Part 1

ALEXANDER THOM'S LIFE AND WORK

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A personal note about my late father, Alexander Thom

ARCHIE THOM

When my father was born, Queen Victoria was on the throne; the law of the land required a mechanically propelled vehicle to have a man walking in front with a red flag; powered flight was still a dream; the Yukon Trail was known to only a few men; and later feats such as the moon walk and sending probes to visit Halley's comet were mere fantasy.

My father was born at The Mains Farm, Carradale, on 26 March, 1894. His father was a dairy farmer; his mother was the daughter of a Glasgow muslin manufacturer. The family left Carradale when my father was seven years old, and about that time his brother was born. He remembered Carradale for the rest of his life, having absorbed much of the atmosphere of that active fishing village. He always had a soft place in his heart for his native county, and especially for the peninsula of Kintyre. In later years he really enjoyed his frequent survey trips to the many prehistoric sites in Argyllshire.

His boyhood was spent at Dunlop, on the family farm acquired in 1901. With access to all of his father's tools (his father ought to have been an engineer) the growing boy had a marvellous time, building his own playthings - an electrically driven pendulum clock, model aircraft, model boats, canoes, kites, bows and arrows - even a glider. On two pram wheels and pulled by a rope against the wind, I believe that it lifted him two feet off the ground. He attended Dunlop School where he acquired an excellent basic education. One amusing highlight occurred on the dark night when he flew a box kite carrying a storm lantern over Dunlop village. About 1907 or 1908 he was sent to Kilmarnock Academy, some eight miles distant. Upon leaving that school he took a compressed course at Skerries College and sat the Preliminary Examinations for entrance to University. He attended engineering classes at the Technical College for three sessions, gaining the qualification of Associateship of the Royal Technical College in 1914. He was awarded the

degree of B.Sc. in engineering in 1915 after a further year attending courses at the University of Glasgow. During that year he also studied astronomy under Professor L. Becker, who was Head of the Department of Astronomy.

By this time his many interests emerged. He extended the use of a waterwheel, which his father had built for threshing oats, by making it drive a dynamo for charging a battery to light his parents' house. This, I am told, was the first house to be lit by electricity in the Parish of Dunlop. In this period he built a powerful windmill to help to boost the house-lighting battery.

He became the assistant Scout Master in the local troop. He used a camera successfully. He was obviously very interested in things astronomical and was reading voraciously. One of his uncles presented him with a three-inch refractor telescope, and a special removable section of the roof in the attic of the house was built. From that relatively sheltered position he did some observation work which was published. One paper which many years later he was to remember reading was that report by B. Somerville on Callanish (Somerville 1912).

In 1917 my father married Jeanie Boyd Kirkwood. I was born in 1918. With the help of my mother, during the 1922 summer vacation from Glasgow University, he built, on the farm at Dunlop, a small cottage called Thalassa, from which the sea can be seen. My late brother Alan and my sister Beryl were born there in 1923 and 1926 respectively. Deep ponds usually take two nights' frost to freeze over for safe skating, and A.T. built a flat concrete area which could be flooded easily and which gave us a fine skating area after even a light frost. In summer the area served as a model sailing boat pond. Many flat-bottomed models were made and raced.

We were on holiday on the Island of Arran once, about 1930 or 1931, and it was there that I recall first hearing my father talking about a standing stone. Until then the only standing stones I knew about were the six upright 'rubbing stones' in the fields on the farm here in Dunlop. I can remember him theorising at the nine ft-high stone in South Glen Sannox, Arran, explaining how it might be possible that prehistoric people watched the sun setting on the high mountain ridge to the south west, viewing it from the big stone. He was thinking then of what he was later to call a 'backsight'. He surveyed Sannox years later and observed that from the stone, at Martinmas and Candlemas, the sun set behind the mountain ridge and reappeared momentarily an hour later in the col.

In the early 1920s he took up colour photography, and became skilful in producing the large positive glass slides for display. In 1938 I remember him struggling for two days to attempt to produce a coloured print from a coloured

positive, using a trichrome printing method. This was years before the arrival of the present type of colour printing.

In the area of Dunlop, fields are separated by stone dykes, fences or hedges. Itchy cattle love to rub themselves against solid objects and it was customary to have an upright stone, about five ft high, in each field, so that the boundary dykes, fences, hedges and so on would not be subjected to too much wear and tear from livestock. These are the 'rubbing stones' referred to above. Needless to say, operators of modern agricultural machinery do not like any obstruction in their path. Once, about 1945, my father made a tenant re-erect a six ft-high rubbing stone which he, the tenant, had felled and then buried below ploughshare depth, because it was too heavy to drag to the edge of the field. (Thirty years later, at the Hall of Clestran on Orkney, we were to find an eight ft-long menhir recently removed from the middle of the field and lying away against the stone dyke. 'Remove not the ancient landmarks' (Proverbs, 23:28).)

My second memory of my father's interest in standing stones recalls a sailing cruise in 1933. Whenever possible, he arranged a summer cruise in the Hebrides. His sailing experience spanned the years from 1909 to 1974, when he became too frail for the sport.

During his lifetime he skippered yachts of lengths ranging from 25 to 66 ft. His knowledge of the waters and islands of the west coast of Scotland was vast. He often thought seriously about owning and maintaining a yacht of his own, but he never owned a sailing vessel after 1921, when he had sailed an open boat on The Solent. He had found out as the years passed that two to four weeks of hard sailing each season did him for the rest of the year. I know because I sailed with him regularly for half a century.

On this particular cruise in 1933 we had been having a long hard sail from the Sound of Harris northward, in the open North Atlantic, not a peaceful ocean, and in the evening had entered the sheltered waters of East Loch Roag, Isle of Lewis. A quiet anchorage, where the ship's company can have a good night's sleep, is always sought for while cruising, and this time the Skipper navigated his way carefully as far in from the open sea as possible, chose a little bay and dropped anchor. As we stowed sail, I well remember looking up and seeing the full moon rising over the low land and there, silhouetted against the orb, were the Stones of Callanish. We were within a biscuit's toss of The Stonehenge of Scotland. I do not know to this day whether the Skipper had come here on purpose, but the six of us all went ashore in the moonlight immediately after dinner and explored the site. The date would be about 9 August 1933, with sunset about 10.07 p.m.

While exploring the site in the moonlight, the thought was running through his mind that the Megalithic Builders had lived here on Lewis as well as on the mainland of Britain, and his respect for them rose considerably. 'The Boys' as he often called them later, had had to cross The Minch too, like ourselves. He saw that one of the rows of stones pointed to the Pole of the heavens, and he remembered Somerville's report.

He has written that this was the time when he decided to collect more information about as many megalithic sites as possible. I cannot say exactly when he began surveying: my own first memory of site surveying with him was in 1938. As the years passed he made many forays into inaccessible areas, usually with a companion, and I suppose that I myself have visited more sites with him than any one other person. I was living nearby, and it was natural that I should help. My two children also became involved as they grew up. When my son Alasdair and daughter Susan became old enough they occasionally accompanied their grandfather. Once Susan was with him at Kintraw on the day that he decided to cross the deep valley to the northeast and investigate the ground. She had just sat down on the stone at 'the platform' and her grandfather was setting up the theodolite. He asked if there were any stones about and she evidently said, 'What about this one here?' It was called The Susan Stone thereafter. When she had been younger she said once 'What does grandfather do when he stands on the stones?'

As the time passed he found it necessary to go back frequently to sites. Perhaps he wanted a sun shot, a revision of the horizon profile, or other additional site particulars. My mother, who perforce had to adjust to living with her husband, once likened him to the mole-catcher - reputed always to leave a pair to breed so that he would always be asked back. When possible, he liked to take an azimuth on two separate days.

Over the decades it came about that as he expounded his theories and hypotheses I acted as a sounding board for his ideas.

He began to realise that he was dealing with the work of men who had an advanced knowledge of geometry. When he understood that these people were not only intelligent but scientific in their approach, he was able to get ahead. Metaphorically speaking, he put himself in their position and 'wore their moccasins'. His lack of knowledge of archaeology was in some ways an advantage because, as he said, he had no prejudices to overcome.

After I retired in 1979, I could of course spend much more time with him. Not much more fresh survey work was done however.

He knew that Halley's Comet had been seen through powerful telescopes in 1985; he could recall having seen it in 1910. He maintained, however, that the comet which passed by in 1911 was much more spectacular.

Some photographs of a comet, taken in December 1916 at Winchester, Mass., attracted his attention, and he began to calculate the orbit. I have a file of his figures with a letter dated 8 August 1919, addressed to Professor Becker of the Department of Astronomy at The University of Glasgow. The young enthusiast almost certainly completed the calculations between April and August 1919, in the interval between two jobs. He always found something to work at. Professor Becker, who had taught him Astronomy before the Kaiser's war (my father's terminology) and had been interned in the U.K. during hostilities, returned to Germany. Quite a friendship must have existed between them, because in 1936 Professor Becker wrote him a testimonial.

During Hitler's war (again my father's terminology), while living at Fleet, Hants, he had little time to do field work, but by that time he had quite an amount of standing stone data to mull over. He must have relaxed on occasion from the demanding work at the Royal Aircraft Establishment, 'The Factory' as it was called, by poring over one-inch maps and making marginal notes of the S.S. (standing stones) positions almost always shown.

At the R.A.E. he was initially involved in work on the small low-speed wind tunnels but after a year he was appointed to be the man in charge of the High Speed, pressurised Wind Tunnel. The task before him and his team was to get the tunnel working as soon as possible, with fans, force balances and so on, and then put it to use. He gained a considerable reputation and was advanced from Senior Scientific Officer to Principal Scientific Officer (covering, in his own words, a very wide ground). To quote Professor Austin Mair:

> A.T.'s energy, enthusiasm and drive led to the completion of the High Speed Tunnel in 1942 and later in that year the first model aircraft (a Spitfire) was tested in the tunnel. From that time until after the end of the war the tunnel was in continuous use, normally seven days a week, and there were no breakdowns. The intensive use of the H.S.T. from 1942 to 1945 led to greatly improved understanding of the problems of high speed flight. Among the most valuable achievements were understanding the importance of thin wings and the causes of longitudinal trim changes at high Mach numbers.

Models of the De Haviland Vampire and the Gloster Meteor were tested in the High Speed Tunnel.

In the early summer of 1945 he was one of a team of British Engineers sent to Germany to find out how far advanced the Germans were in their technology.

In May 1944 he sucessfully applied for the Chair of Engineering Science at the University of Oxford, taking up his duties there more than a year later in the autumn of 1945. Under his guidance, both the teaching of undergraduates and postgraduate research work flourished. Soon the Engineering Laboratory was too small for the ever-increasing numbers of students. As the years passed, its deficiencies became more and more obvious. Architects were called in, and action taken. The laboratory extention was finally named, in his honour, The Thom Building.

On retiring, he and my mother returned to The Hill, to live in Thalassa, the cottage they had built in 1922 'to last for five years'. It was modernised to suit their requirements, and an excellent workshop was fitted out. He was soon contentedly engaged in making himself a twelve-inch Cassegrainian telescope, both mirrors for which he carefully ground and polished himself. At that time I am sure that he was Scotland's leading amateur mirror grinder. My mother was greatly dismayed with the jeweller's rouge transferred from the seat of his pants to the cushions of the house furniture in Thalassa.

He built an observatory for the telescope, complete with clock drive and adjustable seat. I have a photograph of part of the moon's limb taken with this telescope, but his eyesight was failing and no more work was done with it. About this time he built a 4.25 inch refractor telescope, the object glass of which was a lens from a submarine periscope - a German one, I think.

From 1946 onwards he devoted much of his spare time and energy to what was later called archaeoastronomy. Field work was done mostly during the Easter and Summer vacations from Oxford. Winter was used for calculation work. The yacht cruises were continued. On board would be his smallest theodolite, specially reduced in weight by himself in the workshop. He carefully machined excess brass from it, gleefully saving and weighing the resulting swarf.

Many islands were visited from the yachts, islands which are often almost inaccessible by public transport. A tent was carried on many Easter and summer expeditions; I remember awakening one March morning to find two inches of snow on the tent. Camping allowed us on occasion to visit up to a dozen sites in a day. Azimuths were obtained from sun observations whenever possible, and a radio was always carried to monitor the rate of the watch, used for timing each shot of the sun.

He began to write up and seek to publish his findings in the early 1950s. Astronomers (Thom 1954) and statisticians (Thom 1955) were the only people interested, his work being looked upon with contumely by the archaeological establishment. A glance at the list of his publications in this volume will show how slowly his work came to be recognised after 1954.

At one time he sent a paper to the U.S.A. which was returned to him after some six months, not accepted. This was too long for a senior citizen to wait and he proceeded to write a book. The rest is history. He did, at least, live long enough to enjoy the general acceptance of his efforts. Is it perhaps indicative of established thought that the last paper which he wrote (Thom 1984) was published by The Prehistoric Society? That article mentioned neither archaeoastronomy, calendars, metrology nor statistical analysis, but gave the engineer's thoughts on how men could have moved huge menhirs.

At one stage, during the Christmas and Easter vacation as well as in the summer, he made dozens of horizontal observations from Thalassa to enable him with reasonable certainty to know the effect of horizontal refraction. From The Hill the sun sets into the sea for about 30 days in winter, but he never had the good luck to observe the sunset on the sea horizon and measure its altitude in clear atmosphere.

After retiring, he spent much more time on archaeoastronomy and began to write about it more and more. He coined specialised terms such as major and minor lunar standstill, graze effect, lunar band, megalithic inch, megalithic yard and megalithic rod, as well as backsight and foresight.

His work extended from the Shetland Archipelago to Cornwall, from the Hebrides to Wales, Stonehenge, Avebury and Carnac. He did practically no field work in Ireland, making only one trip as far as County Tyrone.

To facilitate work in his study he built himself an index using notched cards with holes which allowed him to extract circles, flattened rings, eggs, ellipses and so on with ease, using a knitting needle.

Informed at a public meeting by Glyn Daniel in 1969 that he, Glyn Daniel, was in the process of inviting A.T. to Brittany in 1970 to look over the Carnac Alignments, my father spent the rest of the winter planning and arranging for a team of helpers. In all, five survey expeditions were made, one in July 1970 and the remaining four in the spring of each year from 1971 to 1974 inclusive. Much field work was necessary; who better to lead us than this old man who kept us regaled with yarns of his experiences in 1913 when he had spent the summer working as a chainman on Canadian Pacific Railway construction? He trained his teams well, and often, in the quiet Breton countryside, the

humorists were heard to say (quoting the Skipper) 'Come on, "This is how it was done on the C.P.R."'

The plotting of these surveys alone took a long time; Kermario, for instance, ended up on an eight ft-long roll of paper. It alone took several months to plot. Main survey points or hubs were always carefully referenced in, each year, for future use, and by the end he knew the relative co-ordinates of, say, two menhirs two miles apart, to within ± 4 ft or better.

I put it on record that my father had a very good aural memory. He could recite the whole of Tam O'Shanter, the epic poem by Robert Burns, and The Pied Piper of Hamelin, but he seemed to have difficulty in learning school French. About 1929 he learned German, using the Pelman Method. Later, in the 1970s and 1980s he read many German novels for relaxation. 'It makes the story longer'. In spite of having spent 27 years of his life working in England, south of the Border, he still maintained the use of his native Scottish tongue, both the dialect and the accent. Towards the end of his tenure of the Oxford chair my mother once said 'It has been a long war this time!'

He was always seeking new horizons. During the early 1920s, having seen the need for power-assisted control of flying boat rudders and the like, he had invented a pneumatic servo-mechanism. In 1939 this device went to the R.A.E. with him for the experts to examine. There the backroom team he led helped to add 20 m.p.h. to the top speed of British fighter aircraft. Later, he designed and had made for him a beautiful pantograph which he needed for reducing or enlarging his survey plans. He designed a rain gauge suitable for use on board ship and on sloping mountain rain gauge sites (wind tunnel-tested of course). He performed experiments on conical models of hailstones in his 24 in x 24 in tunnel in Glasgow University. I would like to draw attention here to the work he did at Glasgow University between 1925 and 1934 on investigating the side forces brought into play by the flow of fluid past rotating cylinders. This work was done in his wind tunnel, and in his water and oil channel. I was never told, but Barnes Wallace must have referred back to all of this pure academic research work while inventing the spinning bomb, to be used so successfully in 'busting' the Möhne Dam in Germany in the 1939-45 war.

In the 1918-24 period he used two motor cycles. An epic four-day journey from Sussex to Dunlop in 1919 with my mother and me was, to them, a memorable occasion. Later about 1931 he took up pedal cycling seriously and he and my mother must have cycled several thousand miles on their tandem before the second war came. He cycled daily to the R.A.E. from Fleet for the six years of the war, then daily to the Oxford University Engineering Laboratory for another 16 years. By this time he had learned to look after

himself; he had the habit of taking a cold plunge early each morning and saw to it that he took enough exercise.

In 1916 one of his uncles gave him an Albion motor car, which was requisitioned and sold to The Norman Thomson Flight Company (his employers) for conversion into a works truck. On this car, to the amazement of another uncle, he found out by himself how to 'double de-clutch' while shifting gear. In 1938-39 he owned a 4.25 litre Bentley touring car and used it on survey trips, but he did not drive regularly until after the war.

A.T. loved intricate woodwork, carving, lathe turning, screw-cutting and so on, and he became expert in moulding small aluminium castings. Pen-and-ink sketching was easy for him, and some of his water-colour paintings show his talent. He could sing reasonably well. I can remember him once or twice playing an old fiddle, but he was no musician. In the early 1920s when 'wireless' came in, he built his own receiver sets. At one stage he proudly claimed to be receiving broadcasts from the eastern U.S. This involved sitting up late at night. He once heard a programme, noted the broadcaster and the time, wrote and received a certificate that he had heard 'The Voice from Way Down East'. He built only receiving sets. I well remember the two very high aerial masts needed in those days for reception. The two-volt lead acid battery could always be charged by the water wheel-driven dynamo.

The theory of probability has to be taught to surveying students and when at Glasgow University A.T. invented a device to demonstrate a Gaussian error curve. A long horizontal row of about 200 one mm-diameter holes was drilled in a vertically-positioned brass sheet about seven inches high. Each year each student in the class was given ten balls; he then had to stand back a certain distance, decide where he estimated the centre to be, and then step forward and insert each ball in turn in the estimated hole. That was a good teaching device, as the theory could be applied thereafter, with the distribution curve as a basis for discussion.

His open-air activities included hill walking, a little ski-ing on 1926 vintage Norwegian skis, outdoor and indoor badminton, outdoor skating, gardening, greenhouse tending, roses, shrubs, maintenance of The Hill farm (90 acres), and some fairly arduous rock climbing on the soft granite of the ridges on the mountains of Arran. He possessed an ice axe, used in The Austrian Tyrol in 1929-30.

To quote my father, he tried to do unimportant things gracefully, and I think he succeeded. He certainly grew old gracefully, coping first with double cataract, then with a broken thigh, and later with retinal decay. At the end he was registered as a blind person, and he made great use of the talking book service.