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THE HISTORICAL SOCIETY OF CHARLES COUNTY - 1961 - WHAT IS PAST IS PROLOGUE

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Introduction

This article is about a very talented man who was born in Charles County and is buried in Charles County. His ability with engines was internationally acclaimed.

The information in this article was gathered from several sources and it was put together by the son of Arthur R. Middleton, Mr. Edward L. Middleton, P.E.

ARTHUR R. MIDDLETON

Arthur Raphael Middleton, fifth child and third son of William Jordan and Mary Ellen Dyer Middleton, was born September 20, 1862, at "Jordan" or "Cedar Hill" in Charles County, Maryland. He attended school for a few years and then went to Baltimore, Maryland in search of work. Finding employment at Detrich & Harvey Machine Co., on Preston Street and Jones Falls Avenue in 1876, he was an apprentice machinist by day and an elevator operator in the Masonic Temple at night.

Middleton, together with Charles White, an employee of the same company, became interested in the Otto Engines, a number of which were in and around Baltimore. From the design they came up with their own ideas for a better gas engine. White and Middleton opened a machine shop on the corner of Fayette Street and Jones Falls in 1884 and began building single cylinder horizontal gas engines under the firm name of White & Middleton Gas Engine Company.

They applied for a patent "Gas Engine" in January, 1889, which was granted on July 9, 1889, No. 406,807. They applied for a patent "Gas Engine" on an improved engine in April 1890 which was granted on October 14, 1890, No. 438,209. This engine proved to be very successful and the demands for it necessitated their move to larger quarters at Pratt Street and East Falls Avenue. In January 1894, they applied for a "Gas Engine" patent, and on September 10, 1895, they received Patent No. 545,995 for improvements on their gas and gasoline engine, especially relating to a new type, centrifugally operated fly-ball governor for speed control of the engine under all phases of loading.

One of these early type D-15 H.P. engines was on display at the Henry Ford Museum in Dearborn, Michigan, and a type A-5 H.P. gasoline engine is stored at the Smithsonian's Paul Garber Facility in Suitland, Maryland, needing restoration.

Prior to 1895, their engines had been ignited by the "hot bulb" method, but in April 1895, they applied to a patent "Igniter for Gas Engines" and on August 24, 1897, they received Patent No. 588,917, a fore-runner of the spark plug and distributor of the electrical ignition system for modern gasoline engines. During this period (1895) they moved to a third and larger location at Charles and Winders Streets. This shop was 85' x 220' with an upper story of 85' x 60' used for pattern shop and storage. There were two 5 ton overhead traveling cranes running the full length of the shop.

In June, 1904, they applied for a patent to their "Explosive Engine" powered by gasoline, and on January, 29, 1907, the patent was granted, No. 842,737. This patent was primarily a gasoline fuel injection pump and governor control improvement. It can be said to be a fore-runner of the present day fuel injection system used on many automobile gasoline engines. Up to 1895 the fuel generally used was natural or city gas for these prime movers. The introduction of electricity as a power and light source in the early and middle 1880's by Edison and others led to the patent of "Power Transmission" applied for in February 1905, and granted on May 9, 1905, No. 789,642.

Together with the many sizes and models of the single cylinder (horizontal) type engine, the firm built many vertical and marine engines of single, two, three, four and eight cylinders. The eight cylinder model ran like the four with two cylinders firing at the same time. Their first successful marine engines were installed in their 78' yacht, SEA BASS built in 1899 by Joseph Thomas and Sons, Baltimore, Maryland.

In August 1897, Simon Lake launched his 36'9" *ARGONAUT* submersible built by the Columbia Iron Works Dry Dock Co., Baltimore, and powered by a 30 H.P. White &

Middleton Marine gasoline engine, and made what was probably the first successful run of a full sized submarine in the United States from Baltimore Harbor toward the mouth of the Patapsco River. In 1898 the *ARGONAUT* sailed from Norfolk to New York under its own power, becoming the first submarine to navigate extensively in the open sea for over 2,000 miles.

During 1900, Lake organized the Lake Torpedo Boat Company in Bridgeport, Connecticut, and there in 1901 he launched the *PROTECTOR* submarine which was 65' in length and powered by twin White & Middleton Marine gasoline engines. Both engines were 4 cylinder 10" diameter bore and 12" stroke developing 120 brake horsepower at 300 rpm. After the United States rejected the *PROTECTOR,* Lake offered it to Russia. Russia bought it for $250,000 and ordered five more, ultimately increasing their order to a total of eleven submarines.

Between 1901 - 1906, Arthur Middleton was in Kronshtadt and Libau, Russia, helping install the White & Middleton engines. Norman Polmar and Jurrien Noot, in the 1991 edition of "Submarines of the Russian and Soviet Navies, 1718-1990", provide a detailed description of Lake Submarine in Russia from page 10 to 22. It is of interest to note on page 17 "at 11:48 in the morning of 19 Dec 1901, there commenced the first and only sailing, in the entire world, of a submarine beneath a solid field of ice-". This was the *KEFAL* commanded by Lt. V.A. Merkushev and powered by White & Middleton engines.

Between the years 1890 and 1907, White & Middleton, whose main office and manufacturing plant was in Baltimore, Maryland opened a distributing office at 39 Lake Street in Chicago, Illinois. Chris D. Schramm, of West Chester, Pennsylvania also represented White & Middleton during this period, as did D.P. Gosline of 30 Oliver Street, Boston, Massachusetts, a New England agent.

Preston Foster of Warren, Ohio, provided the writer with the article of 9-29-1894 by the *INDIANAPOLIS NEWS* "The Cascade Contract", as follows:

THE CASCADE CONTRACTS
Complaint of the Board's Award by J. W. Wallace
When Completed

"Within fifty days the masonry on the new cascades will be completed. The cascades will be in operation December 1. Dean Brothers, of Indianapolis, received the contract for pumps; W. H. Whiteney for a pump and installation and Middleton & White, of Baltimore, for gas engines. The cascades will be heated by natural gas and will run all winter.

J. W. Wallace, local agent, for the Otto gas engine, says that the bid he submitted to the Monument Commissioners was $335 lower than that of the White & Middleton Company. He says that he cannot understand why the lower bid did not get the contract, or a least why he did not receive a hearing. Comparing the bids Mr. Wallace said: "The White & Middleton bid was on three engines of 25 horsepower each: my bid was on three engines of 28 1/2 horse-power each. The Monument Commissioners called an expert gas engine man, who presented the claims of the White & Middleton gas engine and detracted from the Otto gas engine. The commissioners did not ask me to present the claims of the Otto engine. The White & Middleton engine may be as good as the Otto, but the difference in the price should justify the commissioners in awarding the contract to me."

"William H. English, one of the Monument Commissioners, said: "The commissioners were unable to decide on the merits of the different gas engines that were submitted. We went to Hetherington & Berner and got them to send us an expert. He had no interest in either of the engines. He examined them all and finally recommended us to take the White & Middleton engine. He advised us that in spite of the difference in price, the wisest thing for us to do would be to take the engine which we finally decided upon."

"I think I have nothing to say in reference to these charges of Mr. Wallace," said President Langsdale, of the Monument Commission. The bid of the Otto Company on three 25 horse-power engines was $3,960, of the White & Middleton Company, $4,395. We reserved the right to reject any bid. We think that White & Middleton bid the best for the State and we accepted it. We consulted impartial experts." - *INDIANAPOLIS NEWS,* Saturday, September 29, 1894.

It is of interest to note that a patent was applied for by Charles White in June 1909, and granted on November 8, 1910, No. 975,008 for "Method of Operating Gas Engines and Apparatus Therefor", relating to the ability to burn heavy oil in a 2 or 4 cycle engine. This design had been jointly worked on by both members of the firm and probably was one of the many things that led to its termination. In 1911, the partnership was dissolved with Charles White acquiring the half interest of Arthur Middleton and operating the Charles White Gas Engine Company until 1913-1914. The Koppers Company, Bartlett Hayward Div., of Baltimore acquired the patents and produced White & Middleton engines until 1925 when they were sold to Richard H. Thomas, 161 Grand Street, New York, NY, where production of new engines apparently ceased. Bartlett Hayward produced the single cylinder horizontal engines for 5 to 60 H.P. weighing from 1,600 to 16,000 pounds.

On page 552 of "American Gasoline Engines Since 1872" by C. H. Wendel, the following two paragraphs are noteworthy.

"The White & Middleton line grew by leaps and bounds. Its fame even spread across the Atlantic, as noted by an in-depth article on the engine by *ENGINEERING* of London, England, in their January 21, 1898, issue. Further evidence of an ever expanding line is also noted in the February 16, 1899, issue of *AMERICAN MACHINIST* which gave test results of a 15 H.P. White & Middleton engine. The same issue also illustrated the 30 H.P. vertical style designed especially for electric generator service. A similar engine of 60 H.P. rating was also in service at the Vanderbilt Estate in North Carolina, installed around 1900. This engine was started by reversing the current and motorizing the generator".

"Using two cylinders of 11" x 12" bore and stroke, the White & Middleton marine engine of 1899 gave the company a complete line of engines for all power needs. Rated at 300 rpm, this outfit weighed 2 1/2 tons and delivered 60 H.P. A special reversing gear was included as an integral part of the marine model. Even at this early date, White & Middleton engines used no adjustable bearings on the wrist pin, it used a bronze bushing in the connecting rod in conjunction with a hardened steel wrist pin."

The same *AMERICAN MACHINIST* article of Feb 16, 1899, gave this account of the tests as follows: "The White & Middleton Co. exhibited a 15 BHP engine at the American Institute Fair in 1890-91 which ran on 16 cubic foot of New York City illuminating gas per hour per BHP. This consumption was, as far as I know, the lowest on the record for an engine of that size at the time. A 60 BHP. was tested in Pittsburgh in 1896 and found to run on 8 cubic foot of natural gas per BHP per hour. This is believed to be the World's record for an Otto cycle engine. The heat of this gas varied from 1,050 to 1,100 B.T.U. per cubic foot. If 1,100 be taken as the heat of the gas, it gives a heat efficiency for the engine of

$$\frac{33{,}000 \times 60}{1{,}100 \times 778 \times 8} = 28.9\%$$

Gottlieb Daimler, one of the able German designers of the Mercedez-Benz automobile, visited the plant in 1893 to meet Arthur Middleton, who was considered, he said, to be "The outstanding genius of his time." In 1942, Mr. A. E. Ashcraft, Vice-President of Fairbanks, Morse & Co., of Beloit, Wisconsin, told Edward L. Middleton, that White & Middleton engines were considered to be one of their biggest competitors in the business. He said that it came nearer to being the ideal of simple, economical and efficient power then placed on the market.

On April 24, 1911, Arthur Middleton, together with his brother, Benjamin G. Middleton and Joseph K. T. Meads, formed a corporation to be known as the Middleton, Meads Gas Engine Co., of 11 E. Lee Street, Baltimore, with himself as President. At that time, he lived at 3000 Garrison Blvd., in Forest Park, Baltimore, until 1914 when he moved back to Charles County. In August 1917, Arthur Middleton applied for a patent "Watertight Bearing for Propeller Shafts, and the Like" and on July 16, 1918, Patent No. 1,272,834 was granted. This bearing and seal was a precursor to seal assemblies used on most liquid pumps today.

Arthur Middleton was among the children who learned the hardship of crossing Jordan Swamp on foot each day to attend school. Later on, he bought an acre of ground from Charles Moore near Piney Church and gave it to Charles County for a school. A one-room school was built and used for many years. On September 22, 1974, Arthur Middleton Elementary School in St. Charles Community, Waldorf, Maryland was dedicated by Lt. Governor Blair Lee to his memory. The mechanical, electrical systems were designed by his son's firm, Edward L. Middleton & Associates - Consulting Engineers.

Arthur Middleton died on April 22, 1933, at home on Banks O'Dee in Charles County and is buried in Holy Ghost Church Cemetery, Issue, Maryland.

Edward L. Middleton
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