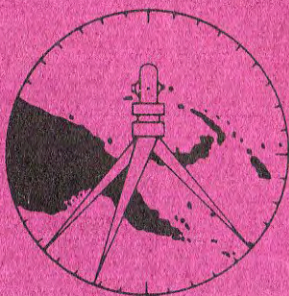


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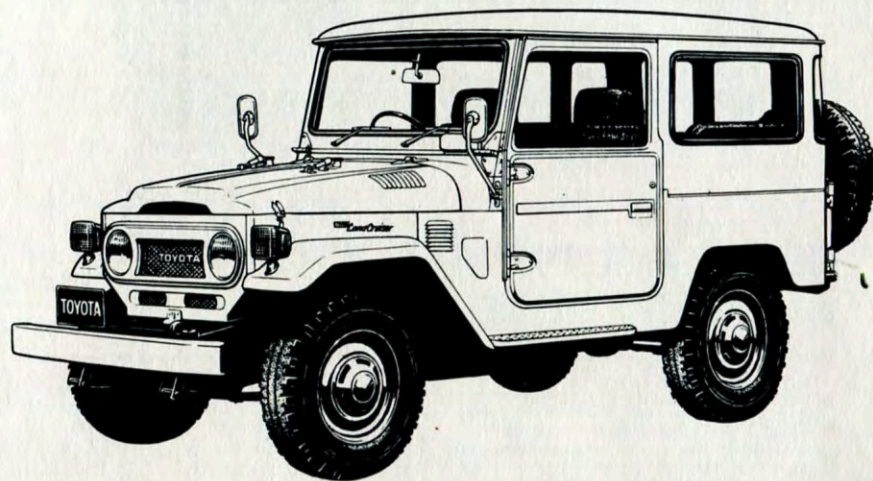
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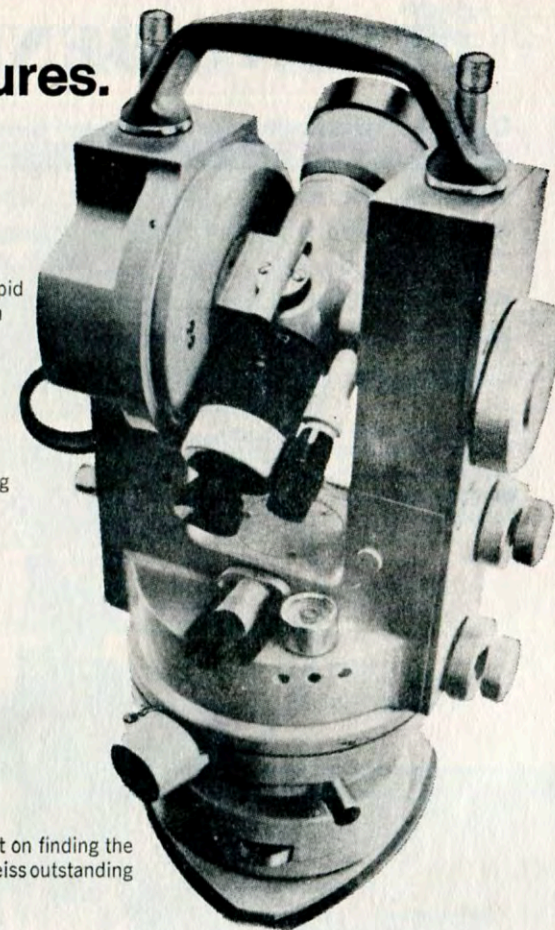
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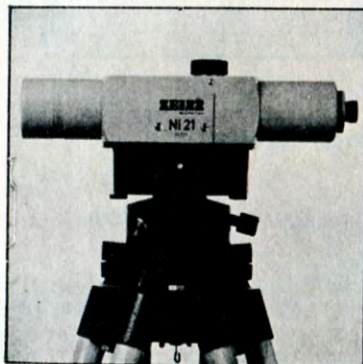
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The Journal of the

Association of Surveyors of Papua New Guinea

Vol. 5

September 1975.

No. 3

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PRELIMINARY

NOTICE

Eleventh Survey Congress

to be held at

Madang

12 - 16 July 1976

more information in next issue

EDITORIAL

This journal goes to print as the first edition after Independence and our journal in its present format has now survived 4½ years and 18 editions. I hope that interest in the Association in the coming years will be sufficient to maintain the high standard set in the past but to do this the Editor requires a continuous flow of articles from members. We would particularly like to see more articles being contributed by Nationals. How about it?

Members survived another Survey Congress last July and we look forward to doing the same thing all over again in Madang next year. Congress Manager Jason Garrett and his committee are already busy with the organisation and the committee would like to hear from members willing to contribute a paper. The tentative Congress Theme is "Co-operation or Confusion" and the date July 12 to July 16, 1976.

J.J. Tierney.

The Journal of the A.S.P.N.G.,
September 1975, Vol. 5, No. 3.

A LITTLE BIT OF THE PAST WITH BACKSIGHT

By: Charles W. Marshall
L.S., F.I.S., Aust., M.Aus. I.M.M.

In the afternoon of a professional surveyor's life, the clearness of the backsight tends to fade as it does late in the day in the field.

When Mr. Mennis invited me to write an article on some of my early surveying experience in Papua and New Guinea, I thought it might be appropriate to deal with the methods used under the conditions then prevailing in early exploration reconnaissance surveys for the mineral industry. Therefore I have made some mention of the facilities then available and the extent of knowledge of several areas at that time.

Period

My remarks will cover several phases of some small probing exploratory trips. They will cover:

- 1927-1928 - Western Papua and Turama, Hawoi, Awarra, Bamu and Aramia Rivers.
- 1933 - the first mapping of the Bena-Garfuka River Valley and the original Chimbu exploration when the view of the Wahgi Valley and Mt. Hagen was first exposed to a land party from the east. This was really the trip that inspired much of the later westward exploration.

Background

Some information about the knowledge of the areas then available, and the facilities used, would be useful in helping to understand the exploration climate of the time.

Except for the coast, and the main channel of the Fly River, the hinterland of the Western District of Papua was almost without topographically fixed points. Much of the area was devoid of any distinguishable skyline, so that positional fixing of a point by bearing resection was seldom available.

Except for the Administration settlement at Daru consisting of Resident Magistrate, Assistant Resident Magistrate, Customs Clerk, two traders, the Rev. Baxter Riley of London Missionary Society and several of the wives, Mr. and Mrs. Cowling on Mibu Island Plantation, and the two Europeans at Madiri Mission Plantation on the Lower Fly River, there was no other settlement outpost in the whole area from the east bank of the Fly River to the Dutch Border.

A police post was established at Everill Junction in November - December 1927 by Assistant Resident Magistrate Zimmer and Patrol Officer Speedie, to which V.L. Newberry, our geologist, and myself took urgent relief stores, etc. early February, 1928 at Resident Magistrate Oldham's request.

A Little Bit of the Past with Backsight

The Administration prohibited any penetration beyond the 70 miles from the river mouth limit as it was classified uncontrolled territory.

There had been shallow penetration inland at very infrequent intervals since early 1890 by Government Patrols, bird-of-paradise shooters, and coast wise labour recruiters for the Thursday Island pearling fleets. None of these left any maps behind of any consequence nor did they contribute very much accurate information as to the topography or people, but all of them were game and tenacious men. Several of these early penetrators of the then unknown lost their lives through encounters with hostile natives. Some of the western tribes were magnificent bowmen.

The Deltas of the Bamu and Turama Rivers had been mapped with mixed quality results and some of the main lower channels of the rivers had been approximately positioned. Incidentally, I found as a result of my astro fixes in 1928 that the Upper reaches of some of these rivers had been plotted too far to the east.

In these areas (the Upper Turama and Bamu Rs country) since the turn of the century the administration had contributed several important major penetrations without being able to produce any but very approximate mapping, but their few trips indicated that there was some terribly rough country. Ryan's original exploration across to upper Turama, and Awarra River country was an epic trip. He must have been a splendid bushman.

In all the reconnaissance surveys I was involved in, the main object was mineral exploration but the general development of the country was ever in mind. The basic object of the survey was to observe and report.

Bena Bena and Chimbu Areas 1933

Before the 1930's the central highlands was thought to consist of mainly "inhospitable jungle clad heights". However the penetration of the Kainantu country by Ned Rowlands in 1920 or 1930, and Mick Leahy and Mick Dwyer's famous crossing into Papua and down the Purarai River together with further trips by the Leahy brothers and myself showed that there was in fact much open grassed country.

Facilities

A bi-plane was used in Dutch New Guinea in 1926 called the "Ern". A flying boat flew to Daru in September, 1922 and left hurriedly for Thursday Island as its fabric was rotting with the tropical conditions. In 1927 a R.A.A.F. sea plane flew in Nason-Jones, geologist of Anglo Persian, to Daru to inspect our Oriomo Oil Ltd's base at Oriomo. It made one circle of our base camp at Dagwa 40 miles up the Oriomo River and left. Aerial reconnaissance was rarely available until the early 1930's as flying except to the known landing bases was considered too hazardous.

The first plane into the Lae area was flown in March 1927 by Pard Mustar. He, Parer and others flew in the 1930's without navigational radio control aids or even aerial maps and often encountered intense cloud cover. For such reasons the use of planes for systematic aerial reconnaissance was almost unknown. It was a case of going from A to B and no tarrying in case the weather closed in which it frequently did so that aerial reconnaissance was generally out!

In the southern part of Papuan Western district, which was without even high hills let alone mountains, the best lookout was a high tree. In the jungle this was useless so it was mostly a blind probe.

In the highlands such as Bena Bena - Chimbu area one got many glimpses ahead over the clouds in the valleys in the dawn, and along the valleys below cloud later in the day. This helped in planning the day's run - unless there were changes due to the attitude of the local inhabitants.

Invariably on land trips supplies were carried by indigenous porters starting off from a base camp. Pack horses were tried on one expedition in Western Papua in 1928 but were not a success. They slowed up the speed of travel and were an embarrassment to the expedition in the swamp and lake country. The porter's load was limited to 50 lb. all up, but it was short sighted to load more than about 45 lb. The survey line were limited to 20 lb. all up load to allow freedom to clear the line, etc. This was the rule in Papua. Similarly, the weight was kept to personal belongings and cargo of under 50 lb. in the Mandated Territory. The working line such as survey and "shooty" boys were limited to about 20 lb. so as to allow freedom of movement. The party had to be kept moving onwards as time and tucker were being consumed.

An exploration party proceeds only as far as it can still get or carry food. In unknown country it was unwise to anticipate living on the country either by game or trade. For this reason, as long as the local tracks went in the general direction intended, they were followed, because tracks lead to villages, often the source of food.

Game, although often plentiful, consumed time to hunt and meant straying from the main party to hunt. This was often dangerous in new country. Therefore the main way of supplementing the "carried" rations, was by trading for food. Trade was often the means of contact and making friends - the essence of a successful and peaceful penetration.

The crux of this is that apart from food, medicine and arms, all other items, eg. heavy survey gear were cut to the minimum on walking trips. The old 5½" Theodolite with legs was about 45 lb. weight - a carrier load - so it was mostly left behind.

When the exploration was mainly by launch there was usually no problem in carrying heavy instruments.

The type of surveys my remarks cover are those which were longer than one day's traverse from fixed bases and which penetrated into little known or unknown areas as far as topography, population, food supplies and game were concerned.

In this type of work the party had to be kept compact as strays or stragglers from the main line could be asking for trouble in those days.

While in the plains and open forest in flat or rolling country, the traversing party could be kept within safe distance of the main party; in hilly or mountain jungle country this was not practical if a party was to move at reasonable speed.

Next to food, communicating with the indigenous population was one of the most important aspects. This was made difficult by the ever changing language problems.

It was essential to acquire the trading lingua franca used from place to place - often of only a few words - such as "peace, food, unstring your bows," etc.

As in any operation of peaceful penetration, the trip had to be planned to meet possible eventualities. Once the base was left, the party was on its own. It had no aerial photos, no radio, no check up aircraft or any communication with base. Messengers could sometimes be at risk getting through so were not used.

Therefore all available information had to be collected from any source, and locals with any contacts in the planned direction of travel were recruited as interpreters and for their knowledge of the area.

The daily routine was for the party to be fully active before the dawn - for this was the "tender hour of the day" most likely for local visitors or trouble.

As soon as breakfast was over, the packs were secured, while the surveyor checked his gear and outlined the surveying procedures to the survey line for the day. In the hills he read his round of bearings to all prominent features and the general line of travel was discussed. The local names of all visible rivers and villages were recorded in a rough sketch and all country "dip" slopes and local rock dips and strikes noted.

Until the new light-weight materials ("Japara") became available in 1930 shelters were treated heavy duck tent flies in the low altitude country except when launch transport was available. A wet standard 12' x 14' tent then used was more than a one man load.

At a suitable place, generally about 15 minutes carry from the camp, a short spell was made to adjust all packs and to check the survey system and allow the carrier and survey line to settle into the routine for the long day ahead.

A Little Bit of the Past with Backsight

On a fine day, shortly after 3 p.m., the head of the line kept lookout for a suitable "safe" camp site with wood, water and proximity to trading opportunities, but not too close to the villages.

Except in possible unfriendly country it was essential to have a rest day at about 5 to 7 day intervals. This allowed the field notes to be plotted up, gear mended (a big village pig can run along a cut line or track and make an awful mess of the long steel band, etc.) cuts and sores to be treated, food to be replenished and repacked, gear to be dried out and a warm water sponge down - what luxury!! New short term carriers and interpreters were recruited if available.

Maybe I have strayed from a technical description of "instant" exploratory surveying of the past, but I hope I have given some insight into the conditions under which an exploratory survey party worked and why methods of low order of accuracy were used. However, these methods served their purpose at the time.

The primary object of a reconnaissance exploration was to bring back a topographical and geological impression of the area to allow future planning of new bases should the country opened up appear attractive for more detailed study and mapping.

More accurate mapping could, if warranted, follow on later, eg. the exact shape of lagoons, lakes, etc. in 200 sq. kilometres of wet lands is seldom of practical interest to the miner in an initial exposure and so was not done.

Basically, be it plains, jungle, or high mountains, in this type of survey one planned from view to view and varied the tactics of mapping accordingly. Speed was essential in passing through new country the first time and so the party was limited to obtaining the necessary general information. This was the object of the penetration. Experience indicated that the first contact with unknown locals was often less to be feared than the second or the third contact if the preliminary approaches were tactfully handled.

In the first contact the locals were as wary of us as we were of them. Subsequent contacts allowed the human frailties of the party to become exposed and give the locals ideas as to obtaining the "treasures" of the newcomers. However, they had every right to be suspicious of strangers such as we were.

Equipment Papua 1927-1928

The usual instruments available were the 5½"-6" vernier theodolite, a rated chronometer, a good accurate watch, liquid suspension compass - 2½"-3", several 300 feet steel bands with leaders, 2 barometers (1 for base camp), plane table alidade with "Beamen arc", a plane table top 24" x 30" with a supply of aluminium anodised surfaced sheets, ancillary gear for plotting, tables, long bands and minor gear etc.

A Little Bit of the Past with Backsight

The plane table top became the plotting table in camp and its waterproof canvas carrying cover contained the maps and sheets of aluminium. These sheets were pregraticuled and two sided. When worked on with 4 to 6H pencil the records were not destroyed by deluges if carried through deep water as would be the case with paper.

The hard pencils engraved the results into the surface and the topography was outlined in coloured waterproof inks on rest days.

The 300 feet steel bands would be jointed together for flat or rolling country. The theodolite if carried would be only used for astro fixes and then only on rare occasions when weather permitted on rest days, mainly then only on terminal points, eg. the end of navigation or turnabout point on land trip. Time, clear sky and safety of personnel was the limiting factor, so the theodolite for astro fixes was often not carried.

Experience gained from the first Oriomo Oil Ltd. expedition in 1925 by Surveyors S.N. MacLean and H.G. Foxall was used to advantage.

Specially made waterproof canvas carry bags were made with broad shoulder straps large enough to carry a 50 lb. bag of rice or any general stores, bedding and gear. The waterproof bags were of great use when we ran into almost waterless country on the western trip in 1928. They became water bags when we had to go back up to 6 miles for water for the camp.

For light it was found the simple carbide light was the most rugged and economical. The carbide was carried in a number of small tight lidded tins - which when empty were very good for trading for food, and did not leak or break like bottles or tins of kerosene.

The European sleeping gear consisted of 3 feet wide and 6'6" long heavy canvas envelopes open each end. Poles were put through these for beds and the envelope became the weather proof roll in which all clothes and personnel gear was carried as a swag by the carriers in the daytime.

The only gear in a carrying box was the first aid kit, breakables such as bottles of medicines and chemicals, etc. Boxes became problems in crossing torrents or climbing mountains.

All gear was designed to be as waterproof and as light as possible and it had to stand up to hard useage.

There is no climate of survey work where "time" is more in control than surveys in comparatively unknown areas.

When it was agreed that an exploratory traverse was required then followed the compiling of logistics on which the success of the trip depended.

Some traverses were walkovers. When the type of country, the availability of food and the mood of the indigenous population was friendly and could be assessed, then the traverse proceeded to plan. This was the exception rather than the rule.

With the exploratory traverse into "blind" country the time must be estimated and sufficient food for all personnel allowed. The prescribed ration was 14lb. of rice per day, plus several additives so that on these figures, unless supplementary food could be obtained by trade, a carrier ate his load of food in under a month. However other gear than food had to be carried by the party.

For reasons of passive resistance, language difficulties and barren country, eg. jungle country devoid of population, it was possible that food could be a very serious problem and often was.

The old fashioned 5½" theodolite and legs was a full load for a carrier - so besides the risk of damage on a rough "carry" its inclusion was avoided on walking trips. On a river trip there was no problem except to get a clear sky to "shoot" the sun or stars.

Weight was always cut to the minimum for obvious reasons.

Food, medical stores, weapons for protection and game, light survey gear, tentage and trade to buy food were the primary items and then only would you decide to carry the theodolite and legs, etc. and chronometer (which must be handled with care).

The advantages of the sun or star observations was that you could have several known points to adjust the long traverse against both for distance and bearing.

It was generally essential to know approximately where you were each day. The object was to be able to plot roughly the days run and the 24" x 30" plane table top with a suitable number of plot forms and aluminium sheets carried in a water proof plane table top carry case, complete with tables and scales was satisfactory.

This ground traversing scheme worked in flat or rolling jungle country but was not practical in the high mountain country amongst populations whose friendliness was questionable. Then it was a case of keeping moving as quickly as possible - triggering in with the compass at every opportunity and using every prominent landmark - one never knew which could be seen from any distant point.

If the country was comparatively flat or monotonously rolling like Western Papua, which was devoid of skyline land-marks, the methods resorted to were compass for direction, and distances were measured by most applicable means.

Bearing in mind that time, the consumer of food was the overriding master, the daily travel distance was a prime consideration. The faster you moved the less time also it allowed the locals to get organised ie. the young "bucks" to get ideas.

High accuracy was not normally required. Measurement of distance was often in approximation. For land traversing I used a number of methods and made a "close" if at all possible. That was why the trip would often complete the circle. A misclose in mapping of 1 in 50 was better than no map at all.

Some of the methods used were:

- (1) Compass bearings and long band to fixed sight, tree, pole or some other identifiable object. 10 miles in good country or forest and about 6 miles in jungle or scrub was a good days average.
- (2) Compass bearings along topographical trends, eg. crests of ridges, creek and river valleys and measurement with bands for distance - generally slack line chaining.
- (3) When the jungle or the bamboo was too thick for clearing a line, then I read a compass bearing to a sound in the jungle, eg. a voice or a tree being belted with an axe (there was a pre-arranged code of signals for this), and then slack line chaining and adjustment for bending of bands.
- (4) Compass bearing to smoke and slack line chaining. In peaceful flat country, especially bamboo or low scrub this could be helpful - as clearing scrub could be slow and painful from stakes.
- (5) Compass for bearing and travelling time on various bearings, in other words the distance was guessed. However a fair idea of distance walked was gained from walking back along the measured traverse lines on near "base" surveys. This was only used when it was expedient to "tarry not" in a certain area. One could overtax the hospitality of the locals or a new supply of food could be urgent so the party must be kept moving to a more favourable area.
- (6) Compass bearing resection from pointed directions and reputed walking times indicated by locals to named places or villages. This was "dicey" as some villages had different names from different directions and some would mean the old head village in lieu of the new main village, etc.

The object was to register all information, bearings, and estimated distances from whatever source. It was illuminating what came up when every observation or information was plotted - what was proved was adopted and suspect information not proved was discarded.

River Surveys

In the case of the Turama, Hawoi, Bamu, Awarra and Aramia River traverses, our 32' launch was the base camp and the extra weight - a 5½" theodolite presented no real problems.

The main difficulty was in being at a suitable place - say a clearing in the jungle - at a suitable time for observations. It was often difficult to find a clear sky as storms used to follow the jungle skirted rivers with great frequency. Again the time factor, food and medical supplies were the problem, the party must be kept moving into new ground and one often could not gamble on getting a clear sky by the next day or even during the following weeks.

Mapping

The river mapping was a matter of adjusting a traverse for direction and distance between known points. Using the last identifiable fixed point (probably from very old nautical charts - some of last century), then traversing the river with compass, clock and patent log in lower reaches, and time and bearing in narrow and/or snaggy upper reaches - a map of sorts could be made by adjusting on estimated current flows, thus a picture was obtained of the general direction and main meanderings of the river.

All this gave was an indicated shape of the big bends and the lengths of the straight sections. These were useful and necessary in locating a position on a river for subsequent work. When re-traversing the river using early charts, the time bearing and log method adjusted to current allowed V.L. Newberry and myself to locate our position for work purposes on the Upper Middle Fly River in 1928.

While astro-fixes were seldom done in the mid lengths of the river exploration much energy was often expended in endeavouring to locate a sand spit or obtain a clearing in the jungle at the furthestmost camp up the river. This would then give another fixed point to adjust the crooked time and bearing traverse.

Penetrations into the jungle on either side of the river were mostly done on estimated travel time and compass bearings. Even in the day time, it was sometimes too dark in "old man" jungle to read the 2½" liquid suspension compass except in the middle of a sunny day if away from the river banks. With day-long "on shore" penetrations it was a standard practice for the launch "keeper" to fire a shot gun at noon and three, four, five pm. if the land party had not already returned. This gave compass bearing direction and a point to home onto as it was always the endeavour to circle rather than come back over the same track to give a "close" of a type.

Of course, bearings and distances of almost any degree of accuracy in completely unmapped country were of some use. However in some places it was out of the question, except to guess the distance. For example, in

the prickly sago swamps that one could suddenly run into. The best procedure was to depend on the back bearing and guessed distance over short distances. This was limited to about 200 yards as we found sense of distance became blurred with the often heavy physical effort of travel. A tree was generally blazed out with a slash at each compass reading station.

In the unknown topography, when a survey line of natives must be kept together for safety and the newly found track could wind anywhere for the direction to get any reliable bearing approximation to the last tree marked took considerable concentration. The open country bred natives' sense of direction was not necessarily reliable in the jungle, but I found some of the jungle tribal types (like the Australian aboriginals) very accurate in their sense of direction.

In the unknown country, a track leading to population was followed - even if it went through sago swamp or sharp edged honey comb limestone. Information was the object of the survey and speed with caution was the essence of survival. Peaceful contact with the often isolated groups of locals meant food and food was time - and time was coverage of country and that was the job to be done.

Our correct time for astro fix work depended on a ship's chronometer which was kept on constantly observed rating at our base radio station (one of the first private stations in the country) at the base camp at Dagwa. This base was located near the headwaters of the Oriomo River in Western Papua. The chronometer's safety was not hazarded unnecessarily, as it was probably the only one between Port Moresby and Thursday Island except for those on rare passing ships.

This was the era 1927 - 1928.

1932-1933

The early Bena Bena - Garfuka River and Chimbu Surveys

Early November 1932 New Guinea Goldfields Ltd. prospectors Mick and Dan Leahy reported gold prospects on the Bena Bena River. They then took in from Kainantu H.M. Kingsbury the New Guinea Goldfields Ltd's chief geologist and Robert Whyte an assistant surveyor who had a quick look at the Bena Bena River and returned to Kainantu. The Leahys returned and by December had prepared the Bena Bena air strip and camp in November/December 1932. Thus the base was established for much further exploration.

On January 18 of the following year I was instructed to proceed and inspect and peg such areas I thought fit of the Bena Bena and the adjacent Garfuka River Valley. Having done this, I went back to Wau on 26/1/33 and returned again to Bena on 29/1/33 and brought out Ken Spinks, assistant Surveyor to help me around Bena Bena. On the 22nd January I laid out a base line on the Bena Bena strip area 2,420 feet long and 347 degrees mag. and 1700 feet bearing 225 degrees magnetic.

A Little Bit of the Past with Backsight

The country was unknown except for Mick Leahy and Mick Dwyer passing through on the great crossing of the island by way of the Purari River, when they touched on the Bena Bena River near its junction with the Garfuka River in 1930. The Leahys also made later prospecting trips in 1932 for N.G.G. Ltd. when they came to Bena Bena camp.

The population was heavy, the people of mixed moods - ranging from very friendly to hostile and sometimes not to be trusted. At no time up to my final trip on July 1933 were any of the party at any time out of reach of their weapons. It was not the country to carry out long chaining traverses although much of it beautiful open long grassed valleys.

However as the big open valleys gave long vistas and in spite of high altitude clouds, whenever it was clear and a new peak or river junction appeared it was "shot" with compass.

From the marked ends of the Bena Bena base lines the prominent nearby Kunai Hills were fixed by compass bearings and on some beacons were erected. Backsights were taken from these Kunai Hills to the baseline to check compass bearing variation. Then the system of compass trigging was expanded in the open valley on well conditioned intersections where possible. By the end of January a number of well defined clearly visible topographic features were positioned. Several of these had regular sharp pointed high pimples as their crowns. It was the usual practice to give the point a distinguishing letter and draw a skyline silhouette for future recognition purposes. Language difficulties prevented at this stage giving local names.

I must emphasise that we never moved except in a group - one party always held the base camp and the other, the field party never split up or allowed the locals to separate our line. Time was the controlling factor. It had leaked out to the mining world that new gold carrying country had been found. Until we had pegged what we wanted - the field was open for opposition pegging to take up the areas.

As all timber is owned by local tribesmen all survey pegs and datum posts had to be bought, often after considerable haggling - and when they were erected in accordance with the Mining Regulations it was even money bet some one would move them the next day.

The only thing in our favour was that it was "uncontrolled area" and permission, not freely given, must be obtained from the Administration for other parties to enter the area.

Levels were fixed by Barometer and distant heights estimated by abney level slopes and distance scaled for compass bearing intersection.

The general rough field sketch map of the Bena Bena and Garfuka River Country was completed by the 7th February, 1933.

A Little Bit of the Past with Backsight

The Opening Up of the Chimbu

It was decided to penetrate further west from the Garfuka River. Geologist Kingsbury forecast the general topographic form as to the direction of ranges and rivers and was remarkably accurate in this. We got the instruction to go west and carry out the exploration from the N.G.G. Ltd.

On the 11th February, 1933 Mick and Danny Leahy and myself left the Bena Bena - Goritufa Creek Camp. West of the Garfuka River and over the divide it was unknown country. I decided, as we were in mountainous country, to follow the system of controlling our general direction and distance by relying on the compass trigging. It was the back sights that were the key to the continuity of mapping.

The population was becoming denser and it was not without some difficulty that I could close my mind to the fact that a seething mass of plumed and armed warriors were pressing around while I was concentrating on reading the round of compass bearings, and the barometer and recording the geological features, etc. Again, I emphasise bearings were taken to almost every prominent feature, all the time hoping to see at least a few of them from later observation stations.

When on the 13/2/33 from a high point, we saw the great valley and high mountains ahead and the signs of an enormous population (the Waghi), we decided to circle back (including Hagen) to Bena Bena Camp trigging in all prominent features possible - as probably only 30% would again be visible on this trip. Such was the rough nature of the country and the weather.

Based on compass trigging, an exploratory sketch map was made sufficient for its purpose, and later tied into Latitude and Longitude when, surveyor George Ballam L.S. came through to the Bena Bena area a few months later.

Taking the Last Backsight

It is now time to close onto the backsight and I hope you will be able to glean from my remarks some idea of the methods and conditions used in those early days.

In closing let me pay tribute to the really early explorers, the men of the government services, missionaries, surveyors, prospectors, and those other hardy adventurers who opened the perimeters for some of us to do a little bit of penetration later on.

Also let us not forget these brave local men who went with the early surveyors into strange country and shared their hardships and ensured their successful return, and may I pay tribute to the generally friendly nature of the locals. It was remarkable how few incidents did occur. After all, we Europeans were the intruders!

STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE PERIOD
JULY 1, 1974 TO JUNE 30, 1975

Cash at Bank (July 1, 1974) 2420.82

Add RECEIPTS

Nomination Fees	135.00	
Annual Subscriptions	3482.50	3617.50
Scale of Fees Booklets		287.50
Congress 1974 (Balance of A/c)		185.17
Congress Papers (Sale of back copies)		384.00
Post Courier Supplement Advertising (1974)		469.26
Journal Subscriptions	72.00	
Journal Advertising	786.01	858.01
Interest on Investment		14.25
Total Receipts	K5815.69	8236.51

Less PAYMENTS

Congress 1973	48.34	
1974	1807.50	
1975	50.00	1905.84
Postage Printing & Stationery		518.50
Secretarial (Typing and Duplicating)		146.75
Stamp Duty		5.00
Journal (Six Issues)		2157.65
Members Certificates		84.20
Subscriptions (1974 & 1975)		
CASLE	84.69	
EAROPH	51.42	136.11
Post Courier Supplement Advertising 1974		426.60
Student Prizes		15.00
Auditor's Honorarium		25.00
Scale of Fees Printing	225.00	
A.S.R.C. Report	1000.00	1225.00
Bank Fees		13.65
Total Payments	K6659.30	

Cash at Bank (June 30, 1975) K1577.21

AUDITOR'S REPORT

I have examined the financial records and related documentary evidence of the Association of Surveyors of Papua New Guinea for the period 1 July 1974 to 30 June 1975, and in my opinion the accompanying Statement of Receipts and Payments is properly drawn up so as to give a true and fair view of the state of affairs of the Association according to the information given to me and as shown by the books and records of the Association.

L.R. Heron,
Auditor.

MAPPING THE PURARI PLATEAU, NEW GUINEA

By: K.L. Spinks

(Reproduced from "The Geographical Journal" of November, 1934, with the permission of the Assistant Editor.)

During the past few years prospecting for gold in New Guinea has extended beyond the gold-bearing areas of Edie Creek and the Bulolo River valley in a north-westerly direction to the Upper Ramu Goldfield, the Bena River area, and more recently into the unexplored regions of central New Guinea, penetrating beyond the Purari Plateau to the Hagen Range and the upper basins of the Jimmi and Kaugel rivers. A prominent gold-mining company, New Guinea Goldfields, Ltd., has taken a leading interest in the exploration of these new regions, particularly of the Purari Plateau north-west of the Kainantu Aerodrome on the Upper Ramu Goldfield.

The Purari Plateau, which includes the greater part of the area mapped, is the elevated area bounded by the Upper Ramu River on the south-east, the Middle Ramu River on the north-east, the Mount Hagen country on the west, and roughly by the Papuan border on the south. This area is drained mainly by certain of the headwaters of the Purari River, which flows into the Gulf of Papua, namely, the Karmanuntina, Bena, Garfuku, Mairifuteikar, Wahgi, and Kaugel rivers. The valleys of these streams lie at a general altitude of 5000 feet above sea-level. The intervening and flanking ranges rise to as much as 14,000 feet. They are heavily forested above 7000 feet. The timber-line lies at an elevation of 11,000 feet, and the summits of the highest peaks are covered with moss and scrub. Below 7000 feet the foothills and valleys are sparsely timbered and covered with coarse grass. The valleys are generally wide and densely populated.

The Bena River area, which is approximately 800 square miles in extent, is sparsely timbered and is drained by the Bena, Garfuku, and Karmanuntina rivers. To the west, between the Garfuku and Mairifuteikar rivers, lies a rugged mountainous region rising to 9000 feet. To the west of the Mairifuteikar River extends the Wahgi River valley, occupying an extent of 2800 square miles, flanked on the north by a spur of the Bismarck Range, and on the south by the westerly continuation of the range designated the Central Range by Detzner in 1914. The Wahgi River flows through this valley between gravel terraces rising to grass-covered foothills separated by the timbered valleys of tributary streams. The Wahgi River proper rises in the Benambe Plateau at an elevation of 6700 feet, while its principal feeder, the Ogumantz (or Gumanj) rises on the slopes of the Hagen Range. Both these headwaters flow through undulating grassland at an elevation of 5800 feet to join the main stream in the swampy area at the head of the Wahgi Valley. North-west of the Wahgi River valley lies the country drained by the tributaries of the Yuat River flowing north to the Sepik River. This rugged, thickly timbered area falls steeply in 12 miles from 9000 feet to the plain of the Jimmi River, only 2000 feet.

On the south of the Hagen Range and the Benambei Plateau rise the headwaters of the Kaugel River, one of the tributaries of the Purari River. The main course of the Kaugel River to its junction with the Purari lies south of the Kuber Mountains in a densely forested region at an elevation of about 3000 feet. This region, as yet unexplored, was observed from Camp 52. The upper portion of the Kaugel basin consists of grassland of low relief. The headstream of the Kaugel River proper flows through a flat valley 20 miles in length; its tributary, the Nabilyer (or Nebyer), and its feeders flow through undulating grassland and have cut gorges several hundred feet in depth. This region is well populated.

Exploration Routes

The Upper Ramu Goldfield was discovered by E.W. Rowlands in 1930. A landing-ground was established at Ramu in August 1932. In 1930-1931 M.J. Leahy and M.I. Dwyer travelled west from the Upper Ramu River to the Bena River, thence down that stream to the Purari River proper and to the Papuan coast. They also traversed the area to the west of the Bena River along the foothills of Mount Otto, and crossed over to the Middle Ramu River. In December 1932 the country drained by the Karmanuntina, Dunantina, and Bena rivers was traversed by the first New Guinea Goldfields, Ltd., party consisting of H.M. Kingsbury, geologist, R. Whyte, M.J. Leahy, D.J. Leahy, and a good landing-ground was made by this party at Bena Bena in late December. From January 1933 others of the Company's staff were dispatched to the Bena Bena base. C.W. Marshall and the writer commenced fieldwork, and by mid-February the Bena River valley, including the Upper Garfuku River, had been covered. The mountainous area west of the Garfuku River was shortly afterwards traversed by the Leahys and Marshall, and from a peak near Mount Irimbadi the extensive valley, later known as the Wahgi, was seen to the north-west. The reports of this expanse of open country inspired the subsequent expeditions to the west.

Continuing its activities westerly, New Guinea Goldfields, Ltd., decided to equip a fourth party, and in March 1933 a aeroplane reconnaissance was made in co-operation with Guinea Airways, Ltd. The route taken was westerly from Bena Bena Aerodrome towards the Wahgi Valley. The Administration of the Mandated Territory of New Guinea proposed sending a party into these unexplored areas recently brought to their notice, and it was arranged that the Company's party and that of the Administration should proceed together. M.J. Leahy, D.J. Leahy, and the writer formed the Company's party, and Assistant District Officer J.L. Taylor led the Administration party. A further reconnaissance flight was taken in March by the Administration representatives with the co-operation of pilot T. O'Dea, of Holden's Air Transport Company, and from this trip the ground party obtained a clear impression of the country to be traversed. The expedition left Bena Bena on March 29, and established an advanced landing-ground at Wahgi on April 9. Contact was made with supply planes on April 10. After refitting the parties proceeded up the Wahgi Valley and reached the foothills of Mount Hagen. A landing-ground was made here, and the first plane landed on April 27. Supplies were replenished and the first expedition from this base

camp left on May 9. The mountain locally known as Jaga was climbed and a reconnaissance made of the country to the north. Part of this area was traversed as far north as the Zau and Jimmi rivers, and the parties returned via the Ganj River valley to the base camp on May 20. Contact with supply planes was again made and the parties left on June 1 to traverse the valley of the Baiyer River to the north-west of the landing-ground. The plain of the Jimmi River was reached, and on the return journey the parties divided at Camp 39, D.J. Leahy and the writer returned via the Mugabinya valley and Marabugul, arriving at the base camp on June 20. The parties left to climb Mount Hagen on July 3, and returned on July 8. Supplies were obtained by air and the expedition departed on July 17 to explore the country to the south. The Papuan border was reached and the parties returned to base camp on July 30. In company with J.L. Taylor the author left Mount Hagen landing-ground on August 14, and returned to Bena Bena Aerodrome. The survey work shown on the accompanying map was completed on August 30.

Mode of Travel

Travel in New Guinea depends on native carriers, and ninety natives were employed by the combined parties. The Bena Bena area was traversed by parties comprising thirty carriers. The maximum load that could be transported without delay was about 35 lb. per native. The radius of travel was seven days' march when food supplies for the carriers had to be transported. Aeroplane reconnaissance indicated the possibility of obtaining food from the natives encountered on the march, and the range of travel was increased to ten days' march. Shells, beads, and steel articles were the principal articles of trade with the natives. Shells were preferred by the inhabitants of the Wahgi Valley and the areas to the west, while beads were readily disposed of in the Bena River area.

The parties made use of native footpaths on all expeditions in order to obtain supplies of native foods. The highly skilled pilots of the air transport companies operating in New Guinea were able to transport supplies to any place where a landing-ground could be made. The parties arranged to prepare landing-grounds for the air-transport companies after specified distances had been travelled. The pilots flew out on certain dates and were directed to new landing-grounds by the ground party by means of smoke signals. The parties then obtained fresh supplies from the air transport and proceeded to the next landing-ground site.

The trustworthiness of the natives in the vicinity of the landing-ground at Mount Hagen rendered a white guard unnecessary, and a small party of dependable carriers was left in charge of the base camp. This circumstance enabled the parties to travel with lighter equipment on the expeditions to the north and south. It was possible to leave sick carriers in the base camp, and travel was thus expedited.

Survey Methods

Although the prospecting parties were strong in comparison with the usual expedition of this nature in New Guinea, the excitable and often hostile nature of the natives encountered made it imperative that the line of

carriers should not straggle, nor could the party delay on the road unless in an easily defended position. As a consequence, time could not be taken for lengthy observations. Since it was essential that the work should be done as speedily as possible, and certain points reached by specified dates, only the lightest instruments could be carried. The prismatic compass was found to be most suitable under these circumstances.

The open nature of the country and prominent topographical features made it possible to use a form of compass triangulation. Compass and tape traverses were run for base-lines at each of the landing-grounds, and prominent features which formed well-conditioned triangles were located. A progressive network of such triangles was carried to the next landing-ground. Bearings were taken to as many points as practicable, for it was found that some of the reference points were inevitably obscured by mists. The topographical features along the line of march were located from intersected points. Sketches of the observed skyline features were made for identification purposes, and details were plotted each evening. An aneroid was used for elevation, and points not occupied were tied in for elevation by vertical angles taken by Abney level. A scale of 1:120,000 was used for the field map, and it was found that the accuracy of plotting was comparable with that of the field work.

A theodolite was carried on the expeditions into the regions to the north and south of Mount Hagen, where the natives were more friendly. It was not feasible to use the theodolite for triangulation en route, and the compass was used to fill in the details of the country traversed. At points where magnetic variations were obtained by solar observations astronomical bearings were taken to principal peaks. Latitudes were obtained at the base camps and on the expeditions from the base camp at Mount Hagen landing-ground. The prevailing cloudy weather conditions did not permit of latitude observations at each camping-place, but solar observations were made wherever possible to determine magnetic variations. The requisite instruments for the determination of longitude were not available on the march. A wireless set was forwarded to Mount Hagen landing-ground, but proved unsuitable for precise time determinations. A determination of Standard time was however obtained from Sydney and from Adelaide, Australia, and a longitude determination was made with a probable error of 5 miles.

The network of compass triangles extending from one base camp to the next was progressively adjusted. At the forward base camp the side of a triangle was measured from the base-line and the error in length determined. The magnetic variations obtained by observation were applied to the compass bearings and the whole network of triangles was adjusted. Adjustment was then made for error in latitude on the basis of the theodolite observations, and finally the cumulative error in east-west distance was compared with the longitude determination at Mount Hagen landing-ground. The relative positions differed by 1 mile, which was considered satisfactory.

A determination of magnetic variation and the latitude and approximate longitude of the Upper Ramu Goldfield was made by L.H. Livingston in 1930. The Bena Bena Aerodrome was located by C.W. Marshall in January 1933 by dead reckoning from aeroplane flights from Ramu in fine weather.

The error of closure as indicated when a side of a triangle was measured as a base-line was satisfactory and little adjustment was necessary. This was probably due to compensation of errors as redundant intersections were obtained at all points en route. The maximum adjustment for latitude amounted to 2 miles, and the total east-west discrepancy to 1 mile. After the final adjustment it is believed that detail points as shown on the map are within 1 mile of their true position. The location of principal peaks visible from Mount Hagen landing-ground was made with the theodolite from solar observations, and these locations are probably correct within 1 mile. The heights of stations determined by aneroid are probably correct to 400 feet. The altitudes of peaks obtained from vertical angles by theodolite are probably correct within the same limits.

The following determinations of magnetic variations were made:

Station	Approx. Lat. ¹	Approx. Long. ¹	Date	Mag. Var.
Mt. Hagen Ldg.Gr.	S. 5°49'	E. 144°10'	July 1933	E. 3°40'±5'
Camp 31	" "	5 27	June "	3 40 "
39	" "	5 32	" "	3 55 "
52	" "	6 09	July "	4 27 "
53	" "	6 06	" "	4 05 "
56	" "	5 58	" "	3 43 "
57	" "	5 54	" "	3 37 "
62	" "	5 48	Aug. "	3 28 "
Bena Bena base camp	6 08	145 31	" "	4 13 "

The author is indebted to Major G.A. Harrison, General Manager of New Guinea Goldfields, Ltd., for permission to make use of the map compiled under his supervision.

¹ These positions do not agree within some miles with the larger-scale map from which our map has been re-drawn - Ed. G.F.

BACKSIGHT AND FORESIGHT OF CADASTRAL SURVEYS
IN THE PHILIPPINES

By: Oscar A. De Castro

Cadastral surveys have been defined by the American Institute of Geography and History in a document entitled "Modern Cartography, Base Maps for World Needs", published by the United Nations in 1949, as follows:

"Cadastral surveys in general create, reestablish, mark and define boundaries of tracts of land. Such surveys, unlike scientific surveys of an informative character which may be amended with changing conditions or because they are not executed according to the standards now required for accuracy, cannot be ignored, repudiated, altered or corrected, and the boundaries created or reestablished can not be changed so long as they control rights posted in the lands affected.

"The official record of a cadastral survey ordinarily consists of a drawing or map and a written description of the fieldwork. The drawing represents the lines surveyed, showing the direction and length of each such line; the boundaries, description, and area of the parcel of land; and, as far as practicable, a delineation of the topography of the region, including a representation of the culture and improvements within the limits of the survey"

The basic method employed in cadastral surveys in the Philippines is practically the same or comparable to similar methods employed in most countries of the world; that is, each individual tract is marked on the ground by natural or artificial monuments; the boundaries are measured and their bearings are determined, and a description of the land and its area are given for each parcel of land; and lastly a plan is prepared showing all of the above facts.

Cadastral surveys generally are made for a definite purpose. The type of survey to be adopted depends on the character of the area to be surveyed and its relation to the development program of the region where the land is located. The cadastral survey of cities and municipalities leading to title clearance of all landholdings, especially those either without muniments of ownership, is necessary for both urban and rural development. Cadastral survey is important because it is expeditious and economical; it eliminates land conflicts; it provides accurate areas for collection of taxes; it is useful in public improvement programs; it provides facilities for partition of big tracts of lands into small parcels; and it gives an inventory of all classes of lands within the areas surveyed.

Oscar A. De Castro, former Acting Assistant Director for Surveys and now Special Assistant to the Director of Lands for Surveys.

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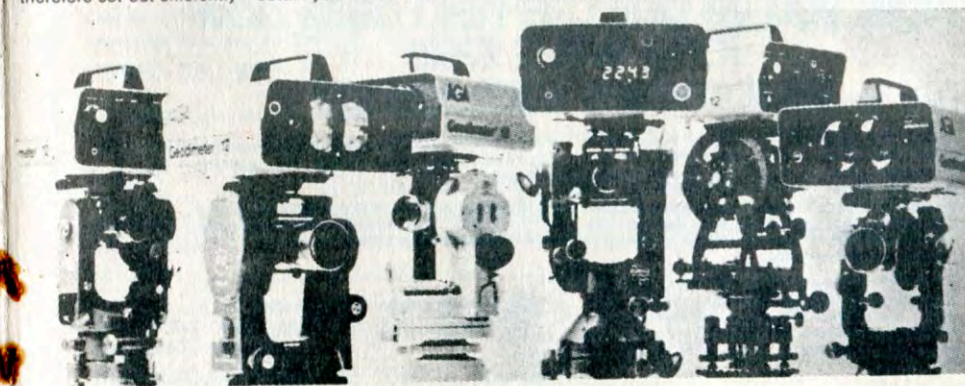
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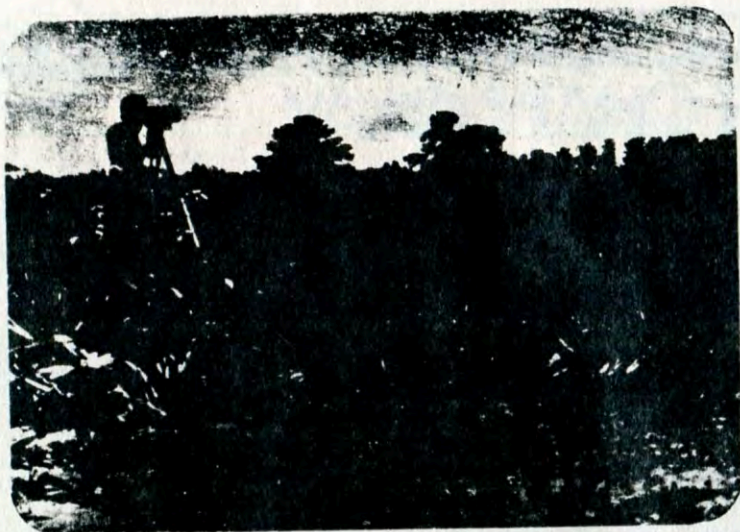


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Backsight and Foresight of Cadastral Surveys in the Philippines

As a matter of fact, the cadastral survey is the first step in any form of land management. Adequate surveys are necessary for the administration of lands and in order that titles may be issued to the owners thereof. Knowing all these, the Philippine Government, through the Bureau of Lands, has started the cadastral survey of entire municipalities since 1913 when the Cadastral Law (Act 2259) was passed.

Of the 1,525 cities and municipalities in the Philippines, only 529 have so far been surveyed with a total area of 7,089,136 hectares comprising 2,004,152 lots. This leaves 996 more municipalities with an estimated area of 15,921,639 hectares to be programmed for cadastral survey. One can therefore see that for the last 62 years since the Bureau of Lands started its cadastral survey program we have cadastrally surveyed 23.63% only of the total land area of the Philippines. Of course we have also surveyed 4,924,951 hectares comprising 1,255,266 lots through public land subdivision (16.42%) and 2,064,272 hectares comprising 425,288 lots by isolated surveys (6.88%). The total surveyed area is 14,078,365 hectares, or 46.93% of the total land area of the Philippines.

From the very beginning of our cadastral survey program we have used the highly accurate method of survey called the numerical cadastre. This method accounts for the slow pace of our cadastral survey program as it is the most sophisticated, expensive and time-consuming technique. The requirement that the survey of property lines be accurate to the nearest centimetre in distance and to the nearest minute of arc in bearings is indeed the cause of this slow and expensive pace.

In 1958, we tried areial photogrammetric survey, or what we now call photo-cadastral survey, with Bulacan Province in the island of Luzon as a pilot project. This project is undertaken by personnel of the Bureau of Lands. Because of climatic conditions, we cannot get good aerial photography of the entire area hence we have shifted to the ground method of cadastral survey. The project is still unfinished. We hope to finish it soon.

Two years ago, we adopted the Graphical Cadastre by ground method or Cadastral Mapping and Photo-Cadastral Mapping. We believe that with the addition of these two methods we can hasten the cadastral survey of the remaining unsurveyed areas of the Philippines.

Cadastral Mapping is the process of preparing cadastral maps without the use of photographs. The location of lot corners of agricultural lands are determined on the ground by transit and tape from tertiary traverses and are plotted on the cadastral map by scale and protractor using the bearings and distances. Areas are determined by planimeter or by the use of triangles.

Backsight and Foresight of Cadastral Surveys
in the Philippines

Photo-cadastral mapping is a method which adopts the good features of the conventional transit and tape method and those of aerial photogrammetry. It makes extensive use of aerial photographs which are rectified for tilt and scale displacement. Photo-cadastral maps are prepared from enlarged, rectified and fully controlled vertical aerial photographs taken under photogrammetric specifications for aerial photography. The identity of the lots are readily ascertained because the photographs are in effect nearly orthographic projection of the objects on the ground. This method is intended only for cadastral surveys where property lines are already established between adjoining owners who had been occupying their land for years.

Photo-cadastral maps prepared under this method have all the good features of the numeric cadastral maps with the following variations and improvements:

- (a) The geographic position of lot corners and the length and bearings of property lines are determined graphically on the photo map without writing their numerical values in figures; and
- (b) The photo-cadastral map will show descriptive physical details such as houses, ricefields, dikes, creeks, trees, etc.

In both the cadastral mapping and photo-cadastral mapping method, the survey of residential, industrial and commercial lots on the poblacion and other highly developed barrio sites are undertaken by ground method and lot data computations are prepared up to area.

Briefly, the steps undertaken in the Philippine cadastral survey are the following:

- (a) Post and distribute notices of survey in the English and Spanish languages and in the local dialect.
- (b) Locate the primary traverse, monument its stations and run the preliminary traverse.
- (c) Start the manufacture of standard concrete corner monuments.
- (d) Prepare the Progress Map from the preliminary traverse and sketch thereon the boundary of the project, locating areas in dispute between municipalities, provinces, etc.
- (e) Establish the base meridian and start the measurement of horizontal angles and distances of the primary traverse. Start the location and measurement of azimuths and distances of the secondary traverses. Prepare the sketch sheets noting thereon the previous surveys, and start sketching of lots claimed.

Backsight and Foresight of Cadastral Surveys
in the Philippines

- (f) Start monumenting of property corners and of political boundaries. Post the thirty-day notices.
- (g) Notify owners or claimants to appear on the ground, verify and approve boundaries as monumented.
- (h) Start locating corners as monumented from tertiary, secondary or primary traverse. Prepare lot data computation.
- (i) Plot on the cadastral maps the corners as located from traverse stations, connecting the corners in accordance with the sketch and survey. Compare and finally adjust previous surveys.
- (j) At the expiration of the thirty days notice, make a tracing of the cadastral maps and verify same in the field correcting all errors, if any are found.
- (k) Number the lot corners in the cadastral maps and in the corresponding field notes by reference thereto.
- (l) Complete the Progress Map. Complete and ink the cadastral maps.
- (m) Make a final check to verify discrepancies. The work should be so arranged that the checking of work in localities which are of difficult access will be performed during favorable weather. All classes of work may be in progress simultaneously in different parts of the project.
- (n) Submittal of survey returns to the Director of Lands for approval.

Because of the magnitude of our cadastral survey program and the limited capability of the Bureau of Lands, private survey contractors are assigned certain projects after they are pre-qualified not only in technical knowledge but also in equipment capability by a Committee on Award and Enforcement of Survey Contracts in the Bureau of Lands. Awards of survey contracts are done by sealed bidding.

Aside from this, we have also decentralized to the 11 Regions to which the Philippines is divided under the Reorganization Law, the verification and approval of survey returns which are heretofore being performed in the Central Office in Manila. It is now possible under this set up to have survey returns approved by our Regional Offices in a matter of days which before took months and sometimes years by our Central Office in Manila.

The Bureau of Lands has also organized the Field Network Surveys and has assigned one survey party in each of the 11 regions to establish control stations for our land reform mapping and cadastral survey projects. The

Backsight and Foresight of Cadastral Surveys
in the Philippines

establishment of a control network survey is very necessary before a detailed survey of an area can be undertaken. The field network surveys also establish the political boundaries of provinces and municipalities.

The classical method of establishing primary control is being used wherein the baseline is measured with invar metal tapes and its azimuth observed together with the latitude and longitude of one of its terminals by astronomical methods. The system is extended over the whole country by the method of triangulation of control points from the baseline. By this method a network of interlocking triangles is formed and all the angles are observed by theodolite. Since the length of the baseline is known, the lengths of all the other sides can be computed by trigonometry and the geographical positions of the control points determined.

Also organized by the Bureau of Lands is a special task force to prepare Land Use and Classification Maps in scales of 1:1,000,000, 1:250,000, 1:50,000 indicating thereon (a) alienable and disposable areas released by the Bureau of Forest Development, (b) areas surveyed by public land subdivision and cadastral surveys, and (c) military and civil reservations. Land Use and Classification Maps are used by our Land Reform Planners in resettlement of people without lands of their own to cultivate. At present we have already completed Land Use and Classification Maps in scale of 1:1,000,000. The rest of the maps will be prepared soon.

The Bureau of Lands has been assigned the parcellary mapping of all the tenanted rice and corn lands of the entire country since its proclamation by the President of the Philippines as a land reform area. To date we have parcelled out 436,863 hectares into 330,604 lots benefitting 241,109 tenants, using the ground method of sketching. Enlarged photographs or controlled photo-mosaics are also used in parcellary mapping. To hasten the parcellary mapping operation of the Bureau of Lands we are now relying extensively on the use of photo cadastral maps.

The Bureau of Lands is also a member of the Committee on Geographical names which standardizes geographical names.

It is also a member of the Committee on the Coordination and Standardization of Surveying and Mapping Activities which has 12 members, the Bureau of Lands included. This Committee has divided its work into 4 working groups, namely:

1. Committee Working Group "A" - Control and Boundary Surveys.
2. Committee Working Group "B" - Topographic and Topical (Theumatic Maps)
3. Committee Working Group "C" - Education, Training and Technical Information.

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in the Philippines

4. Committee Working Group "D" - Photo-Interpretation and Remote Sensing.

Each of the 12 Agencies of the Philippine Government which are members of the mother committee has also a representative in each of the 4 working groups. Any survey problem or information that is brought to the attention of the mother committee is referred to the corresponding working group for study and recommendation. The mother committee takes final action.

The accomplishment of this Committee for the past fiscal year is the completion of an Economic Atlas of the Philippines at scale of 1:4,000,000, the preparation of a photo-coverage index for existing aerial photography in the country, accelerated activity in the establishment of first order vertical control network, cooperative efforts by various member agencies in the Bicol River Basin Development Project, bilateral cooperation in projects of various agencies to enable the use of ships, technical personnel and equipment in several projects of member agencies.

Every year the Planning and Management Staff of the Bureau of Lands spells out the cadastral survey program of the Bureau of Lands. This program after its approval by the Director of Lands is equitably spread out among the 11 Regions in the field and the Central Office in Manila. For the current fiscal year our cadastral survey program is to accelerate land surveys and parcellary sketching to support operation land transfer. We have set a goal of 200,000 lots to be surveyed in FY 1976 with a total appropriation of ₱40,248,091 broken down into ₱1,979,591 for personnel services and ₱38,268,500 for maintenance. (1 Kina = 9.50 pesos.)

The strategies to achieve the target are the following:

- (1) Speed up reconstruction, reproduction and microfilming of maps and plans in the Central Office to be distributed to the Region Offices.
- (2) Intensify and expand geodetic or triangulation points throughout the country to serve as control network in mapping and cadastral surveying activities.
- (3) Strengthen the Regional Surveys Division staff to accelerate processing and approval of cadastral survey projects.
- (4) Organize and assign as many survey parties as may be necessary to achieve the necessary workgoals.
- (5) Modernize survey and mapping techniques (photo-cadastral mapping) for large scale cadastral and economic maps vital to agricultural planning and development.

Backsight and Foresight of Cadastral Surveys
in the Philippines

- (6) Train and assign programmers to handle computerization of field data.

To attain our work goal of 200,000 lots to be cadastrally surveyed for FY 1976, we have 21 on-going projects being surveyed by administration, 70 on-going projects being surveyed by private contractors, 18 projects recently bidden by private contractors, 28 projects to be surveyed by the 11 Regional Land Offices, and 79 proposed projects.

**The P.N.G. Association of Surveyors
congratulates the Government and
people of Papua New Guinea on
gaining Independence and wishes
them peace and prosperity.**

PERSONALITY OF THE PROFESSION

Kisokau Pochapon, the present Surveyor General of Papua New Guinea, was born on August 23, 1946 at Mbuks Village, Manus Island. His education commenced at the primary school of his home village. In 1961 he started his secondary education at Manus High and completed it at the end of 1964 at Kerevat High School. The following year, he moved to Port Moresby where he joined the Survey Division of the Lands Department as a trainee surveyor and was a student in a course organized by Mike Kellock.

With the establishment of a surveying diploma course at the then Institute of Higher Technical Education in Lae, all trainee surveyors from the Lands Department became students of this course and Kisokau graduated with the first group of surveying diplomates at the end of 1969.

After graduation Kisokau joined the Madang Survey Office of the Lands Department and served his articles with Mr. Basil McLaughlan, passing his final board examinations in June 1972.

From February to April 1973 Kisokau attended a managerial course at ASOPA in Sydney, which was followed by a three months practical training period with the New South Wales Lands Department under the Commonwealth Training Scheme.

In June of the same year, Kisokau returned to Papua New Guinea to take up the position of Associate Surveyor General, understudying Graham Matheson who was then the Surveyor General. After only a month in office, he had to attend the conference of East Irian Regional Organization for Planning and Housing in Kuala Lumpur. On his return to Port Moresby he attended a top level managerial course at the Administrative College, followed by a further three months course at ASOPA. Having completed this, Kisokau was appointed a member of the committee looking into University development, and visited places like India, Sri Lanka, Philippines, Mauritius and once again Australia. He also attended the congresses of the Australian and New Zealand Institution of Surveyors in 1974.

In December, 1974 Kisokau was officially gazetted Surveyor General of Papua New Guinea, and in this capacity studied Land Use Planning in various Australian cities from April to September of this year.

Kisokau and his wife Kumant are the proud parents of a two year old daughter. An addition to the family is expected soon.

Since his school days Kisokau has been a keen sportsman, his main sporting interests being soccer, basketball, baseball, lawn tennis and swimming.

Kisokau's first real test as a surveyor was when he did some practical work during his first vacation employment. One of the principals of a

Personality of the Profession

private surveying firm told him to pick up two cement pegs, full size ones, place one on each shoulder and carry them up the slopes of Mt. Vanimo. After his descent, Kisokau was asked whether he still wanted to be a surveyor. His answer was a firm "Yes".

So he made his way, the young Surveyor General, serving a very old profession in a very young country.



Kisokau, third from right, after graduation ceremony.

WELCOME ADDRESS BY MR. BRIAN MENNIS, ASSOCIATION PRESIDENT, TO THE TENTH SURVEYORS' CONGRESS PORT MORESBY

Good morning, it is with pleasure that I welcome you, Mr. Kavali, Minister for Lands, Mr. Lucas, Commissioner for Housing, guests of the Association, Overseas Delegates, Ladies and Gentlemen to the Tenth Survey Congress of the Association of Surveyors of Papua New Guinea.

As you are all aware, Papua New Guinea this year attains its independence, and stands as a Nation in its own right, and it is fitting that we should pause and take stock of our Profession. To do a little bit of "Backsighting" and a little bit of "Foresighting" in fact, and this is the main reason why the theme "Backsight and Foresight" was selected for our Congress.

For "Backsight" we have two historical papers on prewar surveyors and their methods. To serve the "Foresight" role there are several papers on Economic development.

However there is one piece of "Foresight" that I would like to talk on this morning, before asking Mr. Kavali to open our Congress, and this is, that it is very obvious that Papua New Guineans are not being attracted to our profession in anywhere near the numbers needed for the future development of this country.

At this point in time we have more than 100 expatriate surveyors engaged in various types of developmental work. All are experienced men, and at least two thirds are fully qualified. This number is barely enough to satisfy the present demand for experienced surveyors, and at least two Government Departments are well understaffed with such men.

You will note that I used the words "experienced men". I did this deliberately to draw attention to the fact that a graduate fresh out of University is completely inexperienced, and requires several years of working in a practical environment with surveyors, who are experienced, to bring his level of competence up to that which is generally considered acceptable. I do not make this statement implying denigration of the University but to bring home to you the fallacy that is all too current in Papua New Guinea at the present time that a Degree is sufficient to carry out any job going, with experience being little considered. To replace these experienced expatriates there are 25 degree graduates from the University of Technology in Lae, with 9 in their fourth year this year, but only 6 in their third year. At this rate, the output is barely enough to keep up with the increase in demand, without even thinking of replacing any expatriates with nationals.

It is true that there are about 75 graduates from the various technician certificate courses, but these men are all fully occupied generally on demarcation and purchase surveys.

It is obvious that sufficient school leavers are not being attracted to the profession. What is more worrying is that statistics from the Uni-

versity indicate that there is a wastage rate of about 50% over the four year course. Does this indicate that the students we are getting are being poorly selected, or that they do not work as hard as they should once in the University? Or does it mean that the brighter students with the high passes in Form 4 opt for other "cleaner" professions, and those who are left find it too hard to handle a mathematically oriented course.

I understand that the problem is not confined to our Profession but is common to all the technical professions, where precision of result is required.

I put it to your Government, Mr. Minister, that insufficient encouragement is given to students to enrol in the University of Technology in Lae, in preference to the University of Papua New Guinea in Port Moresby. This encouragement could take the form of active lobbying, if that is the word, in the schools stressing that people in the technical professions are the ones who build the country, while the others only talk about it.

Certainly much more information needs to be provided to the schools to allow students full opportunity to see what careers are offering. Careers weeks help, but are of limited scope. To reduce the wastage of students who are attracted, more rigorous selection procedures should be applied, and stricter study and progress conditions should be enforced. After all, the Government is spending a lot of money on the Universities, for what appears to be a small return compared with what should be possible.

However, attracting all the students in the country will be of no use unless the academic staff is there. Bluntly, this country has very few graduates in a technical profession who have sufficient experience to be given a position as a lecturer. Therefore the Government's ideas of local salaries for lecturers is a pipe dream for many years to come. To get men on the open market, world level salaries have to be paid, not the current level, which for a Senior Lecturer is only equivalent to an A.S. A.G. Class 8 Clerk and has a lower maximum than a Class 3 Surveyor.

Papers in this Congress will indicate that Papua New Guinea will require many many millions for its development in the future. Let us invest some of that money now to attract students for, and to speed up education in, the Technical Professions and make it more efficient, so that in the future we have the professional Surveyor, Engineer, Architect or what have you, to continue Papua New Guinea's Development at the pace envisaged, and indeed necessary, to make this the great Nation that it has every right to be.

Mr. Kavali, we are pleased that you are to honour us by opening our Congress and I now like to introduce you to the delegates.

OPENING ADDRESS BY MR. THOMAS KAVALI, M.H.A.,
MINISTER FOR LANDS, TO THE TENTH SURVEY CONGRESS
ON 22ND JULY, 1975.

Mr. President, Gentlemen,

I am pleased to be able to address your Association's Congress at such an important time before our nation's Independence. I am aware that we have visitors attending from overseas countries including Western Samoa, Tonga, Fiji, Australia, Indonesia, Malaysia, and the Philippines. On behalf of the Papua New Guinea Government I extend you all a warm welcome and hope that your stay will be profitable and happy. It is also pleasing that Mr. Leong of the National Chapter of Architects, Engineers, Surveyors and Town Planners from Malaysia is here to share his ideas with us.

I note that this is your Tenth Congress in the fifteen years since your Association was formed. The growth in membership since 1960 with the increasing inclusion of Papua New Guineans is commendable. The emphasis on encouraging local membership is important and can only establish the Association more firmly as a professional body within the country.

In connection with membership I have received correspondence from the Technician Surveyors Association and have strongly suggested by letter that consideration should be given to one Association involving surveyors at all levels. In our country we must work together as a team to avoid expensive duplication and to encourage a co-operative professional Spirit. It is good that you have two Survey Technician delegates present and I hope that the motion to expand membership may be favourably voted upon during this meeting.

Another matter which I would like to refer to in this area is the retention of overseas officers who are qualified surveyors. I am very conscious that our current training programme is still insufficient to produce enough qualified Papua New Guinean surveyors to meet our requirements. Therefore I would like to reassure you that as far as my Department is concerned we are prepared to extend individual contracts for those expatriates who are prepared to remain and work with us.

Similarly there will be a need for the Government to utilise private practitioners for some time. In developing your code of Ethics, oversight of survey practice and scale of fees, it is important that Government surveyors and those in private practice are able to continue to come together professionally through your Association.

Your theme is particularly appropriate at this time to consider the past, and more particularly, the future. In this instance "Backsight and Foresight" can be very objective and practical terms which can be useful in directing your Association towards its future role and needs in Papua New Guinea.

Through your Association I would like to dispel any fears that people may have in connection with our new Lands Policy resulting from the Commission of Inquiry Into Land Matters Report 1973. It is the intention of the

Government to adopt a fair attitude towards landowners. Our stated policies relating to lands acquisition, declaration of national land, conversion of freehold land to leasehold land and land registration all aim to give Papua New Guineans a better opportunity to enter into land ownership and business, while providing fair compensation to overseas interests where applicable. I hope that in assisting to implement these policies your members will fully understand the Government's intention. I personally feel that your role is not merely that of technical professional people, but is also in the fields of liaison and communication.

With further reference to the Commission of Inquiry Report I think it pertinent for your Association to fully consider recommendations relating to survey. The need to involve Papua New Guinean villagers in actual work, to train local field staff in simple survey methods, to further examine methods of photogrammetry, and to facilitate necessary land registration include some of the important areas of concern.

I hope that from this Congress you may give some lead to our Government on its problems connected with land matters in relation to surveying with a view to improving overall co-ordination where necessary.

In addition more young people need to be attracted towards the profession and this is definitely an area where I think your Association could be actively involved.

I wish you well in your deliberations and have much pleasure in declaring the Tenth Congress open.

By: M.J. Page and A.J. Quick

The papers presented to the Congress and the Annual General Meeting were sobering in more ways than one. They presented food for some very serious rethinking by all of us. The emergence of Papua New Guinea as an independent nation has now left the way open for some original innovations and for some experimentation which may not have been acceptable to previous administrations. Papua New Guinea needs a special type of land registration system. This system must be simple and easily understood by people who have no knowledge of metes and bounds, and above all it must be fast and inexpensive. However we must bear in mind that any new system will not be a final solution. The structure must provide latitude for flexibility, growth and refinement to keep pace with the everchanging needs of a developing nation. We must not lose sight of the fact that some day these requirements may be very sophisticated indeed.

Was it coincidence that so many speakers and so many papers stressed that we rethink and reform? No, the need has been foremost in the thoughts of many men at many levels for a long time. We have resolved to do something about it.

Although the congress was well attended, it was somewhat disheartening to note that the number of National members present was not as high as could be expected. In terms of the future, both the Association and surveying, in this country, are in the embryo stages, and whilst expatriate members will probably be here for years to come, it is the National members who will determine the destiny of the profession, and the assistance it will be able to provide in the development of Papua New Guinea.

We are spread far and wide throughout the country, often isolated from civilisation and mostly out of contact with each other. There is little opportunity of getting together frequently to discuss important matters, and when we do meet it is imperative that we achieve the maximum attendance in order that these topics receive our fullest consideration.

Perhaps this subject may lead to some changes in the format of future congresses. The amount of debate on an enquiry into a new cadastral system and pilot schemes during the A.G.M. suggests that such vast subjects may possibly be discussed at length in separate meetings or workshops held in conjunction with the congress. Such topics should be considered more thoroughly than they can be during an A.G.M. Every member should be involved in discussion on broader aspects, leaving the finer details to be handled at committee level.

The social functions arranged for this year's Congress were well up to their usual high standard. They got off to a roaring start with the President's Cocktail Party held at the Waigani Golf Club. Members were able to renew old acquaintances and make new ones among very pleasant surroundings. Getting to the Golf Club and the Waigani Arts Centre for the technical papers caused some problems, especially for visitors, due to the current road works, which necessitated negotiating some fairly well hidden detours.

Backsight on the Tenth Survey Congress

Visitors were, as expected, royally entertained by Port Moresby members in their homes on Tuesday night.

The Annual Dinner held at the Papuan Hotel on Wednesday night was, we understand, the most successful yet in raising finance for the Association. Some members were charged what appeared to be almost "hourly rates" for their attendance. The new licensing laws threatened to put a dampener on the evening but Moresby members came to the rescue, and those who wished were able to continue at a number of quickly arranged parties around the City.

The Luncheon and Fashion Parade held at the Islander was possibly the highlight of the social events. This year's models ably assisted by two well known members were excellent and the comments provided by our well known compere were amusing and entertaining and made the whole show a resounding success.

The official social events were terminated on Friday night by a Mumu barbeque and sing sing at the Public Works Department Social Club. This function was well organised and enjoyed by all participants.

Our thanks must go to the Congress Manager and his committee, all those who presented papers and displays, the hostesses and hosts and all who contributed in any way and worked so hard to make the Tenth Survey Congress a success.

TENTH SURVEY CONGRESS PHOTOGRAPHS



The Minister for Lands, the Rt. Hon. Thomas Kavali opens the 10th Congress at the Cultural Centre, Waigani.



Dan Fitzhenry lives up to his reputation as a stirrer by mixing the claret and oysters with the reverse end of his paddle.



Graham Kendall enjoying a glass of claret and oysters.



Lionel Paisawa, a graduate of the University of Technology pays up.

TENTH SURVEY CONGRESS PHOTOGRAPHS



Geoff Brown collects fines at the head table.



Professor and Mrs Rais of Indonesia mingle with overseas delegates and other guests.

TENTH SURVEY CONGRESS PHOTOGRAPHS



Tony Bomford in a joke-telling mode at the Annual Dinner.



Ron Matheson with friend.



Jeff Tierney in a persuasive manner.



Paulus Breria pays his fine.



The Annual Dinner gets under way.



Mick Larmer and Lady Surveyor, Myra Machin from A.C.T. getting to know one another.

PERSONAL NOTES

Tony Naughton's influence in the profession and the Association will be felt for many years to come. In his eight years in Papua New Guinea, two in the field and six lecturing, Tony has been able to impart to the student both the practical and academic aspects of surveying. The many students he taught are heavily indebted to him for the knowledge and good humour with which he has always been ready to assist them. (One student with whom he was especially pleased actually scored 118% in one of his examinations.)

Tony and Jan are now in Hobart, where he has accepted a post with the Lands Department, the duties of which include supervising the post-graduate training of surveyors.

Kisokau Pochopon has just returned after three moons in Canberra. With all the diverse courses Kisokau is doing one wonders whether he is training for Surveyor General or Governor General.

Francis Posanau is back in his normal job of Deputy S.G. allowing Frank Lee to return to Papuan Regional Office.

Paul Ning and wife have not long returned from a winter holiday in New Zealand. Paul reckons its better to be thawed than sorry.

Reg Walters went over to Indonesia for three months about six months ago. He must have seen something he liked.

Tony Ferris has bid farewell to the rarified air and is now deployed in the New Guinea Islands.

Mick Larmer was seen at Varirata National Park recently in company with about six strong men heaving on a great length of diwai in an endeavour to get the 420 Gs front wheel out of a huge barat.

At time of writing Geoff Brown is beating scrub down with great fervour on Fergusson Island so that he can get back for the big Independence Eve Party (also Liz's birthday) at his place.

You may remember that Pomaleu Salaiu used his 'find the ball' prize to finance a new set of wheels. He is again madly pricking away at the Post Courier photograph to pay for repairs necessitated when another vehicle ran into the side of him in Waigani. The Police are looking for the other guy who hit and run.

Things are so slow in the Eastern Highlands these days that Dick Moody jumped on a plane for New Zealand. He says he will return when he can take the theodolite out of its box.

James Hunt had much the same problem in his private practice in Sydney and joined the Central Mapping Bureau in early June. Welcome to James & Marguerite.

Personal Notes

Merik Erben holidayed recently in his native Czechoslovakia and passed through Enschede to see Peter English on his way back to P.N.G. Peter has also returned after successfully completing his Photogrammetric Course. John Van As is enjoying continued success on the good ship Majic Mushroom in the weekly Yacht races on Port Moresby harbour.

Dave Rumble has taken over as Regional Surveyor Bougainville and has now settled in Kieta.

Bryan McLennan left for a colder climate last November and is working in Canberra reportedly "having fun with computers".

Colin Hard has scored again and a new addition to the family (the fourth) is scheduled for October.

Allan Cullum has gone finish and taken up a position in Hong Kong. We hear he disputes the well known myth as he has found things conveniently north-south and has had no trouble orientating himself.

New member Robert Prikulis is courageously carving up the wilderness near Tinputz, despite a well enforced local council ruling to revoke all liquor licences to keep the area dry.

Ed Palaitas was seen around the traps again recently. Either work must be slow around Sydney town, or he wants a break from changing nappies.

Mal Gray "goes finish" on the 26th September though he knows not where to. Things are still grim "down south" but as Mal is shaking a golden hand all the way to the Bank, he should be able to keep above the bread-line for a while.

Tony Ferris, and his delightful wife Sue, have deserted the mountains and taken up residency in Rabaul. Tony will prove an asset to the New Britain cricket scene.

Clive Carson and family had a trip to Lae recently for the August Council Meeting. In his own inimitable style, Clive got a bit confused about the time of the Meeting and had to be pulled from the pool at the Huon Gulf to make up a quorum.

Bob George, the renowned Cocktail Party sleeper and connoisseur of Gin from unbroken bottles, is to take Mal Gray's position as Regional Surveyor. Hope Bob's life is not too miserable now that the Minister for Lands has closed the Golf Course.

Noel Sharp has emigrated from Hagen, hopefully only on a temporary basis, and has now set up house/s at Wabo and Malalaua.

"Scruffy" Kendall finishes this month after 20 odd years with the Lands Department. He plans to go broke gracefully on his property in Queensland.

Hear Lou Rampant is managing to stay one jump ahead of the tax man by continually moving camp.

Max Muller plans to be the first person to waterski on Lake Hargy. The helicopter should have little trouble getting him up on one ski.

Darryl Parker has delighted his family by visiting them not once but twice this year.

There is no truth in the rumour that Clive Bassett has a drink problem. He drinks; he falls down - where's the problem?

Heard that Dave Rumble was practicing being out of work in case he returns to Australia.

Stuart Scriven is not a full time fisherman, although he is often full.

Just as well Bruce Serisier and Stephen Low are doing some work.

Big Al McCarthy resumes at UNITECH in early February 1976 after a stint at University of NSW. Word has it that the recent power cuts south affected his TV viewing to such an extent that another liklik McCarthy is due in 1976.

Ken Massey, family and friends went for a afternoon drive last weekend and ended up in the Saloon Bar at Smugglers in Madang. Ken's month old Mazda Coupe got its bottom wet twice fording creeks but did not suffer any dents while completing the journey at an average speed of 65 kph.

Karl Aschhoff is putting the surveyors on the map (like that one) as head organiser of the OKTOBERFEST, a charity night to be held at UOT. As well as giving the local ales a taste, genuine German beer is arriving via Lufthansa.

Syd Dahl is said to be a grandfather again. This is being checked out.

Tony and Heather Quick are back from a skiing holiday in New Zealand, refreshed and invigorated. Tony gave his unqualified support to their beer (it is cooled). We understand he entered a "chucking" contest with the remnants of a Rugby team in Christchurch with mixed results.

Peter Jolley and Graeme Arman recently visited Lae and were overhead discussing the shortcomings of Land Cruisers. Peter bitterly complained about their flying capabilities and Graeme about their serious design fault in not having wheels on the roof. Following on from this we noticed that Peter has acquired a new land cruiser and his cunningly designed metal shelter on the back probably has aerodynamic possibilities; it seemed to have little else going for it.

O.G.G. Dent writes:

Dear Sir,

Greetings and congratulations on this your Independence issue. The Surveyors Association has the honour of being the first professional body founded in this country and its contribution to progress must continue to be directed through the advancement of all its various fields. As a foundation member I feel it is appropriate at this turning point in history to set out some facts and opinions which have oriented and fixed my views of the profession and of our Association, in the hope that they will contribute to some constructive advancement.

It is nigh on 10 years since a young graduate from N.S.W. paid a visit to this country, to study our cadastral system with a view to writing his thesis for an honours degree. Graeme Toft travelled widely and delved deeply into the ways of the surveying profession; he met a majority of surveyors and made contact with administration officers and Government Departments concerned with the problems of land management. I have not been able to follow his career but the paper he contributed to the "Australian Surveyor" (published June 1967) as part of the result of his studies here, remains the brightest jewel of all contemporary contributions to our professional literature.

However, his prophetic propositions have received little honour, then or since, and the forces of conservative Australian surveying tradition chained to the 1/8000 isolated cadastral survey, still reign supreme and are shortly to be reinforced by a new set of "Survey Directions".

Over recent years much lip service has been given to changes in the system. Surely the time is approaching when the advice given by such learned leaders as Dr. John Sandover, in his address to the 8th Survey Congress on 16 July 1973 (PNG Journal Sept. 73, Vol. 3 No. 3) will be taken to heart; and in respect of membership, the Association will take cognizance of the Vice-Chancellor's stated intention. I quote: "In this context it is well worth mentioning our intention to proceed with a school of 'land studies' where we hope to train graduates as we do at the moment but with some carrying on to an extra year's specialisation in special aspects of surveying such as photogrammetry and others in valuation proceeding to a fourth year B. Tech. giving them greater depth of specialist knowledge. We envisage a school with three departments - Surveying, Photogrammetry/Cartography and Land Economy each producing graduates at three levels, the Technician level, the limited supervisory of technical officer level and the fully supervisory and specialist operative level."

I envisage a broadly based Association of Surveyors granting memberships to qualified professionals and technicians in all spheres of land management.

To date the Association has not been able to accept the fact that the technological revolution and the special needs of this country have relegated the boundary surveyor in the Australian tradition to a minor position in the hierarchy of Surveyors as Land Managers.

Letter to the Editor

The graduate surveyor versed in error theory and the calculus of observations is required to direct and control the topo-cadastral and photogrammetric fields of an integrated survey system.

This does not mean that the Licensed Surveyor, Australian and New Zealand, as a public servant or private practitioner should be phased out. As one myself, I find the topo-cadastral concepts of the integrated survey system appealing most to my capabilities as an experienced field surveyor.

It will mean however that established cadastral surveyors will have to reorient their functions and specialize in fields appropriate to their capabilities. It will also mean a reorganization of the Surveyors' Board and of registration procedures, so that new surveyors can qualify to practice in any of the specialist fields of land management.

This time of Independence also marks the end of an era of individual expatriate control over cadastral surveys within the Public Service bureaucracy. It is too early yet to judge the pros and cons of the Matheson era but historians will want to evaluate the results of a policy which costs in the private sector of "Contract surveys" alone, about one million Kina per year.

Already the financial restrictions imposed by the PNG Government must be causing Surveyor-General K. Pochapon to re-think his priorities.

Is he to be guided by an Association pledged to the old system?

Can more effective surveys than those shown by a cadastral plan be done with the money available?

My view is that they can. By developing a topo-cadastral graphical definition for land registration and dealing, as part of a national surveying and mapping service operating under its own Act.

As I see the priorities, the Association should be pressing for:

(1) Integrated Surveys

The adoption of an integrated survey system which allows the development of a graphical cadastre and large scale mapping as the logical replacement for the isolated cadastral survey and as an integral part of the national mapping program.

(2) Education

The education of surveyors in all fields, with particular emphasis on graduate surveyors specializing in topo-cadastral work and photogrammetry and on Technicians trained to 3rd and 4th order control work.

Letter to the Editor

(3) Membership

The broadening of membership to include graduates and technicians in the accepted Land Studies.

(4) Solutions to Land Tenure Problems

It would appear that the Association made no real impression on the Commission of Inquiry into Land Matters. The report dated October 1973 contained 132 recommendations of which only seven were made on surveying and none whatsoever on mapping! Official statements from time to time advised that New Land Legislation would be passed into law in the period between self-government and independence, presumably based on the recommendations of the Commission and other expert advice received from many quarters.

The orderly pattern of planned land tenure legislation however, went by the board when political considerations and minority group pressures led only to hurried legislation for the acquisition and re-distribution of expatriate holdings.

As 97% of the land mass of the country is not affected by these Acts, the basic and critical land tenure problems remain unsolved at independence.

My letter, Sir, is therefore submitted to be read at this time in the hope that new life may be breathed into our Association, that it may broaden its vision as well as its membership, opt for solutions to our land problems and from its corporate skills and standards give objective advice to government in the public interest.

O.G.G. Dent.

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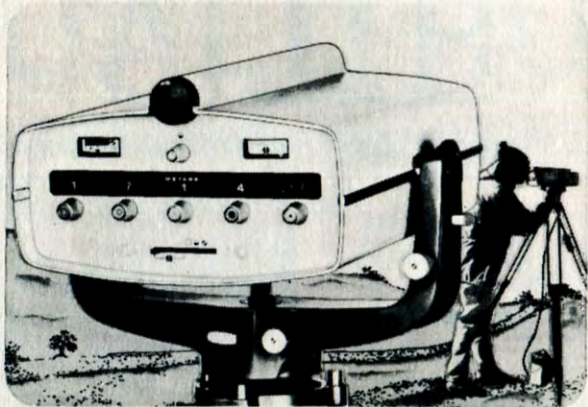
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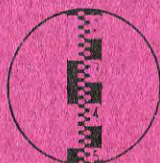
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