Composition of The Atmosphere



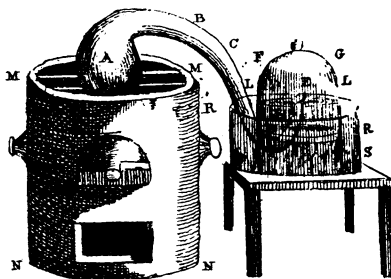
LAVOISIER as he appears in the procession of great scientists that adorns the face of the building of the National Academy of Science in Washington.

LAVOISIER: *ELEMENTS OF CHEMISTRY*. Translated from the French by Robert Kerr, 1790.

*ANALYSIS AND SYNTHESIS OF RED OXIDE OF MERCURY. SEPARATION OF OXYGEN FROM AIR, AND ITS RECOVERY.*

You can, if you wish, repeat Lavoisier's experiment on the constitution of air with apparatus found in any school laboratory. For his matras use a flask connected with glass tubing. The second part of this experiment is found in most elementary chemistry textbooks.

I took a matras of about 36 cubical inches capacity, having a long neck BCDE, of six or seven lines internal diameter, and having bent the neck so as to allow of its being placed in the furnace MMNN, in such a manner that the extremity of its neck E might be inserted under a bell-glass FG, placed in a trough of quicksilver RRSS; I introduced four ounces of pure mercury into the matras, and, by means of a syphon, exhausted the air in the receiver FG, so as to raise the quicksilver to LL, and I carefully marked the height at which it stood by pasting on a slip of paper. Having accurately noted the height of the thermometer and barometer, I lighted a fire in the furnace MMNN, which I kept up almost continually during twelve days, so as to keep the quicksilver always almost at



An engraving made by Mme. Lavoisier to illustrate the experiment reprinted below.

its boiling point. Nothing remarkable took place during the first day: The Mercury, though not boiling, was continually evaporating, and covered the interior surface of the vessels with small drops, at first very minute, which gradually augmenting to a sufficient size, fell back into the mass at the bottom of the vessel. On the second day, small red particles began to appear on the surface of the mercury which, during the four or five following days, gradually increased in size and number; after which they ceased to increase in either respect. At the end of twelve days, feeling that the calcination of the mercury did not at all increase, I extinguished the fire, and allowed the vessels to cool. The bulk of air in the body and neck of the matras, and in the bell-glass, reduced to a medium of 28 inches of the barometer and 10° Reaumur (54.5° Fahrenheit) of the thermometer, at the commencement of the experiment was about 50 cubical inches. At the end of the experiment the remaining air, reduced to the same medium pressure and temperature, was only between 42 and 43 cubical inches; consequently, it had lost about 1/6 of its bulk. Afterwards, having collected all the red particles, formed during the experiment, from the running mercury in which they floated, I found these to amount to 45 grains.

I was obliged to repeat this experiment several times, as it is difficult in one experiment both to preserve the whole air upon which we operate and to collect the whole of the red particles, or calx of mercury, which is formed during the calcination. It will often happen in the sequel, that I shall, in this manner give, in one detail the results of two or three experiments of the same nature.

(Just turn the page)

## Starvation for Epilepsy

Will a starvation diet cure epilepsy, one of man's most ancient diseases?

Acting upon the observation that epileptics deprived of food had fewer "fits," a group of specialists in children's diseases, Drs. F. B. Talbot, K. M. Metcalf, and Margaret E. Moriarty of the Massachusetts General Hospital set out to analyze the condition of starvation that brought about the favorable reaction. This done they proceeded to work out a diet that would reproduce these conditions and yet provide nourishment so their patients would not die from starving.

Their results have been so successful that they feel justified in making the statement that this method of treatment gives the greatest promise of improvement of any yet devised for the treatment of epilepsy in childhood.

The condition brought about by starving that seems to be unfavorable for epileptic seizures is known as ketosis and can be produced by feeding a diet high in fat but low in carbohydrate and protein. The investigators found that among other changes resulting from fasting were an increase in the amount of uric acid in the blood, a lowering in the amount of sugar, and a more pronounced acid reaction of the blood. The epileptic children treated with diets that produced changes like these showed marked decrease in the number of attacks.

Dr. M. G. Peterman, of Milwaukee, Wisconsin, has been following out practically the same program in treating epileptic children and has just reported to the American Medical Association his results with fourteen cases of several years' standing. These children have completed their diet treatment and are now on normal food and have been free from the attacks from six months to three years since they have resumed eating regular food like the rest of the family.

Science News-Letter, September 24, 1927

### PHYSIOLOGY

## Diagnosis Revised

Quotation from "Brighter Biochemistry" published by the Biochemical Laboratory, Cambridge University.

Jack Sprat could eat no fat,  
His wife could eat no lean.  
Rickets and scurvy were their fates,  
From lack of vitamin.

Science News-Letter, September 24, 1927