

The Family Heritage Series

A weekly discussion of Americanist truths and traditions for those "heirs of all the ages" who will have to preserve that most important inheritance of all — freedom.
Produced by the Movement To Restore Decency.



Volume II

Lesson Eighty

Ottmar Mergenthaler

LESSON IDEA

To discuss the importance of inventors to our country, using as an example Ottmar Mergenthaler, the originator of the linotype machine.

PREPARATION:

Read a brief history of printing in an encyclopedia. Pay particular attention to Johann Gutenberg's invention of movable type to aid in understanding Mergenthaler's contribution to the printing industry.

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AS WE GO about our everyday affairs we seldom think about our surroundings. We take for granted that the school bus is going to get us safely to school and home again. In the evening, when we wish to relax, we take it for granted that our television is going to come on when we flick the switch.

Seldom, if ever, do we take time to ponder this important fact: Almost everything around us — whether a TV set, or a lamp, or a bowling ball — was once an idea in an inventor's head. Nothing in our homes "evolved" by itself. Every object had a creator — a man who once sat at his desk and used his own creative imagination to visualize what he wished to produce. He sketched a design on a scratch pad, studied what other men had done in the same field in the past, and finally constructed a working model of his invention — hoping to sell it to the public.

It is important to realize that throughout history, countless men and women have used their imagina-

tions to create new and useful products for us. And each year, new inventors improve what someone in the past originally designed. This entire process — the transforming of ideas into products and the continuous improvement of those products — is what progress is all about.

WHAT SORT OF person is an inventor — the man who uses his creative imagination to devise worthwhile products for his fellow man? If asked to characterize the typical inventor, we would say that, first of all, he is a man who believes totally in what he is doing; and secondly, he is so resolute that nothing will stop him from completing his invention once he has set his mind to it. [Ask family members if they think such determination is a beneficial character trait. Is it always good to be positive about your beliefs?]

Let's consider how determination and self-confidence worked in the life of Ottmar Mergenthaler, the inventor of the world's first automatic type-setting machine.

Ottmar's career was decided by his parents when he was still in his cradle; they *knew* he would become a teacher. After all, his father was a teacher in their tiny village of Bietigheim, Germany. And his mother also came from a family of teachers. So, of course, it was settled. This new member of the family, born on May 10, 1854, would be a teacher when he grew to manhood.

But Ottmar, even as a young boy, showed more

interest in working with his hands than with books. He was excited by the idea that with his mind and a good set of tools, he could create something useful. His whole life seemed to revolve around his love for manual labor. He would volunteer to chop firewood, till the garden, and feed the pigs – anything which allowed him to work with his hands. It was obvious he had no intention of following in his father's footsteps. At first his parents were insulted that he did not want to enter the field of education; later they realized that the choice of his lifework would have to be Ottmar's decision, not theirs.

When he finally chose, at the age of fourteen, to become a watchmaker, he was apprenticed to his Uncle Hahl for four years with his parents' blessing. Uncle Hahl, a kind old man who ran a small watch-repair shop, was so pleased with his young nephew's skills that after three years he paid Ottmar a weekly wage in addition to the room and board he was entitled to as an apprentice.

IN 1872 YOUNG Mergenthaler's apprenticeship came to an end, and he began looking for a job. But German industry had little to offer an eighteen-year-old – especially when hundreds of older men returning from service in the Franco-Prussian War were seeking employment. So Ottmar did what so many Europeans had already been doing for decades: He decided to seek a fresh career and new opportunities in America. He planned to work for August Hahl, his uncle's son, who had a thriving business in Washington, D.C., making electrical instruments and gauges for the government, as well as constructing models of inventions for inventors anxious to receive patents from the government.

The financial panic of 1873 forced Hahl to move his shop to Baltimore; and although business wasn't exactly "booming," he did manage to earn an adequate living. During this period Ottmar was content. At night he attended school to better himself; in his leisure hours he became a skilled mechanical draftsman.

Then, in 1876, something happened to Mergenthaler that was ultimately destined to affect almost every person on earth. It was a sweltering August afternoon in Baltimore – the kind of day that makes tempers short and conversations terse – when two men walked into the shop. One carried a

queer-looking device. They introduced themselves as James O. Clephane, the official stenographer at the Supreme Court in Columbia, West Virginia, and Charles T. Moore, an inventor, also from West Virginia.

Moore had invented a typesetting machine, and Clephane had agreed to provide financial backing. The problem, as Moore told Mergenthaler and Hahl, was that the machine had certain defects and his backers had threatened to withdraw their funds unless he could remedy them.

Hahl looked over the device casually and shook his head. He doubted he could do anything with it; he was an electrician, not a mechanic. Mergenthaler, on the other hand, examined it carefully. After a few minutes, he looked up at Moore and said: "There is a mistake here, but it can be put right – I think."

Moore and Clephane, encouraged by Mergenthaler's interest, left the defective machine with the young watchmaker, whose mind was already busily analyzing the mechanical problems. But after spending a year of effort on it, Ottmar had to give up. His trial-and-error tinkering had not been wasted, however; he had learned the concepts involved in developing a typesetting machine. With this new knowledge he soon formulated his own design and presented it to Clephane. Clephane liked the plan and gave Mergenthaler permission to construct a working model.

The typesetting machine he built worked this

FOR THE SERIOUS STUDENT

Why do you think the United States is the most prosperous nation in the world? Is it because we have the best farmland or an abundance of mineral deposits? Is it because we have used economic imperialism to seize the wealth of other nations at their expense? Or could it be that our nation's free enterprise system gives men the freedom to invent and create without fear and to be able to profit from their creations? Three excellent books which explain the dynamics of free enterprise are: *The Mainspring Of Human Progress* by Henry Grady Weaver, paperbound, \$.95; *Dividing The Wealth* by Howard Kershner, paperbound, \$2.25; and *Understanding The Dollar Crisis* by Percy Greaves, hardbound, \$7.00. All are available from most American Opinion Bookstores or directly from American Opinion, Belmont, Massachusetts 02178 or San Marino, California 91108.

way: A device much like a typewriter was used to press each separate letter into a *papier-mâché* strip. When one line of type had been pressed into the *papier-mâché* mold, the mold was filled with molten metal. When the metal cooled, it formed a solid bar, reproducing the raised type characters which had originally been *indentions* in the *papier-mâché*. (You can observe the same principle being applied when you pour gelatine into a mold; the deep parts of the mold become the high points of the gelatine when it solidifies.)

The idea was good, but the final product was not satisfactory. The *papier-mâché* stuck to the metal, and even when it had been pulled away – which was a time-consuming task – the final bars of type were blurry.

Mergenthaler discarded *papier-mâché* in favor of metal molds. Each one of these metal molds, called a “matrix,” contained one letter. Each was rectangular with a single character carved in an indented surface on its face.

His improved typesetting machine looked like a stand-up piano with a typewriter keyboard instead of piano keys. Stored inside the machine were hundreds of these matrices. Whenever he pressed a key, a matrix of that character would drop from its storage space into a grooved slot. When this slot was filled with matrices, forming words, he would press a lever which activated a mechanical arm that grabbed the line of matrices and positioned them in front of a hollow opening. Through this opening, molten lead was squirted into the character molds on the matrices, forming a line of type. This line cooled quickly and was dropped into a tray next to the operator.

At the same time, another mechanical arm grabbed the used matrices, lifted them up to the top of the machine and let them fall back into their proper storage spaces inside. The entire process took less than fifteen seconds for a line of type.

It is no exaggeration to say that Mergenthaler’s typesetting machine revolutionized the printing industry throughout the world. We can appreciate the significance of the invention when we realize that for over 300 years – ever since Johann Gutenberg invented “movable type” in 1454 – printers had set type by hand, letter by letter, in a slow and tedious process. This page, for example, if set by hand, might take hours. But Mergenthaler’s machine could set it in a matter of minutes.



Ottmar Mergenthaler
demonstrates his linotype machine

ALTHOUGH MERGENTHALER had become a full partner with Hahl in 1881, he resigned two years later to spend all his time working on his typesetting machine. With financial backing from Clephane and others, he and his associates formed the Mergenthaler Printing Company to market his machine. Interest among newspaper editors was so intense that several influential editors, from Chicago, Louisville, Washington, and New York, paid \$300,000 for a controlling interest in the firm.

Whitelaw Reid, editor of the *New York Tribune*, became president and general manager of the company. It was in his pressroom that Mergenthaler’s machine was first used. During the ceremony showing newsmen how the machine worked, a reporter asked Reid what he planned to call it. Reid replied that it would be called a “linotype” because it set one line of type at a time. From that day to this Mergenthaler’s machine has been known as the linotype.

At first Mergenthaler was content with the new management of his firm – Reid and his associates – but in 1888 disagreements developed over production policies, and Mergenthaler found himself in an unusual position: He was forced to resign from the company he had founded and which bore his name!

Once Reid had ousted Mergenthaler, he moved the entire plant from Baltimore to Brooklyn, New York. Reid was so high-handed that he even took the young inventor's personal tools.

Ottmar was thoroughly disillusioned. He had been forced out of the company he had founded; his tools had been confiscated; and for financial reasons he had to sell some of his stock in the company to scrape together enough money to set up a new machine shop. Many men might have given up in disgust, but not the inventor of the linotype. *[Discuss with your family the effects of discouragement. Point out the importance of perseverance and determination.]*

At a new business site Ottmar turned his full attention to the perfecting of his invention. In 1890 he marketed an improved model and was flooded with orders. His old friends – Clephane and others – showed their faith in him by helping him to organize his new business on a sound financial basis in 1891. The new company was known as the Mergenthaler Linotype Company.

Throughout this period, Mergenthaler worked from dawn to dusk, seven days a week, to fulfill production demands and to improve his machine. Under this hectic schedule his health began to fail, and he developed tuberculosis. For five years he fought the disease; he used every available medication and spent time in Arizona and New Mexico, in the hope that the dry air would stabilize his condition. But it was to no avail. Ottmar Mergenthaler died in 1898 at the age of forty-five.

The inventor was gone, but his invention lived on. When his linotype was first introduced in print shops, old-timers had rebelled against it, fearing it would put them out of work. But their worries were a mixture of shortsightedness and misunderstanding of the dynamics of the free enterprise system. The linotype did not put them out of work – it *increased* the demand for printers and printing throughout the world, by making possible the mass production of books and the daily newspaper. It ended forever the need for men to spend hours

standing in front of a huge box filled with separate pieces of type, hand-setting each page. It created new jobs and the need for new skills.

Looking Ahead

Before we go any further in lessons about inventions and discoveries in the 1800's, let's take time to discuss some of the basic principles of the free enterprise system. Unfortunately, little attention is paid to these fundamental principles in most of our schools today, and few Americans bother to study them on their own.

Yet an understanding of free enterprise and the profit motive – how they work, why they work, and what they mean – is crucial to understanding the success and prosperity of America. Socialists and Communists can tell you many things about the free enterprise system they don't like; but they can't explain why no other system in all of history has worked as well. Next week we'll investigate this proven and successful system for ourselves.

DURING THE WEEK

During the dinner hour, discuss what motivates men to invent things. Will men always desire to create new goods and services, or is it possible that this desire can be stifled? How do you think initiative can be destroyed in individuals? Will government controls and welfare handouts encourage or discourage such creative initiatives?

The Family Heritage Series

Editor: Wallis W. Wood

Staff Writers

Sally Humphries and Frank York

For parents who wish to teach their children the true meaning of liberty, responsibility, and our Americanist heritage.

The Family Heritage Series is an outstanding series of weekly lessons for the home, written to stimulate interest and spark discussion about the legacy we have received.

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