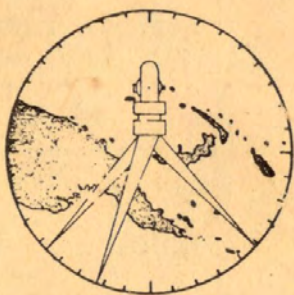


THE JOURNAL

of the

ASSOCIATION OF SURVEYORS OF

PAPUA AND NEW GUINEA



VOLUME 2

NO. 3

JULY

1972

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OF PAPUA AND NEW GUINEA
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THE JOURNAL
OF THE
ASSOCIATION OF SURVEYORS OF PAPUA & NEW GUINEA

Vol.2

No.3

July, 1972

The quarterly journal of the Association of
Surveyors of Papua New Guinea, published in
the interests of the surveying profession.

BUSINESS MANAGER

M.J. Larmer

EDITOR

G.G.D. Arman

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(Views expressed herein are those of the
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J.C. Williams

EDITORIAL

Elsewhere in this edition of the Journal we have the first of two parts of a paper written by Mr. Robert Steel, B. Sc. FRICS, titled "The Professions in the Developing Commonwealth".

This paper deals primarily with the development of professional bodies in situations similar to our own here in Papua New Guinea.

The paper puts forward many commendable suggestions regarding the formation and operation of what it terms Indigenous Professional Societies. No doubt that the profession in this country would be well served to take note of some of these suggestions.

One point Mr. Steel doesn't offer any suggestions on, and doubtless he has very good reason for not doing so, is what may be loosely called, "An acceptable Scale of Professional Fees in a Developing Country".

The present Scale of Fees of the Association of Surveyors of Papua New Guinea is based on providing the Registered Surveyor with a financial remuneration commensurate with his professional status, relative to an affluent society, i.e. Australia.

The question is "how long can this country afford the luxury of catering for a standard of living so far advanced to its own?"

Indigenous surveyors will qualify at a greatly accelerated rate in the next few years and some will opt for private practice.

If they remain members of our Association, they will rightly abide by our Scale of Fees. There is no earthly reason why they should not.

It is possible that a future Public Accounts Committee, (and the massive contribution of the Administration to the funds available for survey work in this country cannot be overestimated in this context) will deem that survey costs or more particularly income enjoyed by the private surveyor are disproportionate to incomes applicable to the other professions.

It may well be that this Committee will advise the Government of the day that the Scale of Fees of the Association of Surveyors of Papua New Guinea is unrealistic in terms of the Gross National Product or the per capita income or any other criteria appurtenant to the standard of living of the country.

It may then be assumed that a reduction of this Scale of Fees will be forced in one way or another, on this Association.

It is an invidious situation Gentlemen, but I suggest that it exists.

The members of this Association would be well advised to prepare for the day when our Scale of Fees will need to be geared to providing an adequate financial return to the indigenous surveyor in respect to his professional contemporaries.

M.J. LARMER.

CODE OF ETHICS

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

Sir Francis Bacon
(1561-1626)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

FOR THE YEAR ENDED 31ST. MAY, 1972

INTRODUCTION

Eleven formal Meeting of Council plus three Extra-ordinary Meetings were held during the past year. Mr. B.R. McLennan posted to Arawa found it impossible to attend Meetings and appointed Mr. K.T. Blaik as his Proxy. Mr. J.C. Williams appointed Mr. J.J. Tierney as his Proxy on occasions when he could not attend. Mr. A.W. Hardy acted as Secretary/Treasurer during the absence on leave of Mr. G. Sparkes-Carroll.

MEMBERSHIP

Eighteen applications for membership were accepted by Council during the year ended 31st. May, 1972, and three resignations were received. Two members were erased from the Register under By-Law 32.

One Associate member was advanced to Corporate membership and one Student member was advanced to Associate membership.

The details of membership are shown below:-

Members on Register as at 31.5.1971-31.5.72

Fellows	3	3
Corporate Members	71	73
Corporate Members (0/seas)	24	31
Associate Members	19	24
Student Members	2	1
Total Membership	119	132

New Members

Corporate	12
Associate	<u>6</u>
	18

Less

Erased from Register	2	
Resignation Corporate	3	
Associate	<u>Nil</u>	<u>5</u>
Net increase in Membership		<u>13</u>

SIXTH SURVEY CONGRESS

The Association's Sixth Congress was held in Rabaul and was a great success. The Rabaul Congress Sub-Committee headed by Mr. J.C. Williams with Deputy D. Rumble made the most of Rabaul scenic attractions and all the visitors were well catered for.

Despite economic restrictions, we had a number of overseas delegates, who confirmed that our Association is held in high regard by members of our profession in neighbouring countries.

A report of the Sixth Congress appeared in Volume 1 No.4 of our Journal.

By all reports our Seventh Annual Congress to be held in Port Moresby promises to be the biggest and best yet, with an impressive list of overseas delegates in attendance.

ASSOCIATION SUB-COMMITTEES

Apart from the Scale of Fees Sub-Committee and the Congress Sub-Committee, Council have attempted to de-centralise its activities by forming the Survey Education Sub-Committee and the Survey Co-Ordination Sub-Committee in

other main centres, viz. Rabaul and Lae respectively. The response has been initially very disappointing, however provision has been made during the Congress for discussion groups on these topics to allow the Chairman to formulate reports to be published in a later edition of our Journal.

The Scale of Fees Sub-Committee will have the task in the very near future of a complete revision of our Scale of Fees. The Sub-Committee is at present reviewing the Engineering Section and with the greater use of E.D.M. equipment and access to desk top computers, the Central Mapping Bureau is seeking modification. We hope that these matters can be resolved in time to allow a reprint of the complete Scale of Fees incorporating all amendments during 1972.

PAPUA NEW GUINEA SURVEYORS BOARD

Nominations were invited earlier this year for Association representatives on the Surveyors Board. The members elected were the same as for the previous term.

COMMONWEALTH ASSOCIATION OF SURVEYING AND LAND ECONOMY

Since becoming a member of C.A.S.L.E. last year we have had exchanges of correspondence and are endeavouring to co-operate in every way possible.

Mr. M.D. Kellock was nominated as our Associations' representative on the Council of the C.A.S.L.E. Education Advisory Board in July last year and accepted the position.

In addition to our annual subscription to C.A.S.L.E. (based on the membership of our Association) Council has again approved an

additional donation of \$25 to assist C.A.S.L.E. finances. A donation of \$50 was also made to the Aubrey Barker Award. This is a fund to enable students to further their studies abroad.

We were indeed honoured last year by the visit of Mr. R. Steel, Secretary of C.A.S.L.E. who whilst attending the Commonwealth Foundation Seminar in Singapore, took time to visit the member societies of C.A.S.L.E. in the Pacific region to collate mainly information on Surveying Education for the 1973 General Assembly to be held in Wellington, New Zealand.

Although his visit was of short duration, he was able to have discussions with members of Council, spend a whole day with Mr. M.D. Kellock, staff and students at the Papua New Guinea Institute of Technology and meet members of our Association at a Cocktail Party in his honour held at the Gateway Hotel.

Mr. Steel who is also Secretary of the Royal Institute of Chartered Surveyors presented the Association via President Ken, with a handsome replica of the coat of arms of R.I.C.S.

ASSOCIATION'S ANNUAL PRIZES

President K. St. C. Matheson attended the graduation ceremony of the Papua New Guinea Institute of Technology and was able to personally congratulate the graduates receiving A.S.P.N.G. prizes.

The recipients were:-

Best results in first year - Lionel Paisawa.
Value \$20.

Best results in fourth year - Jerome Sipuman.
value \$40.

Part of Jerome Sipuman's prize was nomination

fee plus 2 years' subscription for Associate Membership of A.S.P.N.G.

NEW ZEALAND SURVEY CONFERENCE

The New Zealand Institute of Surveyors last year invited us to send a delegate to their Annual Conference held at Napier in the North Island. Council selected Mr. J.M. Papai as our delegate, his post graduate qualifications in Photogrammetry ideally suiting the Conference theme.

Mr. Papai's travelling and accommodation expenses were subsidised by The Commonwealth Foundation of Great Britain and our Association met the balance.

We are hoping Mr. Papai will soon be writing an article for the Journal of his experiences in New Zealand so that our members can share them with him.

MEMBERSHIP CERTIFICATES

Membership Certificates were unfortunately not available to be presented at last year's Congress owing to a number of circumstances. Many had to be reprinted and Council are endeavouring to have another batch completed before the Moresby Congress.

G. Sparkes-Carroll

G. SPARKES-CARROLL
Honorary Secretary.

25th. June, 1972.

REPORT OF THE HONORARY TREASURER

INTRODUCTION

The statement of receipts and payments which follows shows the full year's transactions after the alteration of the Association's financial year from May to December.

An unaudited interim statement to 30th. June, 1972 will be presented at the Annual General Meeting.

ANUAL SUBSCRIPTIONS

With a view to checking our declining financial resources Council found it necessary to increase subscriptions for 1972. The ever increasing load of secretarial work forces the Hon. Secretary to engage the services of commercial firms from time to time for duplicating, typing and printing to provide an efficient service to members.

The Association is at present occupying office space for the storage of records, venue for Council Meetings etc. and although at this time we are not paying any rent, it is anticipated that in the future we will be, especially if moves afoot to combine with other professional organisations and share secretarial services come to fruition.

It is anticipated that increased income from subscriptions will enable the Association to increase its investments for future security.

SURVEY CONGRESS

As reported last year the Congress Account was operated separately. Unfortunately I cannot produce a statement of receipts and payments in connection with the Sixth Congress this being the responsibility of the Congress

Sub-Committee.

The deficit on the Sixth Congress at Rabaul was \$287.80. Congress papers are still available, the sale of which may reduce this figure slightly.

It was found necessary to increase Congress Registration Fees to overcome the persistent Congress deficit.

A new Bank Account has been opened with \$100 for the Seventh Congress.

JOURNAL

We have a separate Journal Account started with \$100 in January 1972. The deficit on the Journal during 1971 was \$437.72. Even with increased advertising revenue it will still be necessary to transfer money to the account periodically.

INVESTMENTS

Our investments have not increased and remain at \$500. With the changing of our Association Account from Lae to Port Moresby we have caused some difficulty to the Reserve Bank and received no interest during 1971. This matter will be clarified in the near future.

Council attempted to purchase 600 shares in Bougainville Copper in the Territory issue, however we were unsuccessful in the ballot.

Until our cash reserve increases we can do little to increase our investments.

MISCELLANEOUS

Due to a regrettable incident toward the latter part of 1971, the Trading Bank Account of the Association was transferred from the

Commonwealth Bank to the Bank of New South Wales at Boroko. To open the new account an amount of \$400 was loaned by some members. The loans have since been repaid.

This amount of \$400 plus an amount of \$4.80 owed from Petty Cash gives a slightly exaggerated balance sheet - the actual balance as at the 31st. December being \$886.64.

A number of social functions were organised in Port Moresby during the year for the benefit of members, all of which were on a divided cost basis with the exception of the Cocktail Party in honour of Mr. R. Steel. An amount of approximately \$42 from Association funds was used to subsidise this function as Council felt that the goodwill involved would benefit the Association as a whole.

G. Sparkes-Carroll

G. SPARKES-CARROLL
Honorary Treasurer.

25th. June, 1972.

STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE YEAR ENDED 31ST. DECEMBER, 1971

RECEIPTS

\$ 95	Nomination Fees	\$10.00	
465	Annual Subscriptions	<u>1572.00</u>	\$1682.00
60	Scale of Fees		155.00
276	Donations		-
563	Commonwealth Foundation Allowance		-
1342	1970 Congress		20.00
-	1971 Congress		1131.30
24	Interest on Investments (Prizes Fund)		-
27	Social Functions		489.62
-	Journal		360.00
			<u>\$3837.92</u>
\$2852			
1202	Deficit for Period		217.00
			<u>\$4054.92</u>
			<u><u>\$4054</u></u>

PAYMENTS

\$ 48	Telephone - Postage	\$ 76.98
90	Typing & Duplicating	-
376	Secretarial charges	602.75
143	Printing & Stationery	63.57
563	Commonwealth Foundation Allowance	-
-	Journal	797.72
-	Student Prizes	60.00
-	C.A.S.L.E. Subscription & Donations	79.52
2628	1970 Congress	82.70
100	1971 Congress	1318.90
4	Bank Charges	21.57
53	Travel	326.43
-	1972 Congress	100.00
22	Presentation to Hon. Auditor	-
27	Social Functions	524.78
		<u>\$4054.92</u>
		<u><u>\$4054</u></u>

BALANCE SHEET AS AT 31ST.DECEMBER, 1971

ASSETS

\$ 522	Cash at Bank	\$ 709.44
56	Bookcase at cost \$56.00	
26	Books at cost <u>26.00</u>	82.00
500	Investments (Prize Fund)	
	Territory Loan Series 111	<u>500.00</u>
<u>\$1104</u>		<u>\$1291.44</u>

LIABILITIES

	Loans from Members	\$ 404.80
	Capital Accumulation Account	
\$2305	Balance as at 31st.December, 1970	1103.64
(1201)	Surplus (Deficit for Period)	<u>(217.00)</u>
<u>\$1104</u>		<u>\$1291.44</u>

AUDIT REPORT

I have examined the accounts and records of the Association of Surveyors of Papua New Guinea for the period 1st. January, 1971 - 31st. December, 1971, and have received all information and explanations required. I now report that in my opinion the above Balance Sheet and accompanying Statement of Receipts and Payments disclose a true and fair view of the transactions of the Association and the state of affairs as at 31st. December, 1971. In my opinion, the records of the Association have been properly kept in accordance with By-Law 51.

J.T. Fielding

J.T. FIELDING, B.Com, A.A.S.A.

Hon. Auditor.

22nd. June, 1972.

A Surveyor's field book should be like the centre page of "Playboy".

Leave nothing to the imagination.

Another pearl of wisdom by
Oscar Sydney Dahl.

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SURVEY TOPICS

Bruce and Tisa Serisier have recently given birth to a daughter Michelle Anne, 7lb.13oz.

Three geodetic section heavy weights, Jim Cavill, Dave Johnstone and Ben Hall recently had their bi-annual rest and recreation leave away from their wives; they spent three weeks on mountain tops in the upper Markham area.

Graham Matheson was due back from leave in October, but now we won't see him until November, due to an accident. 44 gallon drums and big toes do not mix.

John Kronenburg is currently taking three months leave in Europe, supposedly visiting his parents. Fellow workers at Public Works have recently received some interesting literature in very official type envelopes. Censorship is non existant in Holland.

John and Cherry Ginn will not be with us for the Congress as they are off to New Zealand for three weeks.

It appears that baby weights are inversely proportion to the father's height. Jeff Tierney and Allan Mail, who are not over-endowed with height, have recently produced 9lb. plus babies. The latest surveyor to feature is Don Eagleson of similar stature. Sue Eagleson gave birth to a 10lb. 2oz. girl Suzanne Katrina.

Recently noticed in the Post Courier Lost & Found column:-

"Lost - Theodolite legs between Wards strip and Boroko. Finder please phone 53.194."

We believe the legs were last seen on the back of a Land Cruiser and were not secured for high speed travel.

It is to be noted that the Golf Club is situated at Wards Strip and the legs were lost on a Friday night.

Graeme and Alice Arman have a problem. Their baby son is still officially unnamed. Graeme insists on Pierre and Alice insists on anything but Pierre; so far a stalemate.

Clive Bassett.

STOP PRESS

Steven Richard weighing in at 7 lb. 10 ozs. joined the Fitzhenry family the day this edition went to press.

Congratulations Judith and Daniel.

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90215

HEWLETT  PACKARD



CENTENARY OF THE LONG STEEL TAPE

ONE HUNDRED YEARS OF SERVICE

by O.S. DAHL

Under the heading "Correspondence" The Australian Surveyor Vol.16 No. 6 of June 1957, quotes the late Surveyor General Adams of New South Wales, as making the year 1872 the year of debut of the long steel tape.

Prior to this all measurements were made by the Gunter Chain.

At the recent sale of gear by the A.P.C. in Moresby, two Gunter type chains were offered for sale and were purchased by John Macartney and Syd Dahl. These are each of 100 feet and were kept by the Company for the exclusive use of World famous Geologist the late G.A.V. Stanley, who disdainfully rejected the new fangled wind up tapes.

I wonder how many miles of line were measured by the long steel tapes in their 100 years of service. The total must be enormous, even enough to make Danny Fitzhenry's eyes sparkle at the thought of the voucher.

Now with the extended use of Electronic Distance Measuring Equipment, the long steel tape is nearing retirement. The D.M.E. (Doesn't make errors) gear will take over, and perhaps at a survey congress of year 2000 a long steel wire will be displayed as a museum piece as we now display the Gunter.

Hereunder the relevant extract from the 1959 Australian Surveyor.

WHO INVENTED THE LONG STEEL TAPE?

Mr. H. Sheaffe, M.I.S. Aust., of Barraba, N.S.W., writes, in reference to the article entitled "The Linear Standards of the Department of Lands, New South Wales," which was published in the March, 1957, issue as follows:-

".... I have read Mr. Bayliss' article which was most interesting, but I still do not think that Mr. F.B.W. Woolrych introduced the Hypotenusal system or the use of Crinoline wire.

"So far as I know my father, G.H. Sheaffe, was the first surveyor to use this method of measurement for cadastral surveys and it may be of interest to our members to know how he came to use it.

"He told me he was working near Harden in that undulating country of long, even slopes, when it occurred to him that if he read the angle of inclination, measured the distance along the surface, and then reduced it to the horizontal it would be quicker and more accurate. He tried it out and found he got better closes.

"The next improvement was to use a chain of greater length than one-chain. He first tried piano wire, but found this kinked and broke too easily. He then tried crinoline wire 1/12th. of an inch wide and found this a success. I think this was about 1875, but may have been a few years before that.

"At this time crinolines had gone out of fashion so he went to David Jones' store in Sydney, was shown a tangled heap in their basement, and brought the lot for £5. He took it home and made up chains and hoops or reels and gave them away to other surveyors.

"I might add that after father had developed this method he showed it to the then Surveyor-General (Mr. P.F. Adams) who, much to father's disgust, brushed it aside as nothing more than joining two or three chains together."

Editor's comment:

Apparently the Surveyor-General of that day, Mr. P.F. Adams, was inclined to favour Mr. Woolrych, for in the "Surveyor's Pocket Book," dated 1886, he wrote:-

"The question as to who first substituted the steel riband for the ordinary chain has often been asked, and in reply I may state that my attention was called to it by Mr. F.B.W. Woolrych, District Surveyor, in the year 1872, who showed me a length of crinoline steel to which he had fitted the handles of a Surveyor's chain.

"During the year 1873 the steel tape came into general use in this Department."

On the other hand, however, in his Presidential address at the inaugural meeting of the Institution of Surveyors, N.S.W., Inc. (1891) Mr. D.M. Maitland stated, "... I remind the many surveyors assembled here this evening of such effective aids to their work as ... the long wire or hypotenusal system of measurement invented, or at any rate, first brought into notice, by Messrs. Sheaffe and Woolrych which has absolutely revolutionised linear measurements....."

The Editors have a dim recollection of having once read that a New Zealand surveyor beat Messrs. Woolrych and Sheaffe by a year or two. Perhaps a surveyor from the Dominion could confirm this.

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The following is the first part of a paper written by Mr. Robert Steel, Secretary of The Commonwealth Association of Surveying and Land Economy.

The second and final part will be published in the October edition of "The Journal".

THE PROFESSIONS IN THE DEVELOPING COMMONWEALTH

By Robert Steel, B.Sc, FRICS.

SUMMARY

1. This paper discusses the role of the professions, with particular reference to the developing countries, and the ways in which their services to the community can be developed through collaboration between local professional societies, Commonwealth associations, and local professional centres (1.1)
2. The paper is concerned mainly with the consultancy professions (law; medicine, dentistry and pharmacy; accountancy; engineering, architecture, surveying, land economy and town planning) (1.2-1.3). Although there may be local variations in the scope and organisation of these professions, they play a consistently vital role in all countries in promoting public health and welfare, in the fulfilment of national programmes for economic growth and development, in good government and administration, and in successful industrial, commercial and business enterprises (2.1-2.3).
3. In the past, developing countries relied to a large extent on expatriate professional services. There is now a natural ambition in every country to develop indigenous skills.

At the present time, however, these are in short supply in virtually all professions; and some countries may not yet appreciate the full extent of their needs. It is therefore necessary to assess potential manpower requirements, to establish educational programmes, and to strengthen (or, where necessary, to form) indigenous professional societies which can foster the development of local skills (2.4-2.5)

4. The paper discusses some of the existing problems in reaching these goals (3.1-3.10); the sort of help that may be needed by local professional societies (4.1-4.8); and the ways in which the societies can be assisted by Commonwealth Associations (either directly or through regional collaboration) in the development of their professional skills and activities (5.1-5.5). The financial resources required for this work are discussed, with particular reference to the Commonwealth Association of Architects (CAA) and the Commonwealth Association of Surveying and Land Economy (CASLE) (5.6-5.8)

5. The paper welcomes the concept of professional centres, which can provide invaluable administrative support for local societies and a base from which they can operate (6.1-6.4). The activities of professional centres and Commonwealth Associations are seen as complementary parts of a single strategy for fostering the growth of the professions and for achieving the aim of every country to develop the full potential of local professional resources (6.5;7.1-7.2).

1. INTRODUCTION

1.1 The Commonwealth Foundation was established in 1966 to foster the development of the professions in the Commonwealth. The purpose of this paper is to discuss:-

- (a) why the professions need to be developed;
- (b) the ways in which this development can be assisted by Commonwealth professional associations;
- (c) the contribution which local professional centres can make in the developing countries; and
- (d) how the roles of Commonwealth associations and local professional centres form complementary parts of a concerted strategy for assisting the professions.

1.2 From the outset, the Foundation has adopted a flexible attitude regarding the range of professions it seeks to assist; and the potential scope is very wide. When inviting this paper, however, the Director of the Foundation suggested that it would best assist the work of the Seminar if the paper were relatively brief, even if this meant being selective in the range of professions it sought to cover. The paper therefore concentrates primarily on those professions that have roots in private practice, as well as in the public service, and which have the characteristics of consultancy.

1.3 In this context, the main professions are law; medicine, dentistry and pharmacy; accountancy; engineering, architecture and town planning; and the various disciplines of surveying and land economy. Although

the author is most conversant with those professions that are concerned with land use and development, it is hoped that the ideas put forward will be relevant, in whole or in part, to all professions that fall within the ambit of the Foundation and of the professional centres it is helping to sponsor.

1.4 The nature of professional centres, and the services they offer to the participating professions, will be described in other papers presented to the seminar. For the purpose of this paper, it is assumed that each centre is supported by all (or a substantial proportion) of the professions in the country concerned; that it provides accommodation for a secretariat and for meetings, etc.; and that it supplies, inter alia, secretarial services for all or some of the participating professions.

2. THE ROLE OF THE PROFESSIONS

2.1 Before discussing the role of the professions in developing countries, two important points must be emphasised. First, the scope of professional activities and the pattern of professional organisations that prevail within the Commonwealth as a whole are not necessarily applicable, without adaptation, in every individual country. Secondly, the scope and organisation of the professions are evolutionary, and the stage and pace of evolution varies from country to country. Commonwealth collaboration, therefore, does not aim at uniformity; and the need for flexibility must always be kept in mind.

2.2 There is, nevertheless, a consistently vital role for the professions to play in all countries, and especially in the developing countries. The manner in which they play their part will be shaped by national needs and resources, and by national tradition and predilection. But national variations are not of fundamental importance, so long as they are recognised and

understood. We are concerned here primarily with the basic skills the professions practise, and with the application of those skills in promoting public health and welfare, in the fulfilment of national programmes for economic growth and development, in good government and administration, and in successful industrial, commercial and business enterprises.

2.3 It is probably safe to assume that, in every Commonwealth country, there is general recognition of the need for lawyers, without whom none but the most primitive of constitutions or legal systems could be made to work; of the need for accountants, to ensure efficiency and trustworthiness in business administration; and of the need for the medical, dental and pharmaceutical professions in the maintenance and improvement of health. With a little less confidence, one assumes that the public also understands the functions of the engineer, architect, surveyor and town planner. Certainly, one of the first professionals to move into any developing country is the land surveyor, for surveying and mapping are essential to the identification of natural resources and for planning and executing almost every form of development and construction project. Surveyors and lawyers are also required to authenticate land titles, and to deal with a variety of land problems that lie at the heart of social, economic and even political progress. Equally, engineers, architects, surveyors and town planners make their several contributions to the harnessing or development of natural resources, to the construction of buildings and the quality of the built environment, and to the planning and execution of national development programmes. It is perhaps in some of these activities, concerned with the ownership, use and development of land, that the potential

value of the professions is not yet fully recognised in some countries, and where more could be done to develop indigenous skills for the benefit of the countries concerned.

2.4 In the past, most developing countries relied to a large extent on expatriate professional services, but in more recent times it has become a natural ambition of every independent country to establish its own institutions and to develop its own skills. The transition to self-sufficiency however can only be gradual if serious problems are to be avoided. The scale of the manpower requirement, especially, must be recognised. CASLE, for example, has pointed out that, in nearly all developing countries, there is an acute shortage of indigenous skills in all the three disciplines of land surveying, quantity surveying and land economy. As an indication of this, there are about 27,000 chartered surveyors in the UK serving a population of about 55 million, and only about 600 qualified surveyors in the whole of Commonwealth Africa, covering about 115 million people. It is a fair assumption that every developing country needs to increase its indigenous manpower in every profession (with the possible exception, in some countries, of the legal profession!)

2.5 To achieve that goal, it will be necessary to assess potential manpower requirements in all the professions, to establish educational programmes for developing the relevant skills, and to strengthen (or, where necessary to form) indigenous professional societies that can foster the advancement of their respective professions.

3. SOME TYPICAL PROBLEMS.

3.1 In the more developed countries of the Commonwealth, some professions - like law and medicine - are old-established and have a long tradition of academic learning and qualifications. Of the other professions, some have been practised for centuries, but were only 'institutionalised' as the result of the industrial revolution and subsequent scientific progress which led to the need for more formal education and qualifications. Others are of more recent origin, being either new activities or specialisations of older skills. In the developing countries, this process of evolution started later, and has been greatly accelerated as each country has sought to become self-sufficient and to match the achievements of those that are more advanced. The 'late developers' can learn much from the experience of others, and can possibly avoid their mistakes; but it will take time to fulfil their ambitions.

3.2 In some countries, for example, educational programmes have not yet developed to a stage where the schools produce a sufficient output of advanced-level students to supply the needs of all the professions. Without a good academic foundation, students will experience difficulty in attaining professional competence, and there will be a temptation to establish lower qualifications of inadequate standing. The solution, in some cases, will be to concentrate initially on technician qualifications, and for the country to continue with the use of expatriate professional services until its own supply becomes adequate. As a step in that direction, however, it will be important to ensure that the more able students who qualify initially as technicians can advance later to full professional status, if they wish.

3.3 Even where the supply of students is sufficient to meet a profession's present needs, two situations may arise where they must be sent to other countries for their professional education. The first is where the needs of all professions place too great a total burden on local university resources; and the second is where the volume of demand in a particular profession is too small to sustain a viable university course of the necessary quality. In the latter case, on the other hand, the problem may be solved by neighbouring countries co-operating in the provision of a course that meets their needs collectively.

3.4 The disadvantages of training outside the student's own country should not be under-rated. Students who go to the UK to learn about architecture or surveying, for example, will necessarily learn about practice in Britain. When they return home, they may have to apply their knowledge to different situations; and, although their training in fundamental principles should equip them to adjust themselves to local needs, this is not so appropriate as being taught (from the outset) the essentials of professional practice in their own country. Where local educational facilities do not exist, therefore, it will be desirable to train in a comparable environment, and this is a strong reason for collaboration on a regional basis, in preference to the procedure of sending all students to the UK or some other developed country. There will always be merit in a proportion of students gaining acquaintance with a different environment, but this is not an ideal arrangement for the generality of students.

3.5 Local education and training also reduce the risk of precipitating a professional 'brain drain'. This can become a serious

problem if students who go abroad for training are tempted to stay abroad after qualifying; and this risk is increased if the qualification they obtain equips them better for work outside their own country rather than at home. In response to a request for advice on how to deal with this particular problem in one developing country, CASLE suggested that the best safeguards seemed to be (a) to accord appropriate status, responsibilities and conditions to the indigenous profession; (b) to reduce to a minimum the dependence on expatriate professional skills where adequate indigenous skills were available; and (c) to ensure the provision of local educational facilities at university level.

3.6 Progress in education and in the development of the professions undoubtedly varies between one country and another and even between one profession and another. Some developing countries already have a reasonably well-established indigenous profession, local educational facilities, and independent professional societies. Some other countries are in an intermediate stage of producing their first indigenous graduated and have not yet had the opportunity to establish local professional societies on a sound footing; and there are others which have not yet produced any professional skills of their own and may not even have a local society.

3.7 Appendix A to this paper (which contains a list of dates on which national societies for twelve leading professions were formed in 32 countries or territories of the Commonwealth) indicates what a high proportion of indigenous societies are of comparatively recent origin. Many of these are small and consist of a high proportion of younger men and women who may not have had opportunities to participate in corporate professional activities.

They are in a state of transition and their resources are often inadequate to meet the many demands upon their modest organisation. They may desire guidance in the planning and implementation of educational programmes; or in such organisational matters as drafting constitutions, codes of conduct and schemes of registration; or in establishing library or information services; or research or other activities to foster the development of their professional skills.

3.8 Instinctively, new societies turn to those that are well established when they need guidance of this kind. Occasionally one observes in developing countries a reverence for the status quo in the professions of the more advanced countries to which those professions themselves would not subscribe. It should not pass unnoticed, for example, that nearly all the leading professions in the UK have recently been engaged in self-examination, in redefining their objectives, and in redeploying their effort in order to keep pace with social, economic and technological developments. But at least the older professional societies are evolving from established positions, and can do so with greater assurance than newly-formed organisations.

3.9 It is interesting, too, to note the impact on nearly every profession of the rapid growth in world population, the rapid advances in technology, and the rapid growth in knowledge. We are told, for example, that of all the people ever born, one in every 22 is living to-day; and half of those, or one in every 44, were born in the last 20 years. There is authority, too, for saying that three quarters of all man's knowledge of the natural world was produced by people who are still living. The rate at which knowledge is accumulating is constantly accelerating.

For professional men and women, this dictates a need for sound initial education and training, and constant refreshment of the mind in later years if the problems they have to solve are to be tackled effectively and if the peoples they serve are to gain maximum benefit from the skills they can provide.

3.10 And yet, the professions cannot be isolated from the hard economic realities that will circumscribe their rate of development and the scope of their day-to-day activities. Every country must cut its coat according to the cloth available. It can only deploy the human resources at its disposal, and it can only develop professional skills in balance with all other competing demands. What the professions themselves must seek to ensure is that the value of their own contributions to human progress is fully appreciated by those (usually governments) who are charged with the allocation of resources and with the determination of priorities.

4. LONG TERM NATIONAL OBJECTIVES

4.1 For the purpose of our present deliberations, we may assume that every independent country which has the necessary resources will have three prime objectives:-

- (i) to become self-sufficient in providing the professional services it needs;
- (ii) to that end, to provide its own facilities for professional education; and
- (iii) to develop professional organisations that are locally-based and locally-orientated.

These objectives will be more immediately attainable in some countries than in others;

and for the latter there remains a need to consider how best to sustain professional activities in the meantime.

4.2 The first objective rests on an adequate appreciation of the professional resources that are needed and the country's ability to supply them. Because the Commonwealth Foundation was established by Commonwealth governments, and has so far been wholly financed by them, it may be assumed that governments collectively do appreciate the value of the professions. As I have indicated, however, it might be imprudent to make the further assumption that individual governments necessarily appreciate the full scope of each profession, or the full extent of its potential manpower requirements. On the other hand, in my limited experience, these are matters on which governments are disposed to welcome advice, either from a local professional society or from a more detached Commonwealth association; and each profession should ensure that this advice is available if needed.

4.3 The advice is essential not only in assessing the manpower demand, but also for the provision of appropriate educational facilities, to which the demand gives rise. The assessment may be relatively easy to make where a profession is fairly homogeneous, as in a national health service or an integrated legal service, and where the scope of the service is already well defined. The task is more difficult where the profession is more dispersed between private practice and the public service, and even within the public service itself; and there the functions of the profession as a whole may not be comprehensively understood. Here is a situation where outside advice may be helpful; and such advice has already been provided in a number of cases. A related study may also be necessary in regard to the structure of

a profession, to determine the relationship between fully professional persons and those who can operate under their direction either as technicians or as auxiliaries. These are not, of course, once-for-all investigations, and they may have to be repeated from time to time; but it is particularly important that reliable appreciations should be made at the outset.

4.4 Once the need for educational facilities has been established, some developing countries have been able to give them a reasonably high priority. Indeed, some are already on the way to being self-sufficient in this respect; and others, where individual national requirements are relatively small, may be able to meet their needs by acting in collaboration. In the surveying field, Nigeria, Ghana and Kenya are in the former category; the Caribbean countries are investigating the possibility of establishing joint facilities; and a similar arrangement may also be the solution for some of the smaller countries in Africa.

4.5 In step with the development of educational facilities for the professions, it will be necessary to ensure the development of the professions themselves. There can be little doubt that, in order to become fully effective every profession needs to develop a corporate spirit and to harness corporate effort for its advancement. This postulates a need for a strong professional society which can (i) sponsor the provision of educational facilities; (ii) provide a professional home for local graduates; (iii) provide a source of supply for teachers (which may itself be a problem in the early stages); (iv) stimulate research and development; (v) organise the exchange and dissemination of information; and (vi) tender collective advice to governments, universities and other organisations.

4.6 In Australia, Canada, New Zealand and the United Kingdom, most professions have been well organised since the nineteenth or early twentieth century. In some cases, professional societies based in the UK have functioned on a Commonwealth scale in organising examinations and conferring qualifications, and sometimes have established branches of the parent body in countries where their members were sufficiently numerous. As I have mentioned, the tendency in more recent years has been to form local societies, either by transforming an existing filial organisation or by establishing an entirely new society. Although these bodies initially are relatively small and lacking in resources, they do have strong local roots and are well placed to determine local needs and standards and to fulfil local aspirations.

4.7 Consequently, a high priority should be given to the strengthening of local professional societies in the developing countries, and to forming new societies where none yet exists but where numbers are sufficient to make one viable. The membership need not be large and it is interesting to note that, in the CAA, four of its 27 member-societies have fewer than 15 members and 16 societies have fewer than 200; while, of the 30 societies in CASLE, six have fewer than 25 members, and 23 have fewer than 200. The creation of Commonwealth associations has, in itself, stimulated the formation of several new indigenous societies which (as small organisations) might have achieved little by themselves, but which feel fortified by being part of a larger group. In those countries where members really are too small to form a society, Commonwealth associations can appoint correspondents through whom they channel whatever help they may be able to provide.

4.8 There is thus emerging a fairly comprehensive network of national societies in Commonwealth countries representing most of the professions. Through them, each profession can evolve its local standards and qualifications, and establish its professional status; while also striving to develop its skills and advance its usefulness in the ways already mentioned. On the other hand, the creation of independent indigenous societies has tended to loosen the ties between the professions in different countries, and the co-ordination now being achieved through Commonwealth associations has been a timely move to put this right. Participation in the work of such associations does not detract from national sovereignty, and yet ensures that each country can have recourse to outside help and advice whenever necessary.

The remainder of Mr. Steel's Paper will be published in the October edition of our Journal.

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ADAPTION OF LASERS TO CADASTRAL SURVEY METHODS

- A Reply

Although it is sometime since J.C. Macartney wrote his article "Adaption of Lasers to Cadastral Survey Methods - in particular Land Tenure Conversion Schemes", I feel a reply is due.

In his article Mr. Macartney suggests the use of a vertical laser established at a cadastral corner to be resected from known stations.

I propose briefly to explain the principle of the laser and to show that his suggested method requires detailed research before it could be used.

How does laser light differ from ordinary light? Briefly it is much more intense, directional, monochromatic and coherent. The light emitted by an ordinary source such as a candle or an incandescent lamp consists of unco-ordinated waves of many different lengths, that is, it is incoherent and more or less white. The waves of the laser are co-ordinated in space and time and have nearly the same length. This coherence and chromatic purity, and also the intensity of laser light, results from the fact that in a laser excited atoms are stimulated to radiate light co-operatively before they have time to do so spontaneously and independently.

Most survey lasers are gas lasers, containing helium and neon with neon as the active material enclosed in a cylinder that has a partly reflecting mirror at one end and a fully reflecting mirror at the other. The laser is primed by pumping the neon atoms, by means of a flash of intense light to an excited state. With a large number of the atoms in

the active state the system can be stimulated to produce a cascade of photons, all the same wavelength and all in step, by triggering the emission of energy that drops the atoms from the excited state to a lower energy state. A photon (a packet of energy) carrying this quantum of energy (i.e. the difference between the excited energy level and the lower energy level) on striking an excited atom, will cause it to emit a photon at the same frequency, and the light wave thus released falls in step with the triggering one. Waves that travel to the sides of the enclosing cylinder are lost to the system, but those that go to the ends of the column along its axis are reflected back and forth by the mirrors. A beam of monochromatic, coherent light rapidly builds in intensity as one atom after another is stimulated to emit photons with the same energy, and thus the same wavelength, and the same direction. After the laser light has built up in this way (in fact in about half of one second) it emerges through the partly reflecting mirror at one end, as an intense, highly directional beam.

Thus this intense light with parallel, in step, wave fronts is producing light in one narrow direction only. It does not produce any light at right angles to the beam. In other words it cannot be seen from the side and must be viewed by looking along the beam.

Under field conditions this highly directional beam may be modified slightly by interference with gas molecules, water vapour or dust particles causing minor reflections out in all directions but this would be of so little intensity that it could not generally be seen.

Mr. Macartney suggests resecting a vertical laser beam of the infra red variety. This cannot be done under ordinary conditions because no light of the laser will reach the

objective lens of the theodolite or for that matter, the laser beam sensing devices suggested in the article as an attachment to the theodolite. A sensing device cannot sense if no photons of the source light reach it.

In conclusion I suggest that under very favourable atmospheric conditions i.e. high moisture and dust content, the laser beam may be seen. The optimum value of this high content has yet to be researched: A small 1MW gas laser has recently been purchased by the Surveying Department and research is proposed to determine the conditions under which a laser beam can be viewed. If this research produces favourable results then the geometry of the method will also be studied.

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Article contributed to the Journal of the Association of Surveyors of Papua and New Guinea; July 1971.

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An article published in "Lasers and Light", readings from Scientific American.

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Most Surveyors will agree that all calculations should be presented to the Examiners in some simple form, however to express a relationship too simply is bad taste, and may insult their intelligence. Therefore using the expressions below:

$$\log e = 1$$

$$\text{and} \quad \sin^2 x + \cos^2 x = 1$$

$$\text{further} \quad 2 = \sum_{n=0}^{\infty} \frac{1}{2^n}$$

then substituting in original equation

$$\log e + \sin^2 x + \cos^2 x = \sum_{n=0}^{\infty} \frac{1}{2^n}$$

which can be simplified by using

$$1 = \cosh y \sqrt{1 - \tanh^2 y}$$

$$\text{and} \quad e = \lim_{y \rightarrow 0} \left(1 + \frac{1}{3}\right)^3$$

$$\text{Then } \log \left[\lim_{y \rightarrow 0} \left(1 + \frac{1}{3}\right)^3 \right] + (\sin^2 x + \cos^2 x)$$

$$= \sum_{n=0}^{\infty} \frac{\cosh y \sqrt{1 - \tanh^2 y}}{2^n}$$

An alternate simpler method for cadets examiners uses the relationships.

$$e^{i\pi} = -1$$

$$\therefore e^{2i\pi} = 1$$

Further $\text{Cosh}^2 x - \text{Sinh}^2 x = 1$

from which the relationship can easily be deduced that

$$\text{Sech}^2 x + \text{Tanh}^2 x = 1$$

This can now be expressed as

$$e^{2i\pi} + \text{Cosh}^2 x - \text{Sinh}^2 x = 2 (\text{Sech}^2 x + \text{Tanh}^2 x) \rightarrow (1)$$

further simplifying

$$e^{2i\pi} + \left(\frac{e^x + e^{-x}}{2}\right)^2 - \left(\frac{e^x - e^{-x}}{2}\right)^2 = 2 \left[\left(\frac{2}{e^x + e^{-x}}\right)^2 + \left(\frac{e^x - e^{-x}}{e^x + e^{-x}}\right)^2 \right]$$

which is a most handy equation.

Should one prefer the simple circular function in preference to the hyperbolic i.e.

Using $\text{Sec } ix = \text{Sech } x$

$$\text{Cos } ix = \text{Cosh } x$$

$$\text{Sin } ix = i \text{ Sinh } x$$

then from (1) an easy equation involving only circular function can be deduced for those discerning people who discriminate against the hyperbolic.

With the number of possibilities available it should be relatively easy for all Surveyors to choose their own preferred method possibly combining the complex variable with complex circular function for ease of calculation.

It is confidently suggested this alternate form of presenting calculations to examiners would be much preferred to the mundane equation of $1 + 1 = 2$.

The foregoing was a dissertation on the simplification of calculations by Corporate Member Ken Blaik.

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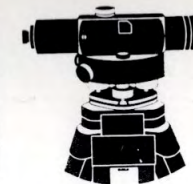
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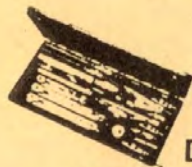


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