Flightlines

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Pénaud & Tatin

Focus on Workshops

April 2012

Two Scale Models from last years events.

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On the Cover: ***Michael Blake with his 30cc Sbach 342,with 2C lipo, Power HD servos, Powerbox Sensor switch and it is Guided by Futaba 2.4 Radio Gear***

The next MACI Council meeting will take place on Tuesday May 22nd 2012 in the Killeshin Hotel, Portlaoise, at 8:00pm.

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Editorial

It seems that the ‘mini’ Summer we had a few weeks ago was just a tease. With the heating turned off and all of the Spring flowers doing their stuff it seemed that the Winter was over. Clear skies, and some warmth demanded that some flying hours were put in. A little complacency set in and this has been rewarded with a return to Wintry conditions. Oh well, it was good while it lasted!

Once again I am hoping to make sure of at least one week’s decent flying weather by returning to the RC Hotel in Corfu in May. A report should be in the next edition. It’s about time I put my money where my mouth is and made a contribution to the mag.

Hopefully, as you read this, the weather has picked up and the various fly-ins and competitions are starting to take place. Why not support some of these this year? The organisers of these events will always welcome both new participants and spectators alike. Details of the events taking place are in the Contest Calendar and on the MACI web-site.

Yet again I am asking for contributions to Flightlines. I would particularly like some photographs to include. If you do have some photographs to send in, it would be helpful if applicable captions could be included with them.

The deadline for the June edition is May 31st.

Fly Safely

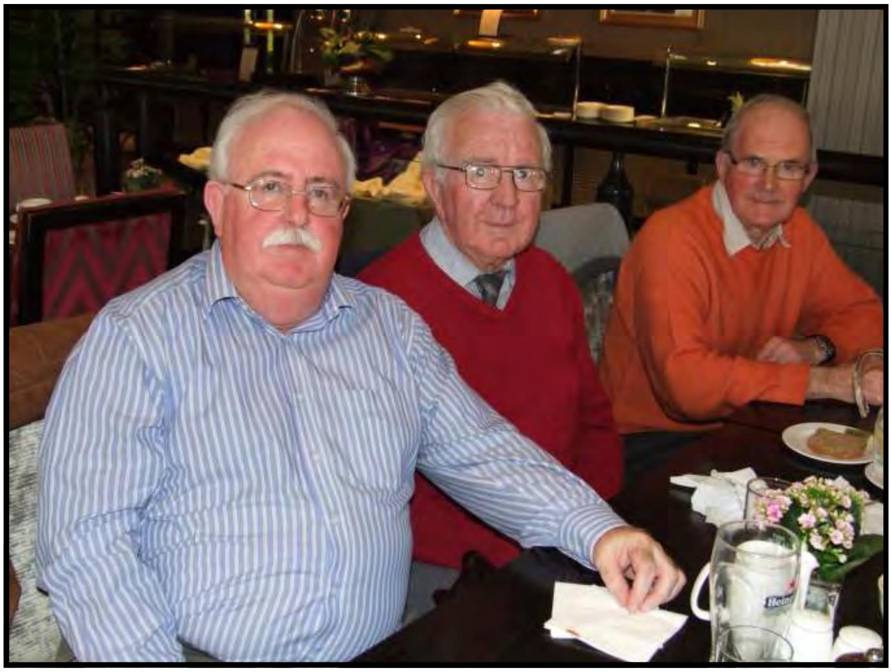
Chris Clarke

Thurles Model Aeroplane Club or what might have been.....

At various times in life, one has to deal with situations that are wonderful, awful and in between. Now don't get scary.... this is not a lecture.... but a recent event did allow me to wallow in a nice bit of nostalgia... which is not something one can get a cure for at the local pharmacy or health centre..!!

In my early years (born on Bastille Day in 1950) I grew up in the shadow of older brothers and sisters as most did. I did notice that while my sisters were giggling in various corners of our house, my older brother Luke had a corner that he took out on various evenings.. it was a building board... on which he built a model aeroplane from balsa wood. It was often a glider.. it was often a control line model..it was often a rubber powered model... and was always covered in tissue paper and a wonderfully smelling substance called dope !!

Luke Thompson - Liam Ward - Ray McCabe - Jossie Carroll - Dickie Kerrigan



Bill Thompson - Luke Thompson - Liam Ward

I got involved in this miniature work of carpentry with it's broken Gillette blue blades, (no fancy Swan Morton No 11 blades), balsa cement and grease proof, (tracing), paper. Back in those days.. someone got a plan and others made copies, (sorry,... backup copies !!), and all made the model from plan with balsa from George Kilroy's sport shop and plywood from Molloy's hardware store. This activity went on from when I was about 6 thru to 11 when all those guys who were older than me got real jobs and were cast to the various ends of the working world of the day.

So who were they ? Obviously my brother **Luke Thompson** who had joined the P&T which at the time was the equivalent of the modern day Eircom and An Post, combined. Also involved was a next door neighbour, **Ray McCabe**, who, I believe with his broher Ian, was the local agent, customer service rep and engineer for Avery Scales Ltd. Mixed in was Jossie Carroll, who was to become a teacher in the local Thurles Technical School which became Thurles Community College which I gather is now Coláiste Mhuire, Co-Ed. Another member was Dickie Kerrigan who went on to serve his engineering time with the Thurles Sugar Factory (Ironically, my own father was transferred from the Carlow Sugar Factory to Thurles around 1949... strange how things happen !!) and others whose names I can remember but not them personally were Aidan and Tony Wall and others.

Back then, when scrounging scrap balsa in it's original and pure meaning, I would take bits of left over balsa from my brother's building board and fashion one dimensional little boats, trains and planes and the discard them and head to bed to check the rubber in my catapult, also bought in George Kilroy's !!

Memory's flood back of being on the back carrier of my mother's bicycle with Luke in charge and cycling out to McGuire's field about 4 miles or so outside Thurles on the Cashel road. At least one large free flight model was being carried by one of the cyclists!!.. it was invariable a KeilKraft Junior 60 with either an ED Racer 2.4cc (.15 in modern glow plug terms !) or an ED Hunter 3.46cc which was a larger diesel from the same manufacturer.

While recently browsing on various club web site, I noticed a couple of pics of some gents and the name caption under it was Dick Kerrigan. I wondered if this was Dickie from Thurles so I popped an email off to the club and within a day or so I received an email from said Dick confirming that he was, in fact, Dickie !! Not only that, he informed me that the following Tuesday there was a sort of reunion meeting of the lads from Thurles to include Dickie, Jossie Carroll, Ray McCabe and a mutual friend who flew way back then, Liam Ward who is in the Shankhill Club and would I and my brother Luke wish to join them.. ! what a silly questions.. !! Of course we would.. and did.

Ray McCabe - Jossie Carroll - Dickie Kerrigan

So on that Tuesday, myself and my brother travelled into the Ashling Hotel across the road from King's Bridge station and met with the 4 lads. To say it was a wonderful afternoon of chatting, remembrances would be an understatement! It was an afternoon of… do you remember this or who was the guy that or what ever happened to this model or this chap. When we broke up at 4pm or so, it was the end of a good bit of crack and some wonderful memories retrieved.. All that was missing was the smell of a tin of KeilKraft Nitrex 15 diesel fuel.. !!

Same time next year ??

Bill Thompson

Scale Judges Course

Saturday 5th May 2012

Venue is the Killeshin Hotel, Dublin Road, Portlaoise for morning session.

Start time and further details will be published on the MACI webpage.

FOCUS ON WORKSHOPS
ANDY RYAN.

There are many fine and well equipped workshops up and down the counties, fully stocked with materials, aircraft and precision equipment, and what sets this fine standard apart from others is the cathedral of model aircraft workshops owned by Andy, and the number of excellent scale aircraft kept by him there. Welcome to Wexford in the sunny South East and Home County of the first class Model County flying field.

Andy is a well-known keen scale pilot and supporter (much appreciated) of scale competitions and Fly Ins. The range and type of model aircraft kept and flown are all in pristine condition and stored in a custom made workshop of large state of the art type and design. It is probably fair to say that Andy is an enthusiastic flyer of large scale aircraft powered by a variety of petrol or gas engines and on board power management systems.

Andy with his Sopwith Pup.

On display and on the workshop bench was a one third scale Sopwith Pup from the Balsa USA stable with an all up weight of 15.4 Kg, wingspan of 2.68 metres, and which Andy hopes to power with a rescued RAF drone engine at 90 cc.

Ultimate and Jodel.

Andy has not one but two workshops, with ample room for working in comfort, good lighting and precision tools neatly laid out for work in hand. There is no fear of getting cold during winter months, the polished floors are heated for extra comfort.

Another fine model on display was an Ultimate by World Models, 42 per centum scale with an all up weight of 23.25 Kg, wingspan of 2.490 metres and powered by a Desert Aircraft 150 cc twin engine turning a 30X10 propeller. This is one fast and powerful scale aircraft – not recommended for the faint hearted.

Also on display and which Andy brought down to the Laois Club last year, was a very fine Jodel by Green RC Models. Power is a 63 Zenoah turning a 22X10 propeller.

Selection of propellers.

Cap with 120 cc engine up front.

A dream come true or emporium for the finest of large scale model aircraft is no exaggeration for what Andy has built and acquired as a scale enthusiast over many years.

Jabberwock Bi-Plane.

The range and type of other aircraft, include a clipped wing Piper Cub by World Models, powered by a Zenoah 80 cc twin engine, Pitts Special, J3 Piper Cub, Cap 232 at 42 per centum scale and a Cessna. On a smaller scale, Andy has a Jabberwock bi-plane, the only methanol engine in his treasure trove of scale aircraft, this one has a Super Tigre two stroke engine, and a red and white Super Cub in 25 per centum scale powered by a Zenoah 26 cc.

J3 Piper Cub.

The sheer excellence of standard and number of aircraft is a testament to the enduring attraction of scale flying, not only for the owner Andy, but also shared by scale enthusiasts alike who have the good fortune to meet Andy and see such fine aircraft take to the skies.

A big thank you to Andy for his tour and opportunity to share with us scale modellers the very finest scale has to offer in large scale aircraft. We all look forward to meeting Andy on a flying field sometime very soon.

Paul Fetherstonhaugh.

PÉNAUD and TATIN
Pioneer aircraft designers and model builders.

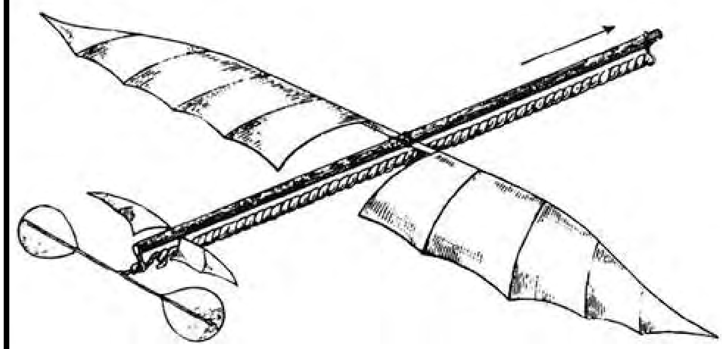
The following article re-printed from 'Aviation, The Pioneer Years' by B Mackworth-Praed gives a "family tree" to all of us who build and fly model aircraft……..

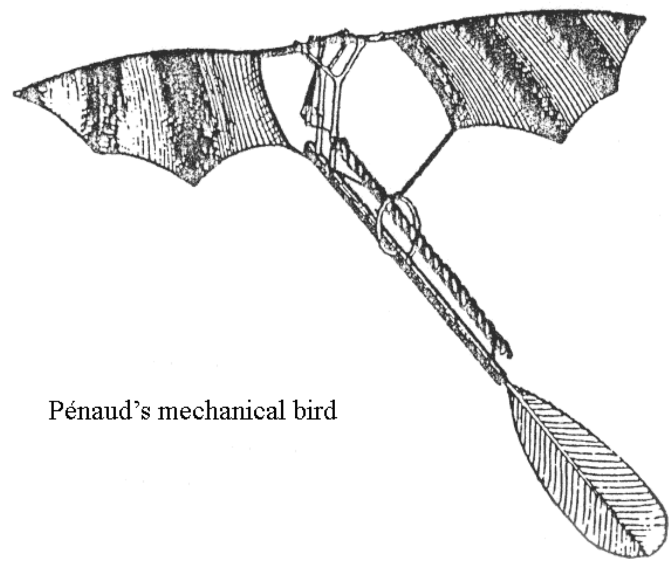
Alphonse Pénaud (1850-1880)

Alphonse Pénaud is one of the most engaging and moving figures in the history of aviation. Gentle, modest, lucid and full of good sense, a pioneer in all that he undertook, as perfect a technician as he was a skilled theoretician, he died very young, leaving behind him work of genius.

The son of Admiral Pénaud, he was born in Paris in 1850, and had intended to go into the Navy when he was struck down by an illness which left him disabled for life. It was during his incapacity that he decided to devote his un-doubted intelligence to research into aviation.

In April 1870, Alphonse Pénaud invented the "engine" of twisted rubber bands which has been used in most subsequent aircraft models, and which remains the classic method for small-scale experiments. He first applied it to a helicopter with two propellers, one of which was free, the other being fixed to the chassis. It was very lightly built and easily went up to the ceiling and stayed there before coming down. Modified by Dandrieux, the Pénaud helicopter became a flying toy which amused children for many years. Pénaud was a perfectionist and this can be seen in the helicopters which he subsequently had built by Breguet, the clockmaker-engineer: the tiny metal pieces were made in aluminium and the propeller blades were of gilded paper to reduce their thickness.



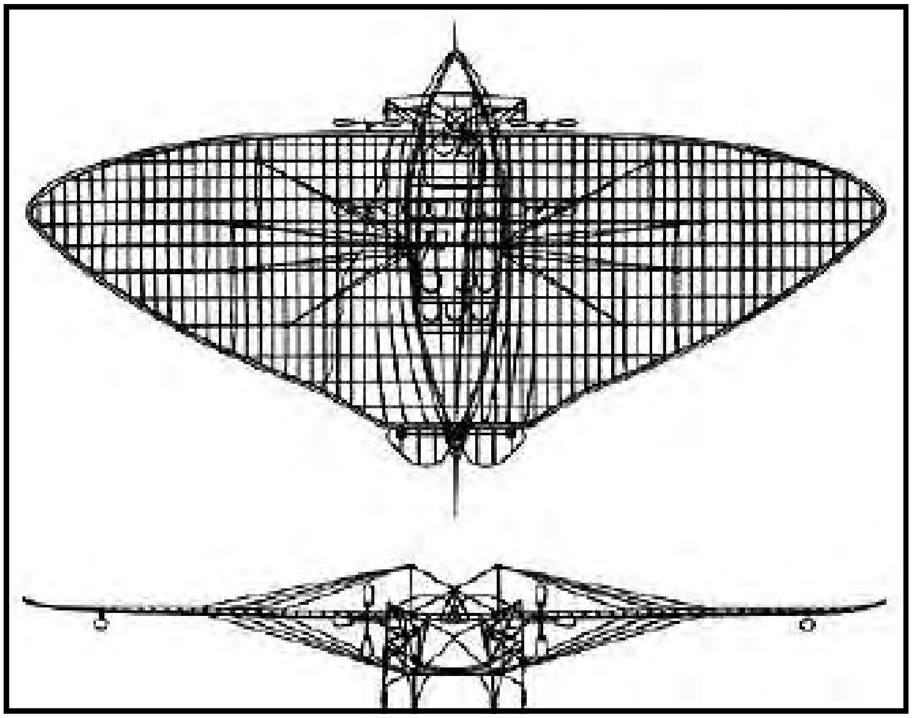


Pénaud's mechanical bird

On 18 August 1871, Pénaud flew a little aeroplane in public in the Tuileries gardens; it was a planophore, a monoplane with the propeller driven by twisted rubber and fitted with a stabilis-ing tail at the back. This experiment first demons-trated the possibility of sustained flight by an aeroplane. Pénaud repeated it many times in front of the Société Franchise de Navigation Aérienne, which had just been formed and where he was to become an organiser and the most assiduous and most ingenious of members. The planophore, built with either a pusher or a traction propeller, allowed Pénaud to study the laws of longitudinal equilibrium in aeroplanes. To compensate for the rotational reaction of the propeller, he twisted the aerofoils on one side or loaded the opposing wing with a light weight. Flights of 200 ft. were made with a machine weighing little more than half an ounce. As well as the joys of invention, Peanut knew the joys of discovery in "dusty tomes" and always acknowledged the work of his precedes -sors, particularly Cayley and Pline.

In September 1871, Pénaud first flew a little mechanical bird, powered as always by rubber springs, which he had made himself. It travelled 10 to 15 yards and rose as high as 16 ft. above the take-off point. Copied as a toy, Pénaud's bird was never improved on. In 1872 and 1873 he pub-lished a treatise on movement through the air and proposed a method for studying air resistance. He then developed his theory of gliding and, in 1873, advocated the use of a zoetrope - an early version of stroboscope for studying the flight of birds, and that of instantaneous photography through a succession of shots which was used shortly after by Marey. At the same time he analysed the influence of the proximity of the ground on flying machines, the importance of balancing aeroplanes and the division of the bird's wing into lifting and propelling parts.

In 1875, the French Academy of Science awarded him a prize for his theory of flight. In the same year he defined the three main obstacles to human flight: air resistance, the high weight/ strength ratio of most materials and the lack of a lightweight engine. He applied himself in particu-lar to the first two, trying to find a way of making use of air resistance while eliminating its harmful eftects, while testing materials, he studied fabric, metal and wood, and their assembly.



Pénauds first project for an amphibious acroplane.

He was as familiar with the problems of bal-looning as he was with research into the instru-ments of navigation and piloting. But where Pénaud put his greatest effort was into the design of an aeroplane which he outlined as early as 1873 and patented with the builder-mechanic Paul Gauchot in 1876. There is no other document of that period in existence as complete as this on a feasible project.

The aeroplane was an amphibious, tailless monoplane, of the "flying wing" type with two "puller" propellers. Pénaud and Gauchot built into their design: a metal or wooden wing with an exterior covering which contributed to the strength of the structure; the eventual elimination of shrouds and, in the meantime, the use ot flattened or streamlined cables; a folding under-carriage with shock-absorbers of rubber or com-pressed air; a watertight fuselage-hull; floats at the ends of the wings; variable pitch propellers with a guard to avoid contact with the ground; elevators and a rudder worked by a single control, handle-bars which could be turned and inclined with one hand; assistance to be given to the pilot by balancing and spring-loading the controls; a rear tail skid; a vertical stabilising fin. The wings were thick, but streamlined. The ribs were covered on both sides by fabric, metal or plywood. The longerons were of box-section or of I-section with open webs.

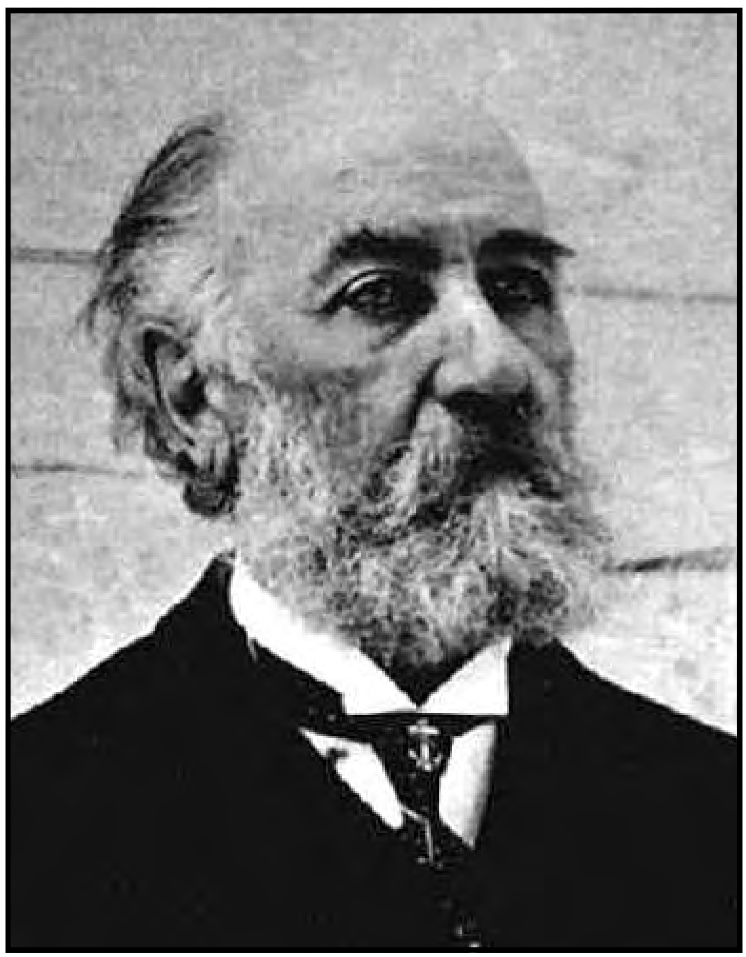
The engine was not specified but Pénaud ex-pressed his overriding faith in the hydrocarbon engine. The surface of the hull and of the wings could be used as a condenser. The patent also described the following details: a windscreen, a streamlined headrest, a liquid clinometer, mometric airspeed indicators, air pressure gauges on the wing, a process for the automatic electrical control of the elevator. Increasing the slenderness by appropriate means to facilitate the movement of the wing through the air was carefully thought out, as was a launching catapult.

In his efforts to put this project into practice, Pénaud, who had no fighting spirit, came up against material obstacles. He became morose and he broke off with the Societé Francaise de-Navigation Aérienne. After having solicited Giffard's help in vain, he put his designs in a little coffin, dropped it off at Giffard's house, went home and committed suicide. This was in 1880. Alphonse Pénaud was only thirty years old.

TATIN

Victor Tatin was a friend of Pénaud's and his principal emulator. His long life enabled him to see their common dream achieved, for he died in 1913, when aviation was developing rapidly.

A very skilful clockmaker-mechanic, Tatin started his aviation work in 1874 by presenting a mechanical flying bird, inspired by those of Pénaud and of Hureau dc Villeneuve, to the Societé Francaise de Navigation Aérienne. He described his system in these terms:

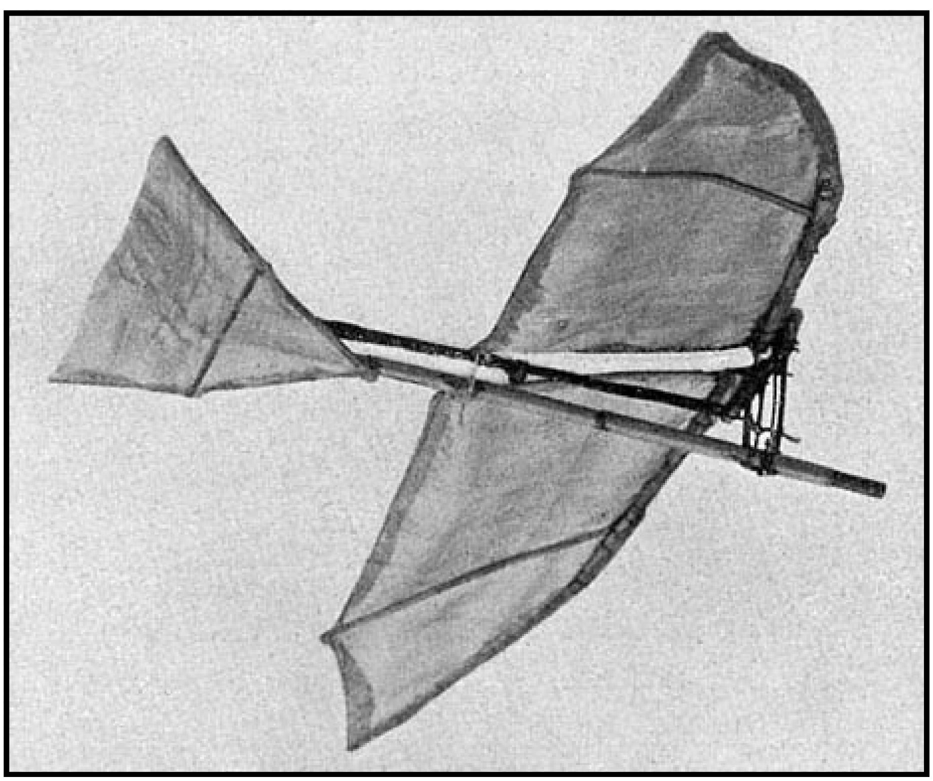


Victor Tatin (1843-1913)

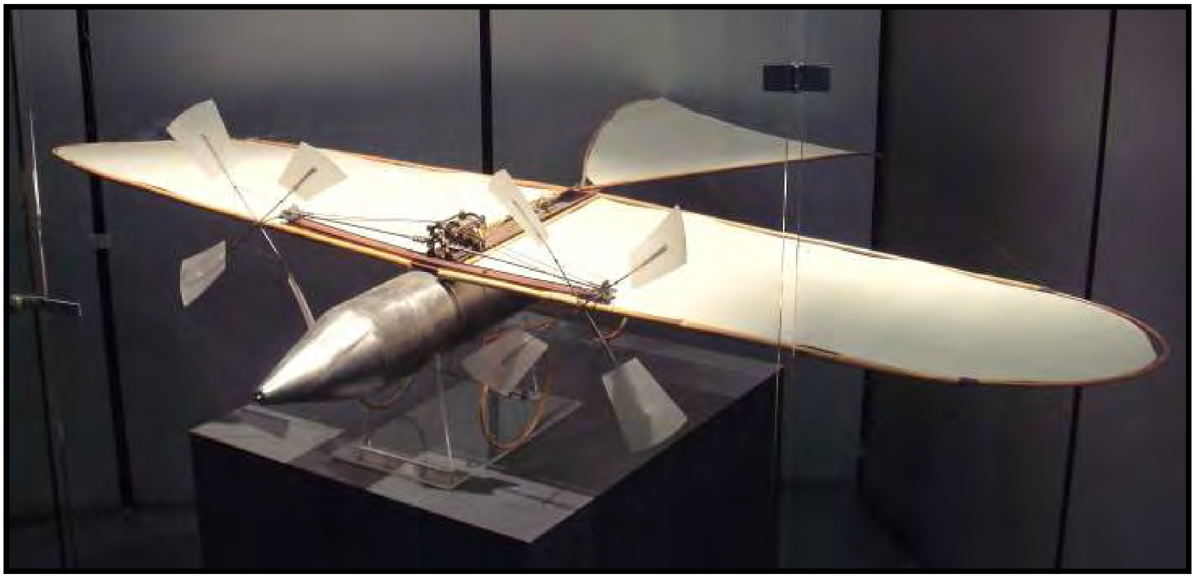
"My apparatus is very small and consists of a wooden frame, at the front of which there is a little machine whose purpose is to transform the circular movement into two lateral to and fro movements. To accomplish this, a crank receives the couple from the twisted rubber and moves an articulated connecting rod on a guide sliding between two columns; this guide transmits its rising and falling movement to two little steel arms moving around a common horizontal axis by means of two little connecting rods . . . The leading edges of the wings are made from the shafts of trimmed feathers bent to the shape of rackets; the surface of the wing is of cloth . . . A wire leading from the main wing rib passes above the cloth and is fixed to the body at the rear edge of the wing; it accompanies the wing in its movement and maintains it on a nearly horizontal plane when it is going down, but the cloth is completely free when it is going up. A peacock's tail feather is placed at the back and serves as a tail. The whole thing weighs less than 1/5 of an ounce which includes one twentieth of an ounce of springs. The wingspan is *9 1/2* in."

In spite of its miniscule dimensions, this beautiful machine could fly for a distance of 15 to 20 yards on being released from the hand.

After numerous flying tests with different machines of this type, with weights varying between *1/50* of an ounce and 3 1/4lb., and after carrying out other experiments on lift with flap-ping wings driven by steam, under the supervision of Marey at the Ecole Pratique des Hautes Etudes, Tatin ended up, like Pénaud, by completely rejecting wings with alternating motion, and from then on only considered the aeroplane.



Tatin's mechanical bird.



Tatin's model aeroplane powered by compressed air.

His first aeroplane, which still exists at the Musée de l'Aéronautique, in Paris, is an admirable construction, made entirely by himself.

The body was a reservoir formed by a steel strip rolled in a spiral and fixed by 1,800 rivets. This reservoir contained compressed air which fed an oscillating cylinder which drove, via a transmission system, two propellers with horn blades. The flat wings, spanning 6 ft. 3 in., were fixed on the top of the body. The total weight, with the three wheels and 3 ounces of compressed air, was just under 4 lb.

Tests took place at Chalais-Meudon in 1879. The machine, attached by a wire to a post in the middle of a large platform, took off and flew in a circle for several seconds, over the heads of the spectators; however, no free flight was attemp-ted.

Twenty years later Tatin collaborated on the design of the Santos-Dumont dirigibles and even designed some manned aeroplanes towards the end of his life. He also tackled numerous other aeronautical problems, inventing a recording aneroid barometer in 1880. This device was tried out as an altimeter in 1882.

Eamonn Keenan

Cleaning Files

Part of an article by Brian Winch in the Feb 93 RCM&E

When you file metal, the little bits taken off by the teeth of the file often embed themselves in the tooth gaps and clog the file. Like when you chew a bit of tough meat, you need a toothpick to clean between your fangs or, as the Americans chant, floss after every meal. With a file, when the teeth are jammed with bits, we say the file is pinned. It needs a toothpick in the form of a file card which is a short bristle steel brush designed for the purpose. The bristles of the brush are rubbed across the file at an angle to suit the teeth and, generally, the file is left sparkling clean, its teeth glowing with a ring of confidence.

I said 'generally' as it is not always so simple. Aluminium sticks to the file like dog deposits to the instep of your shoe. No amount of brushing will remove the aluminium deposits and the file is generally thrown at the dog (that left the deposit} in disgust. Enter the WOO to save the dog - err - day. Gather ye all your files embedded with oil, paint and aluminium and soak them in a strong solution of caustic soda and water. You can make the solution as strong as you like as it won't harm the files - but it will harm human (and sub species) flesh.

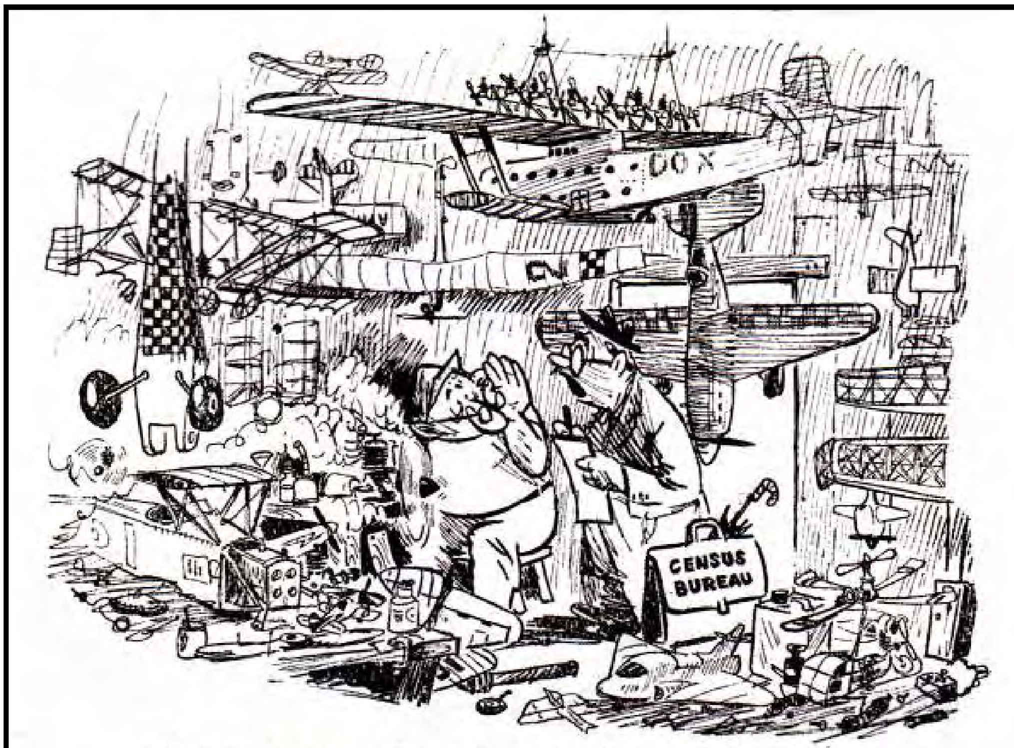
Caustic soda - sodium hydroxide -is a strong alkali used in the manufacture of soap, paper and, strangely, aluminium as well as many other processes. It will also rapidly dissolve aluminium, remove paint and grease. It also rapidly attacks flesh and eyes, so have a care when using it. It is the ingredient in a lot of oven cleaners and can also be obtained by soaking ash in water (in a weak form). Read again what I have said about how it attacks aluminium. If you drop a model engine in it, you will end up learning quickly about the internal parts as only the steel components will survive - the aluminium alloy parts will be DISSOLVED !

On the other side of the chemical scale we use an acid to renew all those worn files which are so expensive to replace. The easiest acid for you to obtain is muriatic, also known as hydrochloric or spirits of salts (the latter applies when the acid is diluted with water). This acid is sold by hardware shops for cleaning brickwork and soldering, and is quite safe to use with a dollop of common sense.

It will attack flesh and eyes so don't wash your dirty hands in it. It will slowly attack metal (slowly being relative to much stronger acids) and the attack is even all over. As you lick the end of your lollypop, the end becomes quite pointy and so it is with the end of the teeth on the file.

The acid attacks all surfaces of the metal and the ends of the teeth become fine, so effectively sharpening the file.

At the end of the process the file is removed, washed and boiled in hot water and, when dry, given a light coat of WD (typical) spray or a mixture of petrol 90% and 10% of any oil. To prevent your newly sharpened file from pinning in the future, give it a rub with chalk (chalkboards/school/teacher type chalk) for filing steel and iron and a coat of kerosene (paraffin) and oil 50/50 for aluminium and brass.



Excuse me—but do you have a hobby?

Instruments In Use In Aircraft of the 1918 Era
Part 1

A study of instruments commonly found in aircraft of this era and used in the training of pilots are the compass, air speed indicator, height indicator, sideslip indicator, fore and aft level, engine revolution counter, water, petrol gauge, pulsator glass or sight-feed oil dome and the pressure gauges for oil and petrol supply.

There is also the map carrier. The grouping of these for ease of reading was often haphazard but ideally, as far as possible, should be grouped together so that they can be seen by the pilot with as little deflection of his eye from the horizon as possible. Generally a total weight of 15 to 20lbs was average for the complete equipment.

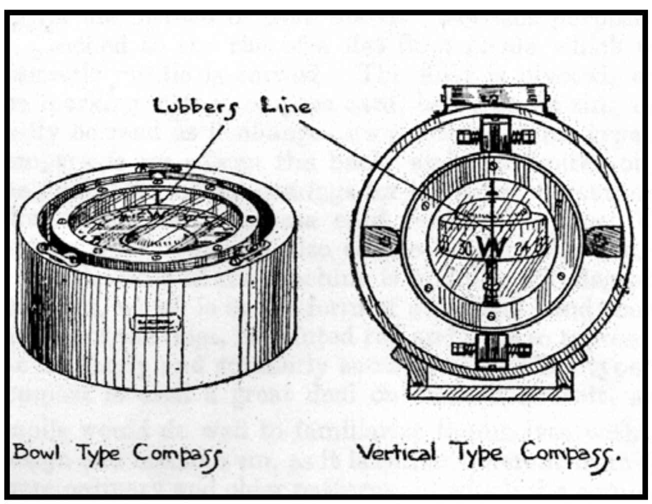
Illuminating the Instruments.

As the instruments may be used at night, some way of illuminating them must be employed. Generally the indicator ringers and the figures on the dials are painted with luminous paint so that they can be seen in the dark. It is also quite usual to find a small electric-lighting set with battery incorporated in the design of the instrument board, with a switchboard for switching on a hooded light to any or all of the instruments it is desired to read. Each is shielded to prevent the pilot's eyes from being dazzled, and can be switched on independently of the others when desired.

Some notes on the instruments chiefly used on school machines will be of interest. Every endeavour should be made to find out not only how they work and how to use them, but what failures are likely to occur and how they can be most quickly put right.

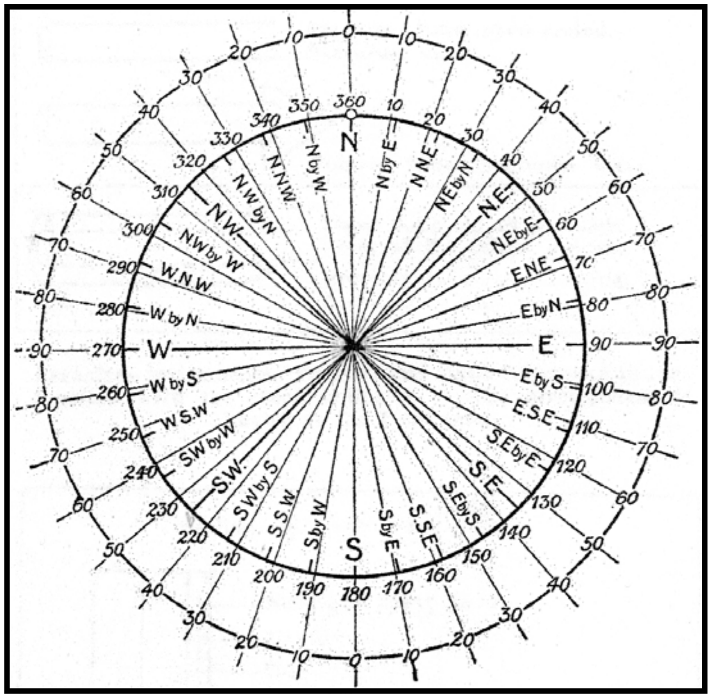
The Compass.

The magnetic compass is a most important addition to any aeroplane intended to be flown across country. It should be placed in full view of the pilot in the fore-and-aft line of the machine when in the flying position.



Two typical types of aeroplane compasses. Left: The bowl pattern. Right: The vertical type, which is read from the back.

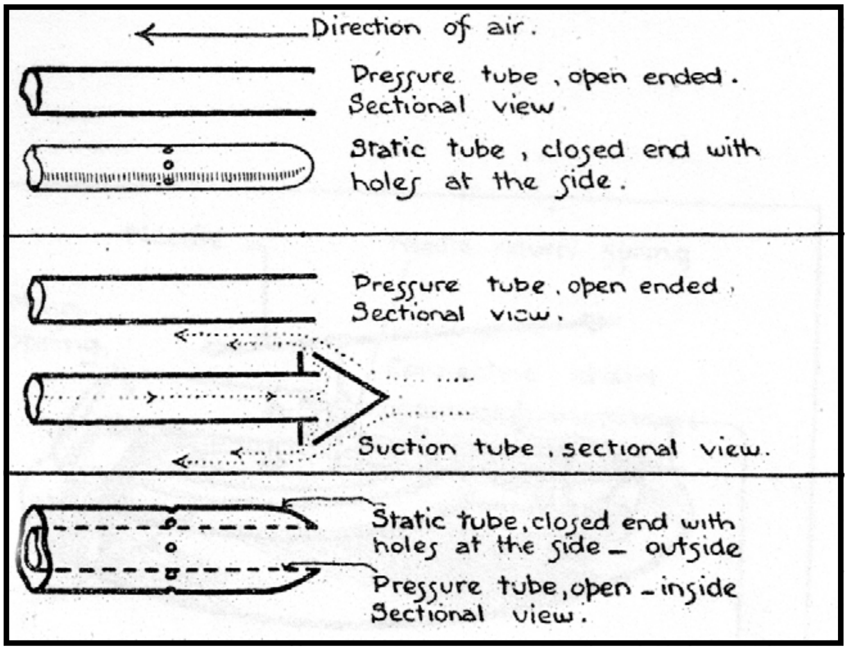
With the tail of the machine raised several feet from the ground, the compass should be set perfectly level, both laterally and fore and aft. The magnetic compass is an instrument for indicating the magnetic north, as the red end of the magnetized needle, to which is attached the compass card, always points to the magnetic north, unless affected by magnetic material near it on the ground or carried in the aeroplane. The compass card is pivoted at a point so that it is free to revolve in the horizontal plane. To damp out vibration it is immersed in a mixture of distilled water and alcohol (two parts alcohol to three parts water) contained in a kind of bowl, made of some non-magnetic metal, with a glass top or side to it, through which the pilot can read the bearing on the card. A mark is painted on the body of the compass, outside the bowl, in the direct fore -and-aft line, both of the machine and of the compass. It is called the "lubbers' line." As the machine alters course, or turns in the air, the compass card being pivoted remains stationary (although to the pilot it appears to rotate), and thus the nose of the machine, and with it the lubbers' line on the body of the compass, register with different figures on the compass card, and give the pilot the direction in which the nose of the machine is pointing from time to time



The dial of a compass

The compass card is circular and is divided into 860 degrees. The marking of the card is carried out clock-wise, i.e., N. = 360 degrees or 0 degrees; N.E. = 45 degrees; E. = 90 degrees; S.E. = 135 degrees; S. = 180 degrees; S.W. = 225 degrees; W. = 270 degrees; N.W. = 315 degrees; and N. = 360 degrees again. The lubbers' line, as well as the figures on the compass card, being painted with luminous paint, can be read in the dark. The cardinal points are N., S., E. and W.; the quadrantal points are N.E., S.E., S.W. and N.W. It is worth remembering that each degree contains 60 minutes (denoted 60'), and each minute con-tains 60 seconds (denoted 60") of an arc. One point of the compass is equal to 11 degrees 15 minutes.

Compass Error.



Pressure and static tubes used in conjunction with the speed indicator. The arrangement is known as the Pitot Tube

If the compass needle is not affected by local magnetic material in an aeroplane, its red end will point to magnetic north and its blue end to magnetic south. The angle that the needle is deflected from true north is equal to the magnetic variation. The angle that the needle is further deflected from magnetic north by magnetic material carried in the aeroplane is called deviation. The total error of the compass needle from true north caused by variation and deviation is called the compass error. Compasses must be swung from time to time to test their accuracy, or if magnetic material is added to the aeroplane, in the shape of machine guns, bombs, tool-kits, etc., it will cause the needle to deviate, from its correct angle. This error can be corrected, to some extent, by inserting small magnets in little holes provided for them in the fore-and -aft line, and also athwart the compass. On some compasses will be found a small wooden box fitted to the underside with holes for the accommodation of correcting magnets, while in others the slots for the magnets will be found on the top of the compass.

A common trouble with compasses is caused by a bubble forming in the liquid. To extract this the filler plug must be removed from the bowl, the bubble brought up into the plug hole, and distilled water added until the bowl is brim full. A fountain-pen filler or glass tube which will allow the bowl to be filled drop by drop may be used for the purpose. To counteract the expansion of the liquid due to changes in temperature, a small chamber of thin metal, capable of expanding and contracting slightly, is connected to the com-pass bowl by a small passage through which the liquid has access to the expansion chamber. Sometimes a bubble can be removed by pressing the expansion chamber when filling the bowl through the plug.

Great care is taken in compasses to insulate them from vibration. Sometimes the bowl is allowed to rest on a horsehair pad in a metal cup. It is also provided with rubber or felt shock absorbers, which assist in damping out the vibration and making the card easy to read.

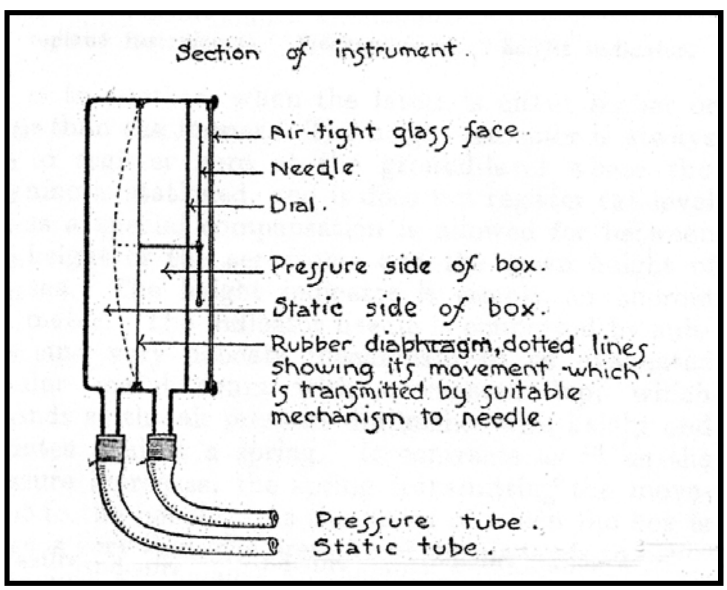
Compass Spinning in a Cloud.

The compass is an extremely reliable instrument, and pupils should accustom themselves to steering by it and learning to study its reading. If the compass card begins to spin when the machine is in a cloud, for instance, it is a sign that the machine itself is turning and not the compass card, the north point of which is always trying to point to the magnetic north as the machine is turning round. Sometimes the compass card can be used as a lateral level, for unless it is lying parallel to the horizon it shows that the machine itself is tilted. In the same way it can be used as a fore-and-aft level.

In some compasses the card is designed to be read on its side instead of from above. For this purpose it is attached to the rim of a flat float inside which the magnetic needle is carried. The float is pivoted, and the marking of the compass card, being on its rim, can easily be read as it changes its position. This type of compass is read from the back, and the figures omit the final " 0 " in the bearings for the sake of clearness. Thus, when the compass card reads 27 against the lubbers' line, which is also at the back of the instrument, the nose of the machine is pointing 270 degrees. The card, which is in the form of a vertical band round the rim of the float, is painted red and blue to represent the northerly and southerly semi-circles. This type of compass is used a great deal on modern aircraft, and pupils would do well to familiarize themselves with its design and mechanism, as it is rather different from the more ordinary and older patterns, in which the compass card lies flat and is read from above.

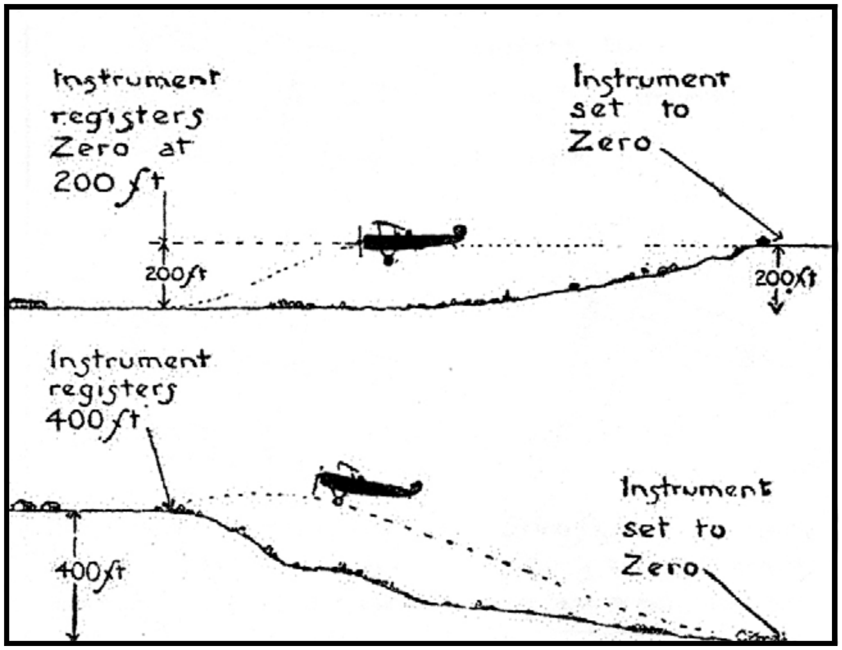
The Air Speed Indicator.

The air speed indicator is an instrument used to inform the pilot of his speed through the air and not over the ground. It consists, roughly, of two parts - the instrument and the Pitot tubes.



Section of Air Speed indicator box, showing the rubber diaphragm and pressure and static sides of

The tubes are fitted to the leading edge of the top wing, generally to one side of the central fore-and-aft line of the machine, so as to be out of the way of the slip stream of the propeller, which would cause faulty readings. On a pusher or a double-engined machine, with the engines placed one on each side of the centre line, the tubes could be fitted centrally, as the propeller draught would not affect them. There are two tubes arranged either side by side or concentrically, one inside the other.



Two cases in which the height indicator might mislead the pupil. The height indicator only registers the height of the machine above its starting point, so unless the ground over which the pupil flies is level with his starting point, the indicator will not be accurate.

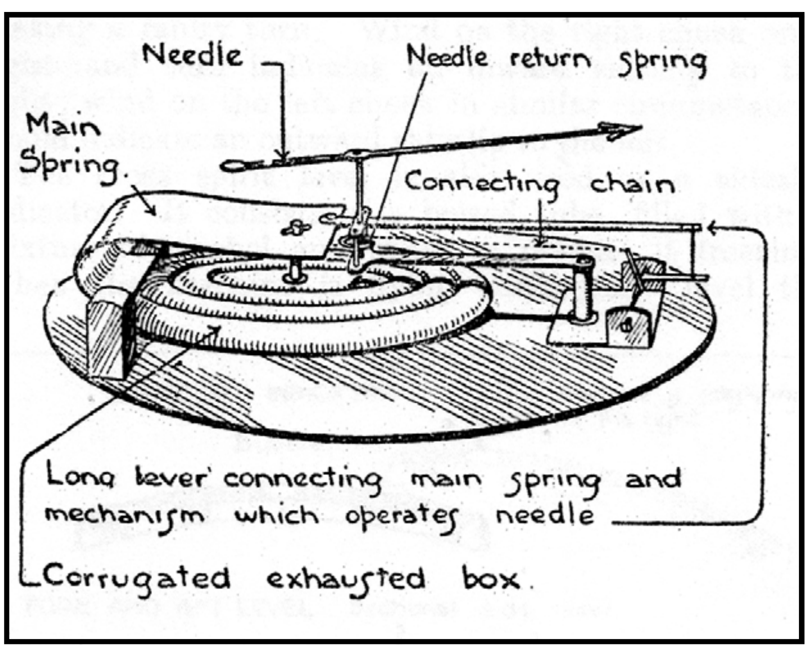
One tube has its end open to the air and the other has its end closed, but is provided with a ring of small holes in its side, or, in the case of the concentric tube, the inside tube has its end open to the air, whilst the outside one, with the holes in it, has its end tapered down and soldered to the inner tube. The first tube registers the pressure of air meeting it and rushing down the pipe leading to the inside of the instrument, which is enclosed in an air-tight case. In this case is a rubber diaphragm, which is compressed by the force of air created by the passage of the open-ended tube through the air when the machine is in motion. This tube is called the pressure tube. The other tube is connected to the underside of the rubber diaphragm which divides the instrument box into two airtight compartments, and transmits the pressure of the air at rest to this side of the diaphragm; thus a balanced result, or reading, is obtained. The difference in the pressure in the. two tubes is proportional to the square of the velocity. Air speed indicators under register with height, and to correct this error a simple method is given. Multiply the reading of the air speed indicator by the reading of the altimeter in the number of thousands of feet and divide by 60. This answer is the correction to be added to the reading of the air speed indicator. Example: Air speed indicator registers 100 m.p.h. at 6000 ft. 100 x 6 ÷ 60 = 10. Therefore the true air speed at this height is 110 m.p.h.

Faults in Air Speed Indicator.

The up-and-down movement of the side of the diaphragm is conveyed by minute and very delicate mechanism to a needle, which works round as a pointer on a dial marked off in miles per hour or knots. Generally, the lowest reading given is about 40 m.p.h. and the highest 160 m.p.h. To secure the correct functioning of the instrument, the following points are of importance :- (1) The tubes should be pointing straight against the air stream when the machine is in the flying level position: if they are canted up or down they will, obviously, give a faulty reading. (2) There must be no air leaks in the connections between the Pitot tube and the instrument. (3) Rubber joints are used in several places, and these should be properly secured by copper wire, not crossed or kinked, and should show no signs of perishing. These rubber joints are used so that the water which might accumulate in the metal tubes may be drained off when desired. (4) The instrument itself must be airtight, and for this reason a rubber packing washer between the glass cover and the body of the instrument must be properly fitted and the two parts screwed well home. Sometimes a careless mechanic may connect up the tubes vice versa to the instrument, or cross them at one of the rubber joints, so that an erratic reading will result. On most instruments the unions for the correct tubes are marked: P = pressure, or open-ended, tube, and S = static tube. It is never advisable to blow through the tube, as moisture from the mouth may get into it. The system can be tested better by sucking through the tube and then closing the open end and seeing if the needle moves. If it does, there is a leak in the in-strument or tubes.

The Height Indicator.

The height indicator is operated by the pressure of the air, and is affected by variations of temperature. It consists of a dial marked off in hundreds and thousands of feet from zero to 10,000 ft. or 20,000 ft., depending on the scale and the type of work for which it is intended. The dial can be set to zero by turning a milled ring.

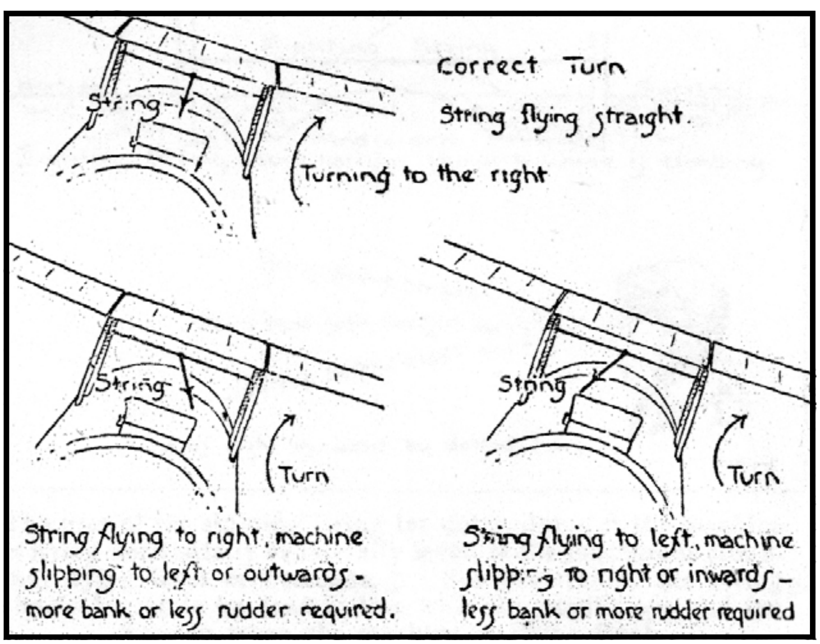


Mechanism of a height indicator

This would be necessary after a fall or rise of the barometer, which would upset the reading of the indicator. It would also be necessary, in the case of the machine being transferred from one aerodrome to another, when the latter is either higher or lower than the former. The height indicator is always set to register zero at the ground-level where the machine is stationed, and it does not register sea-level unless a special compensation is allowed for between the height of the aerodrome and the mean height of the sea. The height indicator is simply an aneroid barometer. The indicator needle is connected by suitable and very delicate mechanism to an evacuated circular metal drum with corrugated top, which expands as the air pressure diminishes with height and actuates against a spring. It contracts again as the pressure increases, the spring transmitting the movement to the needle. As the metal of which the box is made is very thin, the pressure of the air tends to make it collapse altogether. This is prevented by fastening the bottom of the drum to the bottom or bed of the instrument, and the top side to a spring. As explained, the pressure of the atmosphere in the box compresses it against the spring, from which the movement of the box is transmitted by suitable mechanism to the indicator needle. The dial of the instrument is calibrated correctly in feet, so as to give approximately correct readings of the amount of expansion or con-traction of the exhausted drum. With both air speed indicator and height indicator there is a very consider-able lag in their action, so that a reading of both instruments must only be taken as approximate at any given time. Height-indicators give very little trouble in operation, but it is advisable, when anything goes wrong with them, to send them to an expert for repair rather than to tinker with their delicate internal mechanism.

Contouring a Flight.

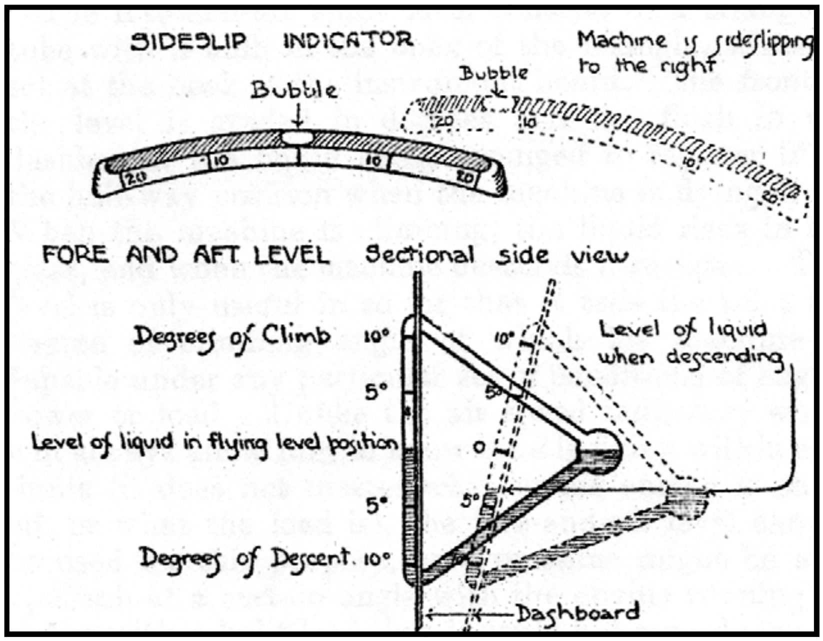
A barograph, or recording barometer, is sometimes used as a height indicator to show graphically the course taken by a machine in flight. The paper on which the recording needle writes is graduated vertically for this purpose in feet, instead of in millimetres or inches of mercury, and horizontally in hours and minutes.



Movements of the string sideslip indicator, which show whether turns are being made correctly.

It is situated on a drum driven by clockwork and made to revolve very slowly. If a pilot winds up the clockwork in starting he will be able, at the end of his flight, to see his up and down course through the air, to work out how long it took him to climb to such and such a height, and to note whether his rate of climb and glide was constant. He can also tell at what height he was at any moment of his flight. These recording barographs are sometimes used by pupils undergoing height tests, or when making cross-country flights, and a great deal of useful information can be deduced from the study of the completed chart of a flight. When a large number of these charts have been made, the instructor can use them to judge the skill of various pupils in climbing or gliding. A steady climb to 10,000 feet is indicated by a steady line, but if the line on the chart goes up in jerks or steps it shows that, for some reason or other, the pupil did not climb steadily, or else did not get the best results out of his engine whilst performing the test.

Trouble with barographs may be caused by friction between the pin and paper, or in the levers actuating the pointer. If the chart shows a number of quick, jumpy lines, friction in the mechanism's indicated.



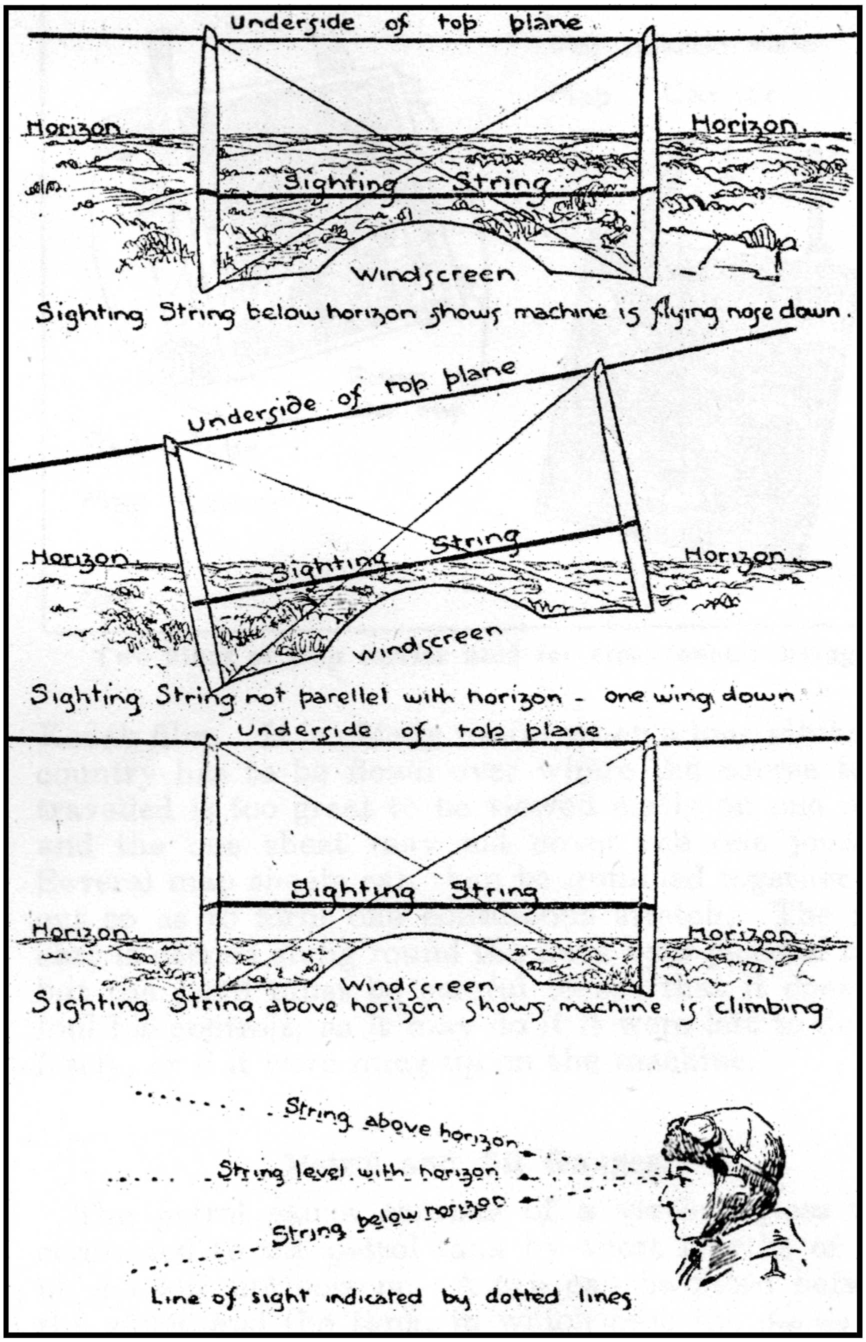
The sideslip indicator and fore-and-aft level. A non-freezing liquid such as alcohol is used in both instruments.

The Sideslip Indicator.

The best sideslip indicator is undoubtedly provided by a simple piece of string or tape fastened to a strut or cross bracing wire of the machine in view of the pilot. It is allowed to fly back by the forward motion of the machine in the air. When the machine is flying straight, or being turned with a correct amount of bank, the string will continue to trail straight back dead in the fore-and-aft line of the machine. If, however, it tends to trail out sideways, either one way or the other, it indicates a sideslip in the direction away from which the string is trailing. Thus, if the string is trailing out to the left from its anchoring point on a left-hand turn, it shows that the machine is slipping to the right or outwards.

If, however, it is trailing to the left on a right-hand turn, it indicates an inward sideslip to the right. The pressure of the wind noticed by the pilot on his cheeks should also tell him that he is making a faulty turn. Wind on the right cheek on a right-hand turn indicates an inward sideslip to the right; wind on the left cheek in similar circumstances would indicate an outward sideslip to the left.

The cross spirit level is also used as a sideslip indicator. It consists of a bowed tube, filled with a mixture of alcohol and water to prevent it freezing. When the machine is flying horizontally level the bubble is in the centre of the level, which is marked 0°. When a wing drops, the bubble moves away from the low side; but on a turn correctly executed it will remain central, as the centrifugal force, which tends to throw the liquid outwards, will have been balanced by the correct amount of bank. If the bank is too small for the turn, the bubble will travel to the inside of the turn as the centrifugal force will cause the liquid to fly outwards. The remedy in this case would be more bank or less rudder.



The uses of the sighting string for determining if the machine is flying horizontally or laterally level. If the machine is climbing, flying level or descending. For preference, the string should be set to be dead in line with the pupils eye and the horizon when the machine is flying level.

If the bank is too great, the bubble will go to the outside, while the liquid slips inwards. The cure is to put on more rudder or to decrease the bank. These remarks apply to all moderate turns, banked up to 45 degrees, and for all turns correctly executed, however steep, the bubble should remain central in the cross level. The use of this instrument in the air is much more likely to muddle beginners than to be of assistance to them. It is far better for them to learn to fly accurately by sight and feel or touch of the machine than to fly by the use of instruments, which, although useful as a means for checking the accuracy of their judgment in flying, are liable to mislead them and to break down.

Horizontal Sighting String.

Some pupils have been materially assisted in their early flying by fitting a string stretched horizontally level across the machine dead in their line of sight. This horizontal sighting string, when compared with the horizon, assists a pupil to maintain his machine laterally level. Unless the sighting string is parallel with the horizon, the pupil knows that he is not flying laterally level. If the string dips below the horizon to the left, he is obviously flying with his left wing down, and he must move the control lever to the right to pull the wing up, centring it again as the machine comes up level. Assuming that when the machine is flying level in the fore-and-aft line the string is set to be dead on the horizon, from the pupil's point of view, the pupil can see in a moment if he allows the machine to get its nose down or to climb. In the first case the string will drop below the horizon, whilst in the second it will appear to rise above it. It has been found a great help to the pupil to have the sighting string dead in line with his eye, as otherwise he would have to judge his position laterally and fore and aft by compar-ing the nose of his machine and the underside of the top plane with the horizon. This double comparison is too much for the beginner, who finds it difficult to gain any idea as to the position which the machine is assuming m the air, whereas with the string he has only one point to keep in mind. The fitting of the string also teaches him to look out ahead of his machine, which is the proper direction in which to concentrate, instead of looking at instruments or aimlessly watching odd pieces of ground, sky or machine that may attract his attention from time to time, which, until he be· comes very much more proficient, cannot possibly assist him to keep the trim of his machine correct.

To be continued…………..

2012 Contest Calendar

For Up-To-Date details visit

www.maci.ie

Scale

Please note

All Scale Championships, except the Scale Nationals, will be held on a Saturday. In the event of a large number of competitors or bad weather on the Saturday, then the Sunday will be utilised. Please check with the contact below, or visit the MACI web-site, on the Friday that the competition is going ahead.

13th May	Scale Fly-In *Melvin Inwood 045 433050*	Curragh
27th May	Scale Fly-In *Paul Fetherstonhaugh 087 1331736 scale@maci.ie*	Laois
June 10th	Scale Nationals *Contact Andy Ryan rinomodels@gmail.com*	Model County FC
23rd/24th June	Leinster Scale Competition *Paul Fetherstonhaugh 087 1331736 scale@maci.ie*	Laois
14th July	East Coast Scale Champs *Contact Liam Jackson 087 2562293*	Roundwood
11/12 August	Scale Gala (competition) *Declan Henegan 087 2625868 declan.h@unison.ie*	Midland MFC
August 25th/26th	Scale Nationals *Contact Andy Ryan rinomodels@gmail.com*	Model County FC
2nd September	Scale Fly-In *Contact Melvin Inwood 045 433050*	Newbridge
16 September	Scale Fly In *Declan Henegan 087 2625868 declan.h@unison.ie*	Midland MFC

F3A

19th/20th May	Munster Champs	Cork MFC
	Noel Barrett 021 2475971 nbarrett@indigo.ie	
16th/17th June	Tipperary Champs	Carron MFC
	Gordon James 086 8269840	
30th June/ 1st July	Tripple Crown	Scotland
14th/15th July	South Leinster Champs	Model County MFC
	Brian Carolan 087 6509848 brian@emeraldhobby.com	
Jul 26 - Aug 5	F3A European Champs	Chateauroux, France
	Pierre Pignot +33 5 49235532 pierre.pignot@orange.fr	
18th/19th August	F3A Nationals &Team Trials	Carron MFC
	Gordon James 086 8269840	
25th/26th August	Backup for Nationals	
	Gordon James 086 8269840	
15th/16th September	AAA & Team Trials	Cork MFC
	Noel Barrett 021 2475971 nbarrett@indigo.ie	
22nd/23rd September	Backup for Team Trials	
	Noel Barrett 021 2475971 nbarrett@indigo.ie	
6th/7th October	Back up date for first event cancelled.	
	Angus Balfour 086 0407648 aerobatics@maci.ie	

Helicopter

14th April	F3N Championships	Athlone
	Noel Campion 087 9670668 helicopter@maci.ie	
12th May	F3N Championships	Shannon
	Noel Campion 087 9670668 helicopter@maci.ie	
16th June	F3N Championships	CMAC Brinny
	Noel Campion 087 9670668 helicopter@maci.ie	
1st/2nd September	Heli Nationals	Carron Tipperary
	Noel Campion 087 9670668 helicopter@maci.ie	

Control Line

12th August Control Line Nationals Cork MFC Brinny
Ralph McCarthy 087 8322791 ralph.mccarthy@cit.ie

Gliding

6th/7th May	Fly In (Aerotowing + Slope Soaring)	Cork MFC
	Richard O'Brien 087 9810851 glider@maci.ie	
TBA	Gliding Nationals	Tountilla
16th June	Shannon MFC Glide In	Tountina
	Gerry Buckley 086 3497493	

July 21/22 Bandon MFC Fly In **Clashafree, Bandon, Co Cork**
All welcome Flying Site Coordinates 51⁰ 44’ 23.40” N
All Models 8⁰ 41’ 40.15” W
Contact Jackie Kelleher 021 4506757

The next MACI Council meeting will take place on Tuesday May 22nd 2012 in the Killeshin Hotel, Portlaoise, at 8:00pm.

Irish Pilots at Retroglide 2011