

He Lit the Lamp

If you had asked people in the 1920s and 1930s to name an eminent British scientist, then most people would have probably have picked Professor A.M. Low! Professor Who, I hear many of you say! Well, there's lots to tell you about a very remarkable personality of the time, and when I have finished you will still be far from sure what to think of him

He was in the news as early as 1914 - with 'Televista', an early 'Zoom', you could say. He realised that television was coming but the inadequacies of the technology and the start of WW1 put paid to Low's Televista and delayed the German work of Arthur Korn. Television had to wait for Baird and others 20 years later.

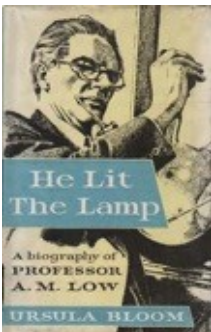


Low was a practical engineer and prolific and versatile inventor, but he was also a futurist, progressively more so. And this is what he wrote in 1925.

Future man will carry a pocket radio set everywhere he goes and television will make long-distance business conferences possible. It will also make it possible for schools to link up, hearing and seeing the same university lecturer at the same time and following the lecture by diagrams upon a wireless-controlled blackboard

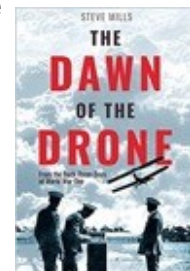
Few would have thought that credible almost 100 years ago.

Low was Archibald Low. He never had an academic chair and his claim to be a professor was rather flimsy. And a lot of his fame came from his own talent for publicity, helped by associating with the aristocratic and famous. So here he is in the Tatler in 1928. He's top-left; John Moore-Brabazon, later Lord Brabazon, is bottom row, second from right. He plays a part in the story.



Low was a man of considerable talent and versatility. Soon after his death in 1956, his biography, written by Ursula Bloom, entitled "He Lit the Lamp". That no doubt referred to the Lamp of Knowledge and to Low's ability to illuminate difficult subjects by explanation. A good deal about him was also written in "The Dawn of the Drone", and I'll come back to that.

Ursula Bloom wrote hundreds of books, but most were light fiction. Low, as a writer, was also prolific. But some of his books were very substantial. My own school Physics prize in 1946 was a copy of "Science Looks Ahead" - 640 solid pages. I still have the book, and I'll come back to it.



Here are some of the many books by Low which contributed to the popularisation of Science in the 1930s and 40s. But Low was far more than just a writer. He was an engineer, inventor, and innovator with a mercurial mind. He was influential, and he was often perceptive in his visions of the future. Mind you, his fertile imagination often ran riot, feeding his public image, though that's easy to say from today's perspective.



Archibald Low was born in London in 1888. He was already experimenting at home in all sorts of ways by the time he went to St Paul's School. There, he sat next to Bernard Montgomery, who he regarded as rather dull. From St Paul's School he went to the Central Technical College, which soon became Imperial College. And that was where he really blossomed. His inventions started to flow, starting with some drawing instruments which were marketed. This was one.



But then his interest moved into motor engineering and his first patent was for a hydraulic clutch mechanism in 1907, when he was still at College. A year later, at the age of 20, he bought his first car, a Panhard. By that time he was working with his Uncle Ted in the "Low Accessories and Ignition Company". Archibald was bubbling with ideas which led to several more patents, mostly in motor engineering. His "Cup Plug" sparking plug was quite successful, He experimented with gas turbines. But larger patented ideas such as his Forced Induction Engine and his gearbox pre-selector needed money and persistence -which he did not possess. Perhaps the most important thing he did during this period was to write his first book "The two-stroke Engine". This is still well-regarded in a historic sense, and was reprinted only a few years ago. There is even a Kindle edition!



Archibald Low lacked the persistence to push things through; his mind was always on the next idea. And very soon his enthusiasm was turning away from machinery towards electronics and wireless. And in particular towards television.

The word 'television' had been coined in about 1900 and Low was not the only inventor with ambitions on this subject Selenium was the key component for Low and others. It was essentially the forerunner of Silicon for photo-electric cells and also for rectifiers. It was used right up to the 1950s. I certainly remember using Selenium rectifiers, which were well-known for the malodorous smell when they failed! I know!

Low constructed a matrix of Selenium cells and a kind of mechanical distributor to connect the electrical outputs to a telephone line. At the receiver, an array of bimetallic strips opened light paths. Unbelievably, it worked and could be demonstrated. He called it Televista. Of course it was really more like fax than television.

It was seen by Gordon Selfridge who staged an exhibition of the latest technology in Selfridges, with Televista in pride of place. So Low got publicity, even though there were actually already others with more advanced systems. That was 1914, and WW1 soon began. That was really the end of Televista, though Low did try to resurrect it Post WW1.

Low was now in the public eye, and very soon a strange affair occurred, reported widely and generally believed. This is from one newspaper report in 1914, early in the war.

1914 – Dastardly Attempts !

The story of the attempts to murder an eminent young British scientist, Dr. A. Low, will be read with the deepest indignation. As far back as August two shots were fired at him while he was engaged in his laboratory.

But the second effort was fiendish in its deliberate cunning. A young German paid a visit and the Doctor accepted a cigarette from his case, to discover that it contained enough poison - strychnine chloride - to cause death! It is be presumed that the brilliant young inventor of the Televista has incurred the ill-will of some Teuton or Teutons.

What a story! Was it true, as many writers seem to assume? Or was it a publicity stunt by Low himself, who was perfectly capable of that? Or was it propoganda designed to stir up anti-German feeling? Or perhaps it was partly true, but embellished?

But whatever you think about it, Low was on a bit of a roll. He enlisted, received Officer Training, and then, no doubt based on his public reputation, he was put in charge of the Royal Flying Corps Experimental Works. And it seems to have been a good choice. The idea of an aerial torpedo had already been mooted, and he began on the 'AT', more innocuously referred to as the Aerial Target to confuse the Germans. It was essentially a remote-piloted aircraft, or drone, with the potential to become a guided missile.

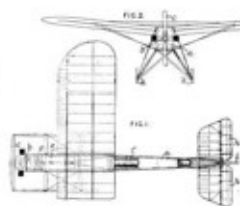


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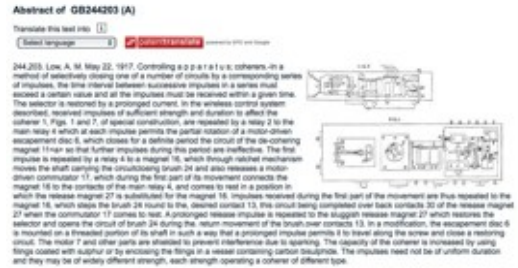
244,258. Low, A. M. Jan. 9, 1918. Aerial warfare.-A self-propelled aeroplane carrying an explosive or incendiary charge *a* is fitted with wireless control mechanism *f* as described in Specification 244,203, [Class 40 (v), Wireless signalling &c.], and with actuating gear *g* as described in Specification 195,101, [Class 40 (j), Electric signalling systems &c.], for controlling the elevating planes *h* and steering rudders *i*. The exhaust from the internal combustion engine *b* driving the propeller *c* may be used to produce a smoke aerial as described in Specification 197,406, [Class 40 (v), Wireless signalling &c.]. The charge *a* may be fired by percussion or by wireless. Slide *k* may be provided for use in giving an initial launching impulse to the machine.



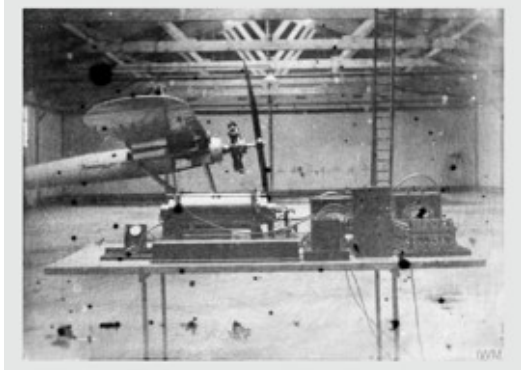
Zeppelins were a potential target.

Rather remarkably, but fortunately for the historian, he was able to describe the whole thing in two patents, applied for in 1918. He called it "Improved Aerial Projectile".

Ruston Proctor, the agricultural machinery people built the first aircraft. Low's group built the wireless control equipment and patented this too. One could hardly call it electronics. The radio waves activated 'coherers' which were tubes of filings which cohered to close a circuit. That activated an electro-mechanical stepping system which was able to selectively operate the aircraft controls. The first one flew at



Upavon in March 1917 in front of many generals. It was launched by compressed air. It flew, and control was convincingly demonstrated before it crashed. Work continued with some moderate success, Sopwith taking a larger part. But it was never used operationally. The Zeppelin raids stopped in 1917.



After WW1, work on pilotless aircraft was taken up by others. The Royal Aircraft Establishment

built the Larynx in 1927. De Havillands built the Queen Bee in 1935. But it is acknowledged that Low started it all.

Back then to Low in 1917. Here he is with a transmitter.



The Navy heard about the work and Low and his team successfully applied the same wireless control system to a motor-torpedo-boat. Several boats were actually built,



known as Distance Control Boats - DCB. They could be successfully controlled from an aircraft overhead. The book, "The Dawn of the Drone" goes into a lot of detail, which is supported by material at the Imperial War Museum including actual equipment. And one of the DCBs themselves has recently been restored. Relics of Low's WW1 work are in the Imperial War

Museum, presented to them in 1955.

Low also did rocket experiments, and this too is represented in the War Museum collection.

He would continue to be associated with rocket-science for the rest of his life.



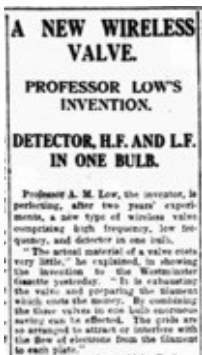
The sending gear for the boats was one of 14 patents that were assigned by Low to his employers, the Services. Two others assigned were for electric gun-timing apparatus, and for a gun-silencer audiometer. There were many more patents in Low's own name covering aspects of wartime work on torpedos, gyroscopes, airships, wind-tunnels, gun-silencers - and more!

Low got something else important out of this. as well as his patents, his reputation and many influential contacts. The Army Council made him an **Associate Honorary Assistant Professor of Physics** at the Royal Ordnance College - enough for Low to adopt the Professor title thereafter.

Low Engineering got back into business after WW1 ended. Nearly all the ideas, in a range of activities, were his own. The three major areas were in Motor Engineering, Noise Reduction and Recording, and Wireless.

I suppose he'd got his enthusiasm for wireless from the war work.

Low Engineering marketed this 2-valve portable radio. How things have changed. Not only in the technology but also in the perception of value. Motor Sport magazine said that it was not expensive. But £16 5s then was about £1000 in today's terms. Low realised that.



Radio valves were expensive items. So he designed a valve with three functions in a single envelope. But by 1925 when he had sorted out the design he was a very small fish in a big pond, and he took it no further.

Another of Low's interests was in the field of noise suppression and audiometry. It stemmed from WW1 work. He had designed and patented an aircraft machine gun silencer and in the course of the work he designed an audiometer to measure sound. This work contributed to a small book, the Oscillographic Monograph.

Now these were the days before the cathode ray oscilloscope, so oscillographs were developments of mirror galvanometer.s. In Low's audiometer a diaphragm made the mirror vibrate, and the light beam created an image of the sound wave on a screen or photographic film.

Low became well known for tackling noise pollution. One successful area was the soundproofing of London underground carriages.



He also made voice-recordings of famous people over a very long period - as here.



But motor vehicles and their technology were a continuing strong interest. Many of his patents were in that field. And he had a close involvement with motor-racing at Brooklands. He was a member of what was then called the Junior Car Club, which was rather more important than it sounds, and where he hob-nobbed with the influential. And he was a member, soon President, of the British Motor Cycle Racing Club.

I'll pick out one example of a vehicle component that he worked on - the springing. Low was not at Brooklands just to watch the racing. Here he is using a cinematograph camera to study springs. And he wrote a book on the use of cinematography in engineering design.



Several of Low's patents were for springs. And one is of particular interest. Vehicle designers know the desirability of minimising unsprung weight. And one approach is an internally sprung wheel. Low patented one design, probably ahead of anyone else. But in fact it was George Dowty, here in Cheltenham, who made a success of the idea with a 1928 patent and actual application to the Gloster Gladiator and other aircraft undercarriages. There was a heritage award for this in 2018. Triumph motorcycles also used an internally sprung wheel in the 1940s/50s.

Vehicle components alone were not enough for Low. Together with Victor Bruce, the son of Lord Aberdare, he designed and built this motor-cycle in 1922. It was well ahead of its time. It had a smooth 4-cylinder 2-stroke engine and shaft drive. Engine and mechanical parts were fully enclosed, so it was clean to ride - suitable, he said, for men in white tennis trousers and for ladies in skirts. It was a demonstration of what was possible, but was too expensive for production at that time.



However his work on motor-cycles and vehicle technology led to high-profile appointments. He became, at various times,

- Chairman of the AutoCycle Union
- Chairman of the RAC Motor Cycle Committee
- Chairman of the British Automobile Racing Club
- President of the British Motor Cycle Racing Club

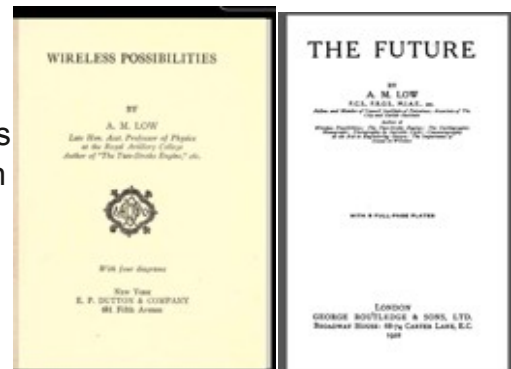
Moving on, Low was an enthusiast for rockets, going right back to his work in WW1. His understanding of rockets and of the possibilities for space exploration led to his becoming President of the British Interplanetary Society. And he experimented with rockets. Here he is with a speedway motorcycle fitted with 4 solid-fuel rockets.



There is much, much more in Low's patents, perhaps as many as 200 of them. His vast experience with patents led to his becoming the President of the Institute of Patentees.

Some patents were solid engineering; some were curiosities.

But I will now start to talk about his books, which took more and more of his time. Early books were on practical matter-of-fact subjects. But in the early 1920s he became more adventurous, indulging in speculation about the future. These were the first two. The quotation I showed at the beginning is from that time, 98 years ago. Low's more perceptive writing is in "Wireless Possibilities". In the other book, "The Future", he allowed himself to range very widely over areas that he found socially interesting. Some of his ideas seem rather wild - but then he wrote it 100 years ago.



C.E.M. Joad, the Brains Trust man hated the book, as we see here.

The complacency and shallow optimism of Professor Low's book will endear it to those classes of the community which are helping to make the future that Professor Low foresees; but in the minds of those who still care for beauty and romance, for leisure and country sights and sounds, and whose ideals are not summed up in the words cleanliness, convenience and comfort, this picture of the scientific future cannot but arouse a feeling of repugnance, as of a world that, losing its soul, has become a mechanism.

Joad said he would "pray to heaven that his future would not be cast in the world of Professor Low."

But as they say, there's no such thing as bad publicity. This may well have helped to make Low a well-known public figure, much in demand as a speaker, sure to entertain as well as to inform.

Low waited a few years before his writing activities really got going in a big way. It's quite possible the great depression, and the earthquake of the 1929 election, when the conservatives lost 154 seats triggered this off. One of those who lost his seat was John Moore-Brabazon, later Lord Brabazon. Brabazon was a graduate in engineering. He first flew in 1908 and in 1909 he proved that pigs could fly! In WW1 he worked on aerial photography in the RFC and no doubt that's when he met Low, and started 40 years of friendship. They are together in the 1955 presentation of Low's WW1 material to the Imperial War Museum. (above)



Brabazon became a politician after WW1, but on losing his seat in 1929 he and Low started the Armchair Science magazine.. He wrote articles on physics in early issues, and Low wrote on subjects which included relativity. Low was the man who could explain difficult science to laymen and to the young, Brabazon soon went back to politics and achieved fame and a title. Low himself was selected as Conservative Candidate for



or Wednesbury in 1934 but never became an M.P.. Low and Brabazon were certainly part of Society, with a big 'S'. Here they are again. All very jolly! These are the people who started the Junior Car club, which became the British Automobile Racing Club of which Low became Chairman for a while. BARC is still the leading organiser of motor sport.



And Low, this strange scientist, must have been magnetic to the ladies of society - ladies with a big L. He had an affair with Lady Cynthia Tothill. Here she is advertising Pond's face creams. She was certainly an A list celebrity of the 30s, and later became one of the Debs of Bletchley Park. Low dedicated two books to Cynthia.



The affair with Lady Cynthia resulted in both their divorces in 1936. But Low's wife Amy re-possessed him in 1940, annulling the divorce with his agreement. That's another extraordinary episode in Low's life! And Amy was acknowledged as the illustrator in some books.

Well, that's an aside. Back to the science and the 1930s. Before moving on to the books, here's Low himself talking in 1933. (Movietone video)

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Low wrote about 15 Popular Science books in the 1930s. He also wrote some science fiction. The first of those , "Peter Down the Well' he called an adventure in thought.

At about this time, the booksellers, Foyles, set up a number of book clubs, and one was the Scientific Book Club. Of course Low was involved. Here's a 1938 advertisement. 2/6 per book, with maximum postage of 6d. I remember being a Member in the 1940s.



Low's books continued to appear in the war years, many concerned with the technology of war.

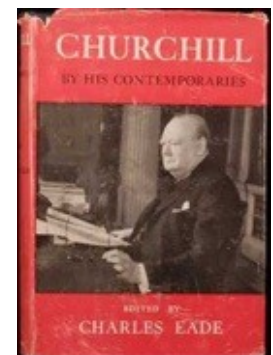
"Science Looks Ahead" was written in 1942. He had notable collaborators in this 630 page work published by the OUP. They included the Astronomer Royal, Sir Harold Spencer-Jones, Julian Huxley, Alliott Verdon Roe and more. These notable people contributed about 120 pages. But Low wrote all the rest himself. In 14 sections, he ranged over most areas of Science with astonishing detail, clearly set out. He expected to see:

- 6000 60MW wind-turbines - not quite beyond the bounds of possibility. Today's large wind-farms
- gyro controlled single-seater in the form of a bicycle. The Segway
- possible to cook a dinner in a cold oven. Microwave oven
- 'radio-knife' in surgery Laser surgery
- dial automatically to any part of the world World-wide telephony
- telephone from motor cars and even pocket apparatus Mobile phones

I think that this was Low's magnum opus. It must have involved a huge amount of work. And yet he published several other books in 1942, including his book on parachutes which itself extended to 232 pages.

And he still had a dozen or so more books to come in post-war years. His last was "Thanks to Inventors", published in the year before he died. He was still inventing; the last one was a novel sand-operated mechanism for mechanical toys.

He also contributed "Churchill and Science" to the notable compendium "Churchill by his Contemporaries". Famous people contributed. Now one might have thought that "Churchill and Science" would be written by an FRS or a Nobel Laureate. Or a wartime scientific adviser like Lindeman, Tizard, or Zuckerman. So what a feather in Low's cap.



Well how do we label Low. Many, quite understandably, dislike the 'Eminent Scientist' tag, and some use the term 'maverick'.

He was certainly remarkable, with diverse and impressive achievements. In particular he was a supreme and publicly esteemed science-populariser, long before today's many science-popularisers.

If he was around now, he'd be a sellout at the Cheltenham Science Festival - with a new book to promote at each appearance.

Here is the ending of "Science Looks Ahead" which makes a good conclusion.

"To have discovered our place in time, and to have learned to love the wonder of everything we see – such is the state of mind that will enable us to attain a fuller understanding of this universe and to play our modest part in its perpetual onward flow."