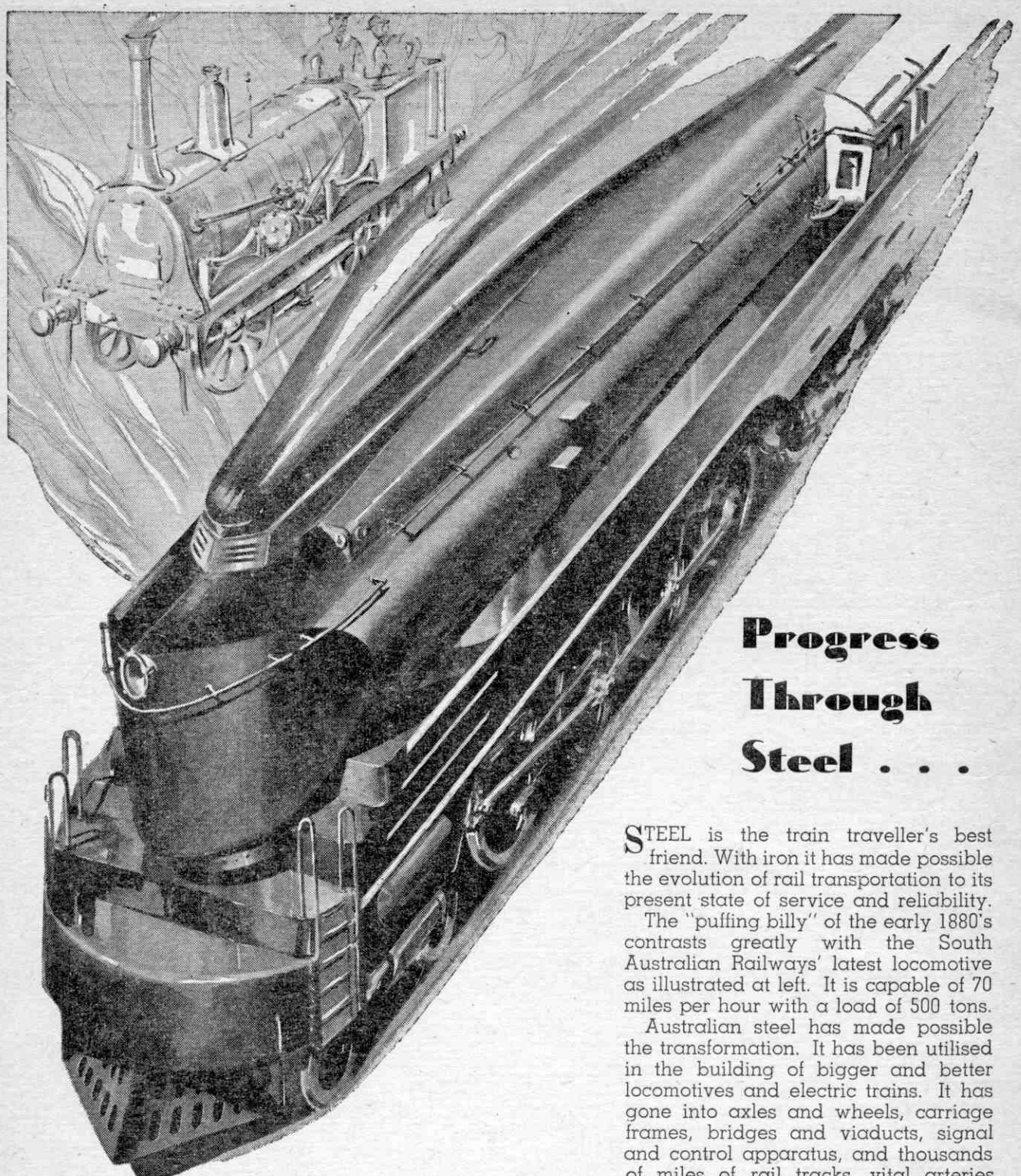
ADELAIDE UNIVERSITY ENGINEERING SOCIETY MAGAZINE



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THE ADELAIDE UNIVERSITY ENGINEERING SOCIETY MAGAZINE

Artium ubertas et scientiae

Vol. I, No. 3 October, 1948

EDITORS:

S. KANEFF, F. J. SLATTERY,

J. B. NEUENKIRCHEN

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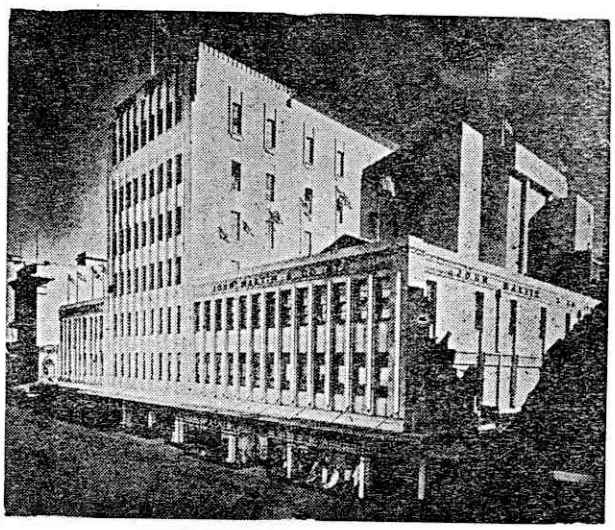

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1947 . . .

1948 . . .

The 1947 issue, written hazily on the back of five beer bottle labels with a thumb nail dipped in vodka, was lost somewhere between the Richmond and the Watchhouse. This was a Bad Thing.

Undaunted, the Editors have pressed on, regardless, to forge another link in this chain of culture and refinement. The result of these superhuman efforts has been the gathering together and publishing of a wealth of literary effort, the like of which has never appeared before. The more technically minded readers are well catered for, and an innovation has been the inclusion of sections on gardening, hunting, and women. (In this regard, the editors would stress that they cannot be held responsible for any results achieved by the processes outlined.)

We thank all those who have submitted their epics for publication, and have refused to print only those which were downright indecent. (Copies of the latter may be purchased from the editors at a small fee.)

We congratulate those who, to coin a phrase, have had the perspicacity and good taste to buy this little book, and condemn those who are reading someone else's copy.

Finally, if this slim volume contributes anything to the advancement of higher learning, the editors will feel well rewarded—and truly amazed.

EDITORIAL

The Engineering Society has managed to survive another year of financial strain. Year after year, it has kept its head above water only by limiting its activities and programme. These difficulties are due mainly to a lack of interest in the Society, resulting in a low membership, with a consequent lack of funds. The Society can provide a complete and interesting programme only when it has a more complete membership.

Without members it has no funds; without funds it cannot provide entertainment; without entertainment it cannot stimulate membership. So the vicious circle continues. The Society can be only as successful as its membership is complete, so that the remedy to all the troubles can be found in full membership. Compulsory membership seems to be the solution to the problem.

On behalf of the Society, we take this opportunity of expressing our profound gratitude to that tower of strength, Archie McArthur, who has, throughout the year, guided the activities of the society so ably. We thank, also his band of willing committee men who have carried on the activities of the Society in the face of such great difficulties.

The Multiple Engineers

Who is the man who designs our cars with judgment, skill, and care?
Who leaves it to the serviceman to keep them in repair?
Who estimates their useful life at just about a year?
The bearing-wearing, gearing tearing, auto engineer.

Who is it takes a transit out to find a sewer to tap?
Who then with care extreme locates the junction on a map?
Who is it goes to dig it up, and finds it nowhere near?
The mud bespattered, torn and tattered civil engineer.

Who thinks without his product we would all be in the lurch?
Who has a heathen idol which he designates "Research"?
Who tints the creeks, perfumes the air, and makes the landscape drear?
The stink-evolving grass-dissolving chemical engineer.

Who is the man who'll draw a plan for anything you desire?
From a trans-Atlantic liner to a hairpin made of wire,
With "if" and "and", "howe'er" and "but" he makes his meaning clear?
The work disdaining, fee-retaining consulting engineer.

Who builds a road for fifty years that disappears in two?
Then changes his identity so no-one's left to sue,
Who sprinkles all the travelled road with filthy oily smear?
The bump-providing, rough-on-riding highway engineer.

Who penalizes zinc, and steels his silver and his lead?
Who is it that the farmer likes to bang upon the head?
Who poisons every living thing that happens to be near?
The sulphur-belching, miner-welching smelting engineer.

Who is the man who views the mines and promptly turns them down?
Who is the one that thinks this is the short cut to renown?
Who is it gives the dud advice to the dumb financier?
The knowledge-feigning, theory-straining mining engineer.

Who takes the pleasure out of life and makes existence hell?
Who fires the real good-looking one because she cannot spell?
Who substitutes a dictaphone for coral-tinted ears?
The penny-chasing, dollar-wasting efficiency engineer.

(Signed) "CHEMICAL ENGINEER"
(Reprinted from an English technical journal)

Song of the Engineers

I'm a helluva, helluva, helluva, helluva, helluv' an engineer,
A helluva, helluva, helluva, helluva, helluv' an engineer,
Like every honest greaser, I likes me lager beer,
I'm a rambling wreck of poverty, I'm a 'Varsity Engineer.

Oh! One day a lighthouse keeper was looking out to sea,
He gave a yell and he cried, "Oh, Hell! a ship in distress I see,"
But the captain of that gallant crew knew he had nought to fear,
For the man below in the engine-room was a 'Varsity Engineer.

I'm a helluva, etc.

Oh! We work away and slave all day upon the road to Hell,
We blast the hills to smithereens with dynamite and gel.,
We find our Eldorado and have our pot of beer,
And when we're broke we tell the joke to a 'Varsity Engineer.

I'm a helluva, etc.

Oh! We run the sewer system and the Tramways Trust as well,
And many of us who've left this earth are firing down in hell.
We write our name in scrolls of fame for many and many a year,
And still we'll sing the song about the 'Varsity Engineer.

I'm a helluva, etc.

And so wherever you may roam, on land or sky or sea,
You'll find a 'Varsity Engineer wherever you may be,
And when you've left this mortal earth to singe for ever more,
You'll hear the 'Varsity Greasers sing the songs they sang before.

I'm a helluva, etc.

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ADVERTISEMENTS

SOCIAL PROBLEMS OF CONCERN TO ENGINEERS

By Prof. E. O. Willoughby

Introduction:

Most of the following comments are of concern to everybody, but from time to time my remarks will be addressed to engineers.

We are living in times of great social change, involving many adjustments, but provided we manage to avoid any further large-scale wars, engineering and scientific advances may gradually become available to the public and result in great improvements in health and material prosperity.

If these are to result in the peace and security so badly needed by all the peoples of the world, we may need to change our sense of values to one placing emphasis on mutual service.

The engineer of the future must be more fully alive to the needs of the community if he is to play a major role in the leading improvements in our standards of living.

International Factors Producing Social Change:

The recent war was a time of great progress in technical knowledge, and manufacturing methods, and of enormous production. It showed in a remarkable way what a united effort, guided by the best skill in the community, is capable of.

Unfortunately, it has left behind it, in most countries of the world, great shortages of food, clothing, and housing, together with a complete disorganization of the buying power of the most seriously affected countries.

Further, as the years pass, since the conclusion of the physical warfare, there is a growing sense of disillusionment, which, unfortunately, often leads to people pursuing selfish needs often contrary to the common good.

Everything we do is shadowed by the international situation, but desperate situations need drastic remedies, and it is likely that the pressure of events will force the countries of the world to solve the problems of preventing war and of working together productively for the good of all.

As one who has lived most of his adult life in England, the fact that there are 2½ million men under arms in Europe and the military campaigning season has between four and five months to go, together with the fact that the peace-loving countries are economically more ill-prepared for war than they are likely to be in the coming years, makes me conscious that we are living in a time of very great danger. Great power exercised over a long period often upsets human judgment and hence we have the possibility overnight of happenings in Europe which may seriously affect the rest of our lives.

Never before have both individuals and countries stood in greater need of mutual assistance and goodwill, and our salvation probably lies in the growing realization of this fact. In Australia, as one of the more fortunate countries, our duty is to produce the maximum of food, clothing, and equipment to help those countries in difficulties.

Our governments are well aware of this, and apart from the obvious difficulties associated with the shortage of machinery, the social factors affecting engineering production constitute Australia's most important engineering problem.

Social Problems and Production:

The serious nature of the social side of production can be realized from the facts that in some large Australian industries, the labour turnover exceeds 90% per annum, and the output per head is less than 40% of the average piece-work production rate. No doubt part of this is a result of readjustment to peace-time conditions, and when this phase has passed, fuller production should be greatly helped by improved industrial relations wherein the employee is made to appreciate the social importance of his work to others.

For, provided a reasonable standard of living is assured, there is nothing which administers to a man's sense of health and happiness more than being socially ineffective.

With this in mind it might pay established industry to give every employee a copy of the annual balance sheet and pursue a public policy of paying wages (including bonus payments) and charging prices for their products which represent a fair compromise between a reasonable reward to labour and recognition of the duty of industry to give the public the maximum service possible at a reasonable price. It is well to bear in mind that the difficulties in obtaining equipment are greatly enhanced by the 6-year diversion of industry to the manufacture of equipment for war and by the large war-time destruction. It is these difficulties, when added to the demand associated with normal development, that have created the unprecedented shortage of equipment. In many industries, men are working with a social conscience and giving their utmost, and if the unthinking minority would do likewise, the lean period would pass more quickly.

What we need is a new sense of values wherein each individual is encouraged to plan his life to give his utmost to the general welfare of those about him and is judged on this basis alone. There is little doubt that the social problems in engineer-

ing are the most important ones facing us at present, and are preventing our profession from giving the public the full benefit of the advances in engineering knowledge, and hence your first and foremost study is your fellow man.

Learn to be one with your fellows in all stations of life and they in turn will talk freely to you, so that many of the mistakes arising through misunderstanding will never occur, and this will be of great service to you when you come to direct the activities of your fellow men.

Opportunities Created by the Needs of the Community:

Since returning to a University, it has often occurred to me that the average student takes too narrow a view of the opportunities open to him. The present keen demand for staff in all the large Government or semi-Government engineering organizations will come to an end in a few years' time when their intake will be reduced to a few of the outstanding graduates for staff replacement purposes. This fact, however, need not cause the average engineer, whose abilities may be of a practical and social nature, any serious misgivings, for industry is developing in Australia on a large scale. There are many excellent posts in industry for those who are prepared to spend a number of years gaining a thorough training in all the methods of production and administration which go to make up the successful running of a large factory.

Again, for those whose interest lies in contacts with other people, there are the sales and installation sides of the profession which often lead to managerships of big engineering merchant houses or sales distributing organizations.

Again, there are industries of a type wherein the methods have been evolved by tradition from capable individuals who often lack the proper scientific training. The methods in some of these industries, by proper scientific investigation, are capable of considerable improvement, and if the young engineer is prepared to "go through the mill" and learn the existing methods and problems of some of these industries, there is little doubt he will find great scope for applying his training and making a real contribution to the industry.

The civil engineer, perhaps, would do well to take a more detailed interest in the social problems of family life and study contributions made by the Scandinavian countries in this field. There is little doubt that the average block of houses, if spaced out a little more on a site, could be made vastly more effective for family life. Distributed over the cost of about a dozen houses, a small play-centre in the centre, screened from the streets, with swings, slides, etc., for the children, would be a godsend to the average suburban housewife.

Again, look at the inefficient laundries in each individual house. A central laundry, properly equipped with electric washing machines, drying equipment, first-rate ironing facilities, etc., would be very much more efficient than the average suburban "wash-house." It surely would be a simple matter to arrange such a laundry for three households who were friendly to carry out their laundry on a specified day of the week.

The idea, of course, can be extended to a local children's rest house, where people take their turn in minding children of other families on shopping days, etc. In short, it seems that there is a whole field of semi-communal life which could be fostered by proper scientific planning of sites which would lead to friendlier relations in the community and a real saving to the housewife.

Again, it should be the concern of all civil engineers (at least) to watch the development of their city, note that the parks are in keeping with the housing development, and to discuss and foresee the traffic and transport problems, and apart from the purely academic side of the profession, keep the problems of the community before them by active discussion, and make their contribution to solving them.

To sum up, there are many untried fields of employment wherein scientific methods could effect considerable improvements and the enterprising man who is prepared to "go through the mill" and, by experience, to become thoroughly familiar with the problems of these industries, may well be able to make a marked contribution to the effectiveness of the industry.

In conclusion, in the past, far too many University engineers became "technicians," and it is only by developing to the maximum a full awareness of the needs of the community around us and of social development in the world at large, that we will be able to make our maximum contribution to the community.

Secretary's Report of Activities of A.U.E.S. for 1948

I have much pleasure in submitting to you for your approval the Secretary's Report of the Society's activities for 1948.

There were no general meetings in 1947, but early in the year, on 17th March, the society held its Freshers Welcome. This was particularly well attended and proved a most entertaining evening. The Freshers were addressed in turn by the President and Prof. Robin. The Prof's. address was entitled, "Molecules, Men, and Morals," and although intended essentially for the Freshmen was appreciated by all. After the Prof.'s address the meeting was further entertained by some films kindly loaned by the Shell Co. These were mainly concerning motor bikes.

1948 saw the reintroduction of initiation of Engineering Freshers, this was carried out very successfully on April 14th. These solemn ceremonies were carried out in a hall in Gouger street, and were preceeded by the traditional procession of freshers through the streets of Adelaide towing carts packed with hilarious senior students. The whole show was splendidly organised, no fresher was spared, and the evening provided amusement not only for senior students, but for all who attended. The credit for the success of the evening was due to a few people in particular who were most enthusiastic.

For those freshers who did not attend on April 14th, a special treat was prepared; this involved a tug of war across the river, cold water tar, mud, and much amusement for the University in general.

The Engineers' Ball for 1948 was held in the Refectory on April 17th, and although it was not probably up to the high standard of the previous years' ball, it was certainly a social success.

The Professors and staff and their wives were invited, and strangely enough, they enjoyed it immensely. A new feature proved a surprising success, that was the singing of the Engineers' songs all very lustily, but not altogether tunefully. The Engineers have now earned the right to say that they consistently have the best ball of the year. Once again this is due to a few people, in particular, the committee and in addition, Messrs. Slattery, Stanton, Curry, Neuenkirchen. The ball was not an outstanding financial success, however, and this was partly due to attendance less than maximum.

I recommend that the ball for 1949 be held on the last Saturday of the first or second term as it has been proved that any dances held on the last day of term are always well attended.

The second term saw only one ordinary meeting held in the evening, and that was called to discuss business and later to see some instructive films loaned by Lincoln Electric Welding. This, as with all other meetings called at lunch-time, had a very poor attendance.

In the second term plans were made to hold a barbecue at Silver Lake, and although there was not any encouraging interest shown by members these plans were gone ahead with. One Saturday morning our venerable president (Mr. McArthur) set out in a modernised Ford for Mylor with thirty gallons of the cool amber with which he had been entrusted. The three kegs made it, but the Ford didn't until some four hours later.

After some half-hearted football, it was found that it was rather difficult to mark a football and balance a glass of beer at the same time so the football was abandoned and attention was focused upon two dissected sheep and an occasional sip.

Formality was certainly not the keynote that surrounded the fire while the chops were being cooked. The lusty voices of Curry and Allardice led the chorus of the guards about the keg and it was soon apparent that the evening was to be a success.

Dancing with intermittent refreshment followed throughout the evening and it concluded with a round of campfire songs in which the ladies could join.

The barbecue was as the ball a social success, but not an outstanding financial success, once again because of poor attendance.

A debating team was enlisted (or perhaps conscripted) and preparations made for a debating evening, but stage fright at the last moment caused its abandonment. The Engineers were the only major faculty not represented in the University debates this year—perhaps this will be remedied next year.

The Engineers' Society responded well to the appeal to assist the W.S.R. appeal and provided the only outstanding stunt in the University stunt day. Also, the Society nominated Miss Pauliene Begg as the Engineering Candidate in the Miss University Competition. The sum that was finally collected was £39/4/, just a few pounds short of that required to make our candidate eligible for judging. Perhaps if the members of the Society had known this they would have put up an extra effort. Our contribution was aided greatly by the proceeds of a picture evening provided by the kindness of Mr. Geo. Bolton. This was an excellent show, but once again was marred by a poor attendance.

A magazine committee was elected in the second term comprising of Messrs. Kaneff, Slattery, and Neuenkirchen.

In the sporting sphere, the Engineers held their own, winning the Tyas Cup for rowing. Also the Engineers were victorious in defeating the Science football team.

The Engineering Society under the leadership of Ian McBryde was well represented in the University procession, there being some seven floats, including the prize-offering, the "Bank Bill." Incidentally, the procession was directed by those two outstanding Engineers Perkins and Neuenkirchen.

The Engineers dinner has been initiated again for 1948 and a possible time is December, this is a custom worth preserving and may be borne in mind by the succeeding committee.

Looking back on this year and making comparisons with previous years, this has not been an outstandingly successful one.

In conclusion, I would like to pay tribute to those who have stood so solidly by the Society and who are ever prepared to lend some time and energy to helping its functions. If their example is followed by just a larger number, the Society need not fear for its future for it will flourish.

I wish the Society a successful year in 1949 and I thank you for the honour of having been elected to serve as your Secretary.

August 23rd, 1948. D. J. Bath

Treasurer's Report

In the beginning there was £3/3/4 in the Society bank book, but due to an influx of 47 members at 5/ a head it was boosted somewhat.

Also during the year we have had a couple of money making "dos". The Big Ball brought us home the colossal sum of £4/8/2, while the barbecue, which I am afraid cannot be regarded in the same light, as it was £6/9/3 "in the red" when the books were closed.

But, still we march on with about £7/10/ in our bank account and a lot of bills to be paid. If we can't pay them this year we will pay them next year, and so we progress, onward ever upward.

I have been Treasurer of the Society for 1947-48 and I wish to offer my deepest sympathies to the next Treasurer, who will have upon his work-torn mind the financial "success" of this magazine. (Such flippancy is not becoming to an executive officer of the Society.—Ed.)

R. B. Moffitt, Treasurer.

[For 1947-48.—Ed.]

SOCIETY MEMBERSHIP

Man, in general, is a collective animal. He has to form societies to live satisfactorily, for membership of them brings privileges otherwise unobtainable—domestic security in the family, economic security in the trade union, and national security in the State.

Beside these necessary societies, man also forms others to make life more enjoyable, and to fill his spare time. The public house and pool room are loosely knit leisure time clubs, as indeed, are all sport and hobby clubs.

The Engineering Society was formed to perform both of the above functions. It has a dual purpose; firstly to provide the student with a means of protecting his rights in the faculty and voicing his opinion on such matters, and secondly to provide entertainment and comradeship. It has done both, to the limit of its power. But its power is limited by its membership. And its membership is at present very small.

This state of affairs cannot continue. If the Society is to be of maximum value, it must have complete membership. Every engineering student must be a member. Every student should want to be a member. His rights need a guardian, his outlook needs a voice. The faculty is divided into two parts, the teachers and the taught, those who study not for themselves and those who study not. The professors and lecturers have a common voice, and we, too, need a common view.

Besides protecting student interests, the Society is aiming to supply entertainment and diversion from the more serious side of university life. Film evenings, talks by guest speakers, annual ball, annual dinner, and barbecues are examples of the lighter side. But these need your support also, both financially and numerically. The question of finance is here raised. Without an adequate bank balance, the society is naturally limited in its activities. Free refreshments cannot be provided without funds, nor can halls be hired, transport arranged, and so on. The membership fee is only a few shillings, not in itself sufficient cause for non-membership.

Compulsory membership, as it exists in the medical and dental faculties, has many desirable features, and could well be implemented. However, apart from improving the financial situation, it does not help increase the interest shown in the Society's activities. This can come about only by a realisation by all non-members of the necessity and usefulness of the Society, and secondly, of the entertainment it provides. It is, therefore suggested that all non-members examine the work the Society has done during the past year and the enjoyable evenings it has provided, with a view to becoming a financial member.

Finally, remember that attaining a degree is only part of your university course. If you ever intend becoming an executive, in any position where you have to deal with other men, you need experience. The Society can provide this; and it is easier to learn on fellow students than on company directors and bankers.

WELCOME . . . .

Edgar Clynton Ross Spooner

A Tasmanian by birth, studied at Hobart University, where he was Rhodes Scholar in 1931. At Oxford he did research in electrode potential phenomena, for which he was given the Degree of Doctor of Philosophy. For further research in that field he was awarded Doctor of Science at Hobart University.

On leaving Oxford he became technical assistant to the works director of National Smelting Co., Avonmouth, England; then technical superintendant and finally works manager. Later he became assistant general manager of Magnesium Metal Corp. Ltd., Swansea. Then he became Research Director on carbon processes and fuels for Sutcliffe, Speakman & Co. He was a member of the British Industrial Mission to Germany studying the carbon industry and its branches.

Dr. Spooner is married and has two children.

JAMES DUNCAN: Graduated from Adelaide with B.E. (Mech.) in 1940. He then went to Richards, where he was employed for six years. During this time he toured America, studying motor car and aircraft design. On his return, he became Development Engineer on post-war car body design. After this he taught at Scotch College for eighteen months, whence he joined the lecturing staff of the Mechanical Engineering Department.

BENJAMIN DOWNS: A native of Liverpool, graduated from Liverpool University in 1941 with a degree of B. Eng. (Mechanical). He then did his post-graduate apprenticeship at Harland Engineering Co., and later joined the staff of Liverpool University, lecturing in Mechanical Engineering. In 1947 he received the degree of M.E. for research into fuel injection. He came from England to join the staff of the Mechanical Department early this year.

REX EUGENE VOWELS: Who joined the staff of the Electrical Engineering Department in 1947 as lecturer in Power Engineering, studied Mechanical Engineering at the University of Adelaide and in addition took the Associate Course in Mech. and Elect. Eng. at the S.A. School of Mines. He received the degree of Master of Engineering as well as the Associate Diploma in Mech. and Elect. Eng. (at S.A. School of Mines). Mr. Vowels did a special course in Mathematics at the University of Tasmania.

He is an Associate Member of the Institution of Engineers, Australia, as well as a Member of the American Institute of Electrical Engineers.

Prior to his appointment as Lecturer at Adelaide, Mr. Vowels was successively:

Assistant Electrical Engineer, Hydro Electric Commission, Tasmania.

Head of Electrical Engineering Dept., Swinburne Tech. College, Melbourne, Vic.

Electrical Engineer, State Electricity Commission, Queensland.

Mr. Vowels is married with three children.

JOHN WILLIAM PLETTS: Joined the staff of the Electrical Engineering Department as lecturer in Electronics in August of this year. Mr. Pletts studied Light Electrical Engineering at City and Guilds Engineering College, London, where he obtained his B.Sc. degree. He is an Associate Member of the Institute of Electrical Engineers.

Before joining the staff of Adelaide University, Mr. Pletts held positions in Marconi's W.T. Co. and the British Ministry of Supply in Radar Development.

He is married with two children.

Twilight of the Sods or Glider Club Report

By Wun Wing Lo.

Scene: Sellick's Beach on a Sunday afternoon.

Sweet Young Thing: "Just look at that silly fool, he has been swimming fully clothed. Who is he?"

Patient Glider Club Enthusiast: "Not at all. That's Steve (Leatherskin) Kaneff. He's just landed the glider in the water—evidently not enough land about!"

Ever since the Wright Brothers made their first memorable flight, men have been fascinated and thrilled by this business of flying. The Engineering Society Glider Club (or to be more correct—The Adelaide University Engineering Glider Club) has been no exception. First formed in the late 1920's it was disbanded in the early 1930's when someone wrapped the glider round a tree, but not before an Australian Primary Glider record of 62¼ minutes duration had been set up.

Nothing was done until 1946 when the Glider Club was reformed and steps were taken to finance and build a Primary Glider. However, instead of this, we managed to get hold of a ready-built machine for £25 and much enjoyment has been derived from this.

The greatest activity was in 1947 when such famous people as Ray Hannan, Rus. Nicholas, Niel McKeller Stewart, Don Tonkin, H. Rutherford, B. Martin, Peter Lister, and Steve Kaneff tried to emulate the birds. There were also other active, but non-flying members whose names are too numerous to mention here. Flights were made at McLaren Vale and Sellick's Beach during terminal vacations and on Sundays during the term.

It is interesting to note that none of the active members had ever been up in a glider before, the whole process of learning to fly being a matter of trial and error. Many of the flights, for this reason, were rare spectacles, indeed—such as the awe-inspiring loop which Niel McKeller Stewart performed when 20 feet from the ground. Although he landed upside down, he was not hurt. At a matter of fact, during all the flights, no one received even a scratch, although landings were made on all points of the machine, top and bottom. Usually the only damage was a broken wing skid, while on rare occasions the skid received a buffeting (not to mention the seat).

Due to most of the keen members leaving the University, there have been no activities of the Glider Club in 1948, these being further made difficult by the fact that no towing car is at present available nor is there a convenient flying field which can be used.

The glider is at present stored in the Mechanical Engineering Building awaiting a new skid. There have been suggestions that flying should be resumed in the Christmas vacation and carried on next year. This is, of course, a very good scheme if there are sufficient interested people—half a dozen really interested members makes an ideal workable number.

With the resumption of flying in view, it is, therefore, suggested that if there are any who are really interested in flying, they should contact S. Kaneff (Electrical Engineering Department—Research) some time before the end of the year so that activities can be arranged over the vacation and next year.

Interfaculty Rowing By A. R. Curry

Engineers Retain Tyas Cup

Interfaculty rowing was revived this year, six faculty tub four crews competing for the Tyas Cup on May 19th.

The Engineers again proved their superiority by convincingly winning their heat, the semi-final, and the final, thus retaining the cup which we have held since 1936.

The crew this year was made up of the following infamous oarsmen—bow, A. G. Scott ("Policemen's Pet"); 2, R. B. Moffitt ("Curly-top"); 3, A. R. Curry ("I'm serious now"); stroke, I. B. McBryde ("Grumpy"); cox, E. Scroop ("Small fry").

After a whole week of grim, determined training, the crew, fighting fit, faced the starter for their first heat against a plucky Dentistry crew. The long, arduous training of the Engineers, however, soon proved its worth and they completed the traditional course, from the Henley landing to the Varsity boat shed, two lengths ahead.

In the semi-final we met Medicine. Suitably awed by the imposing array of King's Cup and Intervarsity oarsmen in the rival boat and vainly attempting to copy their air of quiet confidence, our crew of nonentities rowed an inspired race to crack Medicine at the bridge and beat them to the line by nearly two lengths.

Attired in bowler hats, in the gathering dusk and amidst the thunderous cheers of two or three spectators the Engineers won the final from the veteran Arts' crew by a clear four lengths.

We are now in a position to state with assurance and a considerable degree of accuracy that the cup, presented in 1884 by W. Tyas, holds exactly half a gallon.

THE ENGINEERING INITIATIONS

By Len Perkins

THE NIGHT OF APRIL 14, 1948

At 7.15 p.m. on this fateful evening, what sounded and looked like the Saturday evening get-together of the Garbage Collectors' Union, but which on closer inspection proved to be the Engineering Faculty complete with mugs, was to be seen scrambling on to two wagons outside the Eng. Building.

Then, complete with band and with "To the Medical Library" notice prominently displayed, the procession rolled slowly towards Osborne Hall, in Gouger street, to the tune of the "Volga Boatman" rendered in close harmony by the Engineering Choir.

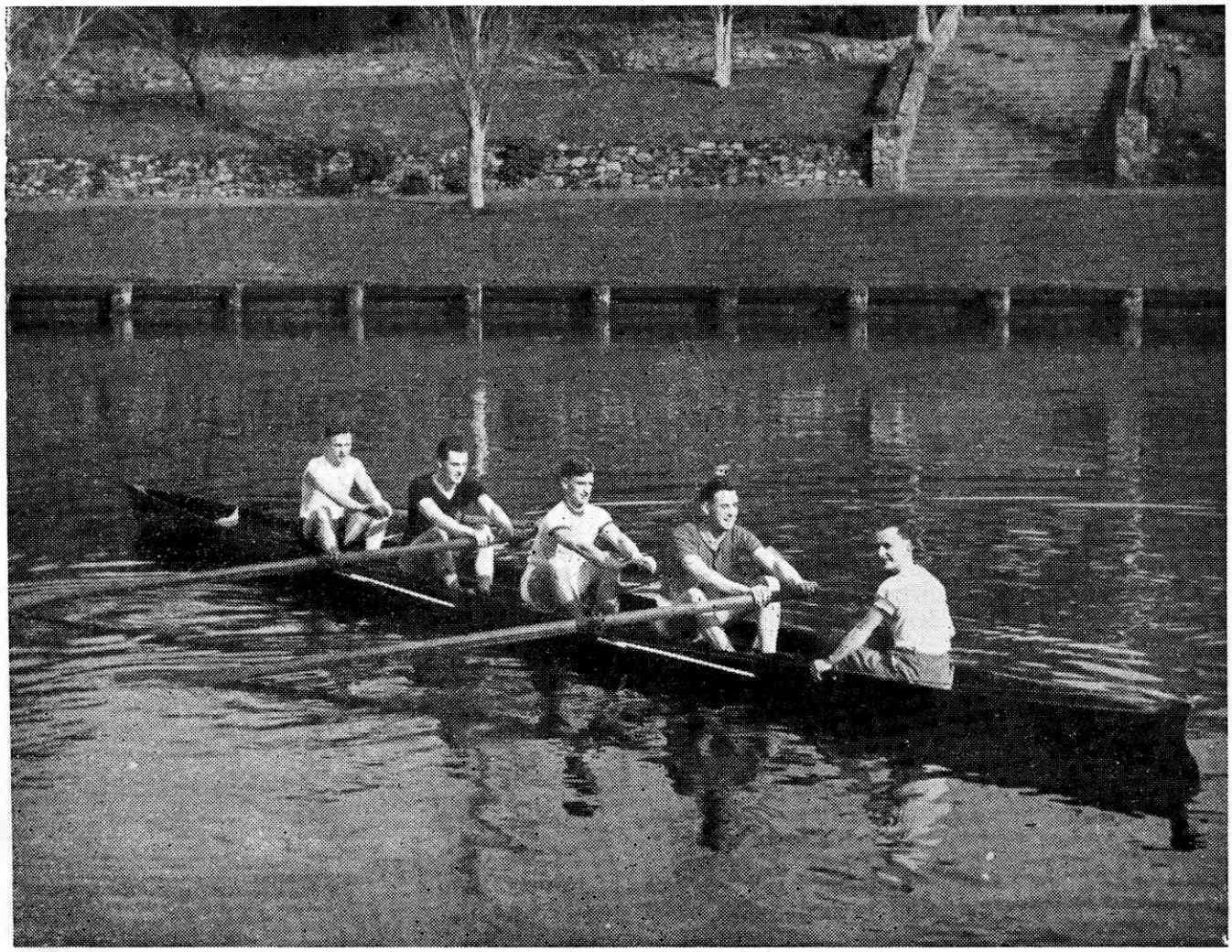
On arrival, the chaps fought their way up the stairs like scholars and gentlemen, but were met at the head by Colonel Horatius McBryde in front of barricade) and his henchmen (behind barricade). Nothing daunted it took comparatively few seconds to swarm over railings and banisters and with mugs well to the fore the hall was quickly filled.

The boys had arrived!

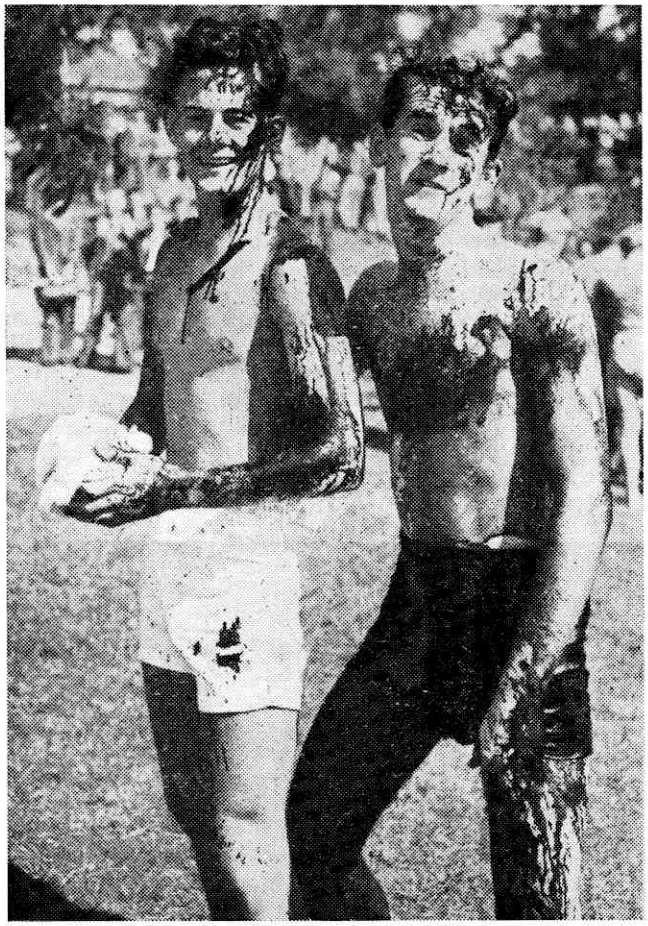
Here the freshers were quickly rounded up and then led, as lambs to the slaughter, towards the initiation line. Everything was in readiness.

Boot Polish—Black and Tan, by the O'Grady, Stanton duo.

Hair Dye—Inecto No. 4 at 5/1; Nienaber enjoyed this immensely.



ENGINEERS' CREW—WINNERS OF TYAS CUP, 1948.
Bow, A. G. Scott; 2, R. B. Moffitt; 3, A. R. Curry, stroke, I. B. McBryde; cox, E. E. Scroop.



This is what happens to Engineers who do not attend initiation. J. Richardson (left) and Keith Buckley.

Hair Bleach—Fisher ran out of peroxide early and wasn't at all impressed with the results of using pure ammonia.

Hair Trim—Sweeney Todd Neuenkirchen.

Methylene Blue—This we are led to believe produced the most amazing results and it was with great regret that owing to the uncertainty of the lethal dose it was decided to withdraw from production.

Rubber Solution—Liberally applied beneath tender arms by Jim Whittle.

Highlight of this part of the programme was the way in which Eck Knuckey, an uninvited Science Student, offered to go down the line assisted by 26 blokes.

Now came the hit of the evening, The Peanut Derby. For various reasons we find that we are unable to give a running commentary of the above event, but suffice it to say that most freshers looked absolutely ludicrous without pants and only a peanut.

Congratulations should be extended to one chap called Dunn. who finished the course in abnormal time, thereby setting up a Southern States record.

Anyone caught practising next year, however, will be put back two yards.

Most people are more likely to remember the "exarsperating" expressions on the faces of Burton and Hodgson, while others will recollect with awe the extreme muscular concentration of blokes like Dowding over the last three yards.

Then, after some disappointing blindfolded boxing, in which nobody was laid out, it was decided unanimously to broach the first two kegs.

Three minutes, five seconds later, R. D. G. Reed could be seen scrambling out of the bar complaining of horrible gurgling noises emanating from both, and asking permission to broach two more.

Entertainment was then provided by a well known quintette doing pastoral dances in the corner. Rumour has it that LeMessurier went home barefooted after this and accomplished some remarkable back flips on the Rundle street pavement.

Shortly before 11 o'clock, however, the 50 gallons ran out, and to the strains of squeezing the last dreg from the keg, the engineers (the stayers) passed slowly out into the night, dragging the engineers (the players) to the tune of "Don't Go Down the Mine Daddy."

The Annual Tug of War

The scene now shifts from the dingy atmosphere of an Engineering taproom to the bright and cheery banks of the River Torrens, where a meek and motley array of freshers were to uphold the honour of the Faculty by attempting to pull a sturdy collection of Meds. into the murky depths.

To enter properly into the spirit of things, however, three uninitiated freshers were first tarred, feathered, and then flung bodily in. Waugh thought this was great fun and insisted on participating: five minutes later a rather blackened Waugh was to be seen beetling towards the George Murray.

Anyway, after losing the toss, brunette Burton (the author is often colour blind—Ed.) and his crew found themselves allotted to the precarious and precipitous northern bank, where against a background of gum trees they looked more diminutive than ever, a fact which brought tears to the eyes of Uncle Arch. But—wonder upon wonder, may blessings shower upon that fine collection of Engineering manhood—the honour of the Faculty was upheld by dragging the Meds. into the river, thus ending the 1948 Initiations.

As we left the final tumultuous scene of Med. tossing Engineer and Engineer tossing Med., we found ourselves ruminising on the brutality of mankind and making mental notes that next year the active participation of all second year chaps would have to be curtailed somewhat.

WHAT IS AN ENGINEER?

By D. J. Bath

The following conversation is, no doubt, very familiar to you all. The lass, usually charming, has prised from the engineering student, usually silent, the fact that he is at the University.

She—"What are you doing at the University? (usually varsity)?"

He—"Engineering."

She—"Oh! Engines, bridges, and things."

Heaven knows what conglomeration of ideas the "things" includes, most probably plumbing and engine drivers and numerous mechanics and that quaint chap at the top of the crane, but, anyway, the conversation usually lapses there and once again the engineer allows his profession to be wrongly represented in the public's mind.

Unfortunately, the impression, as held by the lass, is common, in fact almost universally accepted, and this perhaps to be expected since every mechanic who tends an engine whether stationary or moving adopts the title of engineer. The plumber has become the sanitary engineer, the electrician the lighting engineer, and so it goes on.

But the next time this conversation piece occurs, as it inevitably will, I want you as an engineering student to assert yourself and, however painful it may be for our charming lass, I want you to say, "I'm sorry, but that is not quite correct."

For in truth, very few of the Civil Engineers will ever see a bridge, nor will the mechanical engineer design high speed diesels, or gas turbines. "Well," she may ask, "if you are not going to build bridges what are you going to do?"

Your reply could well be, "I'm training to be a genius."

This would, no doubt, put an end to conversation for quite some time, but do not relent in that time for you may go to a dictionary and you find.

English—ENGINE, French, engin.; from Latin Engenium, a genius, an invention.
Engineer, English, ingin-er; Old French, enginer; French ingenieur. A person of genius or ingenuity.

In the Latin—Ingeniosus-a-um (ingenium). Naturally clever, talented, acute, able, ingenious.

Although you may already be aware of your claims to the title of genius it may be well to be ready to substantiate your claims for the engineering profession in general.

A good engineer must possess:—

Ability, education, training, and experience; this in itself will not raise an eyebrow, but in addition he must be:—

1—An Economist.
2—An Accountant.
3—A Scientist.
4—A Leader of Men.
5—A Philosopher.

And if he is to be successful he must be of inflexible integrity, sober, truthful, accurate, resolute, discreet, of cool and sound judgment, must have command of his temper, must have courage to resist and repel attempts at intimidation, quick to decide, prompt to act, must be fair and impartial as a judge on the Bench, must have experience in his work and dealing with men, must have business habits and knowledge of accounts.

He, the successful engineer, is essentially an economist who has been entrusted with the world's resources—water (hydro), coal, mineral, manpower, liquid fuels. These are his responsibility. He must see that they are used to add to comfort of our civilisation with the minimum waste, and this includes waste of manpower, since it is also his duty to see that risks to human life should be as little as is possible. So perhaps the claim of genius is not quite so fantastic, for a man who can fulfil these conditions is one. He is a person greatly in demand and when found he is worth his price; rather he is beyond price and his value cannot be estimated in money.

Unfortunately, not all of us will be successful, but we should know for what we are striving. The way will be made easier for those who follow if all engineers were to strive to erase the public's present impression of our profession and install the idea that the engineers are the controlling profession of this civilization. For they are.

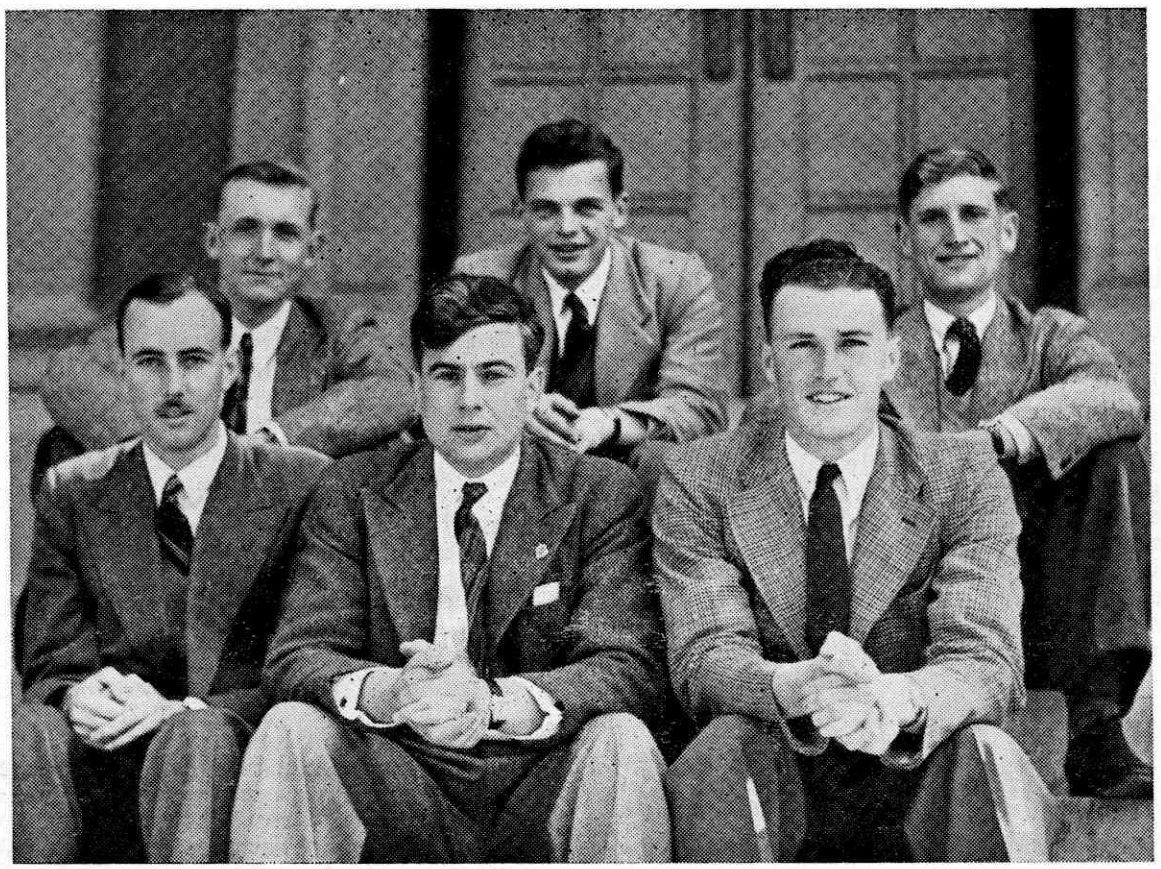
To achieve this each student should take a pride in his work, in his profession, and this logically starts with his faculty.

Since your position in the worlds of industry, civil life, in war, will be that of the leader, it is your responsibility that you should be fit for such a position. Educational credentials are but a fraction of the required qualifications, and strangely enough, the remainder may all be learnt from your neighbours.

If you pick up the threads that have been dropped as we have gone through this article and tie them together it offers the conclusion that if the student who is asked, "What are you doing?" is:—

1—An engineering student.
2—Proud of his faculty.
3—Proud of his work.
4—Actively interested in his fellow students.
5—Able to learn

he may then honestly say, "I am training to be a genius."



ENGINEERING SOCIETY COMMITTEE.
Back Row (l. to r.): R. S. Severin, J. G. Allardice, A. R. Curry.
Front Row (l. to r.): B. P. Opie, A. McArthur, R. B. Moffitt. *Absent: D. J. Bath.*

McARTHUR, ARCHIE: President of Society and helluva good chap. Has ruled the rowdy engineers with the touch of a scholar and a gentleman. Doing last year Electrical. Owns a T-Ford which is eminently suitable for carrying kegs of all sizes. Resides at St. Mark's, but in spite of this, he is still a good bloke.

OPIE, BRIAN: Vice-President of A.U.E.S. and known far and wide as Moustachio Brian, due to the fact that he carries on his upper lip a conglomeration of hairy growth of 6/6 size—6 tufts of 6 hairs each. Renowned for his sense of humor and ability to take a joke in good part (I hope). Doing Fourth Year Civil.

BATH, DON: Secretary of Society. As can be seen from above, he is very shy of publicity, but, nevertheless, our secret photographer managed to catch him unawares and his photo appears with the Secretary's report elsewhere in the magazine. Minimised too much his role in Society affairs. Also from St. Mark's, but notwithstanding is a decent chap. Fourth Year Civil.

MOFFITT, DICK: A.U.E.S. Treasurer and well-known for his reticence, or rather lack of it. Known as Peanut, or sometimes even Dingo. Rowed in engineers' crew, which beat all-comers for Tyas Cup. Will be President next year. Third Year Mining.

CURRY, ALAN: Past President of A.U.E.S. Most of his actions are past precedent. Known as Dingo, or even some times Peanut. Also rowed in victorious Tyas Cup crew.
Fourth Year Mining.

ALLARDICE, JOHN: Staunch Committee member for last three years. Known to all his friends, by virtue of his refined speech and courteous actions, as Gentleman John. Spends a lot of time at Electricity Trust. Doing Fourth Year Mechanical, but should be concerned with things more civil.

SEVERIN, DICK: Committee A.U.E.S. this year and will be Treasurer next year. Comes from country, where his friends (?) say he should have stayed. Doing Second Year Civil.

IN MEMORIAN: Of the two Freshers' representatives who were appointed at the beginning of the year. Since they were last observed at the initiation and tug-of-war ceremonies, they have failed to make an appearance, and it is with regret that we record their untimely demise.

WHO'S WHO IN THE LITERARY WORLD

EDITORS

KANEFF, STEVE: Used to be known as Leatherskin, which title he has since renounced. Is doing Honors Electrical or something equally shocking, and can often been seen deep in the depths of the Electronics Laboratory struggling to control herds of volts, farads, ohms, etc. Is only surviving member of Glider Club

NEUENKIRCHEN, JOHN: Known as Pie-cart for some reason which has never been satisfactorily explained. Digests well and also does Third Year Mining. Will be Secretary of A.U.F.S. next year. Co-director of 'Varsity procession. Is not a member of the Glider Club, the Socialist Club or the Fine Arts Society.

SLATTERY, JIM: Born and bred on the rolling plains around Snowtown, this hoary old son of the land has endeared himself to all by his bluff manner. Is inclined to be shy and should mix more with the opposite sex and also take a little time off from his work to relax. Doing Refectory III and Maths III; should pass Refectory III.

CONTRIBUTORS

WOODS, MISS E. M.: Known to all engineers as Liz. We believe she is doing her last year in Mechanical and so, with her departure, the genus "engineeris feminis" will become extinct.

BATH, D. B.: Also gets a write-up on the page opposite. Conclusively shows in his article that an engineer is a genius

PERKINS, L. J.: Known to a select circle of intimates as Len. Organises Initiations and Processions. Captained Engineer's Rugby Team, which was narrowly beaten by Arts. Should get a typewriter before he sends anything else into the Magazine.

STAPLEDON, R. J.: Wrote an excellent treatise, although his theory is inclined to be somewhat rocky. Nevertheless, he has tried to give us the dinkumoil.

TURNER, K. G.: The Editors feel they should record the fact that this chap has a magnetic personality. In fact, he is quite a live-wire. Inclined to be somewhat brief

MAGAZINE COMMITTEE.
L. to R.: J. B. Neuenkirchen, F. J. Slattery, S. O. Kaneff.

Practical Magnetic Recording

By K. G. Turner

The author would take the opportunity at the outset of stressing the fact that, although he has been very scrupulous in sifting information gathered from many sources, he cannot answer for the veracity of same. He has, however, put to the practical test and has satisfied himself as to the correctness of most of the following points:—

I would point out that, although I have carried out research from scratch on the construction and design of a wire recorder, I do not profess to be an authority on this. However, I will endeavour to set out the layout and construction of a magnetic wire recorder from a practical standpoint.

The history of wire recorders goes back to about 1900 when experiments were made with a very small amount of success. In 1914 further headway was made when a wire was passed through a coil coupled to the output valve of a set. On this set-up the dots and dashes of a Morse code signal were recorded. This could be said to be the first real wire recording. Then, very little headway was made until the early 'twenties, when D.C. bias was used and results more or less satisfactory were obtained. The main troubles were then lack of good recording media and quiet amplifying valves. It was not until the late war that a really good unit was constructed.

Once good recording media and quiet amplifier valves were available, the next great step to be overcome was the high noise level due to the use of direct-current bias, which left the recording head and wire with a residual magnetism. This last bugbear was overcome when supersonic bias and erasing was used.

The Germans, British, and Americans all seemed to have made equal headway, the Germans being perhaps slightly in advance. The last war was the cause of the wire recorder making rapid strides in portability, versatility, and quality. It was during the war that these countries, especially England and America, realized that a small instantaneous fool-proof recording system was urgently required. These recorders had to be able to operate in trucks, tanks, and aeroplanes, in all weathers. There was only one type of recorder known that could do this—the wire recorder. The wire recorder has since amply demonstrated its value.

The chief advantage a wire recorder has over other conventional methods of recording are:

(1) Portability,
(2) Cheapness of a recording,
(3) Absolute instantaneity of recording.

Treating each advantage in order, portability is perhaps the outstanding advantage. The whole unit can be made compact enough to be carried in the hand. Also, while being carried, a recording can be made without any detrimental effects due to being bumped and rocked about. This is invaluable for recordings that are required to be taken at a moment's notice at any location, since a unit can be placed in the back of a car, motorcycle sidecar, or even on a bicycle and taken where required. In addition, up to an hour's recording can be made without changing discs or needles, a fact which makes such units ideal for speeches, lectures, etc.

The cheapness of a recording cannot be surpassed by any other method. For an hour's run, the cost at present is approximately £2/10/0, equal in time to twenty 3-minute recordings of the disc type, with the added advantage of being continuous. This makes it an excellent means of recording speeches and sporting events, which are to be filed for future reference.

The magnetic recorder is the only high-quality, truly instantaneous recording. A recording which is made can be played back immediately an innumerable number of times. The disc recordings need to be processed or hardened for reasonable long life, which is very short compared to the same recording on wire. There is a film process of recording which takes quite a short interval of time between recording and reproducing, but this process is costly and is not portable.

From the above it can be seen that the wire recorder is a very versatile recording and reproducing piece of apparatus. Briefly, the wire recorder functions as follows:—

The sound intelligence is converted by a microphone, to electric waves which are preamplified and are fed to the main amplifier which converts the signals to magnetic flux variations (dependent on frequency) which are biassed and recorded by a magnetic lead on the wire. Playback involves the converting of flux variations to voltage variations which are amplified and made to work a loud speaker.

The author will now take the reader through the workings of a recorder from the microphone to the speaker.

MICROPHONES:

To the uninitiated, any microphone of reasonable quality would appear to be quite suitable for use in wire recording, but this is not so. As a commercial unit is constructed to work under all conditions, such as over rough roads in the back of a car or truck, upside down in aeroplanes,

in all weathers (as they were in the Services), any microphone would not do.

For a start a Carbon mike (a Carbon mike IS capable of good speech quality) would appear quite good from the viewpoint that it has high output and would save pre-amplifier valves: but this is not so, as the playback Head of a wire recorder has an output of somewhere in the vicinity of —80db. and amplifiers would be required in any case to give sufficient output. Therefore, this pre-amplifier could be used for the amplification of a still better microphone.

Secondly, as a carbon microphone should never be bumped during operation, due to carbon noise, etc., it would not be the best type where vibration is encountered.

As there is sufficient pre-amplification for a crystal type the reader may jump to the conclusion that that would be quite suitable, but again there are drawbacks. A crystal mike is easily broken by a fall. It is also very susceptible to moisture so that it would need to be thoroughly waterproofed, which is not easy to do. A ribbon microphone has properties which are attractive to outdoor use with the exception that the ribbon is easily distorted or stretched.

The best microphones are the moving coil or dynamic type, since they will take quite a large amount of falls, can be jarred and bumped considerably, without becoming the worse for wear. They can be immersed in water and not lose their output or quality, due to the fact that their windings are of low impedance and the diaphragms are of aluminuim. There is, of course, a limit, but so far the dynamic microphone has stood up to all classes of use and handling much better than any other type. Hence, where a reader is contemplating constructing a magnetic wire recorder, the author would recommend that he go into the pros and cons of microphones for all-purpose use very carefully.

PRE-AMPLIFIERS:

The pre-amplifier needs to be very little different from ordinary types, except that one with a low frequency cut-off is more desirable, due to the fact that a magnetic wire recording tends to have a low-frequency accentuation. However, more will be said on that point later. The gain of the pre-amplifier needs to be a little more than 80 db. to bring the level to 0 db.

A circuit which proved quite suitable is shown in Figure 1.

The gain of the amplifier shown is approximately 40 db. per stage and in practice, using experimental recording and pick-up heads, proved to be quite adequate for normal use.

MAIN AMPLIFIER:

The main recording amplifier is perhaps the most important part of the amplifying system, as here the frequencies to be recorded have to be equalized. As I mentioned previously, there is a tendency for a recording to be bassy. In an endeavour to overcome this the magnetic flux which makes magnetic recordings possible needs to be set up by a constant current at all frequencies desired to be recorded. Even then, a definite treble boost is necessary to compensate for further loss at the higher audio frequencies. The constant current can be brought about in one of several ways:—

(1) A high resistance in series with the recording head forming the plate load of the power amplifier.
(2) A low-resistance head in the cathode of the amplifier.
(3) An equalizing network in the amplifier plate circuit, consisting of choke-capacitance networks.

Fig. 2 shows the various methods.

C_1, L resonated at the same frequency as C_2, H, RFC,

C_2, H, RFC resonate at a high audio frequency, where H is recording head,

C_X is coupling to high-frequency bias,

RFC is choke presenting high impedance to high-frequency bias,

X is bias coupling.

The disadvantage of a. in Fig. 2 is that the power required in the amplifier is greatly in ex-

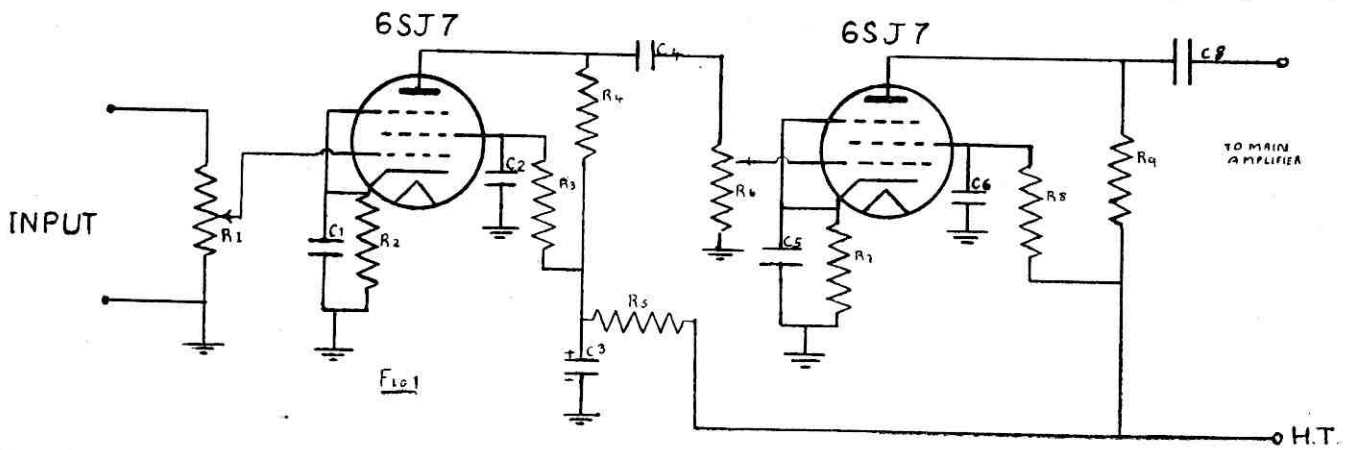
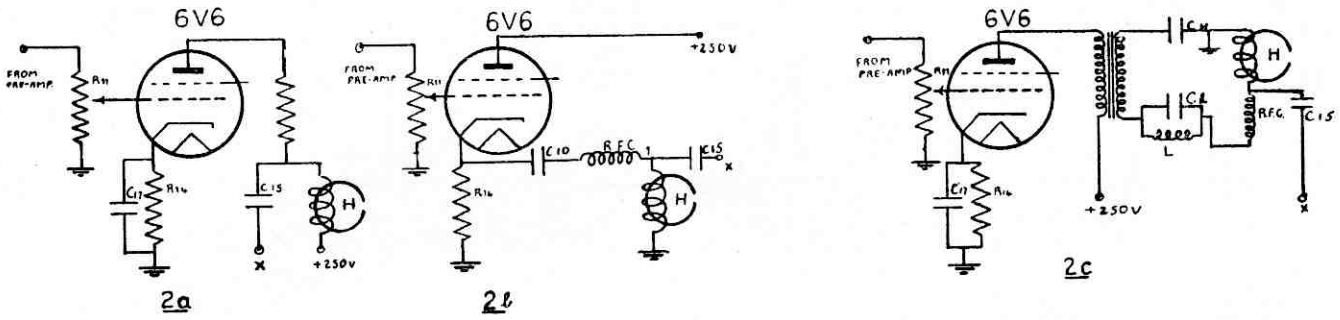


Fig 1



cess of the small amount used by the head to do the actual recording. In addition, the direct current passing through the head to the valve plate circuit tends to leave D.C. polarizing in both the wire and head; this gives a high noise level. Better results would, no doubt, be obtained by substituting a one-to-one ratio transformer for the head and connecting head to secondary.

Circuit b. in Fig. 2 is the final method used by the author and showed promise of quite good recordings. This method has the advantage that negative feedback is used, which greatly reduces harmonic distortion.

Circuit c. works quite well, but requires patience and design to arrive at the required values, the values being critical for good results. This method requires the minimum of power for recording.

Incidentally, the actual power required for magnetic recording is only a small fraction of 1 watt, most power being consumed in the equalizing network.

In b. the RFC is a choke which presents a high impedance to the high-frequency bias, usually between 20-100 kc. The 100-mfd. condenser is for coupling purposes to isolate the head from the D.C. current in cathode circuit. The condenser C , H, and RFC are resonated at a high audio frequency, somewhere about 5 kc. C and L are also resonated at the same frequency; this will give practically a constant current (audio frequency) in the recording head, H, up to the resonant frequency of the network and also a constant impedance reflected to the valve plate. But this condition is not as easy to arrive at as appears at first sight, due to the fact that the inductance of the transformer secondary has to be taken into account. However, the ear is a poor judge of quality and quite good "sounding" recordings can be made with this method.

RECORDING AND PLAYBACK HEADS:

The actual recording and reproducing heads take on many and varied physical forms, each one having its own particular advantage and disadvantage. The author found the circular type to give by far the best results. Although being a little harder to construct, it is well worth the extra time spent. (Incidentally, the same head can be used for magnetic tape recording without any alteration.) The head is turned up in a lathe and the laminations fitted by hand and the coils wound also by hand.

In America, it is claimed to have an improved version of circular head. This head has two air gaps. By being constructed that way it fulfils two purposes. It breaks up the residual magnetism in the head and also allows machine-wound coils to be fitted. The author has not as yet tried this type.

Fig 3 shows a few of the different types of heads.

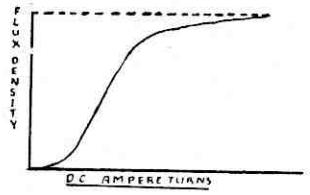
The square head has a groove cut down into the laminations just large enough to allow a snug fit of the recording wire. The same applies to the triangular head. The main disadvantage with this type is that the groove broadens with use, with a consequent loss of output, and higher frequencies. The circular head overcomes these troubles as the wire runs on top and over a surface diameter of approximately $\frac{1}{4}$ inch. As the wire runs across the head, it is also slowly moved back and forth over this diameter, consequently only a small portion of the wire passes over one small section of the head during a recording, giving this head a very much longer life over the grooved type.

The physical-recording air gap has a diameter of between .0005 in. and .0015 in. The actual effective diameter is considerably greater, due to fringing effects of the magnetic flux. The highest frequency that a given recording head will record is governed by.—

(1) the air gap,
(2) velocity of recording media,
(3) type of recording media (or to be more correct, the quality of recording media).

The highest frequency that can be recorded with a .0001 in. air gap and wire velocity of 2 ft. per second is 12,000 cycles. This again is reduced in amplitude by the recording media. Even with the best wire and conditions possible, it is at present practical only to record a flat response to 10,000 cycles.

The usual set-up for recording and playback is to use one head with two air gaps, one gap to record and reproduce, and the other to erase with supersonic bias.



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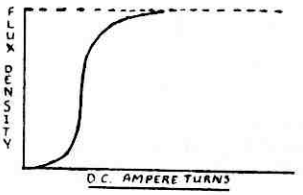

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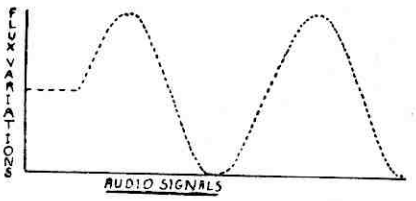

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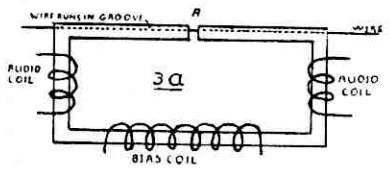
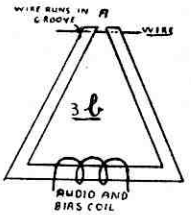
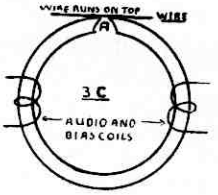






In some of the earlier models, three heads were used: one for recording, one for reproducing, and the other for erasing. This system gives the best performance, as the reproducing head should have a slightly smaller gap than the recording gap. When a common gap is used this cannot be brought about. However, quite good results can be brought about using a common gap.

The author uses two heads, one to erase and one to record and reproduce, using a .010 in. gap in the former and .0015 in. in the latter.

ERASING AND BIAS:

The whole secret of reproducing good high-quality sound from magnetic wires or tapes lies in the use of supersonic bias and erasing.

In earlier research work, direct current was used to energize an electro-magnet, which in turn erased or biassed the magnetic variations, according to which was desired. The principle of the bias is to allow the variations of magnetic flux to swing above and below a fixed point of the straight portion of the magnetization curve. The process was brought about thus:—

The wire was subjected to a saturated condition of a steady magnetic flux (shown at Point A in Fig. 4a). This placed all molecules in the wire in one direction, thereby wiping or erasing any modulations that had been on the wire. The polarity of the direct current was then reversed and reduced to a sufficient value to bring the flux to the centre of the wire material's magnetization curve (point B, Fig. 4b.). Fig. 4 illustrates these positions.

This standing flux is then modulated as shown in Fig. 4c. This system of bias, although capable of reasonable quality, brings about large noise signals, due to the residual magnetism left in both wire and recording head.

A system which overcomes these drawbacks uses a supersonic frequency as the erasing and biassing agent. When the wire and head are subjected to a high-frequency saturating current, which when cut off falls gradually to a low value, they are left in a truly neutral condition, that is, there is no residual magnetism left in either. The terrific noise level which is apparent in the D.C. biassing method then falls to a value comparable to an ordinary disc recording. When recording the high-frequency current is reduced in value to still "agitate" the molecules, but not enough to erase the recording. The value of this current is not critical. It can vary over a wide range without having an appreciable effect upon the recording. This current will affect the high-frequency audio response before distortion is noticed. The biassing frequency used can be between 40 kc.-100 kc. In some units the lower frequency is used to erase and the higher one to record, since it is not easy to saturate a small diameter steel wire at 100 kc. with the types of heads used. Also the 100 kc. effectively reduces intermodulation effects which become apparent with the lower frequency.

COMPOSITION OF RECORDING MEDIA:

The recording media are manufactured in several forms, varying from a cellulose tape, upon which is sprayed an active layer of 90% magnetite and 10% adhesive, to an electroplated brass wire.

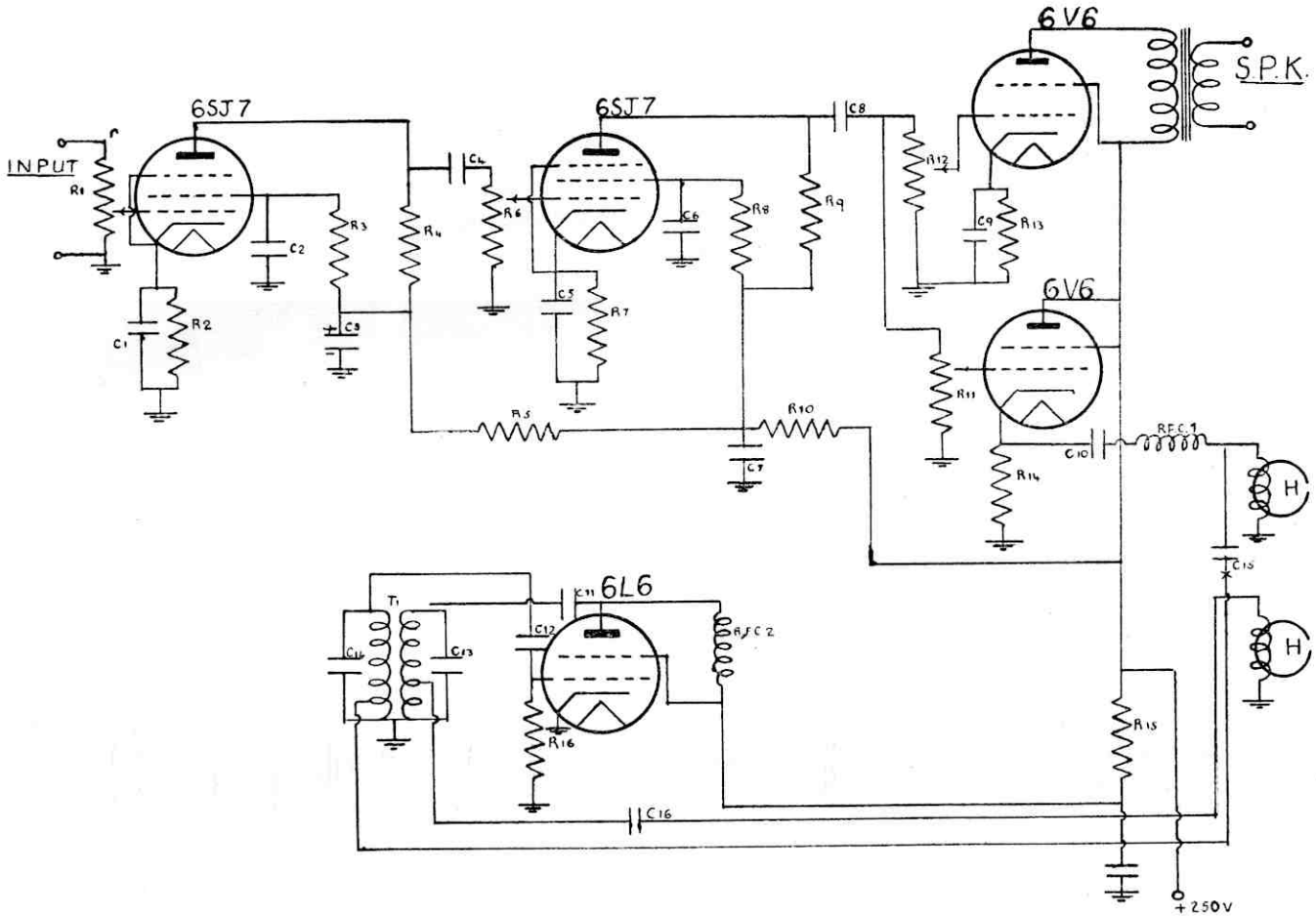
The Germans used a tape which had a body of "Luvitherm," a variety of polyvinyl chloride, in which the magnetite is directly impregnated. The claims for this type of material are extreme quietness (noise) and excellent mechanical properties which do not decrease with age. The magnetic materials are sprayed on to a depth of between 0.01 to 0.02 millimetres with a width to $\frac{1}{4}$".

The early wires were composed of mainly carbon steel, but this has been superseded by various alloy steels, particularly the ternary alloys of iron and nickel-chromium, nickel-copper,

or cobalt-copper. The coercivity of these materials has been increased from about 25 oersteds for carbon steel to about 150 to 250 for various commercial recording media, and up to over 400 for some experimental media.

All these recording materials are produced by closely controlled drawing or rolling operations combined with suitable heat treatment to effect the desired magnetic and physical properties.

Another method of producing a good media to offset the expensive methods of rolling and drawing is to electroplate a ductile, non-magnetic base material with a ferro-magnetic layer. The plated layer usually consists of a cobalt-nickel alloy, applied to a thickness of about 0.0003 inch. This material has a coercivity of over 200 oersteds and a retentivity of about 10,000 gausses. The overall diameter of the wire-recording media is usually between 0.003 and 0.006 inch.



R1	.5 meg
R2	600
R3	.5 meg
R4	.1 meg
R5	30K
R6	.5 meg
R7	600
R8	.5 meg
R9	.1 meg
R10	50K
R11	.5 meg
R12	.5 meg
R13	400
R14	400
R15	2K
R16	50K

C1	8 ufd
C2	.1
C3	8 ufd
C4	.005 ufd
C5	8 ufd
C6	.1
C7	8 ufd
C8	.005 ufd
C9	25 ufd
C10	100 ufd
C11)	
C12)	
C13)	Governed by
C14)	Frequency
C15)	
C15)	
C17	8 ufd

CH, H, RFC1, resonate at a high audio frequency.

CL 8 L resonate at same frequency as CH, H, RFC1.

Cx is coupling to high frequency bias.

RHC is a choke presenting high impedance to high frequency bias.

X Bias coupling Pt.

H recording head.

Although the output voltage from a tape media is low compared to a wire media, this is more than compensated for by the fact that the tape can have a much greater width.

The wire or tape is driven or dragged over the recording, erase, and pick-up heads at a constant velocity between 1.5 feet and 2.5 feet per second (for good recording media) to 6 ft. to 8 ft. per second (for carbon steel).

It is of interest to note that the latest recording media have the property that the recorded signal will remain on the wire or tape almost indefinitely, certainly for very many years.

CONCLUSIONS

There are quite a number of magnetic tape and wire recorders on the market today, especially in America, where the prices are quite reasonable. There is only one type, to the author's knowledge, for sale in Australia.

The frequency range of most recorders, so it is claimed, is flat from about 30 cycles to 9,000 cycles. The units are manufactured in portable cases and make quite an ideal means of instantaneous recording.

The complete circuit of the recorder constructed by the author is shown in Fig. 5.

No claim is made as to immunity from criticism, but quite good sounding recordings were made with it on ordinary steel piano wire. No attempt was made to check frequency response or distortion. In conclusion, the author adds a little advice to intending experimenters and constructors of magnetic wire recorders. Most of the calculation and design can be made from theory and should the experimenter do so, many otherwise wasted hours (or days) will be saved.

ENGINEERING–MEDICINE TUG-OF-WAR, 1948.
Engineers in foreground.

'VARSITY PROCESSION

By

Hyman A. Komer

We could not allow this year's procession to pass without comment. Held on the very auspicious date of Friday, August 13, it was a complete success, packing the streets of Adelaide once again with an amused and intrigued crowd of some thirty thousand.

As is usually the custom with such events, the Engineers were well to the fore. Having been revived after the war by two engineers, Brian Claridge and Len Perkins, this year's procession was again directed by another pair of engineers—Len Perkins (a repeat performance) together with John Neuenkirchen. At the rate that Len's going through the University, we might even have his hearse in the Proc. one day—a truly remarkable sight.

Once more, inhibited potential brains were unshackled—for the day at least—to provide ideas for floats and to supply that necessary carnival spirit. Preparations for the great show began quite early in the day—getting transport, placards, posters, uniforms, costumes, and last, but not least, that carnival spirit. This was obtainable for a small fee from the hostelry up the road. And so on to 1.15 p.m.

The miners, not having acquired a sufficiently thick layer of alcoholic liquid on their tonsils to dispel the danger of silicosis, developed a float whereby they could drink, as well as smoke, and play cards. Depicting the coalies "hard at work," they carried the last bit of coal left in South Australia, championed the "swinging-the-lead" bonus, and waved the Red Flag about, generally.

Following this we saw the plight of a poor gas-less house-wife, shown in a very true-to-life fashion by Jennison, who will never be forgotten for the rare beauty which he gave to this role—not only was it rare, but it was rank!

The School of Mines followed this with another float on coal, showing a very complicated process for gasification of Leigh Creek coal.

One "exhibit" which particularly amused the crowd was the topical Bank Bill, which was sorrowfully carried past in a coffin.

On other trucks, Lovely Mothers showed off their charms in their very own sweet way.

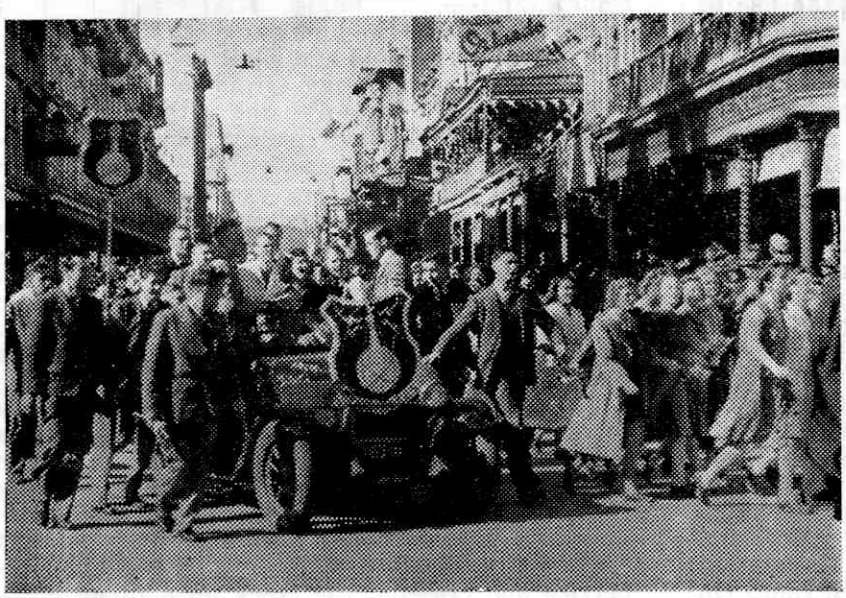
The Police Flying Squad puttered along the route, while Inspector "Goofy" Allardice continuously arrested a very besozzled Mattner. Last, but not least, we must mention our noble president, Archie McArthur, who collected "Guns for Malaya" in a very worthy manner.

The main credit for all these floats must go to "Mac" McBryde, who organised the engineers' section. Good on you, Mac!

Admittedly, other societies had floats in the procession, the best of which were probably submitted by Medicine and Ag. Science.

So much for this year's procession. I'm sure that everybody who took part in it or who saw it enjoyed the spectacle, and, with enthusiasm growing every year, I'm sure we can turn on a bigger, better, and brighter Varsity Procession next year.

Till then.



The Engineers were well to the fore in this V.E. Day procession.

WHY I WALK . . . . . .

Elizabeth M. Woods

Many people seem to think I go bushwalking because I haven't enough sense to do something better, or because I can't afford a car, or for some other unworthy reason. They are wrong. To me, bushwalking means exercise, comradeship, and some knowledge of the bush.

Walking is accepted as one of the best of exercises, and we do walk, although not in the epic manner of our forefathers. They thought nothing of a 50-mile walk for a week-end. My great grandfather used to walk from Goolwa to Adelaide for the week-end to see my great grandmother when they were courting. They were the "Good old days," at least of walking. Nowadays, we are happy to cover 15 to 25 miles in a week-end, and, although some theorists accuse us of laziness, we don't care; the theorists don't come with us.

Now about the comradeship. I think few city dwellers know that such comradeship exists. We are a group of people from widely differing week day occupations, but in the bush anyone is willing to share his last billy of coffee with the bloke he had a row with at the last General Meeting, or share the scrapings of his tobacco pouch with the chap who disagrees strongly with his political views (NOT discussed round the camp fire, thank you). In the bush we are an isolated band, with something in common that is not shared by the people who sometimes pass us on roads, and who so obviously wonder what queer creatures we are. Our comradeship is not quickly learnt, and you have to come with a mind ready to learn and a desire to share in it before you can understand.

Bushlore and a love of the bush are the rewards for a willingness to learn and the use of some common sense. Bushwalking constitutes a way of life very different to city life, and yet parallels it closely in many ways. For example, you would not, presumably, throw eggshells and empty tins round your dining room, and so the bushwalker burns the egg shells, and burns, bashes, and buries the tins—this last so that the tin rusts more quickly, no animal is likely to catch its foot in an open tin, and finally, the tin should not come to the surface again, anyway. These are small things, but they matter just as much in their way as do the big things—how to look after oneself in the bush, how to find your way, how to read maps, always to be prepared for accidents and to know how to deal with them; I am not sufficiently advanced in all this knowledge to talk of it at length and with assurance, but, believe me, it's fascinating to learn.

This is how a week-end trip goes. Proposed trips are outlined in our monthly magazine, and everyone who can come turns up at the station or other meeting place at the appointed time. On a recent trip eight of us caught the 12 o'clock train to Reynella, six boys and one other girl, all the others were evidently scared off by the promise of rain. It was raining already when we reached Reynella, and that meant pulling ground sheets out of rucksacks, and wearing them cape-fashion to keep selves and packs dry. We warmed up quickly as we walked along a road for some distance and then over pleasant hills and fields. Feet were soon wet through, but not cold. An old mine shaft demanded the attention of Dave (our leader), Lin (an intrepid scrambler), and Jill, almost equally intrepid, for some 20 minutes, and then we walked on to Clarendon and so to a suitable camp site some two miles further on, by the Onkaparinga. Tents were soon pitched, and Jill and I cut into a patch of bracken to make us a bed as soft and warm as any to be found in four walls. Since tents were spread out over some distance, several cooking fires were built, and we were soon deep in the important business of tea —an unworthy name for a worthy meal. As usual I cooked and despatched steak and onions, stewed apricots and custard, and a billy of coffee. Rain began again when we were eating and Jill and I finished the meal in our tent, but the rain soon cleared away, and we joined the others, who were building up an already blazing camp fire. We took our groundsheets to sit on, and a billy, dried milk, and bourn-vita for supper. The time went quickly as usual as we yarned and sang—we have a wide collection of favourite songs, ranging from "Danny Boy" to "My Defences Are Down," and including several Boy Scout songs which we think are true vocal expressions of our comradeship—

"Out along the highway clear,
Stalwart friend and right good cheer,
Friends who're not afraid to share,
Oh, who'll come a'roving with me?"

At 10 o'clock Dave made a damper for supper, and a new chum who hadn't seen a damper made before, became very excited, but the rest of us were only interested in our own suppers, and we were soon ready to return to our tents, unroll sleeping bags, don all extra clothing, and settle down. A shower pattered on the roof, the river rippled by, and the wind roared among the tree tops, but these are usual Saturday night sounds, and we soon slept.

On Sunday morning ham and eggs and coffee completed the process of waking up, and, being a lazy crowd, we left camp at 10 o'clock, wet tents loosely folded and slung across our packs. During the day occasional showers brought rain capes into use, but we had a pleasant lunch-hour at Scott's Creek, after struggling through blackberries and crossing the creek on a fallen log—

a horrible process for people whose sense of balance is not all it could be. After soup, biscuits, dried fruit, and coffee, I was ready for anything, and even kept up with our champion pace-maker —for a while.

At Chambers Creek a known and extensive mine shaft exerted its call, and the usual enthusiasts took off shoes and socks to wade through icy water to reach the vertical shaft, where the idea is to get to the top. The rest of us sat outside and shivered for an hour until they emerged very wet, but not as cold as we. We built a fire and they dried out, and put on all spare dry clothing that the party possessed, and then we walked rapidly into Blackwood, whence we came home in the train, where all food left was brought forth and shared out, and thoughtful ones put on dry socks, which greatly increased the comfort of the journey.

So ended another bush walk. During the week boots go to the bootmaker, and food is accumulated, and so it goes on—a grand way of life.

. . . . . WHY I DON'T WALK

By The Flying Man

I am, physically at least, a fairly normal human being. I have two arms, two ears, and two legs. These legs are roughly 3 feet 2 in. long. They are very useful. They enable me to look people who are 5 feet 11 in. high direct in the eyes. They enable me to look down on people who are less than this height, although I do have to look up at the few people I meet who are taller (that is, except when they are sitting down). These legs enable me to rest my elbows on the bar, to violently remove cats or dogs which may impede my progress along public thoroughfares, and to play baseball. They enable me to wear trousers to keep the space between my shirt and shoes warm. Am I then, going to destroy all these wonderful advantages I have over earthworms and fish? Certainly not.

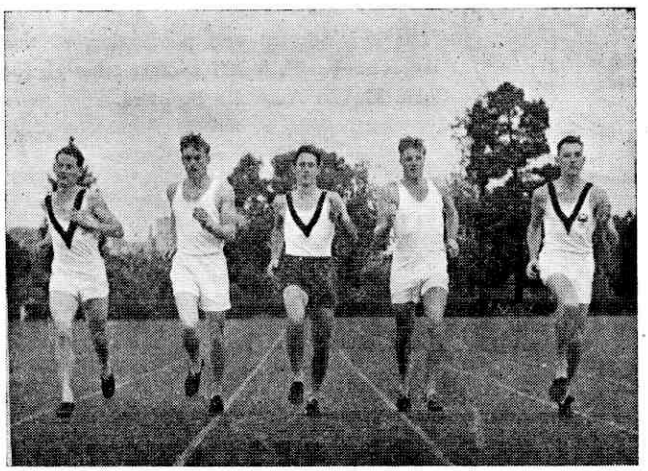
Imagine me after several weeks of feverish bush-walking. My shoes, socks and shins have long since gone. I am walking on my knees. As an engineer or dentist, I am useless. As a doctor, my field is very limited. As a policeman, my work would be pointless; nor would I be assigned to the riot squad. Perhaps I could get the low-down in the vice squad, but I don't like coming face to face with such aspects of life.

By this time the bush-walking bug has bitten me bad. I continue walking, and wearing my legs down, till finally, they disappear. Nothing separates the rest of me from the earth. I move along the street, while children stop, look, and flee screaming. Socially I am a forgotten figure. My overcoat trails behind, like a regal train. The tail of my shirt is dusty and dirty, like third class seats in a steam train. What a frightful picture, what a sad tale.

I don't want to be known as the man who didn't ride in a Ferd, or didn't repair his shoes with Crowhyd, or didn't wear Ezycrawlin' slippers. I don't want to picture as the man who didn't eat enough Cheep cheese to get enough calcium to build up enough bone to get enough leg to keep the rest of me from the ground.

I want to be a normal human. I therefore, don't go crashing around like an errant dinosaur, or surviving stegocephalian.

I don't go bush walking.



Members of the Inter-'Varsity relay team here pictured include H. Hillier (lane 3) and P. Brokensha (extreme right).

H. Hillier is to be complimented on winning the University 100 yards championship.

ANNOUNCING

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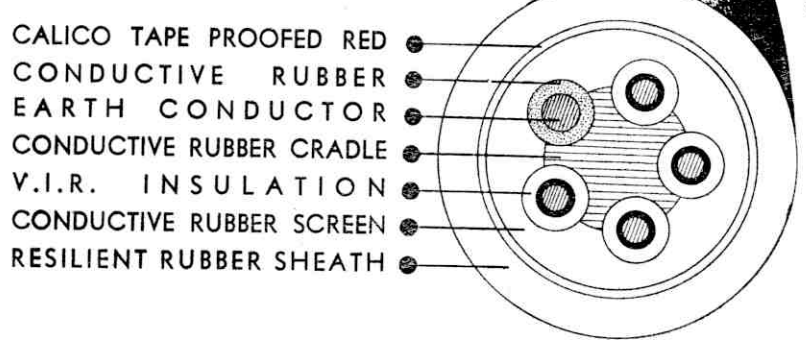
SAFE! Immediate cut-out to earth

SECTIONAL DIAGRAM OF CONDUCTIVE RUBBER CABLE



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Extensive tests on colliery sites have proved it an outstanding success and have showed that its performance is equal in every way to that of the more conventional metal-screened cable. The conductive rubber cable, however, has tremendous advantages — it cannot be damaged by broken wires in the copper screening — if the cable is damaged by any other cause, repairs can be carried out with the same technique adopted for ordinary rubber, thus saving considerable time and cost.

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ESTELLE, by F. J. Slattery

He swore at her, slammed the door, and walked out into the night, thinking. Life with Mary was becoming more and more intolerable. Even the day they were married they had argued, and after three years they were always fighting. It could not go on like this. A divorce seemed to be the only solution. But what grounds had they, yet?

He walked on into the night, scarcely looking up till he came to the other side of town. Then he remembered that he had not been this way since he was married. He had known these parts well in his student days, for this was the bright side of town. Theatres, small cabarets, cafes, and night clubs jostled each other in narrow streets, thick with people out to have a good time. The sound of dance bands and laughter filled the air, and through the door of a darkened cabaret came the husky voice of a woman singing. He stopped, for the song seemed vaguely familiar. Then, like a flash, he remembered. Estelle had often played it for him.

Estelle, beautiful, dark, untamed. Did she still live in those same rooms? Her memory stirred him, and he walked on more resolutely. It would be good to see her again. She would have a soft word for him, and a soft heart for his worries. Perhaps she was now married. No, he couldn't bear the thought. Estelle loved too generously to ever settle down with one man.

Here was the place again, the same doorway through which he had gone often before. Her name was still among the list of tenants. Thank God for that. Up those same stairs. He recalled the nervous anticipation of the first night he had gone up them. After that it had been easy, but the first time he had almost turned and run out. He was glad now he hadn't. The third floor, second door on the left. He paused, knocked. A movement inside, and Estelle's ruffled head peered around the door. "Jimmy?" she said incredulously. "Yes, Estelle. Busy?" She opened the door. "Come in and wait. Why, I haven't seen you for years. I missed you at first, quite a lot. Then when you didn't come for months, I knew you had gone. One of the students told me you had married and were living across the other side. What is she like? Are you very happy?" "No, I'm not." "Oh," she said. "Still, I'm pleased you have called back to see me. But I have another customer first. I'll get rid of him straight away, and we can get together, and you can tell me all about the last three years." She walked into the next room, shut the door, and he sat down on the sofa to wait. Same room, same paintings, by students she had known, adorning the walls. He remembered walking around the first night and looking at all of them. The door from the next room opened, and a short, middle-aged man came out. He seemed surprised to see Jimmy, said "Good evening," left some silver in a box on the table, and left.

Estelle came back and walked up to him. "I'm ready now. Come into my room." He walked in. The room was the same as ever. He sat on the other side of the table, leaned his elbows on the edge, smiled at her, and said, "Estelle, you are the most beautiful fortune teller I have ever known."

The Chemical Nature of Woman

This element called woman is a member of the human family, and it has been assigned the chemical symbol W. The accepted atomic weight is 120, although a number of isotopes have been identified having weights ranging from 95 to 400.

OCCURRENCE: It is abundant in Nature, found both free and combined, usually associated with man.

PHYSICAL PROPERTIES: A number of allotropic forms have been observed. Their density, transparency, hardness, colour, boiling and melting points vary with wide limits. The colour exhibited by many specimens is a surface phenomenon and usually due to a more or less closely adhering powder. It has been found that an unpolished specimen tends to turn green in the presence of a highly polished one. The boiling point for some varieties is quite low, while others are likely to freeze at any moment. All varieties melt under proper treatment. The taste varies from sweet to very bitter, depending on environment and treatment.

CHEMICAL PROPERTIES: Absorbs, without dissolving in, a number of liquids, the activity being greatly increased by alcohol. Absorbs seemingly unlimited quantities of expensive foods. Some varieties catalyse this food into fat. Many naturally occurring varieties tend to form Anne-ions, others cat-ions. Their ionic migrations vary widely. All varieties exhibit great affinity for Ag, Au, and Pt, and for precious stones both in chain and ring structures. The valence towards these substances is high and the study is complicated by the fact that the residual valence is never satisfied. Many stable and unstable unions have been described—the latter in the daily press. Some varieties, being highly explosive, are exceedingly dangerous in inexperienced hands. In general, they tend to explode spontaneously when left alone by man.

USES: Highly ornamental. Wide application in the arts and domestic sciences. Acts as a positive or negative catalyst in the production of fever, as the case may be. Useful as a tonic in alleviating sickness, low spirits, etc. Efficient as a cleaning agent. Equalizes the distribution of wealth. Probably the most harmful (income) reducing agent known.

—Aust. Pharm. Notes and News.

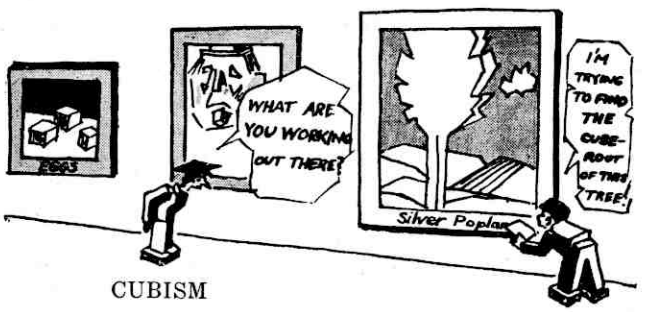
X.Y.Z. Throgmorton–The Perpetual Engineer

(With Apologies to Armstrong)

For some years now, we in the Engineering Faculty have had with us that truly great personality, X.Y.Z. Throgmorton—the Perpetual Engineer. Students may come and students may go, but Throgmorton goes on for ever—for he is the spirit of all Engineers.

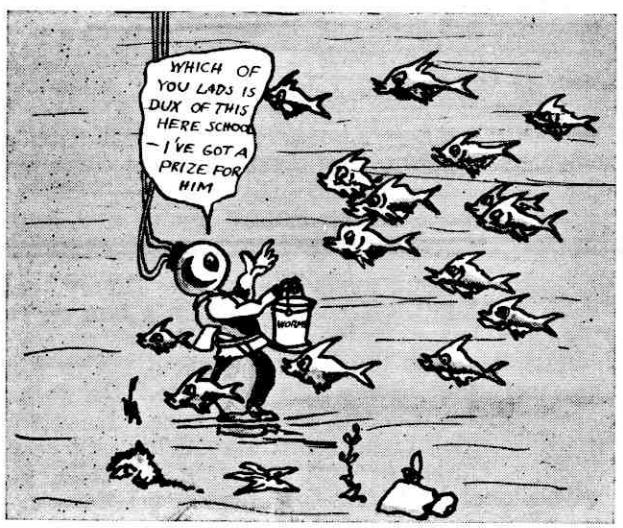
In spite of the fact that X.Y.Z. has been with us for so long, however, many are unacquainted with him, and for this reason, the following few characteristic points may not be out of place.

1. BORN—Presumably.
2. PARENTS—Unknown.
3. PHYSIQUE—Generally good, but shows marked deterioration after 6 p.m. on some evenings.
4. LANGUAGES—Engish and (very dinkum) Australian.
5. ACADEMIC ACHIEVEMENTS — Very few. At times X.Y.Z. is slightly confused, for example, he has art and mathematics slightly mixed up.

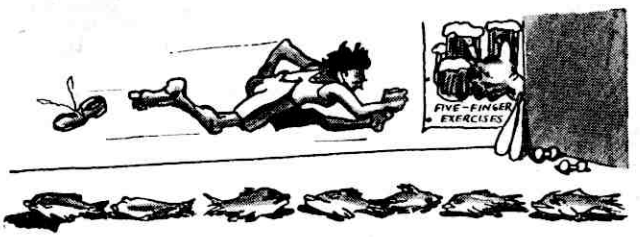


CUBISM

However, in spite of this, X.Y.Z. is constantly working for the advance of education in a practical manner.



6. MUSICAL INTERESTS—Throgmorton is genuinely interested in good music from Spike Jones down to Beethoven. X.Y.Z. realises that the Woodwinds add timbre to the orchestra, but imagines that an oboe is a tramp. Throgmorton is very good on the piano.



— MAESTRO THROGMORTON RUNNING UP AND DOWN THE SCALES—

7. ATHLETICS—As might be expected, "Throg" shines at physical exercises and sports.

X.Y.Z. (Samson) Throgmorton here seen going through his daily dozen at the parallel bars.

This article has been included without the knowledge of either Neuenkirchen or Slattery.

Engineers' Procession Thru' the Ages

By Julius B. Nonsuch

APRIL 14, 1948.

Scene: Rundle Street at 8 p.m.

Enter two Citizens.

Loud noises off. 2 trolleys carrying a jazz band and no. of youths come into view drawn by other youths, who are wearing shorts and shirts.

1st. CITIZEN: My God ! What's this coming?

2nd CITIZEN: Perhaps the Revolution has started. If so, we might as well start running now.

1st. CIT.: No. I can't see a Red Flag. Listen to the din, will you!

2nd CIT.: I can't help listening to it. It seems to be a sort of procession.

1st trolley passes—Cit. speaks to Youth on trolley.

What's the idea, sonny?

YOUTH: Don't call me sonny, you old crumpet. We're initiating our Engineering freshers tonight.

He points to freshers.

See their clean faces and unruffled hair. Well, you won't know them in an hour's time.

Youth laughs fiendishly and draws a tin of boot polish, a bottle of peroxide, and some hair scissors from his pocket.

So long, you old peanut !

Procession rolls on into distance.

1st CIT.: I'm glad I'm not a "fresher."

2nd CIT.: Me, too. Say, what is a "fresher," anyway?

1st CIT.: Oh, someone who gets too fresh. Come on, we'll be late.

Exeunt

If Shakesepeare had seen such a procession he might have written the following—perhaps !

1st LORD: Ods Bodikins,
What horror now confronts our mortal vision
To mock the tranquillity of our souls.
What noisome clangour doth rend the night air
To set the populace uneasy in their beds.
Come, haste away, my liege, lest we fall foul
Of the devil's base minions who even now
Draw their fiery chariots near our presence.

2nd LORD:
Hold you content. What, man, I know then, yea
And what they mean, even to the utmost scruple.
'Tis but the artisans in their fever
Come to practise their mystic rites.
Alack, those who now do enter their serried ranks
Will suffer 'ere the cock crow his alarum;
Even to transform their countenance rudely
That recognition itself will pass them by.
Come you, let us depart our merry way.

Exeunt

According to one of the elders.—Chap. IX.

And it came to pass in the middle of the night that there arose a terrible wailing and great was the sound of sackbut, psaltery, harp, flute.

And two of the elders of the tribe girded up their loins and came forth from their tents. And the one lifted up his voice unto the other saying: Behold the disciples of darkness and wickedness are upon us. Let us not tarry here for this place is evil, but rather let us seek refuge amongst the hills.

But the other was angered and spake unto him scornfully saying, knowest thou not the artisans of the host, who have this day made increase in their number and even now do ordain their new disciples into the innermost mysteries of their sacred profession. And at the first cock crow their tents will know them again and their mothers will not. For such is the power of the artisans who ordain as to change their innermost soul, yea, and it shall be written in their faces.

And it was so.

Chap. X.

Deciphered from Pepys' secret diary—

Up betimes and to the city where I listened to the discourse of two men but recently admitted to a college wherein they do practise some secret new art called engineering. And they did relate how certain ceremonies were performed upon them to their great discomfort. Indeed their trials and tribulations were of such a kind as to forbid telling them before delicate ears: whereat I marvelled greatly but knew not what to think for these engineers be mighty liars.

And so to bed.

[The author disclaims all originality for this article.—Ed.]

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8 BAD TRAITS OF CHARACTER—We reluctantly add that X.Y.Z. is sometimes unreasonably superstitious.

'PROSPECTIVE AUSTRALIAN MIGRANTS': Engineers' float during 1947 University procession.
Block courtesy 'Advertiser."

INCIDENT DURING UNIVERSITY PROCESSION, FRIDAY, AUGUST 13.

Inspector 'Goofy' Allardice arrests 'Dead-beat' Mattner.

GARDENING HINTS—By Q. Kumber

This month, dear readers, I will deal with two of the more lesser known species of vegetable growth, viz., the pickled onion and the salted peanut. The first thing to do is to prepare the plot prior to planting.

Plot Preparation

1. Remove all the soil to a depth of two feet. This may be deposited in a spare room or on the garage roof if no more suitable location is available.

2. Sprinkle lettuce leaves profusely in the pit one evening. This is a trap to attract all manner of snails and slugs.

3. Next morning, dust the gasteropods (before they wake up) with "Sizz-Fizz," an acidic preparation guaranteed to dissolve a full-grown slug in thirty seconds flat. In addition to exterminating slimy creatures, "Sizz-Fizz" converts the bones of small wogs into useful phosphates which will do your garden no end of good.

4. Now, replace half the soil and scratch it vigorously with rake, fork, hoe, nail file, or what have you. This, believe it or not, allows the soil to breathe, which is supposed to be a good thing.

5. Splash half the surface with "Grapevinegar" to the extent of ½ fl. drm. per square inch. The other half of the ground is sprinkled with sea water to about the same degree as the vinegar—a little in excess of the vinegar dose, if anything. As you may have guessed, fellow gardener, the former area is for the onions and the latter for the peanuts.

6. Replace half of what soil remains and repeat the spraying just as before.

7. Replace the rest of the dirt and severely mash it about with a pick or something so that the concentrates are not all confined to the two planes. The plot may now be deemed to be ready for sowing.

Sowing

Get a boy to walk about the plot on stilts. This will make a lot of indentations in the surface of the ground, and will simplify sowing.

1. The Onions

Dear reader, have you ever planted a single onion seed? Did it come up. Certainly not, I'm sure. The only way to get an onion seed to come up is to plant a couple of score of them in the one spot. Therefore, place a teaspoonful of onion seed in each hole in the onion area.

2. The Peanuts

These hardly ever come out properly, anyway, so it doesn't matter much how you plant them. If you, dear amateur horticulturist, purchase two threepenny-ha'penny bags of salted peanuts, you should have sufficient and with possibly a few left over for a slight snack. The procedure is to drop one peanut into each hole.

Now drive your car back and forth across the plot until most of the holes are filled in. All that remains now, poor reader, is to spray the onions weekly with vinegar, and the peanuts with brine, until you lose interest. This shouldn't take long.

"An Ingenious Method of Capturing Wild Rabbits"

Elmer Flub's Improved Method

The requirements are: one large slab of stone, one lettuce, a watering can and a couple of pounds (avoirdupois) of pepper of the sneezing variety. If the hunter is not very athletic, he had better take along a ladder in addition. (Don't forget a bag in which to place all the rabbits.) Wander about paddocks known to be infested by the creatures until you find a hole which appears to be inhabited. Place the large slab just outside the hole and on this the lettuce. Now sprinkle the lettuce liberally with pepper. The next step is to take the watering can and climb a nearby tree (with the aid of the ladder if necessary). If you neglected to fill the can with water, climb down again and rectify this oversight.

When all is set, commence sprinkling the earth beneath with water from the can. Poppa Rabbit, down in the burrow, sends up Junior to see if it's raining. Junior, on arrival at the burrow entrance, espies the enticing lettuce and, forgetting all else, rushes across and buries his schnozz in the tasty leaves. But, alas, he inadvertently inhales two nostrils-full of pepper. This causes him to sneeze violently and, as his head flies back and forth, it eventually strikes the stone slab and the victim is temporarily stunned. At this stage descend speedily from the tree, clap rabbit into the bag and reascend the tree. In the meantime, Poppa Rabbit, wondering what is delaying Junior, sends up another of his offspring to see what gives. This unwitting animal behaves in exactly the same way as his brother and ends up in the bag. The same procedure continues until Poppa sends Momma and finally comes up himself.

As the reader may see, this method, if persevered with, will eventually clean up hundreds of bunnies. The rabbits may be tamed and kept in captivilty indefinitely and, by the use of special harness, treadmill machines, etc., may be made to do quite a large amount of useful work about the farm. When the animals arrive at the retiring age, they are painlessly put to death in a lethal chamber and the skins and meat are sold, the profit from these sales providing more lettuces and pepper. Elmer's country cousin, Claudbot, has used this method over a period of years and can confidently recommend it to all farmers, hunters, and adventurers.

Geophysical Prospecting for Oil

By R. J. Stapledon

The value of petroleum as a source of lubricants has been recognised for several centuries. To a very great extent, modern industry has been made possible by the quantity and quality of lubricants derived from petroleum. The rapid development of the internal combustion engine and of automotive transport, and the resulting need for petrol and other internal combustion fuels gave tremendous impetus to the petroleum industry. The demand for fuel oils as a source of heat and power added further incentive to search for new sources of supply. The earliest oil fields were discovered by observation of surface or subsurface, indications such as oil or gas seepages, oil sands or showings in shallow wells drilled for water. Although many of the geologic structural principles of oil accumulation were recognised as early as 1860, up to about 1900 the amount of oil discovered by surface observation and random drilling (wildcatting) was more than sufficient to supply a comparatively small market. However, the rapidly increasing demand resulted in geology being called in to an ever increasing degree to help keep reserves ahead of consumption. The geologist rapidly assembled other aids to help him in his search, such as aerial photography, geochemistry, core drilling, subsurface geology, and the several branches of geophysics. The success of the geophysical methods as a whole has been more than sufficient to win for them a permanent place among the many methods the oil geologist must use in his searches.

Many of the types of rock structure suitable for the trapping of oil are now known. The geophysicist attempts to discover these structures by making measurements of various physical properties such as variations in the earth's gravitational or magnetic fields. It is then a problem to interpret these measurements in terms of subsurface geology, and sometimes this enables the geologist to draw certain conclusions concerning the possibility of the occurrence of commercial deposits of petroleum. Geophysical methods are in themselves indifferent to the presence or absence of oil. They merely serve to indicate whether the rock structure is capable of storing oil. In fact, so far there is but one definite method of proving the existence of an oil field and that is to drill holes in the ground. Despite modern methods the present average is about one "strike" to every six holes drilled.

The most popular geophysical methods at present are magnetic, gravitational, and seismic. Seismic methods consist of studies of the travel-time of elastic "seismic" waves set up in the earth by the explosion of a charge of dynamite. Deductions are based on the refraction and more recently on the reflection of these waves. Reflections have been obtained in some instances from depths exceeding 20,000 feet. The author's experience is with magnetic and gravitational methods only, and it is proposed to treat these methods briefly in what follows.

Magnetic observations are made with a magnetometer, which in its essence is a highly glorified dip needle. The accuracy of this instrument in its most modern form is of the order of 1 gamma equals 1-100,000 gauss. Because of its extreme sensitivity it is necessary to compensate for changes in temperature, and also for local variations in gravity. The moving member is mounted on quartz knife edges, and rests on quartz bearings. An ordinary wrist watch placed within a foot of the instrument is sufficient to send it off scale.

Field readings are complicated by the fact that there is a daily variation in magnetic field at any one place of the order of 20 to 30 gamma, this being known as the divernal variation. To overcome this it is necessary to use two instruments, and to establish one at a base, all field readings being referred to this base. After being corrected for latitude and longitude variations, the results are cast into suitable graphical form for interpretation. Usually this consists of a chart showing lines of equal magnetic anomaly, but sometimes magnetic profiles or isometric anomaly charts are drawn.

Readings are easily upset by local disturbances such as magnetic storms, or cigarette lighters inadvertently left in the observer's pocket. One American observer in the author's party was firmly convinced that all large anomalies in his work were caused by buried bombs (the area was New Guinea).

Magnetic methods, where applicable, are generally used for rapid reconnaissance in oil exploration. They react chiefly to large structural features associated with changes in the topography of the basement rocks. However, they are also adapted to the mapping of small local features such as faults, domes, and anti-clines. However, they depend on extremely variable rock properties namely magnetic susceptibility and residual magnetism, and hence do not permit a quantitative evaluation of results. Detailed surveys must be made after promising magnetic conditions have been discovered.

The gravitational method has had great success in the search for oil. In importance it lies between the magnetometer and the seismic method, particularly the reflection method, which is regarded as the most definite of the geophysicist's tools.

The torsion balance and the pendulum have been used for gravity measurements, but these have been superseded in so far as field work is concerned by the static gravimeter. This in its simplest form is a very delicate spring balance. The fundamental unit used in measurements of the earth's gravimetric field in this way is 1-10 milligal = 0.0001 cm./sec2. At various stations over the area being surveyed, the value of this gravitational field, relative to that at a base station are read, and after being corrected for topography, elevation, and latitude, lines of equal force (isograms) are drawn.

This instrument is much more delicate than the magnetometer. It is very sensitive to temperature changes, the maximum permissible variation being 1-10°c. A heavy tread on the ground is sufficient to send it right off scale. Due to creep in the spring, it is necessary to take check readings at the base station at approximately two-hour intervals in order to evaluate the drift.

With the gravimeter a certain amount of quantitative evaluation of results is possible. Within certain limits, the form, density, and depth of a subsurface body producing an anomaly can be deduced from that anomaly.

One of the most recent advances in gravimeter work is in working under water. It has been found more economical to drill over water than on land and in certain areas such as the Gulf of Louisiana a good deal of over water work is being carried out. For this purpose the gravimeter is enclosed in a large diving bell constructed so as to have great steadiness when on the sea bed.

Greatest advance in magnetometer work is the aerial magnetometer. Rather crude forms of this instrument were used for the detection of submarines during the war, and met with great success. The development of an aerial gravimeter presents much greater problems, and is still in the dreaming stage.

The extent to which geophysics has influenced the oil industry is shown by the following brief analysis. The first discovery credited to geophysics was in 1924 and was based on torsion balance work. In 1928, geology was credited with 71% of the major field discoveries in the U.S.A. and geophysics with 7%. The corresponding figures in 1937 were geology 25%, and geophysics 62%.

It must not be supposed that geophysics will displace geology in the search for oil. They are essentially adjuncts, and modern search uses these plus all other aids available such as aerial photography, paleontology (the study of fossils), core drilling, and anything which will help to increase the probability of putting the hole in the right place.

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