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PICTORIAL COLOR AND MAGAZINE SECTION

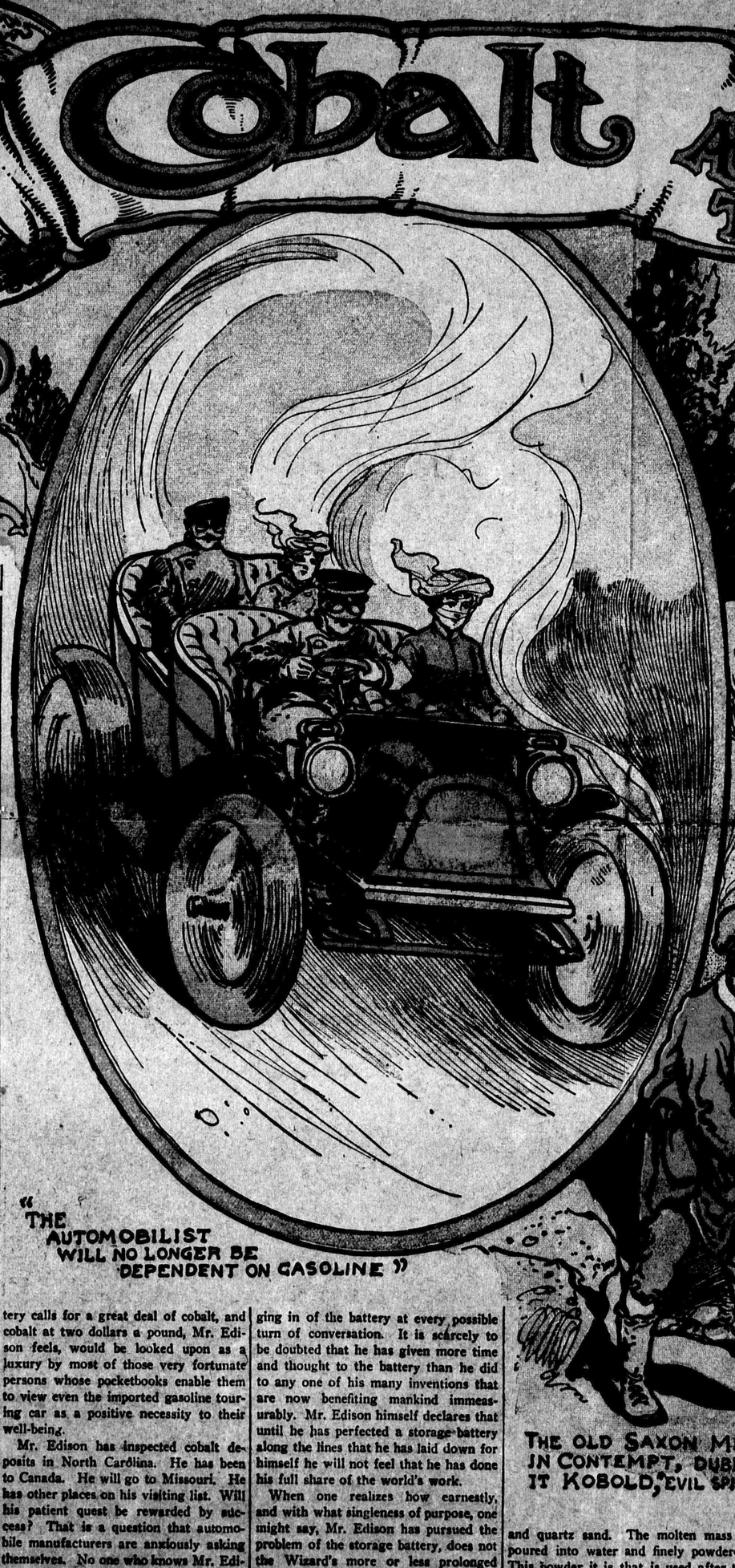
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Cobalt

An Evil Spirit Harnessed To Work For Mankind



"THE AUTOMOBILIST WILL NO LONGER BE DEPENDENT ON GASOLINE"



THE OLD SAXON MINERS IN CONTEMPT, DUBBED IT KOBOLD, "EVIL SPIRIT"

Is the evil spirit of the old Saxon miners destined soon to revolutionize the automobile industry?

Back in the middle ages, when the now famous mines of Schneeberg were opened, the Saxon miners were not long in discovering that the silver was nearly always associated with a strange mineral and that it frequently replaced the precious ore altogether. Specimens of this mineral were turned over to the wise men of the kingdom. One and all pronounced it useless. Thereafter, as they mined, and their eyes fell on the constant companion of the silver they were industriously after, the miners, in contempt, dubbed it kobold. That is to say, "evil spirit"; for, like an evil spirit, they said, it was present only to give them trouble.

Kobold, we of to-day still call this metal, which is one of the elements, though the spelling is now cobalt. It was not until the middle of the sixteenth century, many generations after the namers of the metal had been gathered to their fathers, that even slight use for it was discovered. Up to to-day its uses have been limited when compared with other elements; it is still the gnome of old in large measure. But, will this hold good of it in the near future?

"For a number of years I have been working on my electric storage battery, as you probably know," said Thomas A. Edison, in substance, recently. "It has been my aim to build a battery that will take an automobile a hundred miles without having to be recharged. The problem was baffling until I introduced cobalt into the battery cells. Now I believe that I have the battery all right, and the only problem remaining to be solved in order to make the battery practicable is for me to find a way to get cobalt in sufficient quantity and cheaply."

How does Mr. Edison employ cobalt in his battery? He smilingly keeps the secret to himself. But, he says, if only he can solve the one problem now confronting him—that of cheap supply—the use of his battery will cut down the present weight of the automobile by half. This of itself will greatly reduce the price of the machine, thus tending to make it a necessity instead of the luxury that it now is. It will also increase the speed possibilities. Last, but not least, the automobilist will no longer be dependent on gasoline, the favorite motive power to-day, or steam. Both are objectionable for obvious reasons. Against electricity none of these objections can be raised; it is a noiseless, odorless "fuel."

Thus, Mr. Edison's battery, if the hopes of its inventor in finding cobalt are realized, will bring about a revolution in the electrical world as great as that which took place in the world of water when Robert Fulton demonstrated how a boat could steam her way from port to port even better than she could make the same trip by sail.

Mr. Edison is now traveling about the country, endeavoring to locate cobalt ore of sufficient quantity and purity to warrant it to the point where his battery will be practicable. Cobalt now sells for two dollars a quarter pound. Some days ago it was worth twenty-five cents more. A quarter of a pound of cobalt has about as much bulk as the same amount of iron. Mr. Edison's battery calls for a great deal of cobalt, and cobalt at two dollars a pound, Mr. Edison feels, would be looked upon as a luxury by most of those very fortunate persons whose pocketbooks enable them to view even the imported gasoline touring car as a positive necessity to their well-being.

Mr. Edison has inspected cobalt deposits in North Carolina. He has been to Canada. He will go to Missouri. He has other places on his visiting list. Will his patient quest be rewarded by success? That is a question that automobile manufacturers are anxiously asking themselves. No one who knows Mr. Edison doubts that he has got pretty nearly what he says he has in his storage battery. Mr. Edison has never been of that type of man who announces that he has something which time sooner or later proves that he has not.

To invent and perfect an electrical storage battery for widespread commercial use has been the dream, the ambition, of Mr. Edison for years. Nay, it has been his hobby, to the practical exclusion of all other scientific investigation. He has worked day and night over the problem; he has frequently thought he stood on the threshold of success, only to be disappointed the next day, or week.

In all these years that he has been struggling with the problem interviewers have had a hard time to get him to talk on any subject other than his storage battery. His fellow scientists have perhaps also grown heartily sick of his hobby, for he has talked of it to them at every possible turn of conversation. It is scarcely to be doubted that he has given more time and thought to the battery than he did to any one of his many inventions that are now benefiting mankind immeasurably. Mr. Edison himself declares that until he has perfected a storage battery along the lines that he has laid down for himself he will not feel that he has done his full share of the world's work.

When one realizes how earnestly, and with what singleness of purpose, one might say, Mr. Edison has pursued the problem of the storage battery, does not the Wizard's more or less prolonged trips here and there over the face of the country in anxious search for the much desired "evil spirit" of the old Saxon miners savor of the intensely dramatic? miners' beds savor of the intensely dramatic?

Cobalt, this gnome, this evil spirit that holds such rosy promise for the future, has been practically unknown to the average person. Let us see what it is and what it does.

It is the principal ingredient of a coloring matter known as smalt, which is employed by laundresses to correct the yellow color of newly washed linen, and by paper manufacturers as a blue pigment for staining writing papers and coloring wall paper. Smalt is the only substance that will give a lasting blue to paper, and, until an artificial ultramarine was introduced, it was used exclusively for this purpose. Smalt is obtained by fusing cobalt ore with potash and quartz sand. The molten mass is poured into water and finely powdered. This powder it is that is used after the fashion of indigo and to stain the dainty blue note-paper that is a favorite now-a-days for carrying tender messages around the world.

Cobalt, when compounded with oxygen, also gives a blue color, and oxide of cobalt is used exclusively to color glass, porcelain and pottery. The coloring properties of cobalt blue, essentially the oxide of cobalt, is so great that the addition of one-thousandth part of cobalt blue to white glass is sufficient to make the glass a decided blue.

Cobalt blue, as a pigment, is used by painters and water color workers; they could not get many effects without it. Old Sevres blue, a very famous porcelain blue, King's blue, Thenard's blue, variegated blue, turquoise blue, deep blue, employed in porcelain coloring, all more or less widely known blues, have gained for their uses. And then there is that used for the groundwork of the old-fashioned blue and gold sign boards; the presence of oxide of cobalt as a base makes it blue.

So remarkably does cobalt possess the power of "making things blue," to use a common expression, that even the faintest trace of it will render iron slag distinctly blue. It could almost be said, in all truth, that cobalt, in compound, blues the world.

Had it not been for cobalt the writers of the old fashioned adventure novels would have been deprived of one of their stock and always thrilling incidents—the invisible letter, written between the lines of the visible letter, and always reaching the heroine in the nick of time and keeping her from dying of anguish or hope long delayed.

A chloride of cobalt, when dissolved in [illegible] makes a sympathetic ink. A faint pink in color when in dilute solution, the color is not discoverable when used on paper. Only when the piece of paper is heated before a fire, thus causing the chloride to lose the water, does the writing stand out blue, thus enabling it to be read with ease. The writing can be made invisible again by putting the paper in a damp place or by holding it over a steaming kettle, a la the heroines of long ago.

According to "Watt's Dictionary of Chemistry," these are the properties of cobalt: "Steel gray, lustrous, crystalline plates; nearly white when polished; hard; somewhat malleable; very ductile at red heat and upwards; slightly magnetic, even at full red heat. The compact metal does not oxidize in air at ordinary temperatures."

Chemically, cobalt is classed with iron, nickel and manganese in the iron group. In many respects it closely resembles both iron and nickel, the latter more than iron. It is found associated with silver, nickel, iron, manganese and bismuth. It is difficult to separate cobalt from its associates, especially nickel. It is seldom mined for itself alone; it is more profitable to secure it as a by-product. But the day may not be far distant when cobalt will be mined for itself alone. In its greatest quantity cobalt is now produced as an accessory of nickel.

There is evidence to show that the use of cobalt in coloring glass is one of the rediscovered secrets of the ancients. Modern Europe did not know of this property of cobalt oxide until 1540; before that time the metal was supposed to be worthless, in compound, as it is now of itself—except in Mr. Edison's battery, of course. Blue pottery and glass recovered from ancient ruins have been found to have cobalt as a base for their color.

Not until almost two hundred years after the first commercial use of this gnome metal was discovered by Scheurer did Brandt recognize it as one of the elements. Now, nearly two and three-quarter centuries after Brandt, it would seem that the element itself is to be proved commercially useful and cause a startling revolution in transportation, if only it can be produced in sufficient quantity and purity to make it cheap. Unless it can be found in a comparatively pure state the long and tedious process will render its use in Mr. Edison's factory impracticable.

The principal localities of cobalt production to-day are Schneeberg, Saxony, where the metal got its bad name; Modum, Norway; Tunaberg, Sweden; Musen, Rhenish Prussia; Bolivia; Chile; a little spot in Missouri; the Transvaal, where a pure variety of what is known as speiss cobalt, free of nickel, has recently been found; and Canada, where it is mined as an accessory of silver.

The Canada mines are the latest to be opened. The presence of the element in the Dominion was not suspected until a big cut for a new railroad through virgin forest revealed it in company with its customary bed-fellow, silver. The latter metal at once brought about an influx of miners, who were not long in making the discovery that the by-product of cobalt would be a very valuable asset to the mines. Hence, to-day quite an appreciable percentage of the world's supply of cobalt is being obtained from Ontario. Round about the combined cobalt and silver mines, which are more like diggings than mines, a town of several thousand inhabitants has sprung into existence, and it is now possible for the traveler to go from New York to Chicago without a change of Pullmans into the very heart of this region, which only a few months ago was a veritable wilderness. Many Americans are living in the town, and not a few of the mines are controlled by Yankee capitalists; it is American money that is largely responsible for the rapid development of the Canada of to-day.

The discovery of several more cobalt mines as extensive as the Canadian beds will probably bring down the price of the metal to the figure desired by Mr. Edison. And with this Wizard of Industry on the track of the metal, who knows where it will be mined next? To the end that you and I may behold [illegible] wonderful revolution in transportation and other applications of electricity?