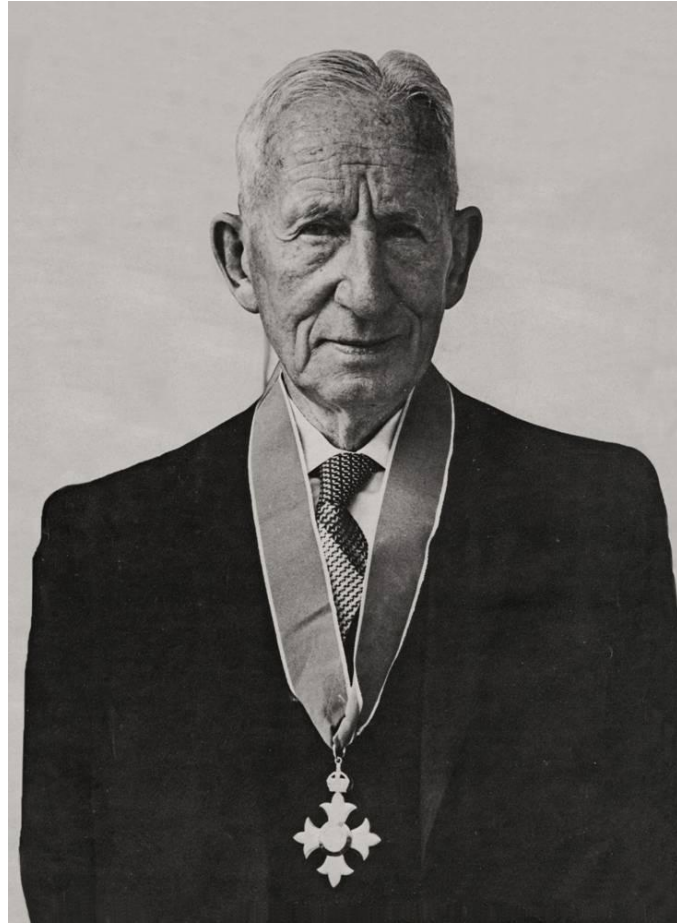


Archibald Hugh Bogle



A Short Biography

**By
Don McKay.**

Archibald Hugh Bogle CBE, FNZIS. (1883 -1972) Surveyor Extraordinaire.

DONALD F. MCKAY

FNZIS

Email: donbron@xtra.co.nz

Abstract. This is the story of the life and times of Archie Bogle, possibly the most outstanding surveyor in New Zealand's history. The range and depth of his talents was astonishing, and the length and variety of his service to the New Zealand Institute of Surveyors and the community unparalleled. While many tributes were paid to him in his lifetime, now, after more than 40 years, with a new generation of surveyors, it is time to revive and perpetuate his memory. The inclusion of a sample of his writings clearly demonstrates the substance of this legendary man and giant among our profession.

Keywords: biography, outstanding man and surveyor, exceptional service, research, tributes, perpetuation of memory.

Introduction

By any measure, Archibald Hugh Bogle was a brilliant man who would have climbed to the top of the tree in any endeavour he undertook. The fact that he chose land surveying was simply a bonus for our profession. He reciprocated when he said toward the end of his life, "he was glad to have spent the last 68 years among surveyors." He was born to surveying as a duck is to water. The word unsurpassed springs readily to mind. He was inarguably the foremost New Zealand surveyor of his time and possibly of all time. The competition for this claim has been fierce but AHB, as he sometimes styled himself, was head and shoulders above them all.

Known simply as 'Archie' to all and sundry he endeared himself to everyone with whom he came in contact through his unassuming personality, innate abilities to understand, his acumen but particularly his wit, oratorical and writing skills. There was a gentleness about the man that enabled him to have or reach a rapport with all around him. These qualities are clear from what his peers had to say about him, as recorded in this article. It may be difficult for younger surveyors to appreciate the admiration and affection that his colleagues of the time had for him. Much of this would have stemmed from his long term editorship of the New Zealand Surveyor (known more affectionately as 'the Journal') the periodic magazine of the New Zealand Institute of Surveyors (NZIS or the Institute).

Some of the superlatives used by his peers to describe him during his career are:

- Doyen of the profession
- Artist with words
- Great totara
- Surveyor of the century
- A remarkable man
- A legend (in his own lifetime)
- A born raconteur.

The purpose of this article is to recount the life of AHB so that he is not forgotten, to reacquaint him with remaining cadet and early university-trained surveyors, and introduce him to all surveyors of the last 40 years or so. Some suggestions are made as to how this may be achieved. The particular catalyst for the article is that this year (2015) is the 40th anniversary of the posthumous publication of his partial-autobiography. While this anniversary may seem a little tenuous, any reason is a good reason to revere his memory.

Why was Archie so revered? A quick look at his service record to the Institute and community will give the answer. Archie and the Institute were inextricably bound between his qualification in 1906 and death in 1972. His membership of 66 years must be a record.¹ Archie was also a consummate professional - a well-respected and technically able surveyor as well as an administrator supreme. The service by this one man will almost certainly never be repeated:

- Member of the Survey Board, 42 years.
- Member of the Town-planning Board (NZIS representative), 15 years.
- Institute President, four years.
- Institute Councillor, 16 years.
- Member of the Geographic Board, 20 years.
- Editor of the Journal, 29 years.
- Assessor of the Fulton Medallion, 29 years.
- Mentor for survey students, staunch advocate for university training and further education of surveyors, 50 years.

This article is a research document in that it brings together, for the first time, most recorded² survey comments concerning Archie's life and times, his service and accolades paid to him. These are fully referenced with a glossary to assist any further research. There is also some original research and observations. The writer undertook this project because of his own admiration for the man, which has, as a result of his research, become unbounded. While written primarily for surveyors AHB deserves a wider audience than just the profession. He was a notable New Zealander in his own right.

Archie – The Man

Early Years

Archie was born on 19 January 1883, the eldest of four brothers and a sister. One brother died, apparently from drowning, as a young boy.³ His father was station master at Waipukurau, some 70 km south west of Napier. Archie attended Napier Boys' High School on a scholarship.⁴ In those days secondary education was not compulsory and required an entrance qualification. In due course he passed University Entrance and Civil Service examinations.⁵

It was in these early years that he almost certainly began his lifelong association with the Maori people, their language, custom and culture. The knowledge, understanding and empathy so gained are illustrated in this article but more particularly throughout his partial-autobiography. One anecdote will therefore suffice: He says that Maori named Whanganui meaning 'big entry'; or 'wide open bay or river mouth'. He continues, with considerable foresight in view of the recent controversy about this name, that, "the spelling Wanganui is a European corruption of the original name of the river."⁶

He attended Victoria University in 1902 and again from 1906 to 1909. This must have been part time as he was working during these periods – see anon. He studied mathematics, physics, practical physics and mechanics.⁷ He apparently did not aspire to a degree but simply studied subjects that interested him.⁸ A notable omission here would seem to be the study of Maori and English in both of which he excelled.

In 1907 he was assistant editor of 'The Spike', the student magazine and full editor in 1908.⁹ This would have been a good apprenticeship for his later lengthy editorship of the Journal.

Family Man

Archie married Bertha Langley Reeve in 1911. They had met at university where she became one of the first-ever female members of staff, being appointed as an Assistant in Mathematics in the same year. A strong but engaging character¹⁰ Bertha also graduated as a Master of Arts in 1911 showing considerable talent in maths. The young couple settled in Wanganui and raised a family of four, two boys and two girls. Both boys became Rhodes scholars and university professors. The girls became top graduates, one in Home Science and the other in Social Science.¹¹ Archie and Bertha must have been immensely proud of their success in producing such outstanding offspring.

Bertha died in 1946, not long after the family had moved back to Wellington.

Regrettably, this family had more than its fair share of tragedy. The death of Archie's three brothers in WWI¹² has been recorded, but not the fact that Bertha also lost three of her brothers in the same war. To this was to be added the untimely death of their youngest child, Gilbert, in 1963 at the age of 37.¹³ No family should have to endure such loss and Archie must have wondered why it happened, and questioned the justice of it all. His stature, however, was such that he overcame his feelings which in any event he mostly kept to himself.¹⁴

Scholar and Linguist

The facts supporting this heading are apparent throughout the text of this article and speak for themselves.

Athlete

Archie was an all-round athlete with success at football, cricket, hockey, tennis and athletics representing Victoria University and elsewhere. But it was as a hurdler that he achieved his greatest success, becoming New Zealand University champion in the 120 and 440 yards in 1908 and again in 1909. He also won events in both the high and long jump.¹⁵

Singer and Actor

Archie had a fine tenor voice. With his singing and acting ability, he gave expressive renderings of college songs written by fellow students who later became well-known composers. With his three brothers, who attended university at the same time, he organised hakas (learnt from the Maori) and Extravaganzas, giving thrilling performances to an excited audience. “Archie was a very popular student.”¹⁶

Writer, Orator and Poet

Archie has been described as “an artist with words with a sparkling pen.” Of his partial-autobiography the same commentator states:

His style is episodic. He creates pictures for the mind of incidents and scenes, from which the whole life of the early surveyor may be visualised. The style, too, has the graces of understatement and of humour.¹⁷

His ability as an orator was no less. One influential surveyor, well known to Archie, describes him as, “undoubtedly one of the best orators, whether in English or the Maori language ever produced by the Institute.”¹⁸ He was in great demand as an after-dinner speaker. The writer attended a Branch Annual General Meeting (AGM) dinner in Auckland in the late 1950s and recalls Archie’s wit, humour, turn of phrase, and succinct and pertinent comments. He had us in stitches one minute, rapt silent attention the next. He had us, as the saying goes, in the palm of his hand. Another anecdote recalled by Past President Ralph Grierson concerns Archie’s reply at the 1951 AGM in Rotorua to the fierce Maori challenge and welcome. For ten minutes, in fluent Maori with appropriate gestures he made the Institute’s response, ‘off the cuff.’ This was Ralph’s most impressive memory.¹⁹

Praise for his skill in the written and spoken word abound in this article.

Examples of Archie’s writings are given in Appendices 1 and 2. While these may be extensive they capture the essence of his skill and are in any event interesting reading in their own right.

His way with words extended to poetry. At times he would simply, presumably if copy for the Journal was short, compose some humorous verses, cartoons or articles.²⁰ Sometimes they had a message; on other occasions they were just for fun. But he was certainly capable

of more serious stuff. An example is shown in Appendix 3. This verse, first written while Archie was at university, was entered into a WWI²¹ competition for a national song organised by the Chronicles of the NZEF, the newspaper for the expeditionary force. The competition attracted many entries and was judged by high authority. Music to accompany Archie's words was composed by Private Chas. A. Martin while he was serving on the Somme in 1918. Archie and colleague won first prize. Late in the war and for sometime afterwards the song was performed by professional singers on stage at variety concerts – popular at this time.²²

Conservationist

Archie had a surveyor's love of the open air, the bush and the birds and clearly he was an early conservationist with a dose of pragmatism thrown in. This is best illustrated by his own story of the huia bird, now of course extinct. It seems that in the early 1900s huia tail feathers became fashionable for all Maori instead of, as previously, being rigidly reserved for the high-born warriors. This was the major cause of the bird's extinction by around 1909. Archie records at some length in his partial-autobiography their demise and notes that he recorded the huia's distinctive whistle for posterity at the Auckland War Memorial Museum.²³

Archie – The Surveyor

Early Training and Qualification

Archie commenced his survey career in 1900 as a clerical cadet in the Wellington office of the Lands and Survey Department. He was given to understand that a field cadetship to which he and his colleagues all aspired was unlikely, "as field surveying in Wellington district had practically finished."²⁴ His luck, however, changed when in 1901 he was appointed to assist the Christchurch Magnetic Observatory's field measurements checking the magnetic variation throughout New Zealand. This would lead to a fulltime position.²⁵

By early 1903, the magnetic work in the North Island was complete and he was given a cadetship under Mr J.A. Thompson.²⁶ Then followed, in what seems to have been a happy relationship, three years of a typical pioneer surveyor's life, nine months or so in the field, often under canvas, followed by the three winter months carrying out the associated calculations and draughting. Their main job was to "subdivide extensive hilly, virgin bush blocks into farm settlement sections, including exploration of suitable road lines for the necessary access."²⁷ Archie, of course, as was a cadet's life for well over 100 years under the articulated system, had to work all day and study all night!

Archie passed his exams and qualified as a surveyor late in 1905. The New Zealand Gazette of November 16 records that he passed with 'credit.' The Journal of that year records that Archie and friends measured their base line with a probable error of 1:417,000 exceptional for those days.²⁸ These events suggest that Archie had become a knowledgeable and accurate Kairuri – measurer of land.

Joins the New Zealand Institute of Surveyors

On January 1, 1906 Archie was elected an Associate member of the Institute and became a full member in December 1909.²⁹ In those days one had to serve a further apprenticeship after

qualification in order to be considered eligible for voting rights. Whether he had any association with the Institute as a cadet is unknown. In any event he remained a member for the rest of his life, a period of 66 years and his association with the profession, 72. He quickly became a prominent member holding every top administrative post at some time, some more than once, some for extensive periods and for two years all at once. More anon.

Private Practice

Also in 1906 he left the Lands and Survey and joined a private practice in Wellington where he apparently worked, attended Victoria University and married in 1911, as discussed above. He and his wife then moved to Wanganui where he set up his own practice in partnership.³⁰ For the next 35 years or so he carried out surveys in the Wanganui, Taupo and Tokaanu areas except for war interludes discussed below and a time during the Great Depression of the 1930s when he travelled around the lower North Island with his team building small bridges. In the late 1930s when conditions improved he developed some land in Wellington – no doubt charging himself full scale survey fees in the process!³¹ (see page 9). Thus, he had experience of both sides of the land subdivision coin. In addition, he had obviously picked up some engineering skills during his survey training, or through subsequent study, or perhaps during WWI.

After WWII Archie moved back to Wellington and set-up in practice on his own account.³² One documented highlight of this period was a contract with the Samoan Government to carry out a number of urgent private surveys over a four-month period. At the age of 73 and in extreme daily temperatures he apparently set an astounding pace and quickly cleared the backlog.³³

He eventually retired from practice at the age of 84 but even then was known, on occasions, to operate the other end of the chain.³⁴

During his Wanganui years he became a well-known identity along the river valley as a surveyor for and advisor to the Maori Land Court. At that time the River equated the Road. Indeed a number of anecdotes in his own partial-autobiography relate to these years – see post (page 19) and Appendix 2. It would have been these experiences that consolidated his knowledge of the Maori people. The pièce-de-résistance came only about five years ago when Archie's grandson, Gilbert, was taking a canoe trip down the Wanganui and somewhere near the Bridge to Nowhere, when chatting to local Maori, it became apparent that Archie's name was still well remembered in the district.³⁵ Can there be a greater epitaph than that? Gilbert subsequently received some mementos of the occasion.

Archie – The Soldier



Archie served in the Army during both World Wars rising to the rank of Major.

In WWI he served for four years from 1915. He enlisted in response to an appeal for men with engineering experience.³⁶ He saw active frontline service in France with the New Zealand Engineers and then with the Royal Engineers surveying gun and enemy positions. The writer has had the privilege of reading some of his letters home in which he describes these activities. He had to get to grips with both French and Belgian triangulation systems with which he was not totally impressed. He was also less than enthusiastic about British systems of survey. Of course he was working in grads and also complains about the use of two or three projections. Nevertheless this work must have broadened his knowledge and experience of surveying. It also seems likely he picked up more than a smattering of the Belgium language to add to his knowledge of French and German.³⁷

Archie again enlisted in WWII and did two stints in Tonga as OC of the engineers constructing defences. These ultimately proved to be unnecessary and he therefore applied for a posting to the Middle East to join the fighting. This was declined on the grounds of age in some choice army vernacular.³⁸

His sojourn in Tonga has produced a memorable anecdote. His company received orders to move and while preparations to decamp were underway Archie ‘disappeared’ for several days but returned on the last night to attend a great feast provided by the Tongans. The feast proceeded in accordance with Tongan protocol, with speakers extolling in elaborate language the events and friendships forged during the army’s stay. Archie’s turn to respond to the hospitality eventually arrived. It then became clear where he had been, as Lex McRae

records: “Speaking in fluent Tongan with all the appropriate allegorical and poetic references he proceeded to give the appropriate thanks. He laid them in the aisle and left his assembled audience, both Tongan and Kiwi, astounded that the ‘old man’ could speak fluent Tongan as well as his many other accomplishments.” The upshot was, when the moving orders were cancelled, no Tongan would converse with Archie in other than his own native tongue.³⁹

Record of Service

Survey Board Member

Archie was a member of the Survey Board continuously from 1924 until his resignation in 1966, a period of 42 years, and was by far its longest serving member. Even the redoubtable C.K. Grierson was a member for less than half this period prior to 1952. The members’ term of appointment was for one year, but renewable. Thus Archie was appointed and reappointed 41 times.

Archie’s term was largely served under the Surveyors Act 1938. He was, however, also appointed under preceding legislation of 1908 and 1928. The 1938 Act provided that the constitution of the Board should be five surveyors: the Surveyor-General as Chairman and four appointed by the Minister (of Lands), two of whom were on recommendation of the Institute. Archie was one of the latter. His first appointment was by an Institute Council ballot. The Board was charged with the examination and registration of surveyors and associated disciplinary action in the case of misconduct by Institute members. These provisions were similar to those of 1908 and 1928. Where the 1938 Act differed substantially was in the making membership of the Institute compulsory for practising surveyors. The Board was also required to consider proposed Institute amendments to the binding (on all practising surveyors) scale of fees and charges and provide a recommendation to the Minister for final decision.

The Board conducted examinations twice yearly. This included practical tests and examination of various survey, engineering and other plans prepared by candidates. It was one of Archie’s proud boasts that “practically every surveyor now registered in our present Institute (up to 1966) passed through my hands at one time or another.”⁴⁰ History does not record the number under the three Acts concerned but the writer’s estimate is around 600,⁴¹ of whom he was one.

One candidate of note was Ian McIntyre who appeared before Archie with his rural survey for examination. It seems that Ian had the temerity to submit a re-survey of Archie’s work around Taupo of some 30 years earlier. Archie apparently “hoped that it all fitted OK.” Ian assured him it did and a lasting friendship was born which was to bear some unexpected fruit – see post (page 20).⁴²

Archie was, in his own words, “sent to Australia to represent New Zealand at conferences of the Reciprocating Survey Boards of Australia and New Zealand”. He also took a leading part when, in 1950, it was New Zealand’s turn to host these four-yearly conferences. This occasion also “included a large assembly of representatives from all English speaking survey authorities, including the United States of America.” Archie notes that these conferences provided great benefits and developed many lasting friendships.⁴³

For a short period Archie was even the Board's secretary while the incumbent was sick.⁴⁴

The Journal records without fuss that Archie and two others had, in January 1966, surrendered their seats on the Board.⁴⁵

Town-planning Board Member

Archie was appointed as the Institute's representative on the Town-planning Board under s6 of the Town-planning Act 1926 from its commencement until his resignation in 1939, coinciding with his appointment as Editor of the Journal.⁴⁶ He served a second term between 1950 and 1953⁴⁷ when the Board was abolished, the 1926 Act repealed and replaced with the Town and Country Planning Act 1953. During these periods he reported extensively to Institute members through the Journal and Annual General Meetings.

Surveyors, of this period, had, of course, an enduring interest in 'Town Planning' having laid out most towns in New Zealand since very early times. The Institute had lobbied hard for a Planning Act and representation on its administration. In this, it was eventually successful. The 1926 Act represented the first real attempt at comprehensive and systematic planning and the preparation of district plans as we know them today, so as to regulate and control of the use of land. There had been spasmodic previous attempts such as Plans for Towns Regulation Act 1876 and some controls on subdivisions under various Municipal Corporations Acts but nothing that met the real needs of the burgeoning New Zealand population, then nearing 1.5 million.

The 1926 Act made it compulsory for all municipalities over 1000 people to prepare, within prescribed time limits, planning schemes for their district, "..... in such a way as will most effectively tend to promote its healthfulness, amenity, convenience and advancement."⁴⁸ Control and approval of schemes was to be centralised (local Councils not having the expertise) and the Act set up the Town-planning Board for this purpose. The Board consisted of around a dozen people amongst whom was a representative from each of the survey, architectural and engineering professions. In addition to its administration of the schemes the Board also had executive and appellate functions.

In a word, the Act was a failure. It had no 'teeth' and was otherwise flawed. Very few schemes received final approval of the Board, although some were under preparation or had provisional approval. Added to defects in the Act, local authorities were apathetic, and there was the Great Depression followed by WWII. There was also a shortage of qualified planners. Councils found they could circumvent the purpose of the Act and still retain some control over land use; a great financial saving.⁴⁹

Institute members including AHB were quick to grasp the problems with the Act and much debate (some heated) took place concerning reform. Indeed, at the 1930 AGM a difference in philosophy emerged on how this reform should be achieved and a great debate raged with Archie in the forefront. He made the point that they had to deal with the Act as it was; there being absolutely no political appetite for reform. Central government was unwilling to enforce the Act.⁵⁰

It is a tribute to Archie's skill and mana that he retained the Institutes appointment to the Board. At the conclusion of the 1930 debate members extended "a hearty vote of thanks to Mr Bogle for his able address and the way he has carried out his job."⁵¹ Nevertheless it must

have been frustrating to him that so little was achieved during the life of the Act, no doubt influencing his 1939 decision to resign.

Archie's position on the Board was clearly a matter of some prestige within the Institute. The 1926 Board has been equated with the Town and Country Planning Appeal Board under the 1953 Act. This latter Board is, of course, the forerunner of today's Environmental Court. Archie's successor on the Board in 1939, Mr E.V. Blake, had this to say to Institute members concerning his contribution:

I have great pleasure in informing you of the esteem in which my predecessor, Mr Bogle, was held by all members of the Board. His work was referred to by the Minister and several speakers as being the greatest assistance to the Board.⁵²

It is to be noted that Archie was involved in the setting up of a separate Town Planning Institute in the late 1920s as one of the Institute's representatives and for a period was elected to the Council of that fledgling body. His involvement obviously continued until 1950 when he was again an Institute representative on the Town Planning Institute steering committee.⁵³

Maori Land Court Advisor

It seems that Archie was at various times advisor and assessor to and expert witness before the Maori Land Court in the Wanganui and Taupo areas. This was likely after WWI and the 1920s and 1930s, before he moved his practice to Wellington after WWII. The details of timing and appointments are obscure, but many of his anecdotes are recounted in his partial-autobiography described separately below.

While these endeavours would have been fee bearing there is clearly an element of public service in this work which is worthy of recording herein.

President and Councillor of the Institute

Archie was President from 1931 to 1933 and again from 1955 to 1957. It follows that he was immediate past president in 1934 and 1958. He was a councillor from 1926 until 1944 except for a break in 1928 for reasons unknown. Thus he held a position on the Institute Council for 20 years, four as President. While a number of Presidents have exceeded four years Archie's total Council service must rank in the forefront, although no records have been researched.

Details of Archie's activities and initiatives during his first term require further research but in all likelihood it was 'steady as she goes' as work for surveyors was scarce at this time.

It is interesting to speculate, why, after an absence from Council of over ten years he returned to the Presidency in 1955. If he simply stepped into the breach because none of the existing Councillors was in a position to take the post (an extremely unusual occurrence), it would be a typical reaction of the man.⁵⁴ Whatever the reason it proved fortuitous for the Institute.

The hallmark of Archie's second term seems to have been, 'business as usual,' although advances were made in university training for surveyors and more particularly the post-graduate education of surveyors in the town planning field. The Institute had long lobbied for a Chair of Town Planning to be set up at Auckland University. Thus, in 1957, with the

Institute's assistance, Professor R.T. Kennedy, distinguished English planner and architect, was appointed to such a position. A one-year full-time post graduate diploma course commenced in 1958, but it was primarily through Archie's efforts that a part-time attendance was introduced; the course otherwise being considered impractical for most surveyors.⁵⁵ Also under his watch, the Institute's Town Planning Bursary was established at the Annual General Meeting of 1957. This bursary provided financial assistance to registered surveyors undertaking the diploma course.⁵⁶

In addition, university training for surveyors became a reality during this term, but more of that anon.

New Zealand Surveyor Editor

Archibald Bogle was appointed by Council to Editorship of the Journal in 1939 and produced his first issue in November of that year. In that issue Archie paid tribute to his predecessor, Mr M. Crompton-Smith, who had carried the editorial torch for 19 years.⁵⁷ Archie was to eclipse this by ten years and on his own retirement in 1968 an Institute wit suggested that by arithmetical progression the next editor was expected to serve 39 years!⁵⁸ Not long after his appointment the President remarked that, "Councillors felt, that in A.H. Bogle they had made a happy choice of editor."⁵⁹ Archie must have succeeded beyond their wildest dreams. McRae puts it this way, "the high standard set by Tregear, Adams and Compton-Smith (*the three previous editors*) was continued and the Editor quickly stamped the Journal with his own brand of dry wit, pithy comment and far sighted idealism in matters pertaining to his profession."⁶⁰

When Archie succeeded to the editorial chair, the Journal was virtually the only means of communicating with members. It therefore contained full Branch, Institute, Council and Annual General Meeting minutes, annual reports and accounts, Lands and Survey Department reports and staff promotions, all manner of notices, Code of Ethics, advice of legislative and practice changes, outright gossip (cleverly disguised), list of members, Branch Officers and Council members, roll of Presidents and Fellows, members of the Survey Board, Institute awards and their recipients and so on; that is to say a full account of Institute business. Initially it was published four times a year with WWII interrupting this schedule (Archie joined the Army, but even so he still managed to produce one edition in both 1942 and 1944 but none in 1943. Perhaps he was on leave). Post war it was reduced to three editions and again in 1953 to two. At the same time most of the Institute proceedings were published separately and sent directly to members. These were economy measures initiated by Council.⁶¹

Archie's own mark on the Journal became quickly apparent. He changed the jacket and layout and introduced a number of innovations. Regular features were:⁶²

- Editorials
- Correspondence
- Examination papers
- Examination solutions
- Examination results, including analysis of pass/fail over the reciprocating states and the recording of meritorious passes
- Registration of cadets

- Registration of surveyors
- Obituaries
- Institute transactions as above and discontinued after 1953
- Days that are gone – from 1956
- Current affairs – from 1953
- Personal
- Town planning affairs.

Major articles on specific subjects by approximate number over the 62 issues were:⁶³

- Education of surveyors – 39
- Error and ground movement – 25
- Humour, cartoons and poetry – 15
- Survey instruments – 28
- Olden days, history and whos who – 63
- Origins – 2
- Property law -21
- Standards – 8
- Status of the Surveyor – General – 3
- Stormwater and erosion -18
- Subdivisional engineering -12
- Town planning matters – 50
- Reserves and open space – 4
- Valuation – 7.

Not only was Archie the Editor, but he was also a major contributor, in fact, the major contributor.⁶⁴ He appears to have written all obituaries. The word ‘appears’ is used as the authors are not acknowledged, which is typical of Archie’s contributions. Whether he carried out the research as well is not known. He also wrote many of the regular and periodic articles. It is, however, in his editorials that he shines out like a beacon with erudite wisdom, knowledge, advice and common sense all expressed in stimulating and well constructed prose. One such example is included as Appendix 1. This celebration of 100 years of surveying and the importance of the profession is one of the longest of Archie’s 62 editorials. He can be forgiven as it is a masterpiece (this author’s favourite) and concerns issues that he obviously felt strongly about. It really captures his essence and abilities. Not that his advice was always accepted (although mostly proved correct in the longer term). On one notable occasion Archie had been editorialising about inadequacies in the nature and content of Branch remits for discussion at AGMs (a matter that was in subsequent years to be raised in more force). One Branch took serious umbrage and set up a committee which wrote a terse letter of complaint to Archie. He published the letter and handled the matter with great aplomb. He noted that he had no objection to attacks on his offending editorials. Differences of opinion were a healthy sign. He goes on:

After receiving this particular bomb, we read over the cause of it again, and we agree that as regards tone and style it was open to gentle criticism, and we have already expressed regret for any personal offence that may have been felt by our northern friends – We repeat that assurance. We must now try again with more patience and courtesy.⁶⁵

This section would not be complete without particular mention of Archie's encouragement of and assistance to cadets, and his articles and editorials on the general subject of education. His concern for student welfare is evident throughout. These sentiments are echoed below. One of his innovations was to provide full solutions to the mathematical papers and sometimes others. This practice ceased on his retirement. In this regard there is a conundrum. These solutions are largely hand drafted and the relevant diagrams are obviously redrawn (to save space) with construction lines added. This draughting is obviously done by the same hand throughout the entire 29 years, so it must be Archie's. The question is, were the solutions also calculated by him or simply copied? Redrawing the diagrams is understandable but why re-work the figures? It is to be remembered that in those days all exam calculations were carried out by logs. Whatever the answer, this part of the Journal obviously entailed a lot of work. It is also worth recording that in the analysis of the papers he must have made a number of examiners ears burn with his expressed dissatisfaction over some papers. These were set for all Australasia by the reciprocating boards in turn.

In his 29-year tenure Archie produced 62 issues, numbers 173 to 234 which contained around 6000 pages,⁶⁶ an average of nearly 100 per issue. Of these he himself wrote an estimated 25%.⁶⁷ Less than A4 size but with a small font it equated well to other professional journals of the time. The character of today's New Zealand Surveyor has of course changed. It is now top in the hierarchy of Institute publications, published once a year with refereed articles (mostly) not heard of in Archie's day. It is perhaps unfortunate that, because of space considerations, these biographical notes do not appear in the same magazine albeit 70 issues and nearly 50 years after his term as its foremost and longest-serving editor (all surveyors by the way). He would have appreciated both the Journal's transition and the fact that he is not forgotten. It is perhaps the Journal for which he was best known. Twice (or more) a year for so many years he was in touch with all members, most of whom he knew personally.

Archie's retirement was announced in the Journal following his last edition.⁶⁸ He was 85 and not in robust health. The headline, "Our Retiring Editor," was inspired, being that used by Archie when paying tribute to his predecessor 29 years before. The unknown author makes several worthy points:

- The Journal was avidly received by most members to see what Archie had to say about surveyors and survey matters, thus reinforcing the comments in previous paragraphs.
- Praise for Archie's "command of the written language and that there are few that could equal him in this respect."
- That Archie's Journals "stand in the best circles of higher education" and should be recommended reading for all surveyors, "or anybody else for that matter".
- Confirming that the recent AGM had, as an "indication, but not as a measure of appreciation," decided to create the Bogle Award for his outstanding service – see post.

Archie's reply in the same Journal was typically modest. He made some revealing observations:

- The Journal held "pride of place" in all his Institute activities. It was fitting that it was the last "to drop away."
- The Journal was a "worthwhile enterprise of significant value as a unifying influence among our widely scattered members."

- He had enjoyed his editorial service and greatly appreciated the “kind regrets” expressed in the acceptance of his resignation.
- He spoke of his admiration for surveyors as a “special type of very fine men” (there were no female surveyors at that time).
- He was indebted to Institute members for “their constant interest and encouragement in any modest success the Journal has managed to achieve.”
- He confirms that he knew practically every member by Christian name.
- With “diffidence” he thanks the Institute for the many honours members have bestowed on him over the years and promises (with tongue in cheek) “not to organise any further calls on their generosity.”
- Archie concludes that he was “well pleased and satisfied to have spent so much of his last 68 years among surveyors.”

New Zealand Geographic Board Member

Archie was a continuous member of this Board from 1948 until his resignation in 1968. It is no coincidence that his resignation occurred in the same year as that from Editor of the Journal. His place on the Board was taken by another well known surveyor with an international reputation, Mr J.H. Miller ⁶⁹ who later became NZIS President.

The Board was constituted under the New Zealand Geographic Act 1946 and consisted of seven people:

- The Surveyor-General, Chairman
- Two Maori people appointed by the Minister of Maori Affairs
- One person nominated by the New Zealand Geographical Society appointed by the Minister (of Lands)
- One person nominated by the Federated Mountain Clubs of New Zealand appointed by the Minister
- Two persons appointed by the Minister.

Thus Archie would have been appointed under the last bullet point in his own right. It does, however, seem likely the Chairman may have had some influence. The term of appointment for members (except for the Surveyor-General) was three years.

The functions and powers of the Board in the determination and spelling of virtually all place names was, subject to checks and balances, very wide. The Board also had a number of related functions and duties.

Little record exists of Archie’s contribution to the Board⁷⁰ but as his appointment was renewed seven times it must have been significant. His knowledge of empathy with the land, Maori custom and language and his general acumen would have been great assets.

Education of Surveyors

Throughout his career Archie had an abiding interest in the education and further education of surveyors. This is self evident from the numerous comments in this article supporting such a contention. Archie’s interest went far beyond that necessary for his official duties and

describing it as his 'passion' (see post, page 18) can be accepted. Notwithstanding these comments this aspect of his life deserves particular mention. He lived in an age before 'continuing education' became fashionable. Were he present still, he would, undoubtedly, have been in the forefront of its advocacy. Indeed it is entirely arguable that he used the Journal as a platform not only to encourage and assist students but also to provide their masters with new knowledge and revision. He was not beyond giving advice to master surveyors on their responsibilities toward cadets.⁷¹

Mention has already been made of Archie's involvement with the Diploma of Town Planning at Auckland University. He was also heavily involved in the establishment of the Diploma in Land Surveying at Otago which became one of the legacies he left behind⁷².

Ever since its formation in 1888 the Institute had been concerned with improving the education and training of surveyors. The setting up of a Board of Examiners (i.e. the forerunner to the Survey Board) in 1900 was the first step. At about this time there was, for the first time, mention of university training. This was, at least in part, to provide full professional status for the profession. The next step was to require a pass in the university entrance examination as a pre-requisite to entering articles. The first concrete steps towards university education came in 1908 but nothing eventuated until 1926 when an Institute Committee, which included Archie, was set up to, "find ways and means of obtaining better educational standard among cadets." This resulted in firm proposals from the University of New Zealand to commence a two year diploma course in 1930. The proposal, however, fell over because of a university erroneously perceived conflict with the Survey Board aspirations on surveyor qualifications.⁷³

The debate continued for another 25 years with a consensus of members (but by no means all) in favour of university education. Archie declared his hand early on when reporting on a meeting of the Reciprocating Boards in Melbourne in 1933 where the subject had been discussed. Archie expressed a personal view that he "looked forward to the day when it (*the above-mentioned diploma course*) or even a full degree will be an essential part of a surveyor's credentials."⁷⁴ During his term as Editor of the Journal he published no fewer than 40 articles, mostly written by himself, on the training of surveyors.⁷⁵

In Archie's second term as President, Mr J.B. Mackie emerged as a force in the Institute. Mr Mackie was an experienced mining engineer/surveyor who had retrained as a land surveyor; at that time he was lecturing at the Otago School of Mines and had a very strong interest in promoting a university course for surveyors. He was to become the first head of the Dunedin Survey School and a doyen of the profession. The association between Archie and Professor Mackie (as he was to become) must have been a partnership made in Heaven. The result laid the foundation for the original Diploma in Land Surveying which became a reality in 1963.⁷⁶

Fulton Bequest Award Assessor

Along with the incumbent President of the Institute Archie was, by appointment of the Institute Council, assessor of the Fulton Medallion awards during his 29 years as Editor of the Journal. Whether he was sole assessor during his second term as President is not known!

During his tenure 42 awards were made in all classes.⁷⁷ This of course included consideration of competing claims and those failing to meet the criteria in years when no award was made.

While Archie would, no doubt, have approached his annual task with alacrity, it was no sinecure.

Tributes and Awards

Fellow of the Institute

At the Institute's 60th AGM held in Dunedin in 1948 Archie's election as a Fellow was announced. Buried in the fine print of the minutes of the meeting it is recorded that, Archie, in acknowledging the honour, made "a felicitous speech in his usual inspired tradition."⁷⁸ No further comment or fanfare.

Archie was, at that time, only the fourth member to be elected to the position of Fellow. He was aged 66. Although not stated the honour was clearly in recognition of his contribution to the Institute and the profession to date. His service was to continue unabated for another 25 years and marks the start of the accolades accorded him over this time.

The Queen's Medal

The New Years Honours List for 1960 records that Her Majesty the Queen had been graciously pleased to confer on Archibald Hugh Bogle the honour of Commander of the Most Excellent Order of the British Empire (CBE) in the Civil Division.

The Citation reads:

For very valuable service in the field of Surveying, especially as a member of the Survey Board for over 35 years and for some years the Town Planning (*sic*) Board. Mr Bogle has been twice President of the New Zealand Institute of Surveyors and for the past 20 years has been Editor of the Institute's Journal.

Archie was nominated for an award by the Institute. It is to be noted that the nominators do not decide the level of the award; that is the job of the government-appointed Honours Committee. The honour of CBE is part of the Order of Chivalry of the British monarchy, rewarding contributions to the arts and science, work with charitable and welfare organisations, and community service. It was established in 1917 by King George V to fill gaps in the British honours system and comprises five levels in both civil and military divisions. These awards have, of course, been discontinued in New Zealand. CBE ranks in the middle, one ahead of OBE. At least ten distinguished New Zealand surveyors have been awarded an OBE, (although some were for services other than surveying) but none, other than Archie, has been awarded a CBE. This strongly suggests the recognition of his exceptional service at the highest levels.

The Journal of February 1960⁷⁹ records this significant event in a typically unpretentious manner. The then Institute President, Mr G.F. Payne, a former Bogle cadet and WWI colleague⁸⁰ makes several revealing points:

- Editorial modesty would have probably prevented any reference to the award. Mr Payne therefore felt "impelled" to write something himself.

- The honour was welcomed with pride and pleasure by every surveyor in New Zealand and many overseas.
- Mr Payne concluded by saying that the honour was richly deserved and that Archie's, tireless devotion to our interests over an incredibly long period was still being maintained and the Institute was truly grateful. He hoped Archie would live long and enjoy his laurels.
- In reviewing Archie's service to the Institute (which he described as long and arduous – Archie was 78 at the time) he noted that:

Practically every member of the younger generation of surveyors has come before Mr Bogle and experienced something of his helpful encouragement in clearing final exam hurdles. Even the editorial whip he has occasionally used to spur the young to greater effort is now, in retrospect, recognised as the kindly assistance it was always meant to be.

In his reply in the same Journal, Archie, while thanking the President for his kind remarks and other friends for sending good wishes and congratulation, admits, for once, being at a loss for words. He then goes on to belittle his own achievement, saying that the real significance of the award was in the words of the citation "for services to surveying." He suggests that such a phrase:

Implicitly recognises and officially records that surveying as such is a national work of fundamental importance that has always given in the past, still gives and we believe always will give, a great service to the whole community. Most of us probably never even pause to think about it but the claim is fair and just. Occasional remembrance of it and particularly of our early long line of faithful hard-working progenitors who did so well to put this country on its feet may help us all in this present day and generation to keep our standards high and clean.

80th Birthday Celebrations

In May 1964 Institute members from Wellington arranged a celebratory dinner for Archie on the occasion of his 80th birthday, albeit a little belatedly (it had occurred in January the previous year). The event was attended by 90 people from all around New Zealand, mostly surveyors of course but also including a number of distinguished guests, friends and relatives. Many others, not able to be present, sent messages of congratulations and goodwill, some from overseas. According to our unknown commentator it was a "joyous and festive affair."⁸¹

The main toast of the evening was delivered, with considerable panache, by Mr Percy Dyett, a long -time friend and Survey Board colleague. In recounting past exploits and anecdotes of the guest of honour he managed with skill and humour in his final comments to refer to, or about, Archie as:⁸²

- The Great Totara
- A doyen of our profession
- A legend in his own lifetime
- Being honoured by his country; he has in turn served and honoured his profession
- Having a record of service unlikely ever to be surpassed
- Having a passion for the welfare of student surveyors.

The occasion, once again demonstrated the respect and admiration with which Archie was regarded, while acknowledging his contribution and service to the profession.

Fulton Medallion

At the above-mentioned dinner, proceedings for the evening were capped by the then President, Mr N.J. Gardiner, when he announced to the gathering and to the guest of honour's considerable surprise, that he had unilaterally awarded Archie a Fulton, Class A.1. (outstanding service to the Institute or profession of land surveying) for 1964. It seems that Archie, despite his position as joint assessor of these awards, had never been considered as a candidate. Mr Gardiner, as President, was the other assessor and determined to rectify this anomaly.⁸³ Archie was only the fifth recipient (at that time) in his class in nearly 30 years since its inception.⁸⁴

Subsequent issues of the Journal record the award as being dated 1963. This backdating obviously accords the spirit of the occasion.

It was yet another tribute to the stature of the man.

The McIntyre Portrait



In March 1965, a portrait of Archie was unveiled. The Institute had commissioned well-known New Zealand artist Peter McIntyre for this work. Apparently Archie's reaction was, "It's not like me but couldn't be anyone else."⁸⁵

The portrait was hung in pride of place in the Survey School, Dunedin for many years on loan from the Institute.⁸⁶ This was entirely appropriate in view of Archie's interest in the future

generations of surveyors. It was, however, for reasons unknown, returned to head office comparatively recently and hung in reception for a period. But in the recent shift in offices no wall space could be found for the portrait and it was consigned to a storage shed in Thorndon Quay where it remains.⁸⁷ Archie's memory deserves better.

The commissioning of the portrait is a one and only in the history of the Institute and yet another example of the respect in which Archie was held.

The Bogle Award

Consequent on Archie's resignation as Editor in 1968 and shortly after publication of his last Journal, number 234, the then President, Mr R.M. Grierson, suggested that an annual award be set up in honour of the service he had given the Institute. At the AGM shortly thereafter this suggestion was adopted unanimously, together with regret at his retirement, best wishes and thanks.⁸⁸

The details of the award were fleshed out with Archie's assistance not surprisingly in favour of outstanding young surveyors. These were first published in November 1969 under the heading 'The Bogle Award:'

This award was created by the New Zealand Institute of Surveyors in 1969 to perpetuate recognition of the outstanding services given and contributions made to the surveying profession since 1900 by Archibald Hugh Bogle, C.B.E., Fellow of the Institute.

Candidates had to be Registered Surveyors, members of the Institute, not be more than 30 years old (later increased to 35), and have displayed high practical ability and ethical standards which reflected credit on himself and the profession.⁸⁹

The establishment of this award is but one more step in the Institute's acknowledgement of this man's achievements and preservation of his memory.

Links in the Chain

In the last three years of Archie's life, in his mid- to- late eighties, he wrote his partial-autobiography recording his early years as a surveyor and gives good insight into the life of pioneer surveyors. The book, which he entitled with some subtlety 'Links in the Chain: Field Surveying in New Zealand,'⁹⁰ was compiled from memory as he had not kept a diary. Considering the intricacy of names, places and events this was no mean feat in itself, particularly at his advancing years. The book is remarkable for its deceptively simple style, insights and humour. His knowledge of Maori history and custom is quite apparent. A thoroughly entertaining and informative read. This writer can offer no better description than to enclose the Preface (author unknown) as Appendix 4.

This slim volume of 90 A4- sized pages was edited and published by the Institute posthumously in 1975 so that, as already noted, this year, (2015) marks the 40th anniversary of that event. Mr I.G. McIntyre, a well known surveyor, former Institute Councillor and long time friend of Archie's was instrumental in guiding the book to publication and indeed was responsible for encouraging Archie to put pen to paper.⁹¹

Copies of the book are now difficult to obtain (other than from libraries). The odd second-hand edition is available through online booksellers at around seven or eight times the original price of \$8. Nevertheless, it is a recommended addition to every surveyor's library. Some selected extracts to whet the appetite are included as Appendix 2.

The book contains a four-page Foreword by the late Hon. Sir David Smith, Supreme Court Judge, Chancellor of the New Zealand University and Archie's lifelong friend. This appreciation was especially requested by the Institute and fleshes out much of Archie's private and later professional life. It is an inspired piece of writing and we learn much about Archie's character and exploits. The author relies heavily on Sir David's appraisal. For example he describes Archie as a humanist and that he lived by his own code – playing the game.

A review of the book appeared in the Journal.⁹² The reviewer, Mr R.G. Brickell, another well-known surveyor and colleague, describes it as "delightful" and "eminently readable;" in fact, he says, "I couldn't put it down." He also pays his own tribute to Archie in the following words:

On rare but rich occasion one has the good fortune to enjoy friendship with a great man. Now the late Archie Bogle was just such a man. One who throughout his life shed an aura about him, which made men feel better; which warmed them and nourished them into growing just a little stronger and a little taller.

Appreciation

The Last Hurrah

Archie departed this world after a period of indifferent health on 14 March 1972. Although his funeral took place in Auckland (where he resided in his last few years) a special memorial service was arranged by the Institute in Wellington at Old St Pauls. This was attended by more than 100 people.

Archie's lengthy obituary⁹³ in the Journal does full justice to his life, times and attributes while recording a number of highlights. The unknown author makes the point:

There may well come a time when a surveyor will enquire as to who was Archibald Hugh Bogle but we think that day is not close.

In Memoriam

Our story of AHB is, of necessity, broken into separate segments. Let us look at these components collectively. Imagine, if you will, Archie's life in his second term as Institute President from 1955-1957 at the age of 70 plus. He was also:

- Member of the Survey Board
- Editor of the Journal
- Adjudicator (sole?) of the Fulton Awards

- Member of the Geographic Board
- No doubt he would also have been a member of the Town-planning Board had it not been abolished by the passing of the Town and Country Planning Act 1953!

He must have been a very busy man indeed! Apart from his official duties and attendances there would have been many unofficial calls on his time, committees and meetings. Archie had the capacity to accept and carry out these responsibilities. This was reciprocated by Institute members in the exceptional trust they placed in one individual. His life experiences made him a very rounded man.

While his appointment to the three Boards carried fees and allowances, and as Editor an honorarium, this compensation would not have matched the time involved (and in Archie's case extra – curricular time) and inhibited the practise of his profession. So while, not exactly a labour of love they were the next best thing, and resulted from his zeal for public service. For example, the honorarium for the Journal was £250 (\$500) per annum in July 1954 and raised to £300 (\$600) in July 1958.⁹⁴

Archie's unusually long service on the three Boards on which he sat, both individually and collectively, is clearly indicative of his ability, his expertise, the contribution he made to each and the respect in which he was held. During the writer's research the staff at Archives New Zealand and at least one other Board secretary expressed considerable surprise at Archie's "unusually long service on a statutory board," let alone three of them. Another surveyor commentator reached much the same conclusion when he remarked that Archie had obviously "pleased the powers that be."⁹⁵

But now, 43 years on and memory fades, as it must, it is this author's purpose to ensure that Archie Bogle's reputation is permanently revived. It was not without good reason that he was bestowed the title 'Surveyor of the 20th Century.'⁹⁶ While acknowledging that the Bogle award goes some way in achieving this objective, it gives little inkling of the stature of this man, neither does it capture his essence. It is the writer's fervent hope that someone will pick up the challenge and with the aid of these notes, 'Links in the Chain', Bogle family sources and further research write a full biography of this special man.⁹⁷ There is much to be written about his life and contribution to the three Boards in particular.

It is also the writer's view that the McIntyre portrait should form the centrepiece of a permanent exhibition at Te Papa paying tribute to pioneer surveyors of New Zealand and Archibald Hugh Bogle in particular, extolling the veritable backbone of the development of this country, led by one of the Institute's and New Zealand's greatest sons. Is this too much to ask?

In his Foreword to 'Links in the Chain',⁹⁸ Sir David Smith summarises Archie's attributes. The writer can think of no more fitting concluding words to this article than those of Sir David's:

Archie Bogle was an exceptionally gifted man. His experience of life made him search for reality. He sometimes contemplated other people with a reserved slightly smiling, interrogating look to see if he found it. He did not tolerate humbug or dithering. He had courage in abundance and said what he thought. The qualities of honesty, desire for fair play, wide-ranging ability, capacity for hard work and determination, combined with an innate hankering for the team spirit and co-

operation, showed naturally in all his activities and attitudes. He had his sombre times but he was rarely, if ever, without the capacity for racy speech. A quip causing laughter could break a deadlock in debate. According to the occasion, he could be consistently serious, gay, witty or humorous. His own chuckle and laughter remain clearly in mind. To me, he seemed to evoke affection, quite unconsciously. He has left behind him a lasting and lovable memory for his family, friends and colleagues and, through his work, a permanent contribution to the welfare of New Zealand.

Acknowledgement

The author wishes to acknowledge and thank Diana Goodman, Archie's granddaughter, for some relevant family information and other helpful suggestions.

Appendix 1

One Hundred Years of Surveying – Editorial from Journal No 174, March 1940

Without claiming any special credit for the fact, we believe it is correct to say that the average surveyor is a modest, unassuming man. But modesty can be overdone. A justifiable pride that rests on a long tale of work well and faithfully carried out, and as such is merely a proper notion of his own quality, should be a rock and stay to any man or body of men. That kind of inspiration from the past is the sure foundation on which to build the hopes of similar promise in the future. Great enterprises have grown and prospered from humble origins, as we know, but not by chance. The human element, the patient honest toil of men building slowly bit by bit, undismayed by failures, and not thrown off their balance by occasional easy achievement, is the unifying influence that ultimately issues in the splendour of the completed work.

This is the centennial year of New Zealand, and the thoughts of a whole people, stirred and uplifted by the countless evidences of what has been done in the past hundred years, look forward with eager confidence to the possibilities of the future. Nor do they forget the gratitude and appreciation due to the pioneers, whose lives of hard work and service made possible the present happy position. As with the country at large, so with our own profession; as with individual New Zealanders, so with us surveyors; the parallel is singularly close. If there be justification for any body of New Zealanders to feel the kind of corporate pride we have mentioned above, surely we surveyors are entitled to claim it. Wherever there is mention of hard work and achievement; of high standards shown in private lives, or in the execution of public duties; of any tributes whatever to the intrinsic worth of our forerunners, there we may hold up our heads with the best- we do not lack tradition.

We print elsewhere a letter received from a registered surveyor, in which he refers to "much more important professions". We are quite ready to believe that that expression used in a hasty letter concerning fees, does not really represent any considered opinion of its author. But it is useful as an indication that some of us at times do not estimate our traditions at their true value, or at least do not clearly connect their implications with our own every-day life and problems. We give place to none in our appreciation of the worth of the personnel, or the value of the work, connected with all the other professions which have done their manful share in bringing this country successfully through its first hundred years, nor should we dream of claiming precedence over any of them. But we stop dead some way short of conceding the qualification "more important". No other profession would claim that from us; should they be so hasty, it would be easy, and very pleasant, to confound them from any angle they cared to select. They will not do so, we leave the prospect almost regretfully. Then why does it arise inside our own marae?

A hasty glance at one or two of our historical associations will be in order here. Our roots go down pretty deep and run cleanly through any cross section of our national life from the day when New

Zealand, as we now have it, was no more than a pleasant prospect in the minds of the colonising Englishmen.

The ship “Tory” which left England in 1839, bringing the advance guard of the New Zealand Company’s venture, had on board an important officer of the Company, Mr Charles Heaphy, a surveyor who later took up arms in the Maori wars and won a V.C. now deposited in the Auckland Art Gallery. When the “Aurora” arrived with actual settlers in 1840, as we may read in an old diary, they landed on Petone beach by means of a small jetty run out by the surveyors, who subsequently arranged locations for temporary huts and tents on the present site of Petone, before proceeding to cut out farms in the Hutt Valley. Some of the field notes of those early surveys are still preserved as appendices to a book written in 1848 by a surveyor named Whitehead. That book also contains a sketch map made by the first survey expedition to explore the Wairarapa. The party went up the Manawatu River, through the Gorge and down the Wairarapa to near the Lake, thence crossing the Rimutakas to Upper Hutt and so on down to Petone. These records are as surprising in the accuracy of the observations and notes made on the natural features met with as they are in the excellence of their draughtsmanship.

When the Plymouth Company was formed in 1840, its chief surveyor, Mr. F.A. Carrington, was left to select the site of the 11,000 acres bought from the New Zealand Company. He looked over D’Urville Island and Queen Charlotte Sound, by the way, before deciding on the present site of New Plymouth. The Nelson settlement was formed in 1841, Barnicoat, Budge and others being the surveyors responsible for work carried out “with great energy and rapidity.” In 1843 a fresh settlement was proposed for an association of lay members of the Free Church of Scotland. Mr. Frederick Tuckett, a surveyor then in Nelson, was deputed to select suitable site in the South Island. He made a job of it and was months going right down the east coast looking at all likely spots and incidentally turning down the present site of Christchurch. Finally he selected Dunedin, but not until he had gone on foot over many miles of Otago hinterland. So with all the settlements; they were selected and laid out by surveyors. And so with all subsequent development of all the land in the country. When time was found for organised surveys beyond towns and environs, there were various outstanding claims to land aggregating millions more acres than existed. One Wentworth claimed a modest 20,100,000 acres. Presumably his blankets were extra red or his pocket knives had double handles!

Many of the earlier surveyors worked and explored under conditions that shortened their lives; several lost them altogether. As long ago as 1846, Heaphy and Brunner went from Nelson right down the West Coast to the mouth of the Arahura. Later Brunner made extensive trips in Westland, finally going up the Buller and back to Nelson after 550 days away from civilisation, having lived the whole time on native game and vegetation. Howitt, with all his party save one, was drowned in Lake Brunner, Townshend was drowned on the Grey bar, Charles Whitcombe in the Teremakau. Cameron died in an open boat on the way from Preservation Inlet to the Bluff, after an accidental gun-shot. Oldfield’s grave is in the bush behind Eltham, Joshua Morgan’s in the Tangarakau Gorge, and Todd was shot by Nuku Whenua in his tent at the foot of Pironga. Charles Weber, who worked on the Trans-continental railway from New York, and has a town, a river and a mountain named after him in America, has likewise a township and county in Hawke’s Bay bearing his name and commemorating his work. His skeleton was discovered by bushfellers three years after he had disappeared when exploring in the Forty Mile Bush between Pahiatua and Eketahuna. Quite recently the Geodetic survey of the South Island has re-observed stations in the high country on the Nelson- Marlborough boundary. In 1885 Stephenson Smith’s party, coming down out of that country for winter recess, was caught in a snowstorm. A surveyor named Paske and a head-chainman named Thompson died from cold and exposure. Thompson was a brother of ‘T.K.’ well-known to men of the present day. Dozens and dozens of surveyors who survived those early times endured conditions that now sound incredible. There is no space even to glance at them. But the results are about us on every hand.

Things were done long ago which now appear to have been mistakes; roads have to be deviated and boundaries amended. No doubt the authors often knew it would be so; much of their work was done to meet the hasty needs of early settlement, or under the exigencies of a political situation they could not control. In any case the wonder is not that some errors have to be corrected and gaps filled in; an understanding mind realises that the real slips were extraordinarily few. What can the motor -borne critic, roaring across four countries in as many half-hours, surmounting two or three ranges and crossing rivers and gorges with the same easy certainty, know of the toil and sweat, the mouldy biscuit and skinny pork, the chopping and swagging, the weary climbs, and the cold, wet traverses in the winter gullies that made up the long arduous travail leading to his modern road. What indeed! The North Island Main Trunk Railway, through the centre of the wild bush country of the North Island is nowhere more than an easy walk from the line selected long ago by James Rochfort.

No! We do not lack tradition, but it is idle to dwell either on the good old days or the bad old days, except as it assists us to face our own days. There have always been problems, uncertainties and insecurities. Surveying as it used to be has gone or nearly so. On the other hand, there are numerous opportunities open today to the man with survey training, which were never even dreamt of by his predecessors. As we have seen, they had their trials; we do not particularly want them again. Nor is it any use sighing over their good times, they had them less often than we do. What we do need is their courage and resolution. None of them had all he wanted nor finished all he meant to do, but in the main they put up a great show. Courage then, brothers, the first hundred years is always considered to be the worst. Tighten up your swag straps if you will, and even adjust one or two of the lumps sticking into your backbone, then up with the chin and let us press on. But for God's sake let's have no more muttering in the ranks about more important professions. There are none.

Appendix 2

Extracts from 'Links in the Chain' – A.H. Bogle

Page 2 – The Bush Legion

Surveyors' wives were not often found in the earlier survey camps, no doubt because of the generally rough country and the extreme difficulties of travelling. But occasionally, some of the hardier spirits did make the grade and by the available records, found the effort worthwhile. One surveyor and his wife spent months at a Maori kainga, in the heart of the Urewera Country, and met with nothing but extreme good will and kindly assistance from the Maori inhabitants.

An old tattooed rascal was very anxious to trade for their year old Pakeha baby, and made a tentative offer of £50 cash; but as there was no recent deals to assist in arriving at a fair valuation, the prudent parents would not deal. (There may, of course, have been other cogent reasons, not openly expressed.) A further story that the would-be purchaser was prepared to go to a cool £100 extra, if mother and babe could be transferred as one parcel, is perhaps a little suspect.

Page 3 – The Bush Legion (continued)

The presence of Maori ladies in the camps was strictly forbidden, officially. But one Don Juan, well known in his day, who was discovered by a snooping inspecting surveyor, in "*flagrante delicto*" so to speak, claimed that his official instructions plainly ordered him "to cultivate friendly relations with the natives". Was it for him to query such wise, warm-hearted decisions, so obviously the result of sound theory and long experience? He was warned against obeying orders with quite such excessive zeal.

But suppose you had an excellent Maori chainman and did not want to lose him, and suppose he said his young wife would be lonely in his absence and he wanted her along with him on the job, and you knew she was a splendid cook and you certainly did not want to lose her either, and you could not

have one without the other – then what? You put “wifie” on the payroll as a younger brother of her husband (same name anyhow) and thus ensured a prosperous season and a contented camp. But whether you should be proud of your smart little scheme or ashamed at your mild dishonesty, was a question I never resolved.

Some of the early survey fraternity married Maori wives, and fine women there were, too. One very well-known King Country chainman had an equally well-known Maori wife, who mostly stayed home to watch over their youngsters. But she used to accompany her lord and master to the small sports meetings of the countryside and invariably won the competition for stepping out an exact chain.

One unlucky day, a stiff breeze disturbed her voluminous skirts and disclosed the sad fact that she had a flax band, tying leg to leg, which enabled her to step out a chain about as near as her husband could measure it. Adam, of course, said he knew nothing about it, but Eve said that if he were not such a stingy old fool, he would have bought her some decent heavy skirt material when asked for it and such a silly accident could not have happened. All in fun, anyway, and certainly no loss of social standing; in fact, rather the reverse!

Page 42 – The Water Highway

Tongariro and other members of the cluster of magnificent mountains standing in the centre of the North Island were all gods and ancestors of the Maori. Taranaki, now Mount Egmont, was originally a member of the same family, but was driven out long ago for a misdemeanour and it was his furious path of baffled rage that caused the deep rift now occupied by the Wanganui River. He may return some day. Maoris claim that is why no Maori settlement has ever been established on the direct line between the sundered peaks,

The commander of the Takitimu canoe which brought the ancestors of some present day Maoris from Hawaiki was Tamatea. His grandson, also Tamatea, was a keen explorer and Maori historians credit him with being the first to travel up the Wanganui River beyond Kauarapaoa. He penetrated beyond Taumarunui and when his canoes could go no further by water, dragged them across country to Lake Rotoaira and thence by the Poutu River outlet to Lake Taupo. His bragging about his exploits to the local people brought a challenge to try the Waikato River. Tamatea and all his men were lost in the Huka Falls.

Page 55 – Land Court Logic

I was once appointed an assessor of the Maori Land Court. Judge J.W. Browne was holding a court sitting at Jerusalem and before deciding between two rival claimants to a small block across the river, he wanted to see about the proposed boundaries on the actual ground and, therefore, wanted me to show him them. One claimant named Rangi had his house within hail of the river bank and could be called to bring a canoe across for his important visitors. When we reached the river a canoe was already tethered on our side.

The judge decided to “convert” the craft, provided I could handle it. Nothing easier, provided he would just sit quietly and be a passenger. Unfortunately, there was a long pole in the canoe, and still more unfortunately, the judge was very anxious to help. He stood up and pushed the pole into the soft bank, where it stuck. The canoe moved steadily off-shore and the judge became steadily less and less erect and more and more unable to let go of his supporting fast-leaning pole. The end, of course, was quite peaceful and he just flopped gently into the foam.

I gave the judge my shirt and trousers and kept a singlet and we tried again. By this time, Rangi was coming down to meet us, but seeing me with no pants and the judge little better off, he went back for some clothes. I got a fine pair of dark serge trousers. We were soon sitting on a small hill, viewing “The landscape o’er” like Moses long ago.

Then to business, I was to be an assessor, so must be properly sworn. Had Rangi a Bible? No, but his small daughter had a hymn book. What about that?

“Good,” said the judge, and who was I to argue on the finer shades of doctrine. Rangi and his children could sing a hymn, if that would help. The judge rather thought not. So the court sat.

Luckily, I was able to come down heavily on Rangi’s side; after all, I was wearing his Sunday trousers. And when we got back to the canoe the judge sat very carefully amidships. While he was settling down, Rangi tapped me on the back and whispered: “Next time I go to court, e hoa, I only hope the judge got my pants on.”

Page 59 - River Traverse

The survey of the Wanganui River itself was not as difficult as might be expected. Even in the canyons there were nearly always places where one could set up an instrument and run a traverse, generally by zig-zagging from one side of the river to the other. If that was impossible, we had to stick to one side and cut ordinary traverse lines as required.

I used two canoes and always worked down stream. After an exploratory run, the first canoe went ahead with three men. One was sufficiently experienced to be able to choose suitable stations; the second assisted with access to the station from the canoe and clearing any growth preventing a clear sight fore and aft. The third man’s job was simply to keep the canoe handy. As soon as the two men on shore had driven a spike or tube and set up a flag signal for me to observe, they would tumble aboard and drift down to the next station. In the second canoe, I always had Paora and two other men, - one an experienced chainman, an important position.

While I set up my instrument, Paora would drift away down stream with the chainman paying out the chain held at my end by his mate. It was a tricky job as the chain had to be kept fairly taut. If allowed to sink to the river bottom it might get among rocks or submerged logs and cause great trouble. The Pakeha boatmen would curse and shout but, generally, it would be Paora who would handle the canoe to suit the circumstances and would finally clear the chain.

Paora would land the chainman at the signal mark. With his chain now hanging clear, the chainman would wind up or pay out till he had a full chain mark on his wire. Then the man at my end would hand over the link band for me to read and record the required measurement. Once that was done, the chainman had to wind up smartly to avoid snagging the chain again. Meanwhile, Paora was bringing the canoe back for me and my helper. In general, I always had plenty of time for the necessary observations, including check shots to points on the ridge traverses along the heights above.

Appendix 3

New Zealand! My Country! by AHB. Winning Entry, WWI National Song Contest.

Far away yonder across the dark water
Set like a gem on the breast of the sea,
The joy of my heart and the queen of my fancy
New Zealand is calling, aye calling to me.

Others may boast of their cities and temples
Castles and pedigrees, lands wide and fair,
But give us a glimpse of our clean running hilltops
And where is the breath like our own native air.

There is the soil that has formed us and fed us,
Streams that we played by, the warm sky above;
And there are the hands that we clung to as children,
The homes of our dead, and the women we love.

New Zealand! My country! The fount of pure freedom,
Where all who are worthy may bear them like men,
May the Lord give us strength to uphold thee in honour,
And the star of thy destiny never shall wane.

Appendix 4

Preface to 'Links in the Chain' – Author Unknown

The decision of the New Zealand Institute of Surveyors to publish this book is intended as a tribute to Archibald Hugh Bogle CBE, FNZIS. If his story should capture a wider readership, the intention of the organisation the author served with distinction for 68 years will have been amply fulfilled. Archie Bogle was a New Zealander and a professional surveyor who deserves the widest recognition.

He typifies the field surveyors of yesterday – the pioneers who subdivided the country for European settlement, laying the foundations for the comparatively comfortable existence settlers in the most remote parts of the country enjoy today. Through the interest, energy and dedication of men like Archie Bogle, the high hills proved to be less formidable, the deep valleys more accessible and the fertile plains more profitable. The road took the easiest grade, the bridge was built in the most convenient place, the fence line ran straight and true and the family home stood in the most sheltered spot.

Archie Bogle writes as he spoke of his work - with all humility but with profound knowledge and great integrity. His style is earthy but educated, relieved of the pedantry he abhorred by resort, sometimes, to a characteristic licence with language to fit the mood. His book reflects the author's genuine feelings for others – the people he met, those whom he liked and those he disliked and those with whom he disagreed – all presented with directness, tempered with understanding. The characters he portrays flit through the pages with the same ease as Archie Bogle traversed the undeveloped countryside.

Field surveying at the turn of the century involved working under Spartan conditions, calling for the utmost in human endurance. The surveyors lived in tents, slept in bunks made from saplings and used fern and bracken for mattresses. A kauri slab transported from camp to camp and set up on tree stumps served as a table for plan work. The cook house was a 10ft by 12ft tent, boarded at the ends and with a roughly- constructed chimney at the back. The men hunted their meat in the bush, did their own washing and mending and treated their own injuries, usually lacerations received in rough country and boils caused by diet deficiencies.

Archie Bogle found time to survey people as well as places. A rugged but essentially gentle man, he could listen respectfully while Maori bards and orators talked of tipua and taniwha, could offer a willing hand or ear to the comrade in trouble or seeking advice, could find time to fossick for the fabled haunts of the now extinct huia bird and could tarry beside a mountain reflecting, like his Maori friends, on the utter insignificance of man.

The Maori people, particularly, earned his love and captured his interest. Though he was a surveyor opening up the country for European settlement, he sympathised with them in the loss of their ancestral lands and respected their rights to those they retained, realising how closely the soil was linked to their traditions and way of life. He admired Maori clannishness and hospitality, the people's

concern for legendary lore and their competence in contending with the forces of Nature, particularly in poling canoes up and down the Wanganui River.

Among the Maoris, Archie Bogle found an important link in his chain, for he originated from primitive stock cherishing similar ideals and standards. “I’ll let you into a secret”, wrote one of his closest friends; “there’s good stuff in this old Scotch (*sic*) family that has a long straight tree running right back to Robert the Bruce, the turbulent and formidable opponent of Edward 1 of England. His descendant has a proud heritage”.

Archie Bogle practised his profession intermittently in late life but preserved his interest to the end. Surveyors who regarded him as the doyen of their profession have since paid tribute to his memory. One of them wrote: “I doubt if his records of service will ever be surpassed”. He was undoubtedly the most widely known and best respected surveyor of his day. Indeed, as the decision to publish “Links In The Chain” – the apt title selected by this imaginative man – testifies, Archie Bogle was, in the words of yet another colleague, “the outstanding surveyor of this century.”

Endnotes

¹ NZIS Past President Ralph Grierson, mentioned herein, qualified as a surveyor in the early 1950’s so will soon equal that record.

² There are minor differences between the various writers as to names, places and dates. Even AHB himself and Lex McRae were not immune from these errors. The writer believes that those details contained in this article are correct, having carried out the necessary further research to resolve differences.

³ Smith, D. 1975, page viii. Confirmed by AHB’s granddaughter, Diana Goodman in personal communication with the writer.

⁴ Ibid.

⁵ Ibid.

⁶ Bogle, A.H. 1975, page 42. The writer has generally retained the English spelling in the text, as did AHB.

⁷ Personal communication from Victoria University.

⁸ Smith, D. 1975, page viii.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid, page x.

¹² Ibid, page ix. See also, Bogle A.H. 1975, page 82.

¹³ Personal communication from Diana Goodman –AHB’s granddaughter.

¹⁴ Smith, D. 1975, page ix.

¹⁵ Ibid, page viii and confirmed in personal communication from Victoria University.

¹⁶ Ibid.

¹⁷ Ibid, page vii.

¹⁸ McRae, J. A. 1989, page 537.

¹⁹ Personal correspondence from Ralph Grierson to the writer.

²⁰ For example, see Journals Nos: 199 (p.348) April 1951- It could happen here alright, 204 (p.298) Aug. 1953 – The hole in the road, 209 (p.379) Feb. 1956- A tail from the bush, 212 (p.127) Aug 1957- Operation plumbob (for specific comment see McRae, J.A. 1989, page180), 233 (p.552) March 1968- Life on the ocean wave.

²¹ Smith, D.1975, page ix.

²² Courtesy of Diana Goodman.

²³ Bogle, A. H. 1975, page 31.

²⁴ Ibid, page 12. No doubt to the considerable amusement of present Wellington surveyors.

²⁵ Ibid.

²⁶ Ibid, page 17.

²⁷ Ibid, page 22.

²⁸ Journal No 61, Sept.1905, page 160.

²⁹ McRae, J. A. 1989, page 176.

³⁰ Smith, D. 1975, page viii. A firm’s name that ensures today – Wall Bogle and Payne.

³¹ Ibid, page x.

³² Ibid. Smith seems slightly in error as to the date of AHB’s return to Wellington and his own land

development. The writer has accepted family records.

³³ Anon. 1973.

³⁴ Ibid.

³⁵ Personal communication

³⁶ Smith, D. 1975, page ix.

³⁷ A.H. Bogle's personal correspondence and family records indicate that he spoke both languages.

³⁸ Smith, D. 1975, page x.

³⁹ McRae, J.A. 1989, pages 537 and 538.

⁴⁰ Bogle, A. H. 1975, page 51.

⁴¹ Based on Journal reports and writer's own registration number.

⁴² Personal communication from Judith McIntyre – Ian's wife. Yet another examinee and mentioned herein was Ralph Grierson who was to become NZIS President.

⁴³ Bogle, A.H. 1975, page 81.

⁴⁴ Ibid.

⁴⁵ Journal No 229, March 1966, page 74.

⁴⁶ McRae, J. A. 1989, pages 386 and 403.

⁴⁷ Ibid, page 411.

⁴⁸ Section 3.

⁴⁹ Writer's own studies.

⁵⁰ McRae, J.A. 1989, Chapter 16. The importance of this issue can be seen by the fact that McRae devotes seven pages to this particular issue and nearly 50 pages to the 1926 Act.

⁵¹ Ibid, page 399.

⁵² Journal No 176, Nov 1940, page 59.

⁵³ McRae, J. A. 1989, pages 391 to 393 and 410 to 411.

⁵⁴ There is some anecdotal evidence that internal politics were responsible. At that time, it appears there was some conflict between the Lands and Survey Department and the private sector (i.e. the bulk of the NZIS membership) and it was considered that one man should not head both organisations. Archie was therefore recalled. The breach was later resolved.

⁵⁵ McRae, J.A. 1989, page 416. Past President Ralph Grierson, in personal correspondence to the writer, notes that C.K. Grierson (former long-term NZIS President) and Professor Knight of Auckland University School of Architecture were also heavily involved. It is to be noted that registration as a surveyor through the cadet system and Survey Board examinations qualified as entry to the course.

⁵⁶ McRae, J.A. 1989, pages 286 -289.

⁵⁷ Journal No 173, Nov. 1939, page 344.

⁵⁸ Journal No 235, April 1969, page 102.

⁵⁹ McRae, J. A. 1989, page 178.

⁶⁰ Ibid, pages 178 and 179.

⁶¹ Ibid.

⁶² Writer's analysis.

⁶³ Ibid.

⁶⁴ Ibid -see page 14 of the text for the writer's estimate and endnote 20 for some other examples of his writing.

⁶⁵ Journal No 202, August 1952, pages 108 -110.

⁶⁶ Writer's research.

⁶⁷ Ibid.

⁶⁸ Journal No 235, April 1969, page 101.

⁶⁹ Journal No 234, Sept. 1968, page 645.

⁷⁰ Advice, by personal communication from the NZ Geographic Board Secretary indicates that Board records for this period are very sketchy.

⁷¹ For just one example see his editorial of July 1940 in Journal number 175 entitled, The Survey Cadet. He seriously questions at some length (inter alia) whether some master surveyors were providing proper instruction to their cadets.

⁷² McRae, J. A. 1989, pages 144-155.

⁷³ Journal No. 173, Nov. 1939, page 342. The university misconstrued the Board's intentions because of the untimely emergence of an old out of date inter reciprocal board memorandum not originating with the

NZ Board.

⁷⁴ McRae, J.A. 1989, page 137.

⁷⁵ Writer's research.

⁷⁶ Part McRae, J. A. 1989, pages 144 to 157 and part writer's comment.

⁷⁷ Writer's research. There would have been one notable exception!

⁷⁸ Grieg, H. E. 1948.

⁷⁹ Payne, G. F. 1960.

⁸⁰ Advice by personal communication from Diana Goodman.

⁸¹ Anon. 1964.

⁸² Ibid.

⁸³ Ibid.

⁸⁴ Writer's research.

⁸⁵ McRae, J. A. 1989, page 183. Readers can judge for themselves from the enclosed photos.

⁸⁶ Ibid.

⁸⁷ Writer's research.

⁸⁸ McRae, J. A. 1989, page 280.

⁸⁹ Ibid, pages 281 and 282.

⁹⁰ Bogle, A. H. 1975.

⁹¹ Personal correspondence from Judith McIntyre.

⁹² Brickell, R. G. 1976.

⁹³ Anon. 1973.

⁹⁴ McRae, J. A. 1989, page 179.

⁹⁵ Anon. 1973.

⁹⁶ Ibid. Confirmed by Anon. 1975.

⁹⁷ There is ample material. For example: Lawn, C. A. 1977, Easdale, N. 1988, McKay, D. F. et al, 2009.

McRae, J. A. 1989, Bogle, A. H. 1975, Journals since inception to around 1980s, Bogle family records, Auckland Museum, New Zealand Institute of Surveyors records, Survey/ Geographic /Town-planning Board records, Maori Land Court records and Archives NZ.

⁹⁸ Smith, D. 1975, page x.

Glossary

This glossary contains some of the more essential surveying terms and jargon used or implied in the text and appendices. They are not, however, precise definitions. They are intended for non-surveyors to assist in the understanding of these 'technical' terms. Although the list is not complete it is considerably more comprehensive than that provided by AHB in his partial- autobiography. It largely relates to the practice in AHB's time. Although methodologies have changed the principles have not.

Land surveying may be defined as the art and science of making measurements of the relative horizontal and vertical positions of natural and man-made features on the Earth's surface and the plotting of them to a suitable scale for representation on a map, plan or section.

The position so fixed must be recoverable and ultimately related to the Earth's geographic coordinates i.e. latitude and longitude. To do this, the measurements must be carried out to the highest order of accuracy, but commensurate with the size and importance of any particular project. Otherwise, serious distortions and inaccuracies would result. Maps would be unreliable, and boundaries could overlap or have gaps between them.

There is great skill and knowledge required to make measurements to the required standard of accuracy. Unfortunately, all measurements are subject to a degree of 'error or tolerance' which is unavoidable. These are not mistakes or blunders but inherent limitations on man's ability to measure anything with absolute precision. This is because of both equipment and personal frailties. A surveyor is much occupied in checking for, avoiding, preventing, locating, ascertaining and eliminating these errors. This is necessary, as their unchecked accumulation can lead to significant distortion. The errors must, by regulation, be within certain limits. Today, surveyors using modern equipment and techniques measure more accurately than 100 years ago when the prescribed limits were greater. It is to be noted that all linear survey measurements are reduced to

the horizontal at sea level (from the usual slope distances taken in the field) and are corrected for atmospheric conditions, sag (where a long steel band or chain is used), and differences to standard. Thus all boundary measurements on certificates of title are horizontal either measured or calculated and it follows that the area calculated from these distances also ignores the ground slope. Thus a 20m by 50m site (1000 square metres) on an even 20 degree slope would contain a ground surface area of about 1060 square metres. The tolerance described above is translated to the certificates by the words: 'be they (*the boundary distances*) a little more or less.'

In geodetic surveying, the curvature of the Earth is taken into account so knowledge of spherical trigonometry is required, and was ultimately controlled by astronomic observations and calculations. Nowadays GPS is much used for this purpose.

In plane surveying the area under consideration is taken to be a horizontal plane.

For even quite large areas the difference between the two is not great, but the reduction of measurements to plan form is very much simplified for plane surveying. In any event, one branch can be converted to the other. Over larger areas of the Earth's surface, geodetic surveying is required. New Zealand is divided into 29 plane surface areas, known as meridional circuits, for convenience to enable cadastral surveying to be carried out (formally) on the plane basis. However, these 29 areas are linked together by the overall New Zealand - wide geodetic system. Cadastral work is now usually, at least partially, converted to the geodetic datum.

Surveying (and of course surveyors) have been around since at least 400BC. The practice has been evolving ever since and continues to evolve today.

Base line: The line between two points which is measured very accurately to give a base distance for triangulation and from which a network of triangles is built up.

Cadastral: Relating to boundaries, i.e. a cadastral survey is a boundary survey. A cadastral map is one that shows property boundaries.

Cadastre: A record of interests in land. Often used for taxation and valuation purposes.

Calculations: Simplified plane survey calculations largely involve the transfer of polar coordinates to rectangular and vice versa, the one for the field and the other for the office.

Central meridian: The line on the Earth's surface passing through the initial point of a meridional circuit and the North and South poles. This line is used as the North direction for the entire circuit and as the name suggests is usually located in a central E/W position of the circuit. The initial point is the origin of coordinates and for plane surveying was originally assigned the values of 0.00 links in both directions.

Chain: (a) Unit of length: 1 chain = 22yds = 66 feet = 100 links = 20.1168 metres. Used in all survey measurements until 1972 and the change to metres. (b) Steel measuring tape or band up to ten chains long and wound on a brass drum. It is divided and numbered every chain except for the first which is divided every link. Measurements can be recorded to three decimal places of a link but usually only two. To **chain and observe** is to measure the length of a line and make the necessary observations to determine the direction/bearing and distance of that line.

Chainman: Surveyor's field assistant, originally the person involved in assisting with the 'chain' used in the measurement of lengths. Nowadays a 'survey party' consists of the surveyor and chainman, but in AHB's early years in bush work several additional assistants were usual.

Check shots: It is necessary to keep control of bearings to ensure that they remain in the same terms as the original of the particular survey. Therefore a system of check points is established to which bearings can be observed directly from the origin. At intervals in a traverse (usually not more than ten stations or points) a

bearing is observed to and from a check point and the two compared. The traverse line bearings from the last check point may require a small adjustment to eliminate any difference.

Close: The mathematically derived net error in position after traversing around a complete loop to the initial starting point or between two points of known position. More appropriately called a misclose. See Ordinate.

Closing line: The last line of a series of traverse lines connecting two fixed points or the last line of a series of traverse lines making a circuit complete within itself. Useful for determining survey error.

Coordinate: The distance of a point north (or south) and east (or west) of an initial point. These are more particularly known as rectangular coordinates, also known as total coordinates, values or latitudes and departures.

Cut ordinary traverse lines: The advantage of traversing down the river bed (where possible) was that sight and chainage lines were clear and not obstructed as it was necessary for the chain to hang in catenary (sag). The alternative was to cut lines between stations (set-ups) about 1m wide by axe and slasher – a labour-intensive and time-consuming business. Nowadays there only needs to be direct line of sight between a total station and reflector, there being no chain to run out.

Degrees, minutes and seconds: The circle is divided into 360 degrees (90 is a right angle). Each degree is divided into 60 minutes and each minute into 60 seconds. These are measured by theodolite with great precision both vertically and horizontally. It is possible to measure, with difficulty and much repetition to the second decimal place to a second. This, however, is only necessary for major triangulation. Thus a degree subtends an arc from a circle centre of $1/360^{\text{th}}$ of its circumference. For a radius of 100m this is 1.74m. Likewise a minute subtends 29mm and a second 0.48mm.

EDM: Electro-magnetic distance measurement. This superseded 'the chain.' Relies on the return time of a beam between the instrument and a reflector plumbed over the mark – the distance to which is to be measured.

Error: All surveying and measurement is subject to some degree of error which is unavoidable as discussed above. These errors are detectable and are eliminated by applying appropriate mathematical rules. Elimination of errors in plane surveying is comparatively simple, but geodetic is much more complex. See also under Land surveying.

Flag/signal: A point (often the sharpened end of a stick cut from a convenient tree) plumbed vertically over a mark and to which the theodolite observes horizontally and vertically and the chainman holds the nearest whole chain mark steady while the surveyor reads the link band to one hundredth of a link while applying a fixed tension.

Geodetic: Relating to or taking account of the curvature of the Earth, hence geodetic surveying and the NZGD, which superseded the earlier plane survey control which presumed the Earth was flat over a limited area.

GPS: Global positioning systems. Determining one's precise geographic position on the Earth's surface by reference to a number of orbiting satellites rather than the sun, moon and the stars as in AHB's day. Not quite so simple as using Google maps on your cell phone!

Grads: Name of bearings used in France. Instead of the circle comprising 360 degrees it has 400 grads.

Grid North: Lines parallel to a central meridian and used as North for that meridional circuit. This facilitates plane surveying.

Horizontal: In lay language horizontal is synonymous with **level**. But they are not the same. They are usually close unless you are standing, say, on the top of Mt. Everest. Level is a line tangential to line between a point on the Earth's surface and the centre of the Earth (vertical). This is the basis used for determining, for example,

grades of roads and pipelines and particularly theodolite angles and boundary measurements. It is determined with a spirit level. Horizontal is the angle of depression from a point on the Earth's surface (above sea level) to the sea level horizon. Sea level horizon is a level line. Vertical is right angles to level.

Link: One hundredth of a chain = 7.92 inches = 0.201168 metres. Links were the official measurement used in surveying and for title purposes until 1972 when metrication was introduced. There are 100,000 square links in an acre.

Link Band: A 'chain' graduated in chains and links as opposed to one graduated in feet or metres.

Magnetic Variation: The difference between true and compass (magnetic) norths. The compass points to the magnetic North Pole which moves over time. Consequently the variation also varies over time as well as from place to place. In NZ it is currently in the range of +/- 20 degrees East.

Mark (also point): An object installed in the ground to give and maintain a precise position. Surveyors use many different types of marks, with the most common being pegs, plugs, spikes and tubes.

Meridional circuit: A large area where surveys are all based on the same bearing and coordinate datum. New Zealand is divided up into 29 meridional circuits.

NZMG: New Zealand Mapping Grid – a coordinate system for mapping the entirety of New Zealand without having the error distortions which occur at the interface between meridional circuits.

Observation: The measurement of angles (or bearings) with a theodolite.

Off set: (noun) the perpendicular distance from a traverse line to an object or topographical feature- (verb) to place a ground mark or series of ground marks adjacent to an existing mark or series of marks, in some cases to provide a line of marks parallel to an existing line.

Ordinate: The distance north (or south) and east (or west) derived from a line of given length and bearing. The north (or south) distance is known as the latitude. The east (or west) distance is known as the departure. However the term is most usually, and perhaps confusingly, described as a coordinate.

The basic mathematics of plane surveying requires that for a closed traverse circuit the algebraic sum of the latitudes and of the departures each be zero. In practice this rarely happens, and then only by cancellation of errors, so that the difference known as a survey error or misclose requires to be distributed according to appropriate rules.

Other end of the chain: That is, the chainman.

Peg: Driven vertically in the ground, these were previously totara or other rot-resistant timber but are now usually made from 75 x 50mm treated pine. Occasionally concrete or aluminium pegs are used. Up until about 1930, most traverse and boundary marks were pegs. Now pegs are used exclusively for marking boundaries.

Pegging tie: The line between a traverse point and a peg measured and observed by a surveyor, derived by calculations.

Permanent reference mark: A survey mark intended to remain for a very long time to preserve the relative positions of all other points on the survey. The most usual form is an iron tube, but can and often is any other form of mark in a large stable block of concrete, purpose built or otherwise. Trig stations are an example.

Plane surveying: Taking no account of the curvature of the earth which is assumed to be flat over a small area, hence plane surveying.

Plumbing: The setting of a target or survey instrument vertically above a survey mark in the ground. This is usually achieved with a plumb-bob or an optical plummet. Nothing to do with pipes or drains!

Polar coordinates: The position of one point relative to another point defined by the distance and bearing between the two points. For plane surveying the simple application of trigonometrical functions, sine and cosine applied to the measured distance and bearing reduced to the first quadrant angle, produces the ordinates for calculation of **rectangular coordinates**.

Projection: Depicting the curvature of the Earth on a flat surface according to mathematical rules which enable distant points on the Earth's surface to be correctly related and shown on maps and used in geodetic calculations. There are a number of different projections, each with its advantages and disadvantages according to its particular purpose and relationship to the Poles. This accounts for the apparent distortion between maps of the same area based on different projections.

Probable error: The error (as defined above) arising from survey measurements can be calculated using statistics or other mathematical rules. Often expressed as a representative fraction (RF).

Ray: A line between two points of which the bearing (direction) has been measured with a theodolite.

Set –up: (noun). The various operations required to be carried out while a theodolite is 'set-up' in a particular position, that is, with its optical centre plumbed over the mark and levelled – (verb). The act of correctly positioning a theodolite and preparing it for use in a particular position.

Surround: A series of lines forming the boundary of a property or a closed traverse.

Theodolite: Also called 'the instrument' or 'jigger.' Used for measuring angles in the horizontal and vertical planes with a rotating telescope in both directions.

Total station: An instrument that combines the function of a theodolite and EDM.

Traverse: (noun). A series of traverse lines. (verb). The act of determining the bearings and lengths of traverse lines together with other ancillary measurements relating to the traverse. A traverse circuit, the usual practice, is to start and finish at the same point; this has an advantage in assessing the survey error.

Traverse line: A line between two ground marks, the bearing and length of which has been or is to be determined. The line may or may not demarcate a particular line, e.g. a property boundary.

Triangulation: Surveying by measuring the angles of triangles formed from a network of survey marks, usually over large areas with distances calculated from a measured base line. There is a hierarchy of accuracy known as 'orders'. In NZ, first order is the geodetic survey of the entire country known as the geodetic datum 1949 (date of completion). This involved observing lines up to 100km long built up from several base lines, each about 10km long. This unifies and connects all surveys in NZ. Ordinary traversing would generally be about 10th order.

Trig, Trig station: Abbreviation for 'trigonometric' or 'triangulation' station- steel pipe or other suitable mark in the ground, usually on a prominent hill. A series of these stations form the apexes of triangles, the angles of which are measured as part of a triangulation survey. Often a beacon or signal in the form of a wooden or metal frame is erected over the mark in the ground so surveyors can observe rays to the trig from a distance without having to visit the position.

True bearing: The bearing of a line relative to true north i.e. the angle. Measured clockwise, between true north and the line concerned. Measured in terms of degrees, minutes and seconds.

True North: The line from any point on the earth's surface that passes through that point and the North and South geographic poles. Other lines from points either East or West are not parallel as in grid North.

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