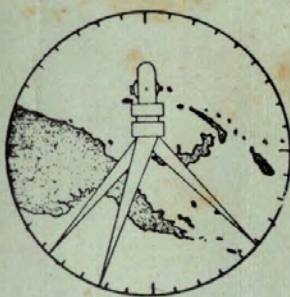


THE JOURNAL

of the

ASSOCIATION OF SURVEYORS OF

PAPUA AND NEW GUINEA



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ASSOCIATION OF SURVEYORS OF PAPUA & NEW GUINEA

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BUSINESS MANAGER

M.J. Larmer

EDITOR

G.G.D. Arman

CONTENTS

	<u>PAGE</u>
EDITORIAL	1
CODE OF ETHICS	4
RETIRING PRESIDENT'S ADDRESS - J.C. MACARTNEY	7
OPENING ADDRESS SIXTH CONGRESS - DAVID MORGAN	11
REPORT ON SIXTH SURVEY CONGRESS - G.R. HOLE	21
PHOTOS TAKEN AT ANNUAL DINNER	25
SURVEY TOPICS	26
AN INTEGRATED SURVEY SYSTEM - O.G.G. DENT	29
SURVEY INTEGRATION - R.G.MATHESON	42
INTEGRATION	49
SURVEY TECHNICIANS - G. ARMAN	51
A SERMON IN NOISY STONES OR WHAT PRICE METRIFICATION - M. OLIDOIT	52
LETTERS TO THE EDITOR	55
LIST OF MEMBERS	63

(Views expressed herein are those of the authors and not necessarily those of the Association).

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(ii)

EDITORIAL

Is it time for a change?

Papua New Guinea is on the way to independence. The actual date is not known, but the survey policies to be implemented and the manner in which they are to be carried out after independence should be known and formulated as soon as possible.

Why? - Do you consider that the existing directions and ordinances fully satisfy the potential demands this country will require; do you feel that the Administration should control a professional body or should that body control itself; are you satisfied that the standards we have set for this country will result in the best use of available resources; do you appreciate the responsibility of your role as a Surveyor in a country where land holds the paramount place of importance, above, amongst other things, people; are you happy that we have the perfect solution?

Now that you may feel that some changes could be thought about, you may say "what?".

Firstly, let us start from scratch and consider what does this country need.

Viz - a professional surveyor, practicing in the various fields of surveying, able to perform a service to a required minimum standard, to be fully responsible for his work and to public demands and protected in trust by the laws of the country for the betterment of that country.

A Surveyor can only be licenced to practice in P.N.G. as a cadastral Surveyor. We must, as soon as possible, implement registration in the form of a practice

certificate for Engineering and Geodetic Surveyors. Only by placing responsibility on our shoulders can we expect a responsible attitude to the value of our services.

How about the Association picking up the tab?

We need to control ourselves and what better way to do it. Who is more capable to determine the standards and manner of practice in this country? We are. Then let us actually do something about it.

The future of the surveying profession is dependent on the capability of the indigenous graduates from the Hitec, Lae. If so they must be given the opportunity to practice in their chosen field without fear of unfair competition, or these people may be lost from the profession.

Following this, a surveyor, being judged competent to effect a responsible survey, should not have to answer to a set of rules and directions, provided he is prepared at law to accept the onus of his services. It is always well to have a survey conforming with the 'book', but is this the surveyor's responsibility or the client's? It's results that count and under our system at the moment results appear to be a secondary concern.

Now that we believe a Surveyor can draw a line in a field book without the guiding hand of an examining draftsman, let us consider the standards he must work to.

1:8,000 - have you ever thought that the old Gunter's chain would still determine the closure even in Papua New Guinea. We must surely be running out of excuses on this one. Why a closure error at all? Why not a positional error? Why not a lineal accuracy

error? Why not the missing line error? Why anything at all? Because people are not prepared to change. But we are - aren't we?

Now we progress to the important aspects of our profession. The physical survey and the marking. There must be a system to replace our archaic antiquated methods. Star pickets, galv. iron pipes, timber stakes and concrete pegs, but is our definition by measurement or monumentation? We have a ridiculous double standard where we need 1:8,000 to re-establish, yet accept monuments where possible. This double standard only means double trouble. Do we need the best of two worlds to protect ourselves? Abolish monumentation as a criteria. Then we may strike some harmony into our system. Fair enough, spend more money on control, possibly a co-ordinated system for P.N.G. and we can afford to lower our monumentation and control our measurements. E.D.M. is not a thing of the past. It is here but we must be able to utilize it to the best advantage to survive.

This leads us to a topical point on the use of survey technicians on surveys in P.N.G. If we can conform to a system of definition by measurement, then the technician can be utilized to his fullest capability and the surveyor can maintain his position at the professional level. Do we ask a draftsman to decide on the definition of a corner by monumentation? No! Then why ask a survey technician to do so. Those who so ask, can only expect problems.

If we are to be professionals then let us act like them. We must move with the times and the people, get with it and re-think our answers or very soon we won't have any problems to decide.

G. ARMAN
EDITOR

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G. ARMAN
EDITOR

CODE OF ETHICS

"I hold every man a debtor to his profession; from which as men of course do seek to receive countenance and profit so ought they of duty to endeavour themselves by way of amends to be a help and ornament thereunto."

Sir Francis Bacon
(1561-1626)

ARTICLE 1. "He (the surveyor) shall always endeavour to maintain and present to his client or employer a high standard of professional conduct and bearing worthy of his profession.

ARTICLE 2. "He shall ensure that his employees or junior associates shall likewise conform to a proper and dignified standard of behaviour, dress and bearing, whilst employed in a manner associated with the profession.

ARTICLE 3. "He shall not solicit or canvas for work by advertising, public announcement, direct approach, or in any way which in the opinion of the Council would bring the Association or its members into disrepute. He shall not advertise through any medium whatsoever the fact that he is a surveyor or carries out surveying save that the following shall be permissible, viz:-

- (a) To exhibit plates and signs at the member's place or places of business which exhibit his name and profession, provided that the characters are within reasonable limits as to size;
- (b) to advertise for a period not exceeding three months the commencement of practice in any new place or dissolving of partnership; and
- (c) to insert in a newspaper a professional card or notice containing his name or the

name of his firm, together with initials or words indicating diplomas, degrees or membership of any institution, particulars of business and time of attendance thereat, and words indicating simply his profession, with card to be of reasonable proportions.

ARTICLE 4. "He shall observe the Scale of Fees, Charges, etc. adopted or approved by the Association and shall not indulge in undercutting or giving discounts, commissions or allowances in connection with professional work, where such is contrary to the wording of spirit of such Scales.

ARTICLE 5. "He shall not knowingly accept, professional work on which another member is engaged, except in collaboration with or with the consent of such other member. This clause shall not apply where a client has given notice of the termination of the previous engagement.

ARTICLE 6. "He shall regard as confidential any information imparted to him as such, concerning the business affairs, methods or processes of a client or employer.

ARTICLE 7. "He shall inform his client or employer of any interest, circumstances or business connection which may be deemed adversely to influence his judgement or the quality of his services to such client or employer.

ARTICLE 8. "He shall accept compensation, financial or otherwise, for a particular service from one source only, except with the knowledge and consent of all interested parties.

ARTICLE 9. "He shall accept full responsibility for professional advice given to his client and shall not practice through the medium of or in association with a limited liability company or similar organisation without the specific approval of the Council.

ARTICLE 10. "He shall co-operate in raising the standard of his profession by the interchange of technical knowledge and experience, and by the active participation in the affairs and proceedings of the Association.

ARTICLE 11. "He shall corporately accept a responsibility to the Government of the day and to the general public for advice and assistance in matters of national welfare and appropriate to the professional interests of his Association.

ARTICLE 12. "He shall conform to any decision by the Association on a question of ethical conduct in accordance with the ruling given by a learned judge to the effect that 'Disreputable professional conduct is such, when professional brethren of good repute and standing would consider such conduct disreputable or unprofessional'."



Opening of Congress.
J. C. McCartney introduces Mr. M. Toliman.

TWELFTH ANNUAL GENERAL MEETING

RABAUL 23rd. JULY, 1971

RETIRING PRESIDENT'S ADDRESS

GENTLEMEN

When one's Presidential year is drawing to a close, one is like a person approaching recreation leave and looking forward to the respite. However, he then looks at himself in retrospect and begins to see his failings and faults; how much more he should have done, what he has left undone and how if he had acted in certain ways, things would have turned out better for the Association. This must be a result of ones training as a Surveyor in that he is always striving for an "exact closure". To the incoming President I hope I have not left you with too many "missing bearings and distances".

In the past years we have always made excuses that our Association is growing up, still striving to find its feet. I believed the Association has now grown up and its responsibility now is to ensure that it stays on its feet.

This past year began to test our stability and could be likened to a cricket match with the Association the batsmen, but batting on a sticky wicket and against some clever bowlers. The sticky wicket could be the current financial stringencies and the bowlers the various clients attempting to use such a wicket to beat the batsmen. The batsmen belong to one team and their plan of play has been laid down. Whatever the game, the side that plays as a team invariably wins and therefore it is essential that all members of our Association play as a team, abiding by the captains instructions which are our "Code of Ethics".

Mr. Dahl in his paper "Quo Vadis" suggested that now is the time to take stock of ourselves. Surely those among us who can think beyond a theodolite and chain have already done this. As to "Quo Vadis", what have you as individuals done about it? Council is not your mother to hold your hand and guide you through troubled times and then set the pattern for your future. Council is rather the medium through which you individually or collectively express your views and have follow up action taken. The success or failure then of this follow action is the test of capabilities of your Council.

Mr. Dent, only yesterday said the Association has done nothing in the past three years to investigate the possible introduction of an "integrated Survey System" in the Territory. The fact that this statement is not entirely correct is irrelevant. What is relevant is Council needs your views and not per hear say but in a written proposal, detailing methods for its implementation and then I can ensure you it will swing into action.

If you are forming the opinion that I am verbally chastising you for your general apathy towards your own profession and livelihood you have made an accurate assumption. In my short address at the Eleventh Annual Meeting when accepting the role of President for 1970/71 I made a genuine plea to you all to, whenever possible, to have group discussions and submit the results of such discussions to Council. I am very disappointed to have to report to you that no such reports were received during my term of office.

For many years now we have been riding on a "Dollar Plated Wave" and although this has made many of us financially stable, have we during this period been doing an annual "stock take" of professional status and as explained by Mr.S.Dahl allowed some facets of

our training to go to other professions who may have existed or been created out of necessity because of our lack of interest.

The "Dollar Plating" at the moment is reduced to a very thin veneer. This situation could lead to two actions by our members.

- (a) A fragmentation with, back biting, lowering of standard of work and a general breaking of Our Code of Ethics.
- or
- (b) A strengthening of the bond of our members and a determined effort to fight for our survival as united body not only sticking to its Code of Ethics but even further attempting to improve them to the betterment of the profession generally.

Our Association belongs to Papua New Guinea and we expatriate members must set an example to the indigeneous members to whom we will be leaving the Association when we return to our respective homelands. I hope that next year we will have some indigeneous members as Councillors.

I am not going to list the achievements of the Association during my Presidential year because if there were any, they should be self evident and you will have derived the benefits from them.

My own opinion is that the Annual Congress has been most successful and both the members of the Association and our overseas delegates must have gained professional benefits and made social contacts which will have more than compensated them for the efforts in time and expense of attending.

To Mr. Williams and his Congress Committee I extend my gratitude and congratulations for

all the work you have put into this Congress. You do not have to eat your words "Anything Port Moresby can do, Rabaul can do better". I would like to make mention of the fact here that for a period Mr. Williams was away from Rabaul and the burden fell on the shoulders of Dave Rumble who did an excellent job as deputy - Thank you Dave. Also I must not overlook the local "Servettes" for their part in the social organisation.

I would now express my deep gratitude to my Council and sub-committees for all the hard work they have done during the year but most particularly for putting up with me as their leader.

Now Gentlemen I have much pleasure in introducing you to your President for 1971/72, Mr. K. St. Clair Matheson. His capabilities as a man and a supporter of our Association are well known to you all and I can assure you that under his leadership the Association will grow in strength. He even has the paddle to help him.

Gentlemen, your new President Mr. Ken St. Clair Matheson.

J. MACARTNEY 23.7.71

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THE ASSOCIATION OF SURVEYORS
OF PAPUA AND NEW GUINEA
SIXTH SURVEY CONGRESS
RABAU 19th-23rd. JULY, 1971

OPENING ADDRESS

BY

MR. D. MORGAN F.I.S.(AUST.)

PRESIDENT, INSTITUTION OF SURVEYORS, AUSTRALIA

Mr. Chairman, Mr. Mathias Toliman, M.H.A., Ministerial Member for Education and Member for Gazelle Open Electorate, Distinguished Guests, Ladies and Gentlemen.

Firstly Mr. Chairman may I say thanks to you and the Association of Surveyors of Papua and New Guinea for inviting Mrs. Morgan and myself to be with you at this, your Sixth Survey Congress and for the invitation to present the Opening Address.

I would like to join in the thanks to Mr. Mathias Toliman, for his opening of this Congress.

I have had the pleasure of attending a large number of Survey Congresses and have found that the opening generally sets a standard for the balance of the Congress. In this particular instance this Congress has been set a very high standard to measure up to and for this we are indeed all very grateful to you, Mr. Toliman.

Before proceeding further, I feel that I must convey to you all the very best wishes for the Congress from two former Presidents of I.S.A. who have visited you in recent years, viz. Alan Wood and R. James Love. Noel Fletcher the S.G. for N.S.W. had earlier in the year planned to accompany me, but found that it was not possible to get away as he proposes to attend the Conference of Commonwealth Surveyors to be held in Cambridge later this year. He also sends you his best wishes for a successful Conference.

As many of you are members of I.S.A. I feel that I must tell you that we are now approaching a significant and serious possible change in our administration. As you will know Ray Steele has been the Honorary Secretary of I.S.A. since its first meeting in October, 1952, and was very active in the formation of the Federal Body. Unfortunately his health is such that he will not be able to carry on after October this year, and the inevitable, that we all feared now has to be faced. We are indeed very fortunate that Alan Wood has offered to take over the duties of Honorary Secretary, subject to his acceptance by Federal Council in October and this will mean that the headquarters of the Institution will of necessity be transferred to Sydney. This undoubtedly will cause a great deal of work for those involved and may mean a re-organization of the work load in order to make greater use of paid assistance.

It may well be said that no one is indispensable but let me hasten to assure you that Ray Steele will be sadly missed and his stepping down from the post of Honorary Secretary will mean a lot of work for those directly involved in the re-organization. His attendance at the Council Meeting in October this year will mean that he will have attended all 60 of the Federal Council meetings.

Your President was good enough to send me a copy of paper entitled "The Formation, Development and Aims of the Association of Surveyors" presented by Mr. T.C. Jackson, the then President of your Association, to the Congress held in 1969. One of the striking points made in that paper was that it was formed on 4th. May, 1960, with a membership of thirteen qualified surveyors and in 1969 the membership was in excess of eighty Corporate and Associate members. This must surely reflect two things, the growth of the Territory and the awareness of at least the majority of Professional Surveyors that there is benefit both to himself and the profession to belong to an Association such as yours. It also can be accepted as a form of assurance to those organizations requiring the services of a Professional Surveyor. Not only does it indicate the member's academic qualifications and practical experience, but shows that he is prepared to observe a Code of Ethics. Observation of a Code of Ethics must be regarded as paramount by any Professional man and I would suggest even more so by the Professional Surveyor as frequently his work, which is not verified from other sources forms the very foundation for large undertakings.

This gives me the opportunity to repeat the phrase "Every man is a debtor to his Profession" and one of the many ways he can honour that debt is to join and be if at all possible active in his appropriate Association or Institution. Frequently you will hear the expression "Why should I remain or be a member of the Institution; what has it done or can it do for me?" Upon enquiring you generally find that all the member has done is pay his annual subscription.

You probably find that he doesn't bother to read the Journal and so does not make any attempt to find out what his Institution is doing or proposes to do to further the image of the profession both here and overseas.

I always remember the remarks of a very senior member of our profession in Sydney several years ago; Mr. James K. Curdie. At a rather well attended General Meeting at which he arrived a little late, having been deliberately delayed by one or two members, the then Divisional President announced that Mr. Curdie had been advanced to the grade of Honorary Fellow of the Institution. Mr. Curdie's record of service to both the profession and the Institution can only be described as outstanding and far beyond any reasonable call of obligation or duty. His reply after the initial shock was "Maybe I have put a little into the profession of Surveying and into the Institution but I can assure all present that I have got very much more out of both than ever I put in to them."

He continues to serve as in the past and to maintain the outlook that he is the richer for it. There are not many Jim Curdies' but it is to he and to others of equal stature that this profession owes a great debt. May be this all sounds as though I am preaching a little to the already converted, however one does find in most gatherings and more so in the larger cities there are those who have their doubts about the value of the Institution.

To me there isn't any doubt of the necessity for the establishment of your Association or I.S.A. in order to weld the profession together within their respective areas of operation, and this can only be achieved by active participation of the members.

Since 1952 I.S.A. has grown in membership from 1175 to 2512 as at 1st. January, 1970. It has brought all Branches of the profession together and has gained world wide recognition through overseas affiliations and memberships. I point to R.I.C.S., F.I.G. and now C.A.S.L.E. and the acceptance of our Journal "The Australian Surveyor" throughout the

world. The I.S.A. is the largest Institution of Surveyors in the world.

Ladies and Gentlemen if you would permit me I would like to change my theme a little. Our profession is a very old and important profession. A recent article that I read on the History of Surveying stated that old Egyptian Chronicles refer to the use of a tape measure by groups of land-surveyors in the re-establishment of boundaries following the flooding of the Nile and the earlier reference is about the year 1980 B.C. We know that other countries and other peoples such as Mesopotamia, Greece the Romans, the Arabs and the Chinese make reference to different measuring instruments and it is known that a land register existed in ancient China. It is understood that as early as the year 1125 B.C. the Chinese succeeded in making a map of the whole of their Empire and it seems it could have been based on earlier cadaster plans and forest maps. Maps specially intended for administration were engraved on bamboo boards, and maps intended for travellers use were painted on silk.

In fact the oldest map discovered to date is believed to date from 3800 B.C. It is a Babylonian Clay tablet and shows outlines of the northern part of Mesopotamia, the mountains and the rivers being distinctly outlined and the towns marked by circles.

So it can be seen that maps and measurement have played a very important part in the development of any country and the world for at least 6,000 years.

This leads me to the ever increasing importance of the Surveyor and his role in mapping as we know it today. As you know Australia has a very large mapping programme and is through the Division of National Mapping (Department of National Development) pressing

on with this most vital work, the final results of which play a most important part in the development of the country.

Mapping, which covers the land and its resources as well as the coastlands surrounding waters, is not an inexpensive undertaking, but without it, more so today than ever before, the development of a countries resources is so retarded that the real question should not be "Can we afford it?", but rather "Can we afford not to afford it?".

In support of that thought I would like to quote from a press release issued by the Minister for National Development on 23rd. March, 1970.

"The Commonwealth is taking another vital step in a systematic programme to assess and utilize the potential wealth of Australia's foreshores. His Department would complete by 1980 a survey to determine depth over the continental shelf and produce a series of bathymetric maps at a scale of 1:250,000."

I know that this work has already started; as a survey firm, members of which are friends of mine are carrying out the first contract.

The Minister also had this to say, "Maps are a basic working tool for mineral explorers and their provision through a co-operative effort by Commonwealth and State Agencies has been a major factor in the success of the search for minerals off-shore in recent years."

I'm afraid that maps and the work required for their preparation is taken very much for granted and it is only when good reliable maps of an area are not available or those that are available are so out of date that they are practically useless that their importance is realized. The non-availability of maps and

the age of other maps have been the subject of criticism in the House of Representatives from time to time. Therefore I feel that I must repeat, "Can any country that wishes to progress forward afford not to afford good detailed maps?" It is from basic maps that all types of developments can be planned for more detailed investigation.

Another facet of the importance of the Professional Surveyor was made clear recently at the Senate Select Committee on Securities and Exchange when a witness, who is not a surveyor is reported to have said that geologists often went to the wrong lease. He said geologists were not surveyors and there have been drill holes put down on wrong leases. This to my mind makes it quite clear that any mining company that wishes to ensure that it issues the correct information about a mining lease should engage a professional surveyor to correctly locate and define the area prior to the geologists carrying out their investigations. In fact a mining prospectus could well carry a certificate signed by a professional surveyor stating that the investigation was carried out on the correct lease. It would certainly offer greater protection to the public.

I would like to touch slightly on the question of fees and remuneration for the Professional Surveyors. At present the N.S.W. Division is revising its scale of fees and once again we see the inefficient trying to gear their thoughts to their inefficiency and we also see the cautious who are afraid that an increase in fees will bring unpleasant repercussions. I firmly hold the view that any scale of fees must be geared to the efficient, and that the remuneration plays a very large part in any profession's ability to attract recruits.

To conclude my thoughts on remuneration it is equally incumbent upon the Professional Surveyor that he employs the most efficient means at his disposal in order that he supply his client with the required information at as low a cost as possible within the ambit of the scale of fees. I will take this opportunity to advise you that the Survey Practice Regulations in N.S.W. have been amended recently to accept the use of Electromagnetic Distance Measuring Equipment and to use Photogrammetric Methods of measurement if appropriate. This, under certain conditions must lead to more efficient methods of survey. It is with this type of approach that we in Australia through the efforts of the Institution at both State and Federal levels have been largely able to overcome a requirement for firm quotations for certain work. Large scale mapping and bathymetric surveys are still being submitted to tender, but such work does involve a lot of expensive equipment and must be regarded as being of a very specialized nature.

One of the greatest sins of many of our profession is one of which I have always been very critical and that is the inability or unwillingness to communicate. They carry out excellent surveys, but prepare very sketchy field notes and write the sketchiest of reports. After all, the field notes, the plans and the report which form the record of the work are vitally important. In a few years time they can be the only available record of the work carried out and it is from that record someone else may have to deduce what was done. A very good example of the value of a good and full report is referred to by Mr. S.E. Reilly in his article on Papua's First Surveyor, Walter R. Cuthbertson. The paper which was published in the Australian Surveyor, September, 1955, had this to say.

"The value of adequate field notes and surveyors' reports was demonstrated by a recent dispute between natives and the Crown over the ownership of lands in the township of Granville East, part of Port Moresby. The land itself was worth about £1,000, but buildings had been erected upon it to the value of some £60,000, so that failure to establish the Crown's claim would have involved considerable financial loss. The Crown succeeded because Papua's first surveyor - Walter R. Cuthbertson - kept full, descriptive notes of his surveys, and submitted comprehensive reports with his plans telling what he had done and his reason for so doing. This survey and report was prepared in 1886 and formed an essential part of the Crown case in support of its claim to the land."

That can be regarded as good communication and an example all surveyors should note.

With the increase in the requirement of academic training in Australia for the Professional Surveyor we are seeing, in our profession as well as in other technical professions, the growth in numbers of the Technical Officer. This, I think, is for the ultimate betterment of the Professional Surveyor but it is also something that must be approached with a certain amount of caution and we must examine what has happened in other countries.

The technician as I see him will be quite capable within certain limits and it should be the responsibility of the professional surveyor to see that the technician surveyor carries out his work correctly. In this way the professional surveyor can become responsible for the work being carried out by several survey parties and thus he in turn can be of greater value to the community.

In closing I would like to refer to the Integration of Surveys and the advance we have made towards this in N.S.W. Our Surveyor General has now received instruction to prepare the information for a new Survey Integration Bill. All this follows a great deal of work carried out by a Committee of Principal Surveyors from various Departments, representatives from the Universities, Surveyors in private practice and the Institution under the Chairmanship of Mr. Noel Fletcher, the Surveyor General of N.S.W. We consider this is a major step forward in surveying that will ultimately be of great benefit to N.S.W. as a whole, and form a basis for other States or countries to develop its own system of Survey Integration.

It also enhances the feasibility of the establishment of a Survey Storage Data Bank; a system of recording data with infinite possibilities.

Ladies and Gentlemen, I feel that I have spoken far too long on the subjects of Surveying and the Institution, both of which are very dear to me. Thank you most sincerely for your extreme patience and in conclusion I would offer to the Association my sincere wishes for a successful and happy conference.

REPORT ON SIXTH SURVEY CONGRESS
& TWELFTH ANNUAL GENERAL MEETING

The Sixth Survey Congress and Twelfth Annual General meeting of the Association was held in Rabaul in July, 1971.

Unfortunately this year the generous support from C.A.S.L.E. which we had enjoyed in past years was limited and with Government restrictions in Australia several intending delegates were unable to attend. However we still managed to have some notable overseas visitors. Among our South Pacific neighbours we had representatives from Fiji, Western Samoa, B.S.I.P. and the South Pacific Commission.

Australian visitors included President of I.S.A., David Morgan and Mrs. Morgan and Klaus Leppert from National Mapping.

One intrepid delegate was due to fly from Perth in his light aircraft but didn't arrive. We trust all is well with him. Many Australian based members however did make the trip by more conventional methods.

Rabaul quietened its earthquake activity for the week and apart from a few light rumbles, noticeable in the swimming pool or the Lands Department water cooler, the general upheaval around Rabaul was caused by surveyors rather than mother nature.

The usual registration formalities were dispensed with and the Council's decision to get straight on with things was a wise one, the President's cocktail party getting into full swing under clear Rabaul skies (for the first hour) at Kaivuna Motel.

As the rain seemed to increase with the thirst a move was made to the lounge of the Motel where part of the open area had been covered in by intrepid surveyors using their bush knowledge for such an emergency by constructing a stout bamboo and canvas shelter. This was an example of the native skills one expects from Surveyors and was a prime example of sturdy lashing and excellent camp construction.

Luckily no one was hurt half an hour later although the drinking rate increased to steady nerves of those nearest the falling ridge poles.

Mr. Mathias Toliman was very kind in agreeing to open our Congress. Mr. Toliman is Minister for Education and Member for Gazelle. It was also the first time a New Guinean had performed this task and we were honoured that he had accepted.

The Kulau Lodge proved a delightful setting, especially for those guests and members fresh from an unfriendly Australian Winter. Right on the waters edge one couldn't have wished for a more typical tropical location.

Dave Morgan followed Mr. Toliman with the opening address, giving us some aspects of the latest moves on the Australian scene.

Papers began immediately and I have not attempted to comment or analyse them, as they are all available for those interested.

A Ministerial Member Andrew Wabiria's paper was of course worthy of separate mention and no doubt our visitors were interested in this, our first "non English" paper.

One word of course is the thanks that the Association must always extend to all those

who did present papers, more so perhaps to non-members for the time and effort involved. Some more effort from members, regardless of how minor they may consider their own particular interest, could ensure the Congress of plenty of discussion.

The Annual Dinner was its usual resounding success, with S.G. Graeme Matheson doing the oyster trick. Brian Dutt replied on behalf of the visitors with some comments on his search for things non technical.

The ladies, led by Bet Macartney appeared to be out doing the males in their efforts to enjoy the evening and pity help the hapless male who ventured near, even though it was a route to a vital room in the Hotel complex.

The organisation for the girls was first class, and how gratifying it must have been for the Rabaul team to see such a good role up of the fair sex (where they got the word "fair" from I'll never know).

Any way thank you Rabaul ladies for your great effort.

Several interesting sidelights appeared from the Congress, the Round Blocks, Tom Richards "Dozer Buster", recovery pegs and the never ceasing discussion on "are we losing status". As Mike Gallagher put it so well, we may be, but what about the "Arts" graduate.

One thing as a non cadastral person, I was overjoyed to see the complete lack of argument on "cement or wood".

It was gratifying to see the amount of discussion which took place, and Council was I think wise in allowing more time for A.G.M. to let people hear the views of more members.

One comment from Peter Jolley which I felt was important was the lack of knowledge of day to day matters which affected the Association which was available to members outside Council.

His suggestion of more information on Council matters in the Journal bears merit, but of course many day to day matters occur on items which action is required before it reaches the members via the journal. Council is after all, vested with the running of the Association affairs.

I personally would like to see more vociferous members making comment at the A.G.M., and directing Council to follow courses of action, rather than the "silent majority" which appears to exist.

I have dealt more on opinions here rather than slavish detailing of every paper or every event, but after all that I think is what Congresses are all about.

To the Rabaul committee our thanks of course should be self evident and if there are any criticisms let me misquote the good book by saying "Let only he who hath run a Congress cast the first stone".

G.R. HOLE



Local identities John Macartney and Graham Matheson with the president of the I.S.A., Mr David Morgan, from Sydney.



President Elect, Mr Ken Matheson, and Mr B. Dutt from Fiji.

SURVEY TOPICS

Tom Jackson has been elected President of the P.S.A. for another term - congratulations Tom - keep them stirred up.

Graeme Sparkes-Carroll on 'Esra Tew' has been leading the Corsair fleet around Moresby Harbour (his wife Margaret is the Skipper)

Brother Clive has almost finished his boat and expects a launching with Cliquot and lobster later this month (all invited).

Chief Stirrer for 1971, President Ken, is moving house into the den and it's not true that he barks at passers by.

Couldn't get to the Congress but it still cost yours truly \$10 for the S.G.'s 13th. oyster - He was recently seen drinking oyster shandy on the rocks at the P.Y.C. bar.

Tony Skehan and family have moved to Lae and he is busily building coffer dams around his house.

David and Val Harrison have a new arrival, a baby boy, James David. Best wishes to mother and son and hope the father survives.

Peter and Jan Jolley are in the baby business again, a baby girl Catherine. Best wishes to Peter, Jan and family.

John Macartney has been promoted to Principal Geodetic Surveyor. Congratulations to Geo John.

Brian Mennis and family have moved to Madang. Brian has been promoted to Regional Surveyor, N.G. Coastal. Good luck Brian.

Ken Blaik returned from extended holiday leave on Misima Island.

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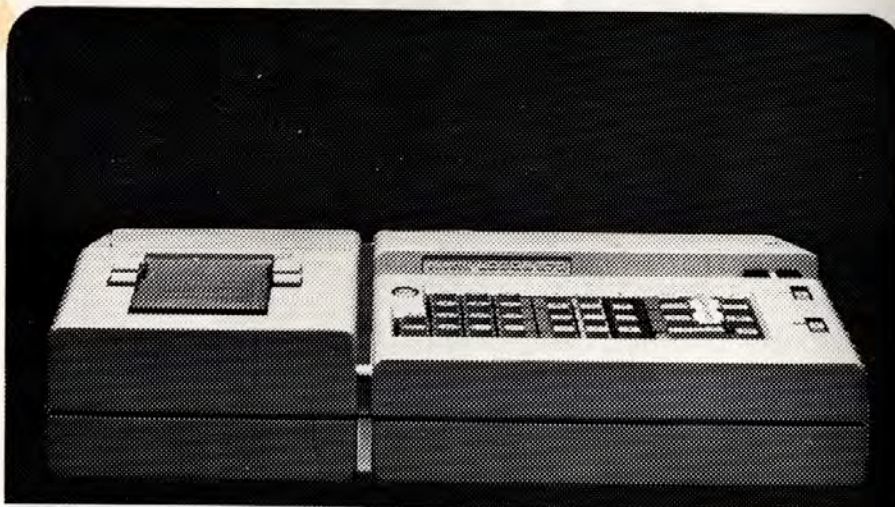
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AN INTEGRATED SURVEY SYSTEM

FOR THE TERRITORY OF PAPUA AND NEW GUINEA

by O.G.G. Dent.

ACKNOWLEDGEMENTS:

L. Eekhout, B.Sc., A.I.S. Aust.

Photogrammetry and the Cadastral
System - The Aust. Surveyor Vol.
21 No. 4.

Professor P.V. Angus-Leppan, University of N.S.W.
Land System Reforms in Canada and
their possible application in Aust.-
The Aust. Surveyor, Vol. 21 No. 7.

Brigadier L. Fitzgerald, O.B.E., F.I.S. Aust.
Rectangular Co-ordinate Systems and
their application to Integrated
Surveys - The Aust. Surveyor, Vol.
21 No. 7.

INTRODUCTION:

If we accept the axiom that perfect land records and an efficient system for dealing with land provide the best stimulus for development then we must view with apprehension the continuing perseverance with a system by no means perfect and fundamentally inefficient by modern standards. Modern technology, using photogrammetry and electronics has revolutionised surveying, but to take advantage of these techniques a common basis of definition and presentation must be adopted. It is apparent that AN INTEGRATED SURVEY SYSTEM is the obvious end result of modern technology.

The term "integrated surveys" was introduced in 1960 by T.J. Blachut who noted three main categories of surveying activity:

(a) geodetic surveying; (b) small-scale topographical mapping; and (c) "detail" surveying - large-scale surveying and mapping with cadastral surveying as the most important component. The first two are generally well planned and co-ordinated, but the third, "detail surveying, by far the largest and most expensive part of surveying activity is rather disorganized and it is difficult to detect any plan regulating this activity". So the concept of integrated surveys was used to describe a survey system built up in logical and systematic manner and comprising the following elements:

- (a) A network of control points at a density which varies with the density of development in the particular area. The network is based on the national geodetic control and positions are expressed as plane co-ordinates on an adopted co-ordinate system.
- (b) A carefully planned system of small and large scale topographic map series at standard scales and with standard sheet lines.
- (c) Cadastral surveys all tied in to the control network.
- (d) Engineering and other large scale detail surveys also related to the control network.
- (e) Organizational machinery for keeping maps and plans up to date.
- (f) Co-ordination of requirements for map and aerial photographs by all government agencies.
- (g) Possibly also a system of title registration with essential information

on each unit of land stored in an electronic memory accessible by computer, to form part of a complete data bank of resources information.

Another important aspect of survey integration is standardization, which must cover the design of the monuments used for control points, common accuracy standards in the control system, and common specifications in all aspects of the mapping.

The advantages of an integrated survey system are enormous. The control network forms the logical starting point for mapping at all scales, for the legal surveys in an integrated system and for the surveys which accompany all engineering projects. The fact that all these surveys have a common basis means that each can be of use to the others. Thus property boundaries are easily plotted on large-scale maps, and the engineering surveyor can make use of elevations from maps and from other engineering projects. The work performed by a property surveyor on a unit of land will enable an actual saving of labour when any adjacent unit is surveyed.

In effect the system ensures that the benefit of any survey is retained, so that later surveys can build on the previous work. The surveyor is not working himself out of a job, as some fear, but making it possible to work more productively.

"Integrated surveys are not an entirely new concept and systems of this sort are to be found in many older highly-developed countries. Because of their rapid development, newer countries are in need of this thorough reform of the land system. It is fortunate that, at the same time, modern equipment and techniques have made it possible to make improvements on past designs,

and to do the work involved faster and at a lower cost. There are positive advantages in doing it now." (Angus-Leppan).

"In our present isolated survey system tolerances have been determined in relation to the capabilities of conventional ground survey methods only. These tolerances provide a margin of safety but it is often out of all proportion to the value of the land being surveyed or any foreseeable improvement of the value of such land. The system is therefore wasteful in principle and not at all necessary for ensuring security of title for many classes of rural land where, as is well known, photogrammetry has the most chance of being used." (Eekhout).

However, a relaxation of tolerances for isolated surveys does not necessarily lead to worthwhile savings as instanced in our attempts at so called "Rural Surveys".

The recent finding in respect of demarkation and title conversion surveys indicates that our present method is creating little more than a muddled mess of mis-closures, because we are aiming at a definition of boundaries rather than a delimitation of parcels.

Titles issued to date are in many cases nebulous and erroneous documents based on unsurveyed data. Even titles issued on the basis of a catalogued survey plan are subject to challenge by indigenous claimants at any time and to Leasehold terms and conditions at the whim of the Government.

It is apparent that the Administration, on the advice of the Surveyors Association and surveyors in particular, has unwittingly accepted the Australian

chain and theodolite technique with its restrictive regulations, methods and controls. Surveyors have developed a professional mumbo-jumbo of field notes and plans in a claim to pseudo-status which is far too expensive and inappropriate for the special needs of this country. In fact indigenous Survey Technicians with limited secondary education can be trained in 2-3 years to carry out effectively normal survey functions under the chain and theodolite technology for which a Licensed Surveyor claims professional fees.

"The Surveyor must be more advanced in the science of measuring than he has been in the past. He must not only know the theory of the strength of figures, and relative errors, but he must apply them. He must regard electronic measuring devices as normal equipment. ... the clinic for the surveying profession has arrived and the surveyor may call on the Photogrammetist, the electronic measurer or computer just as the surgeon uses the radiologist and the pathologist. The ultimate responsibility remains with the professional surveyor, but the present requirement for him to certify that he has personally carried out or supervised the survey is something approaching unreality and taken seriously only by the uninformed. The term Licensed Surveyor served its purpose in the past, but it is now holding back the profession in its changing role." (Fitzgerald).

What we want is not isolated, expensive boundary surveys but an overall picture of what exists, on a scale which demonstrates positions. Boundary fixations and disputes can be settled by mutual agreement and common sense, arriving at a graphical solution. The technical operation is to produce plans on which a graphical delineation is practical and acceptable and the Surveyor can then set out on the ground as required.

A PROPOSED SYSTEM:

I intend to propose a Graphical Cadastre for the Territory with tolerances of sufficiently high standard to permit the development of a Numerical Cadastre in urban and closely settled production areas.

Few difficulties will be experienced in developing a graphical system to delineate natural and curvilinear boundaries which define so much of the customary owned land and photogrammetry and optical measuring equipment lend themselves to this type of definition.

In a graphical cadastre the boundary and monumental information is shown by plotted position on a large scale plan, the basis for which is the co-ordinates of the fixed control points as determined by the integrated system. The development of a Numerical Cadastre simply follows by adding a mathematical definition to the graphical description.

"Consider, for example, the practice, which is now common, of placing permanent marks either during the course of a cadastral survey or as a system covering an entire area during the course of a survey co-ordination programme. Few will dispute the advantages which accrue as a result of this action when applied to urban areas, especially when eventually the positions of corner points of parcels in relation to the permanent marks become well determined and verified. It is then feasible to consider reinstatement of boundaries directly on data so that the boundary becomes a theoretical concept which may be physically defined at any time in relation to the permanent marks. The fundamental principle that monuments govern the positions of the boundaries is still maintained but its significance is trans-

ferred from the boundary corners to a system of well protected and well ascertained reference marks. The concept of the absolute accuracy of the permanent marks also becomes of significance here as this may influence the physical delineation of a boundary or the reinstatement of a corner point should these be required." (Eekhout).

Until such time as there is no question of doubt about the accuracy and precise relative position of permanent marks to boundaries, the judiciary may rely on the evidence available in the nature of monuments. This seems to be the accepted view in Australia, but where in T.P.N.G., like New Brunswick, Canada, legislation can provide for the reinstatement of boundaries from co-ordinated marks and as the general administration of the law is by way of Ordinance and Regulations, the provisions of such enabling legislation would establish the legality.

"When this (integrated) concept is extended to include rural land as well, then in combination with good monumentation and referencing of corner points, it offers many advantages over a system which involves heavy reliance on occupations and which entails conflicting data between adjacent surveys on different systems and also the propagation of error resulting from the accretion of connected surveys without overall control." (Eekhout).

The conclusion therefore is that integration must be commenced forthwith and it is intended that individual Standard Fourmil Zones will be declared 'Integrated Survey Areas' under the appropriate Ordinance (Survey Co-ordination Ordinance may be suitable) when it is shown that a suitable density of co-ordinate control monuments

has been laid down. From this date all surveys will be required to be connected.

Extract from Clause 2 (6) of the New Brunswick Canada Act: "When a survey has been carried out . . . and the original monuments have thereby been tied to co-ordinate control monuments, and a plan of the survey has been deposited as required either in the proper Land Registry Office or with the Surveyor General, then the co-ordinates that may be derived from the plan for those original monuments shall thereafter be evidence of their positions and shall be considered when it becomes necessary to define or redefine the true position on the ground of any such original monuments or the boundaries governed by them."

The explanatory note relevant to this subsection states:

" . . . This sub-section is intended to simplify the problems of restoring lost or missing corners of properties where same occur in an Integrated Survey Area, for it allows the B.C. Land Surveyor the right to use the co-ordinate value of a missing corner in conjunction with any other evidence of the corner which he may find."

Two aspects of this legislation are particularly worthy of note. One is the compulsion to tie in cadastral surveys. The other is the inclusion of the phrase "co-ordinates that may be derived . . ." in connection with permissibility of evidence. It is clear that it is not intended that property boundaries be defined by listing the co-ordinates of all corners. The conjunction of co-ordinates of one corner and the metes and bounds of other lines is sufficient to "derive" co-ordinates of all corners. The significance of this provision would be further apparent on conversion to the "metric" system in due course. Co-ordinates would be derived only

when required, and many past surveys would remain dormant for considerable periods." (Fitzgerald).

The core of an integrated survey system is an efficient plane co-ordinate system that is as uncomplicated and direct as possible. It appears that the Transverse Mercator (TM) Projection in $1\frac{1}{2}$ degree zones would fit in best with the Territory's specifications, as each Zone is geometrically identical with all others, only one set of tables is necessary and meridian convergence is the same as already calculated on the Fourmil Standard Azimuth.

In fact the Standard Fourmil Series can be arranged into 10 Zones $1\frac{1}{2}$ degrees wide from 141 degrees East to 156 degrees East covering the whole Territory with the exception of Mortlock and Tahala Islands. (Vide the index map of the Fourmil Series.)

The main characteristics of each Zone are:

1. There is no actual Central Meridian, the west edge of the Fourmil being taken.
2. Azimuth on the projection will be practically identical to our Standard Fourmil Zoned Azimuth enabling simple transformation of existing surveys.

EXISTING CADASTRAL SURVEYS:

All boundary surveys made since 1914 by Licensed Surveyors are based on the theodolite and chain technique to an order of accuracy commensurate with our existing Regulations. The standard of angular and distance measurement has not changed, although modern optical scale instruments have speeded up field work.

By and large, distance i.e. chained measurements in New Guinea are reliable and consistent, possibly because of good clearing and ample support provided by cheap labour. On the other hand angular measurements are prone to cumulative errors because of poor visibility, uneven sights, short lines and uneven prolongations. Checks on angular work are extremely difficult to arrange. The standard procedure by extra-meridian observations to Sun/Stars is often unreliable because of latitude error and the difficulty of observing the heavenly bodies at the proper altitudes because of cloud. Check by closure is therefore normal and angle adjustment satisfies regulations but position accuracy is still unknown.

Taking the above into consideration it is possible for an experienced Surveyor to arrive at a co-ordinate solution to existing cadastral surveys within the limits of 4th. Order control without affecting the legal status of the survey or any titles based thereon.

Adjustments to existing surveys must be confined to accepted limits however. Any greater adjustment required to make a survey conform would require either a resurvey, partial check or more connection to established control. It is envisaged that existing surveys could be adjusted in angle values and distances by proportionate amounts to conform to the projection, provided that the surround misclose does not exceed 1 part in 5000. The basic premise being that the small corrections applied to an isolated survey could be consistent with the legal tolerance allowed by the presumption of dimensions being all a little more or less.

In fixing a yardstick for the conversion of isolated surveys the following assumptions can be made in respect of any survey

effected by or under the supervision of a duly authorised Surveyor:

1. That the distance (chained) measurements and angle measurements are consistent and of equal weight in any surveys effected about the same time by the same Surveyor.
2. That a mean azimuth correction can be determined by comparison with control points.
3. That a mean altitude of measurements can be fixed to determine the sea level correction.

Then, provided the resulting determination does not leave the surround misclose in excess of 1 part in 5000, the survey can be co-ordinated directly and become part of the minor control network.

SPECIFICATIONS AND REQUIREMENTS:

A.) Geodetic Foundation

1. First and second Order control network as provided by the Commonwealth of Australia.
2. Extension of horizontal and vertical control network to third order standard by the Administration T.P.N.G.
3. Minor control by Government and Private Agencies.

B.) Projection

Transverse Mercator (TM) $1\frac{1}{2}$ degree Zones based on the Standard Fourmil Map Series.

The origin of each Zone is the intersection of the western meridian of the Fourmil and the equator.

Australian National Spheroid.

C.) Mapping - Standard Scales

Cities and Towns 1/500 Spot levels and/or one metre contours & full detail.

" " " 1/1500) Detail and contours
" " " 1/3000) and cadastral data

Regional Areas 1/10000) Topographic & 1/20000) Cadastral

Milinch Series 1/50000 Charting Map

Fourmil Series 1/250000 Charting Map

D.) Permanent Mark Density

Cities and Towns - 1000 metre intervals

Regional Areas - 5000 metre intervals

E.) Type of Marks

1. Concrete pillars.
2. Concrete blocks flush with surface with brass plaque set on road verges.
3. In formed and paved footpaths, concrete blocks and plaques under cover boxes set flush.

F.) REQUIREMENTS FOR IMPLEMENTATION.

1. Enabling legislation within the framework of the survey Co-ordination

Ordinance if possible.

2. An Advisory body set up by Statute to plan and recommend the permanent marking, survey and levelling of integrated areas.
3. Concentration of effort by the Administration to extend 2nd. Order Control and 3rd. Order Levelling.
4. The co-operation of Australian National Mapping Council for advice, data, tables, factors etc. to establish datums and standards for the system.
5. A central Registry Office with Regional offices able to communicate and receive information by telex from a central computerised data bank.

O.G.G. DENT

(July, 1968)

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SURVEY INTEGRATION

Discussions at the recent Congress in Rabaul revealed some confusion over both our present cadastral survey system and the future application of integration. I take the opportunity of describing our present system and giving my thoughts on integration as it may apply here. I will need to make some direct reference to Mr. Dent's open letter and his comments at the Congress.

I must state at the outset that I do not believe Mr. Dent's implication that Queensland is the only State with a system of "isolated surveys by Directions". To the contrary I believe the word "isolated" applies less to Queensland than to the other two States held up as an example of progressive thought.

PART 1.

The "reactionary Queensland dogma" should be first described. Queensland was fortunate in as much that it was late in being established and was able to take advantage of the lessons learnt in New South Wales and Victoria.

In the latter two States a true system of "isolated" Surveys was established, each survey with its own assumed azimuth, poor marking, and generally speaking a quite low standard of accuracy. By the time Queensland commenced its title survey records equipment was available for accurate work, and it had before it the New South Wales' example of a mess of conflicting azimuths and the expense and confusion which resulted. Firstly it divided the State into Counties each with its own Arbitrary Meridian to which each survey must be related. Thus Queensland has what might be described as "Azimuth Co-ordination". Next it introduced

a high standard of marking, including substantial "Mile Pegs" and good reference marking. Finally it demanded an adequate standard of survey - very few surveys in Queensland would not conform with its present 1:6000 requirement.

In fact, in the pre-tellurometer days, Queensland's cadastral survey proved adequate to control a series of Military Mapping - something that could not be considered in New South Wales, or many other countries, at that time.

And so we arrive at a situation where there is no urgent pressure for integration - re-establishment is relatively cheap and easy, and the economics of integration look very different to those in New South Wales where there may be no alternative to integration.

Now let us see how we applied this system to Papua New Guinea. Firstly, instead of the restrictive Survey Practice Regulations of the southern States (which are still preventing the use of EDM equipment for boundary work), we improved on the Queensland system of Directions for the Guidance of Surveyors. Our Ordinance, far from being restrictive, merely states "An authorized survey shall be carried out subject to any directions given by the Surveyor General-----"(Section 41). These then are your Survey Directions, which are thus flexible and capable of alteration at will by the Surveyor General.

Secondly, we introduced the "Fourmil" system of azimuth control, which effectively divides the country into $1\frac{1}{2}^{\circ}$ zones, within which we have complete azimuth co-ordination.

Thirdly, we have by far the best and most substantial system of marking.

Fourthly, we, as did the Australian States, introduced a Survey Co-ordination Ordinance. The difference here is that we have begun to implement it. The primary control network is being broken down and connected to the isolated cadastral surveys, and this work is now virtually completed for the various Highlands Districts for the settled area of New Britain, for the Town of Port Moresby, and, I am told, for the Town of Lae. This year's program should see the completion of the Bougainville Co-ordination Survey. In any of these places a full integrated survey record could be obtained with ten minutes' computer time - if we knew what we wanted.

So, in fact, far from being "reactionary" our practice is well in advance of that currently in use in any State of Australia.

PART 2.

Before going further into the introduction of an integrated Survey system we should first stop and ask ourselves a few questions - why do we make cadastral surveys? Why should we "integrate" them? Can this country afford the system?

A boundary survey is carried out for the benefit of the land-holder. It is made so that he knows where the boundaries - I said "boundaries" not "corners" - of his land are, and so he can identify them without recourse to further expense or without dispute. It is made so that his title can be registered and his rights secured.

This is what the land-holder wants - his boundaries clearly identified, his certificate of title, and a plan showing the metes and bounds of his property in a form he understands.

Neither the Surveyor General nor the Registrar General of New South Wales has yet agreed how the land-holder will be given his boundary description under the integrated survey procedure. Would a piece of paper with sets of co-ordinates related to Johnston's monument be of use to him? Perhaps we could give him bearings and distances with the distances reduced to Sea-level.

Many Surveyors seem to think that surveys are made for the benefit of other Surveyors. They are made for the landholder.

Why should we integrate? Mr. Dent has offered a reason - "'indigenous Survey Technicians with limited secondary education can be trained in 2-3 years to carry out effectively normal survey functions under the chain and theodolite technology for which a Licensed Surveyor claims professional fees'-----therefore -----' a Scientific technology must be introduced--'." In other words, our present cadastral survey system is too simple and cheap, therefore to maintain our professional status we must introduce a more difficult method.

Maintaining professional status has, of course, no direct relationship to our technological advancement. Our professional status has its basis in our relationship with our client - his dependence on our opinion, our acceptance of responsibility for it, and the need for integrity. The present cadastral survey system provides one of the few examples of "professionalism" of this definition but this, of course, is an equally doubtful reason for not introducing integration.

A lengthy report on "Integrated Surveys" has been prepared by a Committee convened by Mr. L.N. Fletcher, Surveyor General of New South Wales. As I said before, if I were Surveyor General of New South Wales I would

no doubt be more enthusiastic than I am here. In this report he describes both the present system and the integration proposal, and in effect says that to avoid the cost of gathering evidence each time a boundary re-instatement is made we should:

- (i) relate each survey to a standard reference position;
- (ii) apply corrections for the accepted projection;
- (iii) apply corrections to reduce all distances to sea level; and
- (iv) to do all this, provide the essential National Control Network.

And so we get to the question of economics and practicability. Which of these two methods is the least costly, and is either within the financial ability of the country and the competent staff available.

The Report goes on to describe the figure of the Earth to be used, the projection to be used, the idea of a false origin, that projection bearings and distances should be shown on plans, and that the procedure could result in two, or more, sets of co-ordinates for any one point. It then states "----but the end result is simplicity and cohesion". For the Surveyor, maybe, - for the land-holder?

The Report further comments - "A System of integration will provide the survey control, system of zones and machinery to permit all future surveys to be incorporated into the pattern of control. It is not envisaged that all existing surveys will be connected to the basic survey immediately as this would obviously be far beyond the resources available."

Our resources are far less, our need is far less urgent. We already have a system which permits easy re-instatement and which serves the purposes of the land-holder and the Registrar of Titles satisfactorily. We have no confused mess conflicting azimuths. We are presently spending \$200,000 per year - staff and consultants - in providing a high standard co-ordination survey which permits the production of Milinch and Fourmil maps and the correlation and recording of "isolated" surveys. Can we afford more, and why?

PART 3.

The purists will explain to me that so far I have mentioned only cadastral surveys. Integration means the integration of all surveys. I was surprised that Mr. Dent was unaware of the Survey Co-ordination Ordinance and our powers under it. This year is the first year that we have had the establishment and staff to commence action under many Sections of this Ordinance and it would be of interest to all to read the Ordinance and learn of our powers and intentions. Survey Direction 1.6 requires you to do this, incidently.

How much further do we go with existing staff, office facilities, and money? The ideal future where every Posts & Telegraphs Engineer, Main Roads Engineer, Drainage and Sewerage Engineer, Irrigation Engineer, Electricity Engineer, Forestry Officer co-operates and co-ordinates to the extent that we have sea level distances, co-ordinates related to Johnston's Monument, and other integrated details, of telephone cables, roads, drains, pipes and powerlines, is imaginable, but is it practicable? Have I any volunteers to create the machinery, persuade the various authorities involved, and to run this monster efficiently in the Public Service of the future?

MY VIEWS.

I was very pleased to read the report of the Survey Co-ordination Sub Committee which certainly gave the lie to the accusation that the Association was not active in this matter. The report was an excellent summary of the position and suggested future action. This action is, in fact, our plan under the Survey Co-ordination Ordinance now that the Departmental Staff establishment has been approved.

Liaison officers are now being appointed by all relevant authorities, and the records of the Central Plans Library are being brought up to date. We are continuing to produce co-ordination control surveys to the limit of our financial ability, and so are collecting and collating data to permit integration when and if economically justifiable.

In the meantime we are in no trouble, and, while even New South Wales is still not sure where it is going, let us wait and see.

R.G. MATHESON
SURVEYOR GENERAL.

INTEGRATION

Appearing during the Hobart Congress, nailed to the door of the Conference Room, under the signature of Ian T. Grashun, for and on behalf of the INDISPUTE OF SURVEYORS, AUST., N.S.W. DECISION, dated 23.9.'70.

PROCLAMATION

Declaration of Variations in Unit of
Linear Measurement.

BE IT KNOWN THAT following a comprehensive study of all aspects, it has been declared that henceforth survey and title dimensions in the State of New South Wales shall be based on a flexible unit technically known as the "Survey Integration Foot", a Standard being defined as follows:-

"The SURVEY INTEGRATION FOOT is that distance between the inner edge of two knots on a piece of Red Tape kept in the Department of Lands, Sydney, being equivalent to the STANDARD FOOT (that being one third ($1/3$) of the IMPERIAL YARD) on the AUSTRALIAN NATIONAL SPHEROID at the CENTRAL MERIDIANS OF 2° INTEGRATED SURVEY ZONES, but varies with the Standard Foot in that it shrinks and stretches in the order of the SCALE CORRECTION for TRANSVERSE MERCATOR PROJECTION of the 2° zone

being $L/2R$ 2 times the square of the mean easting from the aforesaid Central Meridians and also stretches in the order of the correction for the HEIGHT ABOVE SEA LEVEL that being L/R times the mean height of the measured line above the Australian National Spheroid, or thereabouts".

The Survey Integration Foot is equivalent to .30479973 times the INTERNATIONAL METRE but varies with the natural, fundamental and consistently reproducible unit in that it shrinks and stretches in the order before-mentioned be the same a little more or less.

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SURVEY TECHNICIANS

In recent months there have been some discussions and comments over the worthiness or otherwise of survey technicians to carry out surveys in this country.

It would appear that these critics have only found a lack of responsibility in their sub-professional staff due to a lack of supervision and direction on their behalf.

Every professional group can only exist in its sub-professional staff and if that staff is not up to the standard a surveyor requires, then he only has himself to blame. If we can't control our Survey Technicians, we must surely cease to become professionals.

It's no good screaming wolf - get out and provide your own in service training to enable the technician to operate capably within the limits of his knowledge.

Papua New Guinea is not going to wait for you - if you demand your place in its society then society demands that you earn that place and believe me - this is not the way to do it.

The theme of our next Congress "Surveyor-Quo Vadis" must surely have the survey technician scratching his head. Organization liaison and enterprise are the prime objectives he sees missing and who gets the blame - he does.

To Surveyors in this country I say - straighten out your own house first and then you may criticise others.

G. ARMAN
EDITOR

A SERMON IN NOISY STONES

OR
WHAT PRICE METRIFICATION

by Mark Olidoit

Recently we have been bombarded with editorials and press releases concerning an ominous development called metrification, an attempt to replace the archaic English system of measurement with the metric system.

As a member of a generation put upon by recession, rocketing taxes and galloping inflation, we hoped we may have been spared this particular form of chaos.

On behalf of the 100 odd Surveyors calmly transiting this country, I appeal to better instincts to keep their eyes on cloud 19 and pray. The battle, "officialese" verses "the private sector" is about to begin.

To reflect on the potential effects of metric conversion, I would like to recall a remark by that revered Papuan Surveyor, Mark Olididit, on the subject of metrification -

"the first requirement of a blazed line is that it must stay there long enough to be able to find it".

Paraphrasing this remark, if Surveyors in private practice are to completely embrace the metric system, they must first remain in business long enough to do so.

It must be noted that those Administration Departments that have approved metric conversion and therefore imposed additional difficulties and duties on the Surveyor, progress more rapidly than those Departments

that approve reimbursement for associated costs. Please note I say "approve" not "provide". Unfortunately, most of the costs to the Surveying profession are difficult to segregate and identify, and are largely absorbed in inefficiency and overhead.

We are now finding that Administration agencies are becoming exceedingly vigilant in monitoring the costs of conversion, lest Surveyors be contaminated by association with that unsavory motive 'profit'. A possible gambit is an allowable overhead whereby the Administration decrees an arbitrary percentage of direct costs or fees. We can well foresee the Comptroller of the Metric Percenta Board declaring costs that are in excess of authorized ceilings, and therefore are part of the Surveyors profit, along with interest, taxes, rates, overhead etc., etc., etc.

However, I could not leave you in such a negative and frustrated state of mind, and would lighten your thoughts with a personal recollection of my initiation into metrification.

Some years past my company was engaged in a survey for a French concern. The conversion of dimensions to metric units was simple. The titles, however, required a professional translator and we engaged a young French pilot for this purpose, his background not being particularly encouraging.

None the less, we gave him a set of prints of the drawings, to be marked up in red in French. Two days later he returned the set, which we turned over to the draftsman. However, being of an inheritantly suspicious nature, I recalled the translator and gave him a set of the French prints to be translated back into English. We discovered where we had stated "this mark is well founded on

sound rock" it came back as "this mark is discovered amongst wet noisy stones."

If it be the will of Allah that Surveyors think and speak in metric tones, so be it, and I am confident that we shall be able to negotiate some modus vivendi with the Comptroller General of Metric Percenta that will permit us to survive this transition. If this leads to improved balance of payments, hosanna in the highest, and on earth peace and goodwill towards metric conversion, then bravo.

But I still tend to keep an ear cocked for wet noisy stones, and unless we all simultaneously adopt Esperanto, we are all heading for some monumental misgivings.

We shall overcome.



Kulau Lodge Morning Tea.

LETTERS TO THE EDITOR

The Editor,
The Journal of The Association of
Surveyors of Papua & New Guinea,
PORT MORESBY

Dear Sir,

I would like to make a few comments on points within our regulations, points which I consider "vagaries". These "vagaries" also appear to confuse examiners and therefore add to requisitions and hence unnecessarily consume the surveyor's and examiner's time.

1. Distance and Angular Measurements and their agreement or otherwise with P.O.

Principally a surveyor goes out to re-instate, re-define or set out boundaries as accurately as he can. In doing so he has certain stipulated accuracy requirements that must be met.

Our current regulations stipulate:-

- a) Closure (combined linear and angular check)
- (i) $\frac{1}{8000}$ for conformation $\leq 15^\circ$ and all urban surveys, irrespective of conformation.

- (ii) $\frac{1}{4000}$ for conformation $> 15^\circ$

- Parts 2.4, a & b.

- b) Angular accuracy

Closing angle not to exceed 3 minutes, but purely dependent upon the number of set ups. Angular misclosure not to

exceed $20\sqrt{n}$, n being the number of set ups.

- Part 9.9

- and this is where our stipulated accuracies finish.

There is one extremely vital accuracy requirement which cannot be found within the doby of our regulations or ordinances and that is linear accuracy. (Tables 1 and 2 of the Fourth Schedule of the Survey Coordination Ordinance 1967, as amended, make no mention of cadastral survey linear accuracy requirements.)

I believe we should have a stipulated linear accuracy of $\frac{1}{10,000}$ for all cadastral surveys.

If a surveyor measures a line and agrees with P.O. distance to this accuracy, he shows on his plan P.O. distance, naturally without the notation P.O. - meaning the line was measured and agreed $\frac{1}{10,000}$ with P.O. (The notation P.O. after a measurement still retains the meaning that the line was not measured and P.O. was adopted.) Then the field book would show above the surveyor's actual measurement the words "P.O. adopted". Further subdivision of the line would show a new set of P.O. values, if necessary.

This would have the effect of eliminating in requisitions the queries re discrepancies with P.O. of small amounts, and would eliminate on plans the appearance of three or four different measurements for the same line. After all, at this stage, we sign a plan on the basis of our actual field measurements being recorded on that plan, even though we may have agreed with P.O. to $\frac{1}{10,000}$ or better.

A further advantage of this approach would be that in the public eye surveyors can measure a line and actually agree with each other!

Similarly a 10 second disagreement with P.O. could be dealt with the same way with the words "P.O. Adopted" written underneath the actually recorded and adjusted bearing for that line.

Although some surveyors adopt this practical approach, it appears to confuse examiners, and rightly so, as they have no guide within the regulations which stipulates that this approach can be adopted or otherwise. Hence an examiner can only examine and query, if necessary, such discrepancies.

2. The word "disturbed"

This word appears to create confusion amongst examiners, and rightly so, as I for one, and other surveyors to whom I have spoken, appear similarly confused.

There is no definition of the word "disturbed" in our regulations. One might say correctly that not every surveying term can be defined precisely. However this word is vital to the redefinition of boundaries.

Literally the word disturbed should only mean a cement on a lean, and not a cement sitting in the ground as upright and firm as the day it was planted. However this word "disturbed" appears to cover a multitude of cases, e.g. a cement placed in error 0.1 metres from its stated P.O. position, but still firm and upright. In a lot of cases it has been used to reference by a small amount another surveyor's cements (still firm and upright) in respect to its stipulated P.O. position. This results in a

cement being referenced by a small amount, when in actual fact it should have been adopted as found. A typical example of this, which I have seen on finalized plans, is the adjustment of line cements of an old survey by small amounts, when these cements should have been adopted. Hence this word to me undermines the basic rules of boundary definition, i.e. it has the effect of placing the adoption of bearings and distances ahead of monuments when redefining boundaries.

I feel this word should be either defined within our regulations, or better still eliminated altogether. Cements are then referenced without the term disturbed being added, the difference in terminology being that a cement has been adopted as planted, unless demonstrably in error based upon surrounding redefinition information.

Because the word "disturbed" was introduced into our regulations, examiners have queried a surveyor's redefinition because a cement, obviously undisturbed, was adopted when the examiner has felt that it should have been referenced, as the adoption of this cement meant that P.O. bearings and distances were not retained.

Having had my work examined under three separate Regional Offices, I can say quite safely that examining standards vary greatly. One office in particular queries discrepancies with P.O. and bends over backwards to see P.O. retained on plans. What they do not appear to realise is that the original surveyor may have traversed a surround to finish up with a misclose of 1' 50". Another surveyor comes along to subdivide the same area and his surround misclose is 20". Consequently adjustment of bearings in each case is completely different and hence the final bearings are different.

3. The notation "O.C.P."

I do not think that all cements whether placed in 1901 or 1971 can be all classified as "old cement pegs". Obviously in redefinition surveys the original cement peg takes precedence over cements placed at a later date, and surely must be distinguished as such. I think that the notation O.C.P. should represent "original cement peg" and the notation C.P. used to represent a cement peg placed at a later date. Similarly with iron pins.

To an examiner this would surely show at a glance the method of redefinition and the supporting evidence, rather than being confronted with a plan showing O.C.P.'s all over the place with no particular emphasis placed on any particular cement, which means that he must delve into all the old plans in the area to clarify the redefinition.

4. CONCLUSION

In conclusion I feel that:-

- (i) the inclusion of a cadastral chaining standard of $\frac{1}{10,000}$ in our regulations;
- (ii) the elimination of the word "disturbed" from our regulations; and
- (iii) the use of the terms "O.C.P." to mean "original cement peg", "C.P." to mean cement peg of a later date, similarly with iron pins,

would go a long way in simplifying and standardising requisitions, thereby speeding up the process of finalising surveys.

Yours faithfully,

P.H. Mudge.

The Editor,
The Journal of the Association of
Surveyors of Papua and New Guinea,
PORT MORESBY

Dear Sir,

At the Annual General Meeting of the Association of Surveyors of Papua and New Guinea, held on July 23rd. last in Rabaul, one of the corporate members of the Association made a statement from the floor, on which I feel obliged to comment.

The general text of the statement was that a survey firm in the Territory was involved with five of the six engineering consultants who had been approached to submit a proposal to the Dept. of Public Works for the survey and design of the second access to the Highlands, via Bundi, and that when the sixth group gained the commission, the survey firm had endeavoured to use the Association to further it's own ends by objecting to the importation of overseas surveyors to carry out the survey work.

This action was said to be hypocritical because the survey firm had been prepared to carry out work for overseas engineers, but then objected to the use of overseas surveyors.

As far as I can ascertain Arman and Larmer Pty.Ltd. were the only firm approached by five of the six consulting engineers in connection with survey work on this project, and as I was on the Council of the Association for the year 1970-71 and am on record as objecting to the use of overseas surveyors on this or any other project which can be adequately handled by Territory based surveyors, there would appear to be a possibility that these remarks were aimed at me.

The statement as made from the floor is basically correct. I don't believe however that the subsequent action was hypocritical.

When the Department of Public Works prepared a list of the Engineering Consultants who would be asked to submit proposals for the Bundi route, Arman & Larmer were consulted regarding the survey requirements for the project by the six consultants.

Because of the ethical doctrines involved in co-ordinating a proposal with six individual clients, the Director of Public Works was contacted and he advised that his Department was quite satisfied having a Secondary Consultant act for more than one Primary Consultant and that he had instructed his staff to inform all overseas consultants of the locally based firms available and competent to handle the various aspects of the submission.

Of the six consultants, five elected to utilize the services of Arman & Larmer, in conjunction with other members of the Association and the other elected to utilize their own staff.

Public Works Department's apparent attitude here is that they considered a Territory based consultant would be more capable to handle the project than overseas staff. This applied to soil mechanics, engineers, photogrammetrists and surveyors.

All members of our Association are I am sure very much aware of the shortage of Administration money available for survey work in this Territory over the last 12 months. I am confident that in the light of this most members would agree that it is something akin to a 'crying shame' if the World Bank or any other body makes money available for survey work here and it all goes out of the Territory.

An item concerning the employment of surveyors not based in the Territory being used on Territory projects was inserted on the agenda of the Forty First meeting of Council held on 5th. May, 1971.

There were four Government surveyors and three from private enterprise at that meeting, if that is of any consequence, and the general feeling was that the Administration should be approached to ensure that Territory based Consultant firms are given first consideration in the allocation of survey work on the Bundi road and any other project which is within their capabilities.

Our immediate past President wrote the first and subsequent letters on the matter to the appropriate authorities and generally carried the banner for the Association on this one.

I was instrumental in getting this item on the agenda.

You bet I was looking after my own interests. It had occurred to me however that it may also be in the Association members interests generally. A prime purpose of the Association is to safeguard the welfare of its members.

If such action is hypocritical, let the first non-hypocrite to read this cast the first nadi.

Yours faithfully,

M.J. LARMER

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16th.JULY, 1971

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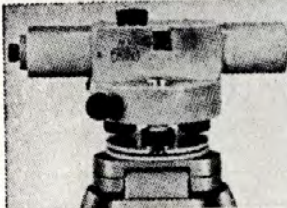
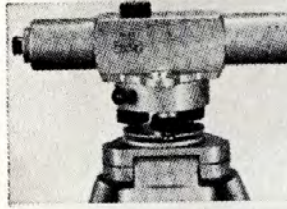
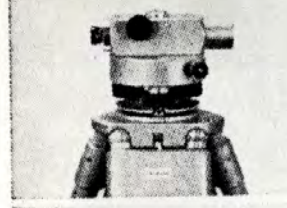
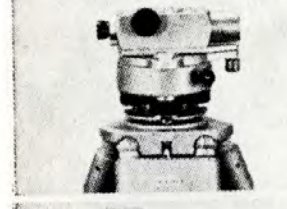
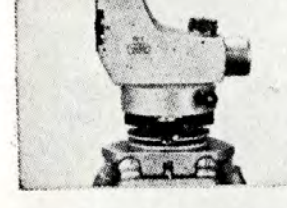
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