



which found its use in embroidery, lace, passementerie, and epaulets on soldiers' uniforms.

All the aluminum had been produced up to this time by Deville's method, which was slow and expensive. The real birth of aluminum as a metal of common use dates from the year 1886, when Mr. Chas. M. Hall, of Oberlin, Ohio, applied for a patent on a process for producing aluminum by the electrolysis of aluminum oxide in a fused bath of aluminum fluoride. A company was formed, under the name of the "Pittsburgh Reduction Company," and put a plant in operation at New Kensington, Pa., in 1889. By this process, which is essentially the one used today, aluminum could be produced in quantity, and fairly cheaply. Its uses soon began to multiply, as its properties became more generally known. Military leaders all over the world began to experiment with it as a means of lightening their field equipment. Because it was not easily corroded, it was used to cover the hulls of sea-going ships. Several small vessels were made entirely of aluminum. The yacht Defender, which defended the American cup against the English yacht Valkyrie III., had a hull of aluminum bronze, and upper frames and deck beams of aluminum alloy.

The statistical record of aluminum, especially for its early life, is very interesting, and shows clearly the value of chemical research. Each drop in price from 1856 to 1894 is due to some inven-

tion or improvement in the process of manufacture.

Year	Price per lb.	Output in lbs.
1856	\$90.90	50
1859	17.27	1,440
1886	12.00	4,800
1887	8.00	7,000
1889	2.00	29,686
1894	.35	240,000
1913	.30	136,000,000

At present, aluminum is produced in vast quantities, its production and manufacture giving employment to thousands of men. Its properties of lightness and durability are commonly known and appreciated. Besides this, aluminum can be rolled easily in sheet, drawn into wire, stamped, spun, welded, and soldered. A large number of aluminum alloys are now being made, which retain the best qualities of aluminum and add the best qualities of other metals. The most famous of these is "duralumin," which is used in making large castings. Much aluminum is also used as an electric conductor for power lines, as weight for weight aluminum is twice as good an electrical conductor as copper, and has the added advantage of having more radiating area for the same weight.

In recent years, the use of aluminum in the automobile business has increased rapidly, being used for crank cases, bodies, fans, and other smaller parts. There are a few makes of cars in which the percentage of aluminum to other metals is very high.

Aluminum pipes are used in many chemical plants, to carry corrosive liquids and gases, especially nitrogen gases. Aluminum is used in making many scientific instruments. Important among these are the balance and weight galvanometer cases, and sextants.

Aluminum has been repeatedly proposed for use in coinage.

Aluminum is used extensively in deoxidizing steel.

Everyone has used aluminum in the kitchen. Every country store has a large assortment of shapes and sizes to choose from. The manufacture of these utensils absorbs a large tonnage of aluminum each year. This popularity, however, is based on several very good reasons rather than on clever advertising.

First—Aluminum is non-poisonous.

Second—It is easily cleaned. It is very seldom anything sticks to aluminum, and if it should happen to a good soaking removes it entirely.

Third—Aluminum is not corroded. None of the acids found in food have any perceptible corrosive action on it.

Fourth—Aluminum utensils do not scorch. This is due to the high heat conductivity of aluminum, which prevents a high local heat.

Fifth—Because of the high heat conductivity, aluminum utensils cook quickly.

Sixth—They are light—about one-third as heavy as others.