

# OF RADIO CONTROL

**T**HERE CAN BE FEW who enjoy the present state of R/C — radio gear that is sophisticated, reliable and cheap (really!), easily built models with good performance, large range of supporting fittings and gadgets, etc. — who have much idea of how this Utopian state of affairs, once regarded as an unattainable dream, came about.

To cover the history of R/C fully would be far too long and tedious for an article such as this, for there were a number of periods when no apparent progress was being made, but an attempt to pick out the more interesting 'high spots' might reveal some 'little-known-facts' about our favourite hobby.

The story starts much earlier than you might think, long before successful powered model aeroplanes appeared, in fact. For instance, 'Straight and Level' reader R. P. Meredith of the North Birmingham Model Power Boat Club sent a cutting from a national daily newspaper — the 'Daily Sketch' dated June 1910 — which, under the heading 'Airships and boats controlled by wireless waves,' describes how two engineers, Messrs. Healey and Roberts had been giving demonstrations at Dagenham Lake, Essex, "of their power to steer electrically propelled airships, boats and torpedos by wireless waves." Illustrations showed 'the operator standing by his induction coil on the bank and guiding a launch about the lake' and 'Mr. Healey's model airship which was controlled in its movements about a shed.'

During World War I or 'The Great War' as it was appropriately known until we had to start numbering them, there were experiments in England to produce radio controlled flying bombs, masterminded by prolific scientific experimenter and writer Professor A. M. Low. Some indication of the importance of these projects is given by the fact that, as well as the Royal Aircraft Establishment (or RAF, as it was then) de Havilland and Sopwith were involved, and after sporadic tinkering with normal aero engines, Granville Bradshaw developed a special engine for the purpose, the successful 35bhp ABC 'Gnat' opposed twin.

As far as can be ascertained, none of the projects were successful and the same can be said of experiments in the USA and Germany, though in the latter case it is of

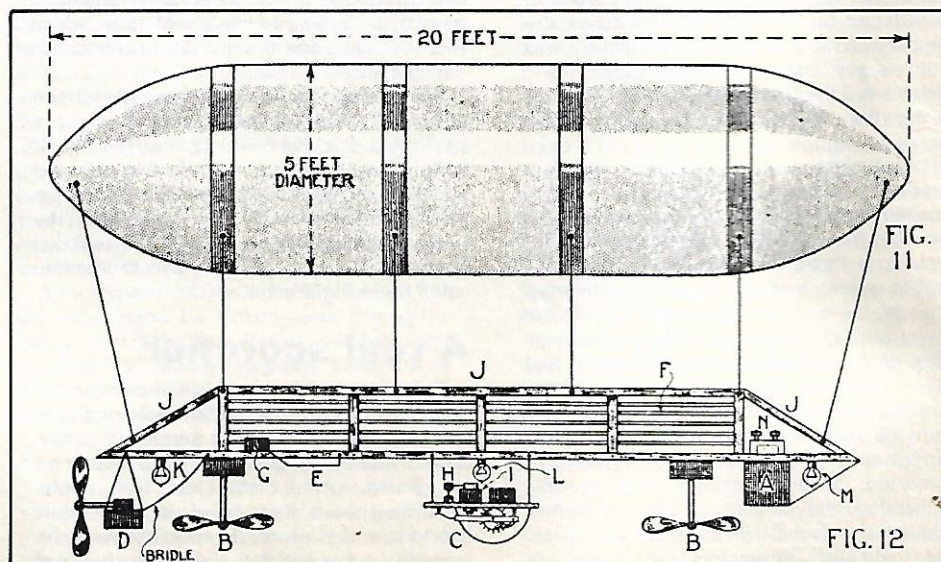
interest to note that a wire guided bomb was actually built by Siemens, a principle that reappeared in WWII as the operational 'X-4' missile.

In the twenties, 'Jane's pocket book of RPV's' tells how RAE finally got an R/C aerodyne to fly more or less successfully, and how three Fairey IIIFs were modified to fly by R/C. This involved increasing the dihedral to ten degrees 'to enhance stability' though we modellers know that the main reason would be to give yaw/roll coupling as the Fairey 'Queens' as they were known, had simplified controls rather like our own 'rudder only' models.

At the same time, one Major Raymond Phillips was touring the country giving displays with his electrically propelled and controlled model airship. Flown in large halls and cinemas — one of my Lincoln Model Centre customers had actually seen one such display in a cinema quite close to the shop — it used a spark transmission system (hence the German term 'Funk-gerät' — 'spark apparatus' — still used and meaning 'radio') radiating a vast amount of energy right across the spectrum. The controls were selected by a sequential system and must have been the first application of control 'puffers' now used on such things as Harriers and Space Shuttles, though in the major's model, separate motors and propellers were used for the 'up-down' 'left-right' functions. Nothing new under the sun?

R/C modelling as we now know it started in 1934 when Hollywood actor Reginald Denny, a keen modeller and model manufacturer, produced a nine foot model of a type that would be instantly familiar to today's vintage fraternity, and offered it to the Army as a practice target for AA gunners, but it crashed on its demonstration flight. Later, a simpler, welded-steel tube affair with a five channel tone filter radio — a type later perpetuated in Graupner's 'Varioton' equipment — was much more successful and was built on a vast scale. The controls were rudder, elevator, two channels for each, with the fifth channel operating the engine cut-off and 24 foot recovery parachute deployment, though the drone could be landed normally on its wheels and frequently was. As the government contracts rolled in, the plant was expanded to become Radioplane Inc. and one of its employees was one Marilyn

Major Phillips' airship and the associated control gear. Was demonstrated in public on many occasions in the 1920s.



**In the beginning ...  
how it all began.  
Peter Russell  
traces the history of  
R/C for models**



Monroe, working in the wing assembly section, later to become the famous actress. Not a lot of people know that. (Reginald Denny was once a member of the St Albans MAC — and not a lot of people know that either — DB).

From the point of view of the amateur aeromodeller, articles were appearing in 'Model Airplane News' as early as 1936, when glider enthusiast Ross Hull produced a big glider with the earliest known application of the escapement principle for sequential rudder-only control. In the interests of simplicity and reliability, the escapement was powered by a twisted rubber band, a system that was to become well known 20 years later. The model "made more than a hundred flights but not without some fifteen crack-ups. However, the number of crashes due to radio control failure could be counted on the fingers of one hand."

The following year saw the introduction of a contest category specifically for R/C models at the American Nationals, and this is when things started moving. Chester Lanzo, one of the leading lights of the very successful Cleveland (Ohio) aeromodelling group, a personal friend of the writer and still flying R/C, won this first event with a model almost identical to the 'Lanzo Record Breaker' popular with today's vintage fans. Chester once confided that the prize was really for models carrying radio equipment because the 'control' bit was somewhat unconvincing!

The following year saw the Good brothers, Walt and Bill, win with a model now displayed in the Aerospace section of the Smithsonian Institution in Washington. Walt was already well-known and successful in the free-flight sphere and had won a number of contests with his 6ft. Brown powered 'Guff' — one of his prizes was lunch with Reginald Denny! The 8ft. R/C model was on similar lines to the 'Guff', fuselage based on Charlie Grant's then highly regarded 'low-centre-of-lateral-area' theory in which the fuselage side areas were arranged to give spiral stability, hence the rather queer shape. The wings reverted to straight dihedral and used the Grant X-8 wing section, a feature of proven merit as opposed to the 'Low CLA' theory which was somewhat less convincing. The structural design of the aeroplane was something of a classic of lightweight yet durable construction.

The writer's replica, built some 25 years ago to the 'words and music' in a 1941 'Air Trails' magazine, has done a vast amount of flying with many different engines, including the Brown, Ohlsson and Denny engines that powered the original, and has never given any need to be modified in any way, except in the case of the undercart location which was altered to remove ground looping tendencies. This was in line with the Goods own mod., incorporated in 1946.

The radio gear was, of course, all home made stuff, using mostly 'normal' radio components of the time. The transmitter was a 'push-pull' affair feeding a big dipole antenna and powered by a rotary generator. The receiver was a one valve super-regenerative type operating a polarised relay which worked on a current change of no more than one or two milliamperes. This operated in turn the sequential rubber powered escapement that deflected the rudder. To save weight, the valve base was removed and the exposed filament, grid and anode wires soldered direct into the receiver circuit. One of the big snags with these state-of-the-art radios was that they had to have a



Possibly the first book about R/C, Major Phillip's book published by Cassells in 1927 at 2/6d - 12½p.

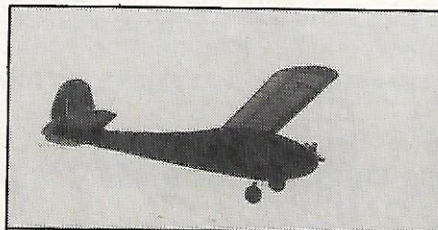
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Radio control goodies available in 1927 - that spark coil was the basic transmission component, wide band width!



Peter's replica of the Good Brothers 1938 R/C model, all authentic except for under-size airwheels. They later moved the wheels aft to reduce the ground-looping tendencies - so did P.R. in the 1970's. Picture taken in the 1963 freeze-up.



A 6in. square hatch was necessary for access to the original receiver in the writer's model. Wings of the 'Goodship' fold when de-rigged.

high voltage supply for the anode circuits — usually about 45 volts for the receiver and anything up to 180 for the transmitter — hence the rotary generator. Nevertheless, with a lot of ingenuity, the Goods got the airborne R/C weight down to little over one pound, a high proportion of which was the 'high tension' battery. Slightly unusual by

later standards was the fact that both the escapement and its rubber band power unit was mounted inside the fin.

For the 1938 Nationals winning flight, the tailplane got knocked out of adjustment during the take off, so, like Chester Lanzo's winning flight of the previous year, there was some doubt whether the radio was really controlling. At the 1939 Nats., however, there was no doubt, and the Goods put on what must have been just about the first really convincing display of R/C flying in public. With Bill on the transmitter (he had a 'radio ham' licence — theoretically, Walt could not legally do so) the model flew around obviously under control, did some figures of eight round designated markers and landed quite close to the transmitter. Modellers' — as opposed to scientists' — radio controlled flying had arrived.

The outbreak of the second 'Great War' might seem a convenient point to make a break in this treatise, but from a technical point of view, this is not the case. Although



[Copy of letter received from the Secretary,  
General Post Office.]

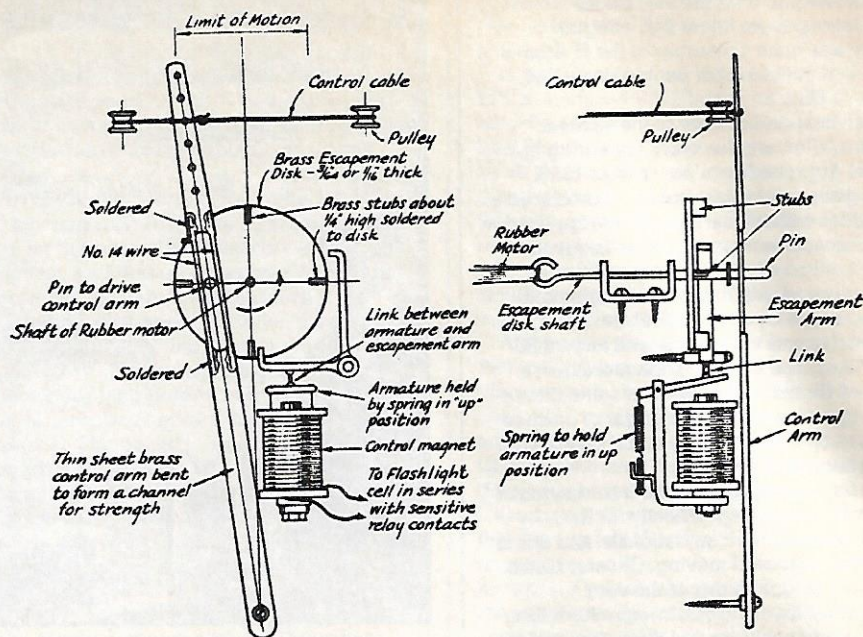
GENERAL POST OFFICE,  
LONDON, E.C.1.  
January 22, 1926.

SIR,—  
With reference to your letter of January 14, I am directed by the Postmaster-General to state that under present conditions he will raise no objection to the installation and use of short-range wireless apparatus for the purpose of experiments in the control of machinery by wireless, but the radio-telegraphic apparatus must on no account be used for the purpose of sending or receiving messages without a specific licence.

I am, Sir,  
Your obedient servant,  
(Signed) J. W. WISSENDEN,  
for the Secretary.

MAJOR R. PHILLIPS.

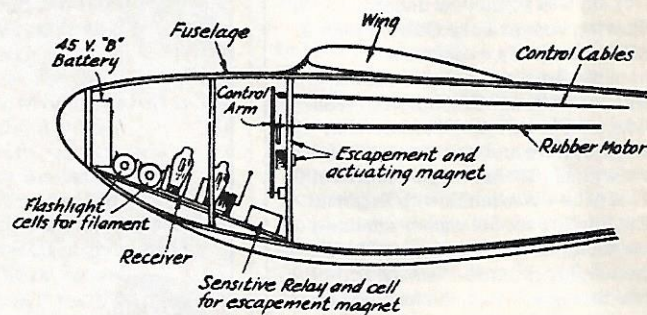
Possibly the first official document recognising R/C, a letter to model airship flyer Major Raymond Phillips - 1926.



FRONT

SIDE

Ross Hull's 1936 R/C Glider  
Featured first known use of rubber driven escapement



A diagram of the control mechanism installed in the fuselage of the model

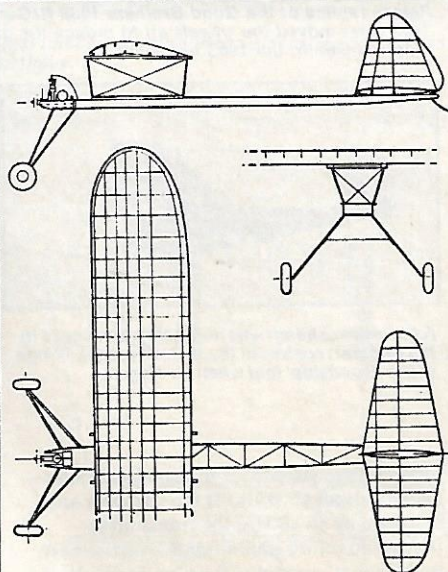
the Americans had another two and a bit years of peace — and two more Nationals, there seems to have been no great progress in R/C until they, too, suddenly found themselves pitched into the conflict and they, like us, had very little time for aeromodeling.

So the story resumes in 1945, more or less where it stopped in 1939. With the great advances in radio and electronic technology, almost all modellers thought that real radio control — reliable and sophisticated — would be the universal mode of aeromodeling when peace returned.

But it was not to be. Very little of the technology that produced VHF R/T, radar and so on could be economically adapted to 'our' sort of radio, and most of us were very depressed to find that aeromodeling was very much "as you were."

The Good Brothers dusted off their R/C model — sometimes referred to as 'Big Guff,' though I once called my replica 'The Goodship' and the name stuck — and won the R/C event at the post-war American Nationals. Jim Walker appeared with a multi-channel model which featured what must have been the first steerable nose wheel, but details of actual flight performance are sparse

Winners of the very first R/C contests at the American Nationals, Chester Lanzo's of 1937 and Walt Good's of 1938, 39, 40 and 47. Both eight foot floaters, many near replicas of the Lanzo model now flying in English Texaco contests, the Good model perpetuated by the writer's replica.

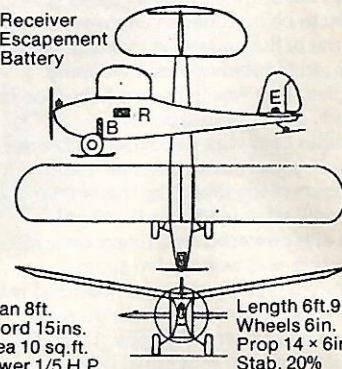


Above: The Chester Lanzo 1937 US Nationals R/C winner

### Good Brothers 'Big-Guff'

Weight with Radios 8½ lbs

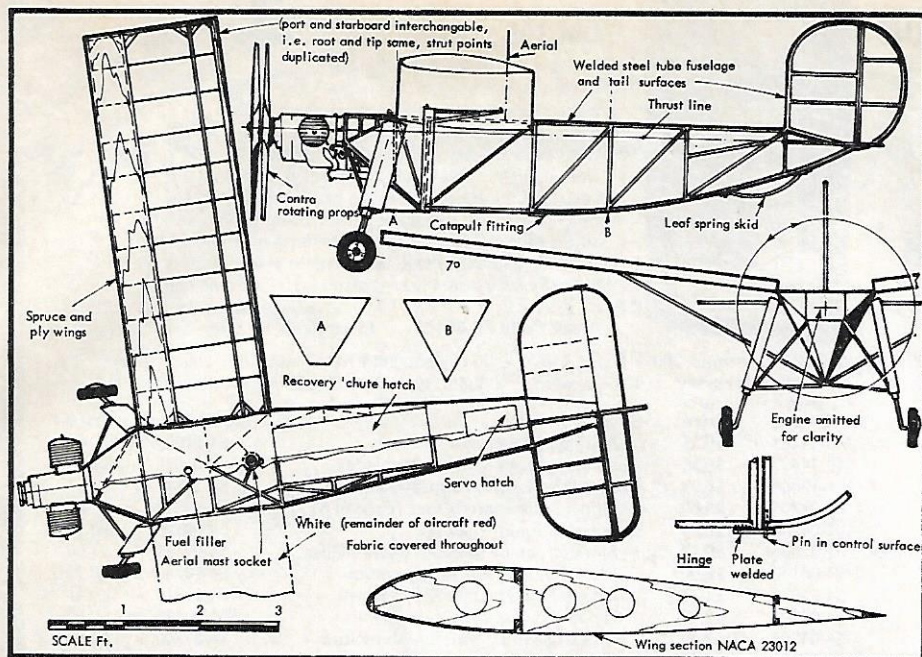
R — Receiver  
E — Escapement  
B — Battery



Span 8ft.  
Chord 15ins.  
Area 10 sq.ft.  
Power 1/5 H.P.

Length 6ft.9ins.  
Wheels 6in.  
Prop 14 x 6ins.  
Stab. 20%





Successful target drone developed by model flier, manufacturer and film actor Reginald Denny, later developed for mass production by Radioplane Inc. Many thousands built and flown during W.W.I., rudder-ale-engine cut/parachute release controls by five channel tone filter radio.

and sometimes contradictory. By 1950, there were several commercial R/C units offered for sale in England, mostly single channel, not vastly different from the Goods' original

conception. They all worked — sometimes.

R/C was featured at the British Nats. for the first time in 1950 but on the day of the contest, a gale was blowing and I'm sure

winner 'Chuck' Doughty will not think me unkind when I suggest that the repeated loops performed by his 'Stentorian' as it blew away were not exactly as scheduled.

By this time, many modellers were beginning to think that single channel — although some S/C 'artists' could occasionally put on an impressive show with it — was not what they really wanted and the Kingston firm 'Electronic Developments' mainly known for its range of no-nonsense diesel engines, offered for sale a multi channel 'reed' set which enabled modellers to get what is now regarded as minimum control — rudder-ale-throt — as we say. These reed sets had an electromagnetic gadget resembling a comb with progressively shorter teeth under which an electro-magnet was fed with different tones developed in the transmitter. When carefully 'audio tuned' each tone caused a selected 'tooth' or reed to vibrate. This made a contact to a relay which in turn operated the control servo. These latter were often home-made, using the almost universal 'Mighty Midget' motor made by Victory Industries of Guildford, and many of us had our first practical and moderately reliable flights — compared with earlier efforts — with this sort of gear.

The Americans, too, were developing reed gear and by the mid fifties with the arrival of the Bonner 'Duramite' servo, R/C had developed from the pursuit of a few isolated experiments to an increasingly popular segment of the modelling hobby. However, the real 'breakthrough' in R/C came with the development of the transistor, (deleting once and for all that troublesome high voltage battery) — the story of which will be 'continued in our next.'

## STATEMENT RE: MAGNUM ENGINES

In August 1986 the "MAGNUM ENGINES" Company ceased trading and the partnership was dissolved. Subsequently a new Manufacturing and Marketing Company, "MAGNUM '86 LTD", was formed.

As a consequence of Magnum Engines' closure a quantity of Castings and Spares were sold. We were led to believe that these parts were to be incorporated into a group radial engine, i.e. five single cylinder engines grouped together and geared to a common crankshaft, this we later found was not the case and the engines are now being sold individually.

Despite our insistence that these engines be completed to our usual high standard and specification, we were alarmed to discover that the engines are being produced outside our specification. Therefore, any person who has purchased, since September 1986, a new engine bearing the name Magnum 91 and is not completely satisfied with it's quality or it's performance may contact "Magnum '86 Ltd" to discuss their problem.

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Engines manufactured by the "MAGNUM ENGINES" Company have black cylinder heads

Engines produced by "MAGNUM '86 LTD" have either gold heads (Sandown Park Limited edition), or normally blue heads.

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