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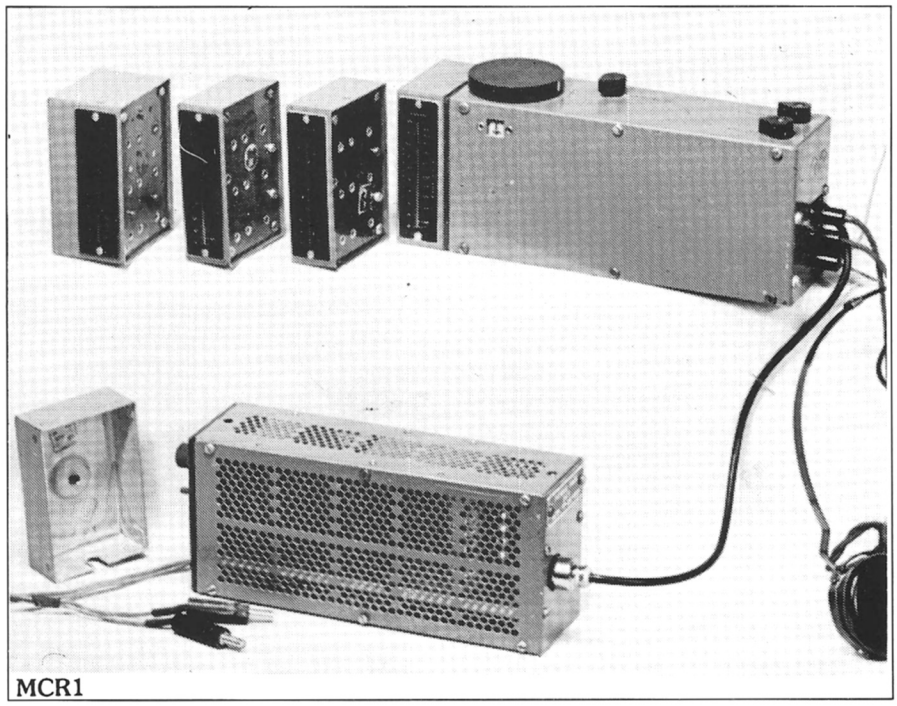
John Brown and the SOE

One of the highlights of the BVWS International meeting in 1984 was a talk by Major John Brown at the London Science Museum on his wartime work with the "Special Operations Executive" designing "Clandestine" radio equipment in secret. Associated with various electronics and communications organisations throughout his life, John has also had an interest in medical electronics - including working on the first artificial heart-lung machines - and also in talking books for the blind and aids for disabled people. A member of the BVWS, he died earlier this year, and as a tribute, we reprint an edited version of a report of his 1984 talk.



MCR1

In mid-1941 John Brown was posted from Royal Corps of Signals Catterick to a "closed address" - an English country mansion in a secluded area of Hertfordshire named "Frythe". Under the cover name of "Inter-Services Research Bureau", it rapidly became the centre of technical development for communications weapons and special devices for SOE.

John's first tasks were to design radio equipment for communication by Morse between England and Occupied countries in Europe, France, Holland, Belgium etc. The first design, a receiver and transmitter in a large "OHMS" briefcase, served only to illustrate the problems of the task; the second, a small box to convert a typical domestic table radio-set into a transmitter to send "blind" messages to England, relying on the BBC programmes of messages to occupied countries for acknowledgement, had limited use as circumstances in Europe changed and the Germans clamped down on all receiving equipment.

The Frythe staff included first class instrument makers using well equipped work-shops, so development was rapid and new designs followed very quickly: the "L" set, a crystal-controlled transmitter with a receiver using small single-ended valves, all running from a car battery via a vibrator-unit, established the specifications on which later sets were based.

As winter of 1941 approached, demands from Operations grew to maximum urgency and the first "suitcase" set was designed by the conversion of the chassis of the transmitter-receiver type 18 standard infantry set. Fitting an 807 in the transmitter, with 6v mains-type valves in the receiver boosted the power and sensitivity, and with power units for optional AC mains or 6v battery operation, the units were fitted into a robust fibre suitcase typical of those commonly used in Europe so that it would attract little attention among the luggage of travellers. This first set, classified for a range 150-400 miles, "Type A" was identified as the 21/1 but more generally referred to as A Mk 1. As soon as the prototype was complete, work began on the Type B Mk 1 for longer range. John's laboratory was augmented by assistants and the modified set was completed in a few weeks and immediately put into small scale production, sets going to Norway, Yugoslavia and the Middle East.

Progress meanwhile was rapid in recruitment and training of operators, mainly patriots who had escaped to Britain and were willing to return to their native countries as agents. In secret country houses they were trained, before being parachuted back. The first two sets were considered too large, heavy and fragile for parachuting and development was accelerated of Mk II versions of both sets. The contemporary WT sets used by the British Intelligence Services , made at Bletchley Park, were also being developed from the simple wooden-box construction to the metal design known as the "Para-Set" . The A Mk II was designed around new all-glass loctal-based valves in the receiver, with an Osram TT11 in the transmitter,and was completed before the end of 1941 and rushed off to the Marconi WT company at Writtle. Volume production included consignments for Russia delivered via the perilous sea route past Norway. The design of the B MkII was completed in March 1942 and volume production was set up at a new factory staffed by Army and RAF personnel. The B Mk II sets went into service with the Yugoslavian partisans where it rapidly became the standard WT set, and it was also used in the Far East. Still, the A Mk II was considered too large and co-operation with Marconi resulted in a crash programme to condense the separate units into a single small box,

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Wartime Developments

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with the introduction of an extra valve to serve as audio output in the receiver and crystal oscillator in the transmitter. The TT11 was replaced by the loctal 7C5, newly arrived from the USA. The result, the A Mk III, became the standard "workhorse" for all SOE communications in Europe in the "A" range up to 500 miles.

The main base stations in England were developed for the special needs of communications to and from Europe, and over 40 transmitters fed an "Antenna Farm" of more than 100 acres. The staff grew to hundreds, including many FANY (Women's Transport Service/First Aid Nursing Yeomanry) women as wireless operators and cipher clerks. Techniques were developed for recording "out station" traffic on 78rpm discs for "finger-printing" identification of operators, and for high-speed morse traffic at 250wpm or more. The UK base stations served as prototype for bases abroad where special problems were solved by the ingenuity of the men who had little time to get "on the air" . Resistance forces in Europe needed huge supplies, not only of arms but also of food, clothing, petrol and general supplies. The organisation of supplies and dropping by parachute in rugged country or to secluded coasts, needed a great volume of signals and offices required rigorous training. The Far East campaigns brought new operational problems in jungle conditions where equipment deteriorated rapidly. The greatest problem was power supplies . The battery charging equipment was bulkier than the sets and supply of fuel over hundreds of miles by sea of air was costly and dangerous, so the demand was for man-powered generator-chargers and the "Chore Horse" petrol- electric generator was supplemented by modified pedal-bicycle generators. Several modifications of these led to John's own "Beach Chair" style pedal-generator which provided direct power for B sets and eliminated heavy batteries. The universal demand for battery charging produced other solutions: a wind-driven one with portable mast; a steam one using a model-ship engine; a converted pressure-cooker; and one using the parachuting folding motorbike . Perhaps oddest of all was a thermo-couple generator using hundreds of couples built into a brazier of the type used by night-watchmen. With adequate supplies of wood it would charge an accumulator in six to eight hours.

An important item in the supply of material and people to the field was the "S-Phone", developed by a small team in 1941 at Frythe and designed by Captain Bert Lane. Using miniature valves, it operated on 450 MHz as a two-way radiotelephone carried on the breast of the operator and powered by a beltfull of batteries. It provided-ship-shore, ship-ship, ship-air and ground-air speech links to pinpoint dropping and landing points. Special versions were developed and the later Rebecca/Eureka beacon system by TRE completed the equipment for the Squadrons of Allied aircraft flown by British, Polish, American and other nationalities dropping supplies to Yugoslavian, Italian and French partisans prior to D-Day, and in operations in most other theatres of war.

BBC special-message broadcasts were used from early in the war, increasing to maximum importance at D-Day. The confiscation of radios by the Germans and the difficulties of obtaining batteries, made precious the few sets in the hands of resistance cells who could distribute information. In April 1943, chief signals officer Brigadier Nicholls described the problem at a late-night meeting at Frythe. After an all night "drawing board session, John put forward proposals with sketches for the set later named MCR1 (miniature Communication Receiver No.1) and variously dubbed "Woolworths Communication Receiver" and by the French "The Recepteur Biscuit" from the biscuit-tin pack which contained the receiver, the universal AC/DC 90-250v power unit, batteries, headset, aerial and earth wires etc. The design was based on the new miniature valves (B7G types IR5 IT4) then available from the USA, and the new Ever-Ready layer battery. The set covered the frequency range from 150 KHz to 15 Mhz. Given immediate "Top Priority". the prototype was completed in a month, followed by several months of tooling and preparation including design of special testgear. Before Christmas 1943, the MCR1 was in production by Philco at Perivale at 500 a week, rising in the time before D-Day. Delivery in hundreds, mainly by parachute, was made by the special squadrons supplying all the countries from Norway through Europe to the Middle East. The story of the coded greetings, poems and other messages which triggered resistance action on D-Day is well known and the value of those actions was cited by General Eisenhower as "Worth two divisions already landed" . Very many Allied lives were certainly saved, though at great cost to the resistance. Later, the MCRl was used in the Far East to restore communications from Allied broadcast stations to areas vacated by the Japanese. In 1944, the development of the UK base stations showed that simpler, lower-power WT sets could be used for communications to the Continent and pocket-sized equipment was designed, using the new miniature valves now also being made in Britain. The types 51/1 transmitter and 53/1 receiver reverted to simple, basic circuits in very compact form. It is noted that, 40 years later, similar pocket "QRP" sets are popular with amateur radio hobbyists. John illustrated with slides sets made for resistance forces as well as sets made in England for the Polish underground which played an important role in V-weapon counter-measures. Many museums now feature sets which have become collectors' items which are valued by radio amateurs since they can still be used. John also referred to the BBC TV series on the SOE and his own B MkII and AR88 sets which are still in daily use and are featured in the title shots of the programme.

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