



# The AMA History Project Presents: Autobiography of ARTHUR HEINRICH

Started modeling in 1903



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## Career:

- Competed in the second, third, fifth and sixth Mulvihill contests flying twin pushers that he designed
  - Built his first model airplane in an effort to come up with a plan for a full-sized airplane
  - Started to build his first full-sized airplane with his brother in the winter of 1909
  - Formed the Heinrich Aeroplane Company of Baldwin in 1912; continued building and experimenting with model airplanes
  - Designed and made his own full-sized propellers by using what he learned from making propellers for model airplanes
  - His twin pusher designs were unique and original; they were lightweight and stable
  - Placed eighth at the second Mulvihill contest held in 1925
  - Came up with the idea of a built-up girder (A) frame to make his planes lighter
  - Placed fifth at the third Mulvihill contest held in 1926
  - Preferred to fly rubber-powered planes
  - Helped form the New York Model Aeroplane Club around 1910
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*The following is an article written by Arthur Heinrich that appeared in the February 1955 issue of Model Airplane News magazine.*

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## **My 52 Years of Modeling**

By Arthur Heinrich

In the December 1953 issue of Model Airplane News magazine, I read with great deal of interest the article on the first Mulvihill Trophy contest, written by my good friend, Christy Magrath. It brought back many pleasant memories of the old times and the old time contest days in which there were not too many rules and regulations and in which the old twin pushers predominated. All models and types flew on an equal footing with each other and let the best man and plane win.

I competed in the second, third, fifth and sixth Mulvihill contests flying twin pushers of my own design. I am primarily, I guess, a twin pusher man and to this day, there is no plane I get more kick out of flying than a twin pusher. Incidentally, I claim to be the oldest still-active model builder and flyer in the country – if not in the world; that is to say, in number of successive years. I built my first model plane in 1903 and I still get as much fun and satisfaction out of flying models as anyone; my interest has never failed and I get out and fly whenever I can.

The first model plane I ever saw fly for a period of one minute or more was a contest twin pusher designed and built by George A. Page, Jr., one of the first model airplane boys. This was a large plane built up on a hollow main frame of white pine; the wings were single covered with rice paper over heat-bent bamboo ribs. It had a large pair of high pitch carved balsa propellers and

was a beautiful flyer. When George came with my brother and me to learn to fly in 1912, and learned that I was very much interested in model aviation, he brought this model out with him one day and flew it for me. It made a most beautiful flight of 70 seconds and landed in the top of an oak tree, at which point I climbed to the rescue, worked out toward the outside of the limbs and sent it on a glide to the ground.

In 1895 or thereabouts, my people moved from Brooklyn, New York, where my brother and I were born, to a small farm in North Merrick, Long Island, New York. There were very few people living near us and no other kids for us to play with. Consequently, we became very much interested in the things around us – the plants, trees, flowers and the wildlife – with which we came in constant contact. We were particularly fascinated by the birds, primarily because they could fly through the air. Because we had no one to play with, I believe, was one reason why my brother and I learned to make things for ourselves at a much younger age than most of the kids today. But I do not want to forget for one moment the interest and assistance our father gave us and to him we owe a very great debt of gratitude, for he taught and encouraged us in everything we tried to do: how to handle tools and make our own toys, etc., so that we were able, at an early stage in life, to do many things for ourselves. When I look back and think of what we did when we were very young kids, it does not seem at all to be very unusual.

Well, as I said, we were very much interested in bird flight and spent a great deal of time watching birds on the wing and trying to figure out how it was possible for a body as heavy as a bird's to be able to pass through the air without falling. One day, brother and I got the idea that we could make a pair of wings and fly. We built a pair of frames of young hickory sticks cut out of the woods and covered them with strong paper on the bottom side. The butt ends we held under our armpits with our arms extended as far down the top side as we could reach, where we grasped a hand piece in such a manner as to enable us to flap the wings up and down (brother was almost eight years of age at this time and I near 10). It was a good try, but, of course, did not work.

As there was no school in our section of the country, father bought a small farm in Baldwin, Long Island, where I still live and here, at the ages of eight and 10, my brother and I went to school for the first time. Here we became so interested in school and other kids to play with that we almost forgot about flying, but not for long, for we soon began making flying wedges out of paper along with other kids to fly around the schoolroom. This revived our interest all over again and we began to do some more thinking, this time around a flying machine, which would take us aloft with it.

In the winter of 1903, I was kicked on the side of the head by a young horse and, while laid up in the house, I started to build my idea of what an airplane should be like. This, of course, was in model form. These models were powerless gliders. I was further stimulated by learning of the experiments of the Wright brothers. Later, when I could go out of doors, I made a skyrocket to power one of these models, but the rocket blew up, scattering my model all over the yard. I gave up this source of power and started to use rubber bands looped together to drive a very crude paper-covered, paddle-like propeller, such as was used by Professor S.P. Langley and others.

Later, brother and I learned to carve propellers and I really got my models to fly. My first models were along the lines of what was to be our first full-size machine and with these, I experimented

and tried to learn as much as possible in regard to making a full-sized plane that would fly. When I started in, I had to find out for myself just where the bulk of the weight, or center of gravity, has to be placed in a plane to bring about a balance while in the air and have it fly, for at that time, there was nothing in books or papers to help one, such as there is today.

After a lot of experimenting, I thought I could build a large size model and put a 1-1/2 horsepower single cylinder marine motor in it and let it take off and fly. This model had a 10-foot wingspan and a 70-square-foot area. Brother helped me install the motor and make a propeller, but there was not enough power delivered from this crude propeller to pull the plane fast enough for a take-off and we gave up on the motor idea. A short time later, we flew this model on a long rope in a high wind having first taken the motor out. After a while, it crashed, but we were so well pleased with what we had learned from it, and so much encouraged, that we decided to build a full-sized plane.

In the winter of 1909, we started to build our first plane. This was a monoplane (as well as the next three types which followed it), as we believed this was the best form for a plane to have. Later on, when World War I came on, we were more or less forced into the building of military bi-planes and, all told, we built three types of bi-planes.

In 1912, we formed the Heinrich Aeroplane Company of Baldwin. While we were building our first plane, I still went right on building and experimenting with models of all kinds. Also, we made experimental kits for study of wind currents, etc., which we flew on a kite string a mile or more in length, as we wanted to learn as much as possible what the winds were doing as high as we could get our kites to go. To go back to the spring of 1910, our plane was ready for its first trial. It was powered with a four-cylinder, two-cycle marine motor of about 35 to 40 horsepower. This motor was not very reliable and caused a bad crack-up of our first and also our second planes, in both cases wrecking the propellers. Inasmuch as these propellers cost from \$80 to \$100 each, I decided to make our own and so made the Heinrich propellers, which were quite different from anything on the market, but flew our first planes very well. In the design of these propellers, the knowledge I had gained in designing and making model propellers was put into practice in the full-scale propellers and it worked out all right.

In an attempt to have equal slippage throughout the entire blade length and to have each part of the blade do the utmost amount of work, the blades were of uniform width and pitch right up to the hub; this made a rather odd, board-like looking propeller. Not only did we have to teach ourselves to fly, but we had to teach this plane as well.

Most of the early models I built were made in the interest of full size plane development and a great deal of time was spent in the study of stability, lift, etc. Different curves were tried out as well as wing shapes and arrangements of wings in relation to the rest of the machine. Models were made to rise off the ground under their own power as well as from the water, and a lot of study and work expended in trying different types of pontoons as well as boat hulls. Model plane water flying is a very fascinating sport. Down through the years I have built a large number of model planes, both experimental and contest types, but only three or four of a design other than my own. The design and construction of my twin pushers is both unique and original and never have been tried before as far as I know, in this country or abroad.

These models, I claim, are the lightest, yet the strongest, for their size of any twin pushers ever built. I really believe that I brought the twin pushers a long way ahead, at least in regard to light construction and stability, up to the time when restrictions of all sorts were put on them and they gradually gave place to models of the flying scale types (Wakefield and other).

In the second Mulvihill contest, flown in 1925 at Mitchell Field, Long Island, I flew a twin pusher with a main wingspread of 40-inches. It had a 45-inch frame built up of a balsa core and white pine top and bottom cap strips. This plane was a bit heavy, but it flew well and I came in eighth place. After this contest, I decided to make my planes much lighter and so came up with the idea of a built-up girder (A) frame of unusual design and unheard of lightness. I thought the frame could be made strong enough to stand the pull and twist of the fully wound motor, but was told by one of our engineers that it could not be done, as it would be too weak. However, it proved to be as I thought and this type of frame worked out OK. I built two of these planes for the 1926 Mulvihill contest held in Philadelphia, Pennsylvania, both of 36-inch frames; one, the Sparrow Hawk, had a flight weight of only 1-1/2 ounces with a motor of four strands of 1/8-inch, flat rubber, which could be wound up to 2,000 turns; the other one, the Blue Heron, was 1-3/4 ounces. These two planes were the same in every respect, but the Blue Heron had bigger wings and greater surface and required more power to fly it. This latter plane was badly wrecked in the contest when caught in a gust of wind, but I repaired it and it is still flying at this date. After the crack-up of the Blue Heron, I flew the Sparrow Hawk in the contest and placed in fifth position. This contest was run in conjunction with the Sesquicentennial Exposition of Philadelphia.

The wings are more or less conventional but are of the very lightest weight for their size. The main frame, however, is much different from any other twin pusher insofar as lightweight and strength are concerned. Instead of a single piece of wood to form each side of the A frame which, to be strong enough to take the pull and twist of the fully wound motor without bending must of necessity be somewhat heavy. The Heinrich main frames are built up of a light top and bottom cap strip spaced apart by balsa braces, from each of the top and bottom piece where the two pieces are brought together to 1/2-inch apart in the center.

The sides are then covered with Japanese tissue paper and drawn tight by applying three or four coats of light dope. The frame is then cross-braced by double sets of light braces, which are also spaced apart by balsa upright braces. Then, to add sidewise rigidity starting at the first pair of braces, silk threads run from the center of the main frame upright to the opposition similar main frame upright in the next pair of cross braces and then to the propeller hangars at the rear. These threads are drawn tight, doped with a heavier dope, and tied where they cross to form the X in the center of the frame.

Under a full wind there is no bend of the frame up or down as long as the sides of the frame so made form a built-up box girder which will not bend under the normal wind and flight conditions, which, of course, would change the angle of incidence of both wings if it took place. There is, however, an alarming bending of the frame sidewise, which does no harm in flight or otherwise. All light twin pushers had to have "cans" to keep the frame from bending up and down. In this type of construction, none are used. However, if a cross thread broke in flight, or the paper on the sides split, the whole structure would collapse on the instant.

A great deal of thought has been given to the inherent stability of these planes for, as every model flyer knows, the more stable a model is, the better it will fly. I have always used plenty of dihedral angle and vertical surfaces such as fins and rudders, both fore and aft, in the case of a twin pusher. I am also a great believer in back swept wings and have used them for a good many years and find that these models fly with much more steadiness and reliability than most. The greater the amount of stability, the longer the plane will stay in the air and the less the power required to keep it there. I fly all my models on about the absolute minimum of rubber and so can get a greater number of turns in the same length of motor as the diameter of the mass of rubber becomes less. When the weather is not so favorable, I have to add a bit more rubber, which provides more power, but, of course, cuts down on the number of turns. While I do build and fly motor-driven models, I prefer to fly rubber-powered planes. There is a certain, altogether different, sort of satisfaction in being able to have a rubber-driven model fly well. I believe a person must study rubber-driven model flying and model behavior much more closely to get the best results from a rubber-powered model than is required to obtain the same performance in a motor-powered one.

In the first place, in a motor-powered plane you start off with a certain power output which, on the whole, remains constant throughout the flight, while in the rubber-powered one, at the start of a flight, there is a more or less great power output and torque that tend to climb the model into a stall, which must be taken care of by proper adjustment before the flight starts. This is followed a few seconds later by a more or less constant power curve and a diminishing of torque and here again the model must be adjusted to take care of this condition, which, in turn, is followed by a minimum power output until the motor is all wound out. All through the last part of this motor run, the plane must be adjusted to fly level and still remain in the air, and it also requires some pretty fine adjustment to keep your model in the air and get the most out of a rubber motor. I do not for one moment mean to imply that there is nothing to flying a motor-powered model, for one runs into great difficulty here, too. In all cases, one must study the habits and fancies of each model to get the best results from it and a great deal of time and patience must be spent in calm weather, gliding and adjusting before you attempt to fly.

To the late Cecil Peoli must be given the credit for the birth of the twin pusher type. He designed and flew the first one in public and created such a sensation with it that he became known all over for this new and sensational type of model. He was the first one to fly a rubber band-powered model on a nearly straight-line distance of 1,000 feet. This was back around 1907 or 1908, I believe. His model flew low, fast and most flights were straightaway. He and Percy Pierce, another of the real early model sensations, really put model aviation on the map to stay. I saw both boys many times at the old Mineola flying field, flying their models before large crowds of people who came from far and near on Sundays to see the old time man-carrying planes and flyers on the Aeronautical Society's flying field just outside the Mineola Fairgrounds.

In the early days of model plane contests, distance was the determining factor. The model, which flew the greatest distance from starting point to place of landing, was the winner and all sorts of measuring devices were used to measure the flights, ranging from a tape measure to a bicycle wheel on the end of a stick pushed along before a person who acted as the official measurer. This wheel carried a cyclometer. With this, the distance could be measured quite accurately and was the best recording device of any used. But, of course, no record could be taken of the distance made in flying in circles, so each contestant endeavored to have his model fly in a straight line as

nearly as possible. This method of determining the winner of a contest was soon outgrown and the boys went in for total time in the air, as is done today.

Also along about 1908, or perhaps earlier, as nearly as I can remember, a group of boys interested in model plane building and flying frequented a room in the New York World newspaper building on Park Row, New York City. This was right at the Manhattan entrance to the Brooklyn Bridge. The World sponsored these activities, but as far as I know, this was not an organized club and the World had two nice elderly men open a sort of model airplane supply room. These men (Mr. Uncels and Mr. Durant) obtained and had for sale to the boys at a very nominal price what model plane supplies and materials (such as they were in those early days) they could get together. In this room, all the model plane boys met and talked their problems over with Uncels, Durant and each other. Uncels was not as well off physically as Durant, who was very active and pretty much in evidence at almost all the model plane meets. It was here that we saw balsa wood for the first time and Uncels and Durant tried to get us interested in its use in the construction of model planes, but it was quite a little time before someone tried it, as we all thought it was too weak, although we were all intrigued by it. I think the first one to use it made a set of propellers for a twin pusher. They were thick and more or less clumsy looking, but still they were lighter than most of the pine and other heavy woods used at this time. Later, a fellow here and there used a piece of balsa now and then in the construction of his model and soon we began to find its real value and model planes changed very much for the better. We used a great deal of split bamboo for ribs, wing tips, rudders, landing gears, etc. Our lightest woods were spruce and pine. We bent our reed and bamboo in hot water and over a flame, also on a firm jig, using both hot water and a flame.

Also, away back there, another great boon to model plane construction came upon the market in the form of a good, quick drying waterproof cement called Ambroid, and I still use it to this day. This cement was one of the biggest single boosts ever given the model plane builder, not, of course, forgetting balsa wood. Before Ambroid came out, we used to dissolve celluloid in banana oil and acetone. This made a cement similar to Ambroid, but not as good. I sometimes think this gave the Ambroid people the idea.

Later on, about 1910 or so, most of these boys, along with some others, formed a club known as the New York Model Aeroplane Club and held regular meetings in a clothing shop of the parents of one of the boys in New York. Among these, I believe, were such greats as Percy Pierce, Cecil Peoli, George A. Page, Vincent Burnelli, Frank Shoba, Harry Herzog, John Carisi, Andy Surrini and a number of others, all of whom I do not recall at this moment. Also, Armour Selley, who, I believe, was the first one to try out and advocate the use of large, slower turning, high-pitch propellers. Most of us turned our props pretty fast and, of course, not quite as long, but we got a good climb in a shorter length of time.

The New York Model Club seems to have been the second club organized. The Chicago club came first. In mentioning the names of these boys, I know there are a lot more who should be included and I hope I have not committed an injustice to anyone by leaving him out.

Some of these boys were very fine model builders and came up with some very nice, neat models. At the close of one contest, about 1914, Harry Herzog gave me his entry, which I prized very much. It was a beautiful twin pusher, covered with gold beater's skin, a favorite covering

used by the best model builders. This was a transparent thin skin taken from the large intestines of a cow or bull and made a fine airtight and very light covering, somewhat hard to get on straight and smooth, and very much subject to weather changes. Herzog was one of the outstanding model builders and flyers of his day.

I like to talk over models and model flying with anyone who is also a model flyer; so if any of you sees a feeble little old man who has a wild and crazy look in his eyes and is prevented from chasing after his planes because of infantile old age and a heart condition, just say “hello” and come right up and talk to him. He will be glad to see you. I am generally accompanied by two or three of my faithful old twin pushers that range in age from 22 to 28 years.

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**AMA History Project**  
National Model Aviation Museum  
5151 E. Memorial Dr.  
Muncie IN 47302  
(765) 287-1256, ext. 511  
[historyproject@modelaircraft.org](mailto:historyproject@modelaircraft.org)

