HYSTERESIS

OFFICIAL JOURNAL OF
THE ADELAIDE UNIVERSITY
ENGINEERING SOCIETY

1965

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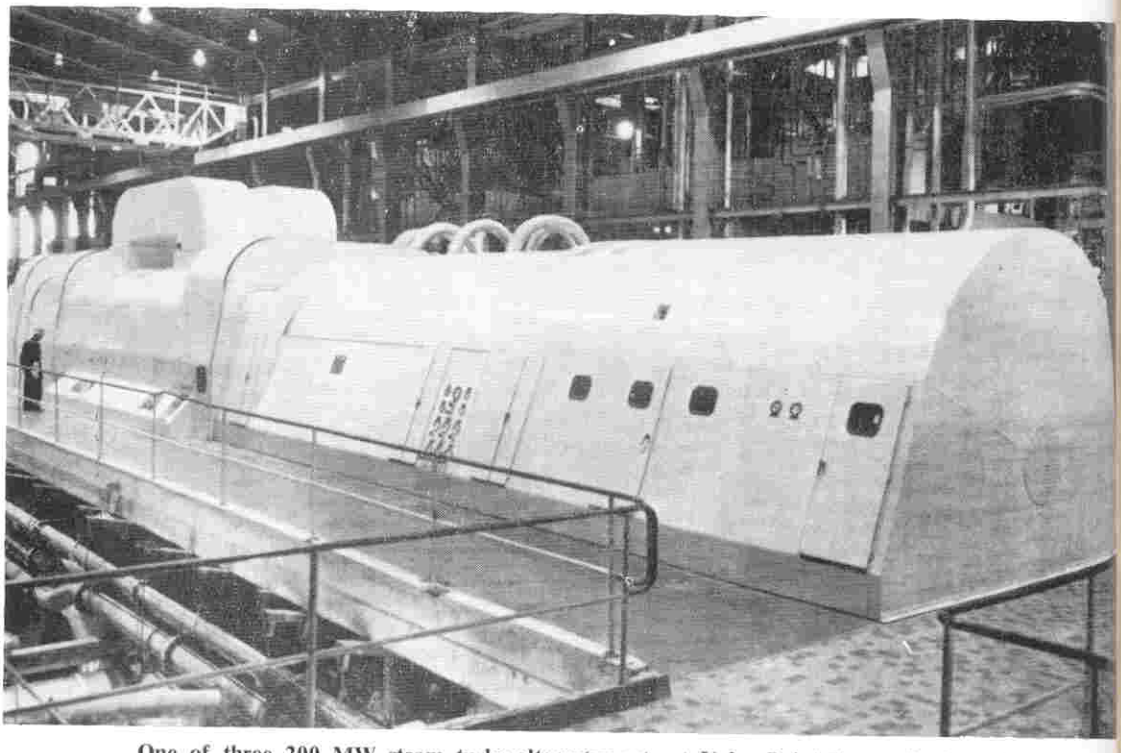

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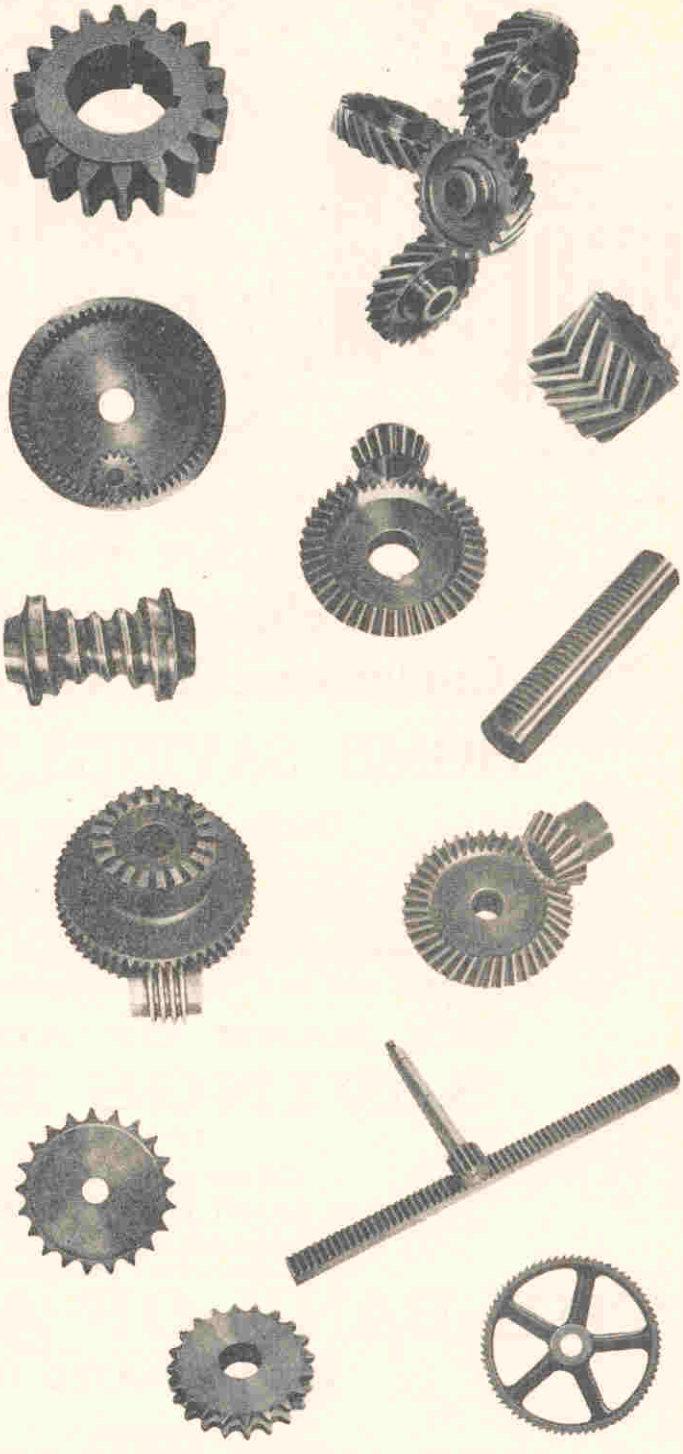

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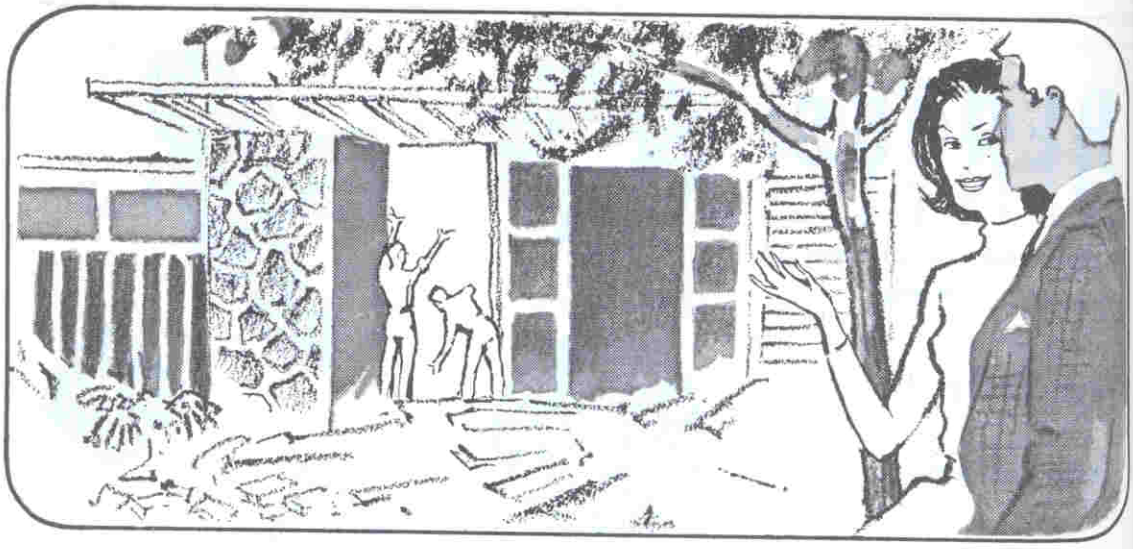

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HYSTERESIS 1965

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EDITORIAL

IF YOU WANT TO HAVE IT—HELP SUPPORT IT!

No, we're not talking about sex this time, or even 10 o'clock closing; the subject is society activities, and we're being serious for once.

Apathy is a word which has been much used and abused at the University, and hence is calculated to frighten away even the most enthusiastic reader, but we are forced to use it again. So before you go, we simply ask you to ponder these facts:

1. Engineering Society membership is falling, and although faculty members gladly attend functions organised by the Society, they have to be cajoled into joining it.
2. Out of four hundred engineering students, only seven or eight had the ability and enthusiasm to contribute to this magazine.
3. Society functions are limited to the Ball, the Dinner, and the Tug-of-War—other events—sporting and social—could be held if more members were available to help run them.
4. There have been no Engineering floats in Prosh for some years.

This is apathy if ever there was, and it is disillusioning to find it amongst us. There was a time when engineers were wholeheartedly in everything—crazy and ingenious prosh stunts, inter-faculty sport, debating, you name it—yet, look at us now!

The time-honoured excuse of "too much work" has been proved wrong by those few individuals who do support everything, and they are not only the bright boys either. It is a fact that our courses are full, and that our spare time is limited, but if all contribute in some small way towards helping to make society functions successful, we will have a better magazine, a more active and satisfying society, a closer relationship amongst students, and a brighter Engineering image.

Attitudes can be habit-forming, and none more so than apathy and laziness. There is a certain quite common component on the staff of most Government Departments known as the "Public Service Missile—one who won't work and can't be fired", and while the present attitude continues amongst engineering students, there will be no lack of candidates for these positions. These years at Uni. can be either the most tedious or the most rewarding of your life—it's up to you. You can either listen to the football or play it against the staff; watch TV or write for it; complain about a function or organize it yourself—the list is as long as your enthusiasm.

Prof. R. W. F. Tait

THE DEAN'S PAGE

I take this opportunity of thanking all students who participated in making Open Day, 1965 the success that it was. Whilst it would be invidious to single out any one project or department for special praise, my prize would go to the student who guyed the rash of notices that appeared everywhere with a card hanging about a foot below one ceiling and saying simply " ROOF ".

It seems appropriate at this stage to survey quickly the events that have occurred since the previous University Open Day in August, 1955. In that period, the Engineering Faculty has acquired additional building space in the form of a new floor on the eastern end of the main building and the Engineering Annexe. However, only a limited part of that space has been made available to us. Most of it is occupied by the Departments of Architecture and Computing Science.

On the staff side, things appear much more rosy, as the number of full-time academic staff has risen from eighteen to thirty-four. However, these gains have been substantially off-set by the fact that we have taken over much teaching that was formerly done at the Institute of Technology or by part-time lecturers.

There have been complaints that although student numbers have changed but little, Engineering is no longer getting its fair share of the best undergraduates. The evidence for this statement is scant and the fact that, in recent years, we have obtained two Rhodes' Scholarships, as well as several other top awards, would appear to give it the lie.

In the courses offered by the Faculty, there have been many changes. We all regret the demise of Architectural Engineering and Metallurgical Engineering, and the impending demise of Mining Engineering. Policy changes brought about the discontinuation of the Architectural Engineering course. Many of us feel, particularly with the contrasting examples (cost-wise, at any rate) of the Sydney Opera House and our own Engineering Annexe before us, that there is plenty of scope for the Engineer-Architect to work in close collaboration with his more "artistic" brethren. Metallurgical and Mining Engineering have died largely because of lack of entrants to these subjects.

The other main change that has occurred has been the gradual drifting apart of the courses in Civil, Electrical, and Mechanical Engineering. In 1955, the first three years of the course were common to all three. Today, Civil and Mechanical Engineering have two years in common but are divorced entirely from the new

Electrical Engineering course. Thus it is no longer possible for an Engineering undergraduate to delay his final choice of career for several years after entry to University.

These changes affect you, today's undergraduates, only in so far as they have narrowed your choice of possible courses and made it much more difficult for you to change from one course to another. Factors which affect you much more are the increasing emphasis on Mathematics, both in formal courses and as part of Engineering subjects, and the gradual elimination of almost all descriptive material. Then, too, there has been at least an introduction to elementary computer techniques in every branch of Engineering. These changes have been made necessary by the rapidity with which the nature of Engineering is changing. A graduate engineer today can avoid becoming obsolete only if he has a sound basic knowledge of Mathematics and Physics (Chemistry, too, for the Chemical Engineer) and after graduation is prepared to devote quite a large proportion of his "spare" time to keeping abreast of the current literature in his chosen field.

As if this were not enough, the Engineer who aspires, as so many do, to the management side of industry must equip himself with some knowledge of ever-increasingly complex techniques of management, including such subjects as economics and operations research.

Lest you feel that this presents a gloomy picture of the life that lies ahead of you, let me assure you that you will find the rewards of a successful career in engineering are worth any effort you may have to make and that very few of you will have any lasting regrets over having chosen engineering as your profession.

PRESIDENT'S REPORT

1965 A.U.E.S. President, Dean Pritchard.

It is indeed difficult to produce a report which gives a true picture of the Society's success or otherwise during the past year. It is far too easy, and less embarrassing, to gloss over the mistakes and dwell on the triumphs, thereby giving the committee a "pat on the back" not fully deserved. It is with this in mind that I continue.

The 1965 committee was young, and in general, not very experienced in Society management. Consequently a casual atmosphere pervaded most meetings, and we did not always adhere strictly to protocol. I feel sure, however, that this very likeable bunch of fellows would have functioned with no more efficiency and certainty with less spirit, had a greater curb on their personalities been imposed. Our first and most important aim, as can be said for the recent past committees, was to improve communication with the members and thus revive the flagging student interest in the Society. It was intended that we would offer the student more, and more of what he wanted. In this first respect we failed for the Society's activities were more restricted than last year's. It must be noted, however, that gauging by the fine attendance at the Ball, we have begun to offer the suitable bait. In doing so we have lowered our ideals, for the Ball is no longer formal, but instead a licensed student get-together. On the subject of the Society Ball it remains only to mention that students filled the small R.S.L. Club, arrived mostly late, preferred to drink than listen to the over-paid floor show, yet still produced a thirty pounds profit to the good of the Society. Thanks go to Peter Mathew, Bruce Golley, and Ray Neuling for their competent organisation. **Our sincere apologies are tendered to staff members for the lack of invitations, which will be rectified next year.**

The Fresher's Welcome again induced a high percentage of enrolments, due no doubt to the excellent films of some of the Society's more shady activities, the stimulating talk by the Dean, Professor Tait, and the natural refreshing enthusiasm of the University newcomers.

The Staff-Student Golf Day did not continue with the initial success of last year, although the few who did attend, thoroughly enjoyed the day. Considering the good organisation on the part of Peter Mathew, we can only conclude that engineers are not ardent golfers.

The Med-Engineers tug-o-war proved again that the Med students are bigger and stronger yet have not the fighting spirit of the Engineers. We owe our thanks to Robert Fry and S.C.I.I.A.E.S. for the organisation of unlimited quantities of ammunition, and willing, tireless throwers.

One of the most important factors affecting the outcome of Society events is publicity. This year we elected a Publicity Officer, Ron Reigel-Huth, whose ingenuity and imagination seem unlimited. He has proved that such a publicity man is a necessity for the Society. I would like to thank two of the hardest working and conscientious of our committee, Bob Burke and Emil Siranovic who have, among other things elected to edit and manage Hysteresis for 1965. I wish them well.

At this point I would also like to thank most sincerely, the patient, hard-working secretaries in our Faculty. Their kindness and efficiency keep the Society correspondence in shape; and in particular, Mrs. Walls and Rene Sands, who typed much of the material for this issue.

My thanks also go to the committee for the way in which they managed to bring success to the little attempted, and for doing so without undue duress. However, the Society requires a full-time Executive with more interest and energy before it can be said that the year has been a successful one. It is with this thought in mind that I wish the 1966 Committee well.

DEAN PRITCHARD, 1965.

TO BE OR NOT TO BE, THAT'S THE QUESTION

by T. S. Chu

When I first approached Mr. Chu about writing an article for Hysteresis he was willing enough, but was rather worried as to the topic he should choose. Finally, after a period of rumination he consulted me, and enquired whether an article about some famous engineer or inventor would be satisfactory. After some consideration I told him that I would much prefer an article about his own life (I was familiar with his background), and the article below is the result.

My reasons for advocating a topic of such a nature are that famous men have had their life histories recorded in many books, and these may be found in any library, but there is seldom much written about ordinary students and their struggles and aspirations.

I hope that this article, as well as entertaining us with an interesting life story of one of our fellows, will give heart to any one of us who has had to struggle to fulfil an ambition by showing that there are others as well who have struggled and made sacrifices to achieve their goal. The knowledge that one is not alone in his struggles is often very heartening.

Thus, it is hoped that more such articles may be published in future editions to enlighten and hearten all of us.

When I was only nine, my father asked me what I would like to be when I grew up. The story went that I replied without hesitation, and said, "An Engineer!" (as if I knew what an Engineer was). Had he asked me again while I was flying a kite, my answer would undoubtedly be something else. Good thing he did not.

The following year, I was sent to a private school—the Methodist Afternoon School, Kuala Lumpur. And there I was taught some of the things all potential Engineers MUST know. Things like Tug-of-War, testing paper gliders in the class, toasting sandwiches on a radiator, singing in unison "Happy Birthday" to any teacher at the end of every term, and many others. Have you ever sat on a piece of chewing-gum? Our teacher did!

At 15 the Headmaster reckoned I should be promoted to a better school, the Methodist Boys' School, which is the morning session at the same building. The environment was different, so I changed—a very natural reaction, so I thought. My progress reports confirmed the change, for in the Remarks column was often written "Forward in Football, but Fullback in History". My father was not very pleased. He thought that Historical training must be thorough, so that the inventions of the Steam Engine by James Watt, and the Incandescent Lamp by Thomas Alva Edison, must not be overlooked. (It is very disappointing to find that they were not the inventors—oh what a waste of time). It was very comforting to find those same marks lost in History returned and sat on top of Maths. and General Science.

The year before I left school, my father died. He left us a dilapidated house and about £(A)20 in the bank. I was supposed to become an Engineer with that! The loss of my father, combined with a few years of schooling, had broken the egg-shell enclosing me. I became aware of and interested in those people standing in the sun peeping through surveying instruments; the monkey jumping up and down the pile-driver and big floating boats dredging for tin. That's the kind of life I like—in the open and under the blazing sun (my definition of an Engineer's life). Unfortunately for me, I did not have an adviser like the Dean of a Faculty to help me. The miserable library in

the school was literally filled with Enid Blyton's series. Consequently my conception of Engineering remained narrow for many years.

When I left school in 1956, our family was heavily in debt. This was due to the heavy expenditure incurred during my father's burial ceremony. At that time, I did not have the minimum qualification to go to the University. I tried, unsuccessfully, to get a scholarship at the Technical College. In desperation, I applied for a Teacher's Training Scholarship to go to England. I was accepted. By September, 1959, I was in Wolverhampton, England, where I attended the Malayan Teachers' Training College, Brinsford Lodge, for 2½ years. My stay over there was a real eye-opener. I travelled extensively during the holidays and gradually I formed new concepts concerning Engineering. The Black Country (Midlands) could be seen after all!

On completion of my course in 1959, I decided to do whatever I could to gain admission into the newly-opened University of Malaya. So for the next two years I attended evening lectures in Advanced Level Physics, Chemistry and Maths. Full-time teaching in the day and evening lectures at night were too much for me. Consequently, I often dozed off during lectures. Once I fell asleep in the back of the class before the roll was called. I was really embarrassed to find the whole class roaring when I said "Present Sir!"

By June, 1960, I decided to give up attending lectures. I studied whenever I could find the time, and sat for the Final Exam in November the same year. Through the "negligence" of the Cambridge University Authorities I was awarded the Cambridge Higher School Certificate.

Having solved the academic problem, I began solving the financial one. It was by a stroke of luck that my application to study Mechanical Engineering under the Colombo Plan was granted. They sent me here on 23rd February, 1962.

Finally, after 16 years of talking and hearing about Engineering, I began studying it!

Since my arrival I have been gradually learning to become an Engineer. If the Authorities here are as "negligent" as those in Cambridge, I am sure my childish dreams will be transformed into reality.

Let me take this opportunity to thank all those who have helped me to get this far.

TO BE—THAT'S THE ANSWER!

N.B.—Just for interest's sake, Mr. Chu, as well as being a teacher and having taught for two years, is now doing his final year Mechanical Engineering, has recently been elected President of the Malaysian Students' Association, and has just gained a wife.

"Uncertainty, in the presence of vivid hopes and fears, is painful, but must be endured if we wish to live without the support of comforting fairy tales.

BERTRAND RUSSELL.

He who knows not, and knows he knows not, is a child—teach him.

He who knows not, and knows not that he knows not, is a fool—shun him.

He who knows, and knows not that he knows, is asleep—wake him.

He who knows, and knows that he knows, is a leader—follow him.

THE RIDDLE OF A.U.E.S.

or Herr Male Strikes a Tough Egg!

Our tale begins, gentle reader, on a beautiful morning in June, when our pocket-sized secret agent, Herr Male, was going unconcernedly about his studies in Refec IIIA, cunningly disguised in his alias of AIR MAIL, that dear little soul who sends you so many letters.

Suddenly, with a crash of cymbals and other dramatic music Herr Male came upon a Mysterious Object. In fact, a shield, upon which was an egg on a string, complete with great and marvellous flashes of lightning. We should point out that eggs to H.M. are something akin to beer to engineers, and this was quite the most attractive egg he'd ever seen.

Without further ado, Herr Male whipped out his eggspoon and, anticipating a delicious snack, belted the egg.

It did not crack.

He clobbered it with all his might.

He jarred his wrist.

But the egg remained serenely undamaged.

Herr Male at last yielded to a growing sense of fatigue failure and wandered off, deject and wretched, but most curious about unbreakable eggs, and strings, and such.

Crossing a road along which many pedestrians walked and few vehicles could make headway, he noticed a truck full of rubbish on which was written "City Engineers Dept."

"Aha!" he said to himself. "So that's what they do when they get their B.E.—Arts graduates paint, and Engineers collect rubbish. I've often wondered."

He looked around at the pedestrians, some with long hair, some with skungey incipient beards, some in jeans, some in suits, some holding hands, all carrying bags. Some he was alarmed to note, had hair almost as long as his own! Suddenly he started. There was a young man with a tie on which appeared that same egg on a string! Under it appeared the letters A.U.E.S.—more mysterious still! But then, with a flash of inspiration of the type that has been granted to only a few of the world's great geniuses—Pythagoras, Newton, Einstein, Herr Male—he realised what the letters stood for:

"ABSOLUTELY UNBREAKABLE EGG (ON) STRING."

Full of jubilation, he raced into the Barr for a quick pint of ideal fluid. Seeing his boozey old mate Strict Silence, who never works and relies on people like Herr Male to buy him drinks (hence the sign "PLEASE MAINTAIN STRICT SILENCE"), he dashed over, interrupting a loud conversation with a hard-looking old lady and a dumb-looking chap in a white coat to tell Strict of his flash of inspiration.

Strict was unimpressed. "Actually," he said, "lots of noisy people come in here with that egg-thing on. Me old Father Eternal reckons it stands for ALWAYS UPSET ETERNAL SILENCE".

The mystery deepened—if Strict was right, the letters had nothing to do with eggs. More curious than ever, Herr Male set out once more.

Soon he came upon a series of notice boards. One was headed E.U. Surely this stood for Eggs Unbreakable! But reading further, Herr Male found something about the end of the world being at hand. He knew, however, that the world was round and therefore didn't have an end. So obviously the person who wrote the notice didn't know what he was talking about.

Then there was another notice headed SCIIAES. "This word must be derived from the Latin 'scio', 'I know'," thought Herr Male. At last he could verify his theory! But the rest of the notice just talked about beer and lilies and other surprising but irrelevant things. Baffled, Her Male walked away.

At last, after climbing many stairs, he came upon a room full of young men with drawing boards and much equipment. Surely they must be designing ingenious things. Perhaps an egg cracker! He unashamedly eavesdropped on a learned conversation between two of the young men, for he was still determined to find out what AUES had to do with eggs.

"What'd yer do Sat'dy noit?" said one young man.

"Picked up this bird at the Wonderland," said the other.

Herr Male realised that he must be a very kind young man, because the bird might have fallen down and hurt its wing. Then it struck him that perhaps—it was just possible—this was the very bird that had laid the AUES egg. So he strode boldly up to the young men. One turned round and looked him up and down in a most unfriendly manner, then turned to the other and remarked. "Gawd, must be an architect lost his way!" The other laughed.

Disappointed and disillusioned, Herr Male trudged away, and we regret to advise that he has only been seen on very rare occasions since that day.

However, since we would like a happy ending to our tale, we are offering a prize of one year's free subscription to Hysteresis for the best suggestion of what AUES stands for, and another for the best device for cracking eggs.

Results in next year's Hysteresis. Umpire's decision is final, and no missile throwing will be entered into.

Entries should be submitted to Mr. J. Mulberry, Dept. of Metallurgical Psychology, who is doing a Ph.D. thesis on psychological stress distribution in metal eggs.

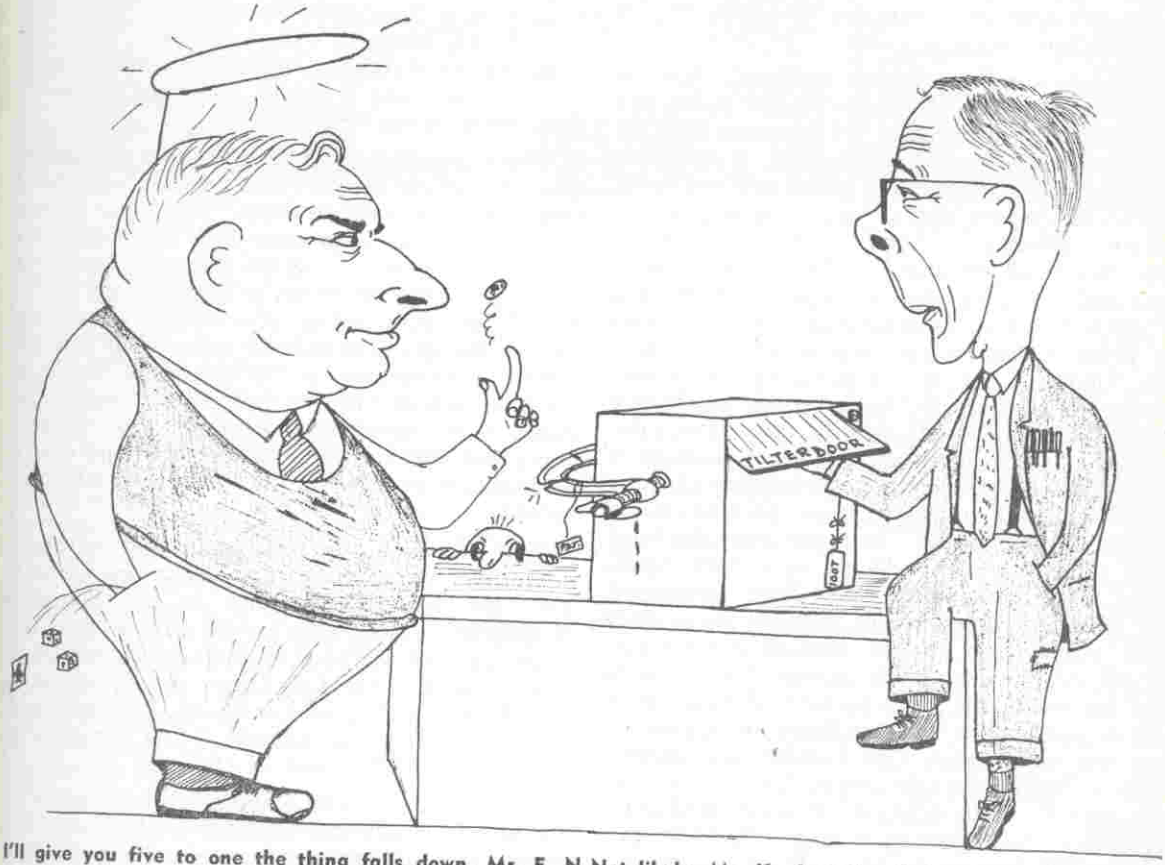
ECCLESIASTICKLES

(Contributed by the AUES delegate to Church, who prefers to remain agronomous.)

Lay not up for thyself treasures in Heaven, for verily thou shalt probably never get there to collect them anyway.

☆ ☆ ☆

They who sing loudly in Church have great need to do so, for are they not the farthest from Heaven?



I'll give you five to one the thing falls down, Mr. F. N Not likely, Mr. K., I used a design factor of 100!

REPORT ON NOISE

by R. B. King

Senior Lecturer in Mechanical Engineering

The Wilson Report on Noise tabled in the British Parliament in 1963 has underlined the fact that in recent years, while the amount of power being utilised in industry, commerce, transport and the home have been growing steadily, the general levels of noise and vibration have been correspondingly increasing.

Engineering industries today are confronted with a wide range of sound and vibration problems, whether it be the noise emitted by their products militating against sales, or the high noise leves from the machinery within the factory leading to loss of human efficiency and productivity and even damage to hearing. The latter is more widespread than is generally realised. In a recent survey of 5,000 workers in factories, mines and dockyards in the Greater Sydney area, one-third were found to have permanent noise-induced deafness amounting to extreme difficulty of hearing, another 20% had noticeable deafness, and still another 20% were showing signs of deafness. Even in the heart of the country, on the inland farms, a recent government survey has found the hearing acuity of many tractor drivers to be damaged by continuing exposure to the engine exhaust noise.

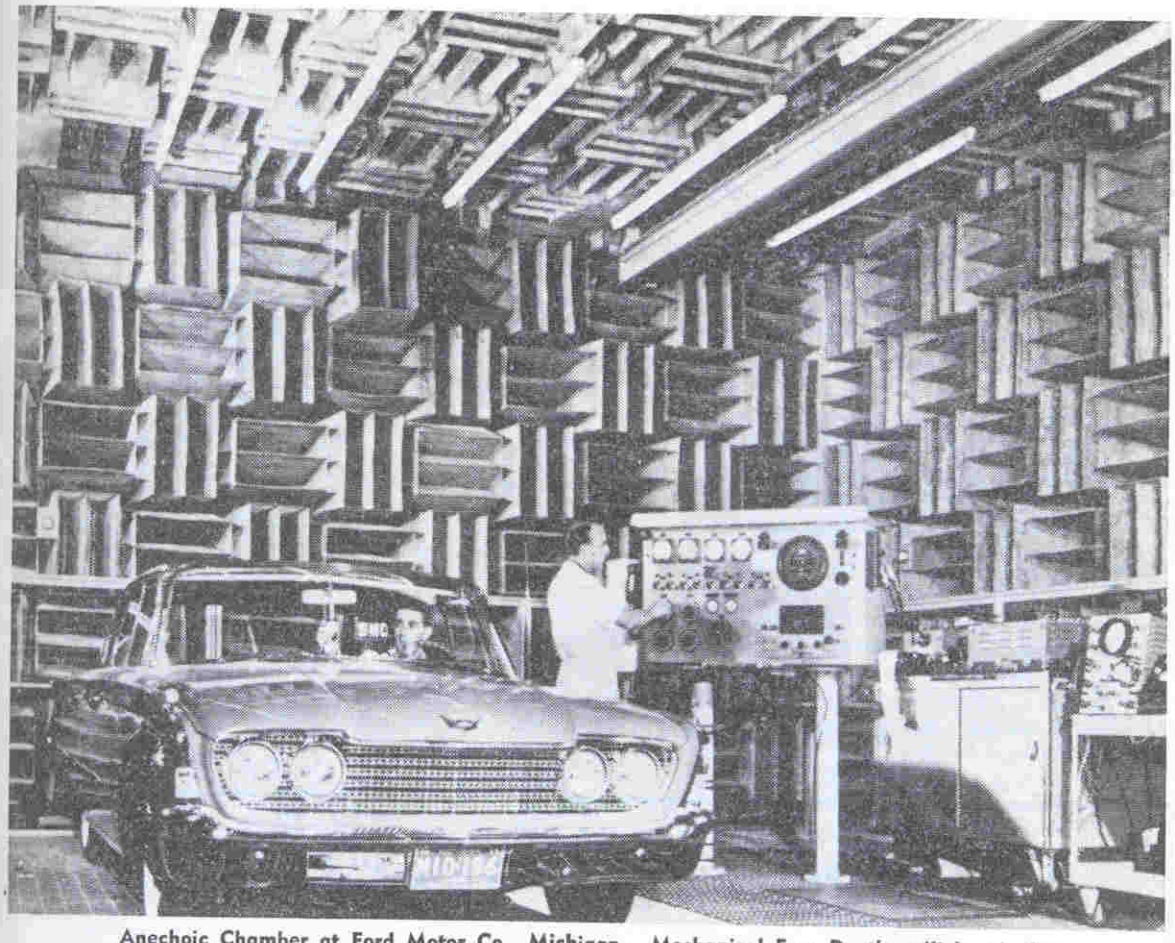
In modern multi-storeyed buildings, used by commerce, the occupant's desire for peace and quiet, and even privacy of conversation, is thwarted by the increasing tendency of architects to favour wide open areas in offices and to employ lightweight construction of partitions and of the building generally. Such methods frequently offer only small resistance to the transmission of noise and vibration from one part of the building to another, and to the transmission of noise into the building from outside sources such as traffic and aircraft. In the community, generally, greater refinements in the acoustics of lecture rooms, auditoria and theatres are being demanded. In the urban areas of large cities noise and vibration from large flow volumes of road traffic and rail transport have become major sources of disturbance. In many countries legal noise limits for new vehicles have been established. Inspection centres have been constructed and fines, or suspension of licences, await road users whose buses, trucks, cars or motor-cycles exceed specific noise levels measured under standard test conditions. The problem of noise inside aircraft and in the neighbourhood of airports is only too well known. At London (Heathrow) Airport during daylight hours 260 jet aircraft roar over the surrounding thickly-populated communities as they come in to land. By 1970, this number will increase to 440. The prospect of a continuous barrage of sonic "booms" from inter-continental supersonic airliners is being faced by England and other countries lying under inter-continental flight paths. It is not difficult to visualise the situation in which we in Australia shall find ourselves within the next few years.

Thus, in all aspects of modern life, noise and vibration problems have become major factors for consideration in planning and design. One would have expected that the technological aspects of applied acoustics would have found their way into courses of applied physics, engineering and architecture in universities and technical colleges. This is still the exception rather than the rule and at the present time there is only one Chair of Applied Acoustics in England (within the Engineering Faculty at the University of Southampton) and none in Australia. As a consequence, there has been an urgent need for an expansion of facilities in Australia for education and research in applied acoustics and vibration studies.

Sound consists of extremely small alternating pulses of air pressure produced by the mechanical vibrations of a solid or fluid. The basic science of acoustics has long since had its foundations laid by the physicist, and the electronics engineer has made great advances in recent years in the techniques of recording, reproducing, measuring and analysing sound and vibration. But it is the mechanical engineer, as the person perhaps primarily responsible for the unwanted by-product of noise in machinery and transport, who is most concerned with research, development and design to eliminate or alleviate the noise and vibration problem.

With the support of government and university authorities, an Acoustics and Vibrations Laboratory—the first of its kind in the Southern Hemisphere—has been established within the Department of Mechanical Engineering. Although still incomplete, the Laboratory was inaugurated last August and useful teaching, research and consulting work is already being conducted, despite present shortages of staff.

The function of this Laboratory is to serve as a centre for study and for both fundamental and applied research into problems of noise and vibra-



Anechoic Chamber at Ford Motor Co., Michigan. Mechanical Eng. Dept's. will be similar.

tion. It is hoped to establish co-operative research among the various interested departments of the University. It is intended to establish close liaison with government and industrial research and development organisations. It will be possible for such organisations to make use of these special facilities for individual study and research. Already one postgraduate research fellowship has been founded by a South Australian industry. Staff exchange arrangements will be welcomed with other educational centres and with government and industrial establishments. Manufacturers are now able to obtain tests by an independent authority on their machines, electro-acoustic equipment and building materials in order to establish their compliance with specifications and standards. The Department is playing an important part in the formulation of Australian standards in this field.

The Acoustics and Vibrations Laboratory contains three specialised rooms constructed to meet international standards, namely, two large reverberation chambers of 6,400 and 3,700 cubic feet capacities, and an anechoic (echo-free) chamber of 8,600 cubic feet capacity. Each of these chambers weighs approximately two hundred tons and is isolated from the main building structure by resilient spring supports. The walls are constructed of 12 inches thick concrete so that very low noise levels close to the absolute threshold of hearing may be maintained. The two large reverberation chambers have walls which exhibit the property of very low sound absorption. These rooms are used for analysis of the sound power output of noise sources, sound power comparisons, sound transmission properties of structures, the random-incidence absorption coefficients of acoustical materials and the random-field calibration of transducers. In addition, high intensity noise fields can be established for investigation of acoustic fatigue. The anechoic (echo-free) chamber is used to imitate open-air conditions by having almost completely sound-absorbing walls. Such a chamber is used

for analysing the noise sources of mechanical and electronic devices covering a score of industries such as automotive, appliance, electrical, aircraft, television and radio, etc. Associated with the test chamber is a Control and Calibration Room and a comprehensive Instrumentation Room for the development of complex electrical or mechanical ancillary equipment and experimental rigs. There is available a wide range of sound and vibration generating, measuring, analysing and recording equipment. The University Computing Centre is being used for research projects.

It is intended, in the near future, to disseminate more widely to technical and professional people existing knowledge of how to deal with noise problems. This will involve short courses, as an extension to undergraduate courses which were initiated in the Department in 1958.

Another of these perennial Anglo-Australian jokes—this time the Pom and the Aussie were watching a belly dancer in a night club in Cairo.

"I say, old chap," remarked the British officer, "that's a bit near the knuckle, eh what?"

"Fer your information, mate," replied Our Hero, "I wasn't watchin' the bit near the knuckle!"

"WALLS ALIAS BUTCH"

☆ ☆ ☆

Pick of the signs on Open Day—one on the Civil Engineering Secretary's door reading "Hands off Walls".

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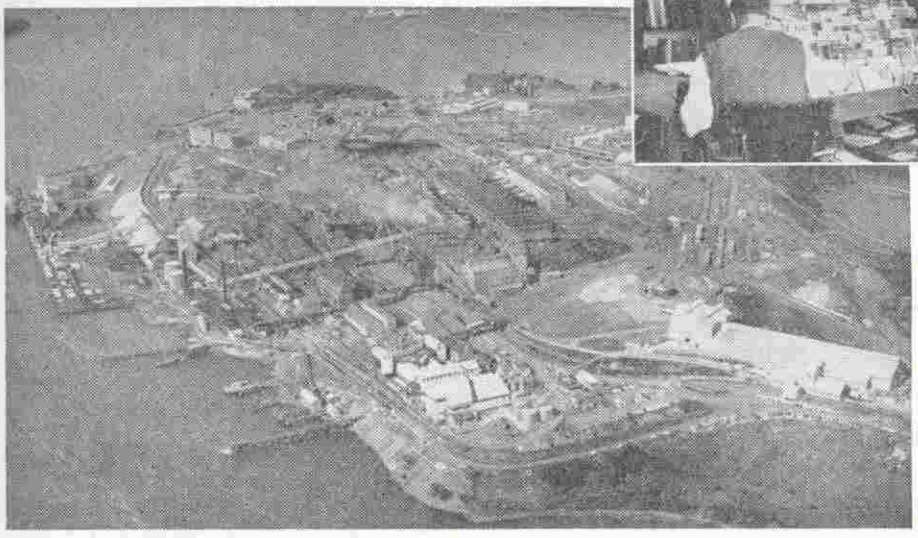

Aerial view of the Risdon Plant on the Derwent River, Tasmania.

Electrolytic Zinc Company operates mines and ore dressing plants at Rosebery, on the West Coast of Tasmania, while the zinc plant and its associated sulphuric acid and sulphate of ammonia units are situated at Risdon, near Hobart. The Company, the largest producer of zinc and sulphate of ammonia in Australia, is at present engaged in an active programme of exploration, development and research which offers a challenging future to new graduates.

The Company offers practical and comprehensive training while paying competitive salaries which are augmented by a twice yearly bonus. A liberal superannuation scheme and complete medical benefit scheme are in operation for all staff.

Further information may be obtained from the Company's Offices at Risdon or Rosebery, Tasmania.

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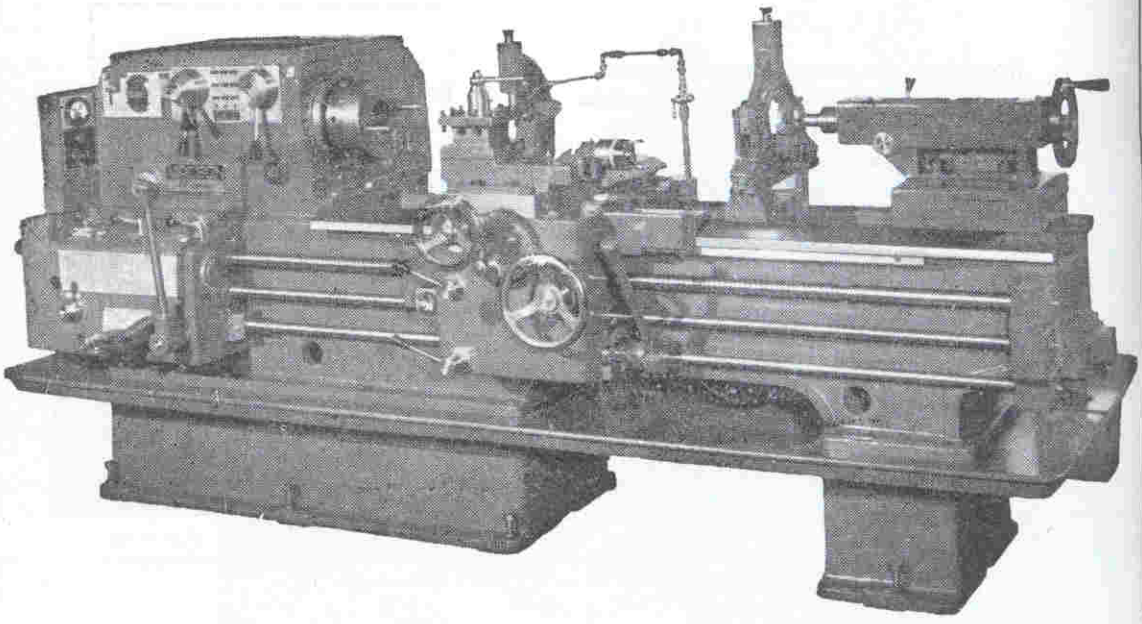
IM6

MACSON

18" and 21" SWING LATHES



The Macson 18" and 21" Swing Lathes, in addition to the regular Macson features, include these advantages:—

- **18 spindle speeds in ranges up to 1,600 r.p.m.**
- **More power. Ranges up to 15 h.p.**
- **Large diameter hole through main spindle.**
- **Multi disc brake.**
- **Inverted asymmetric vee guide ways.**
- **Wide, deep section bed with diagonal bracing.**
- **Wide range of extra equipment.**
- **Sensitive feed trip on apron.**

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SUGAR AND SPICE

It is hoped that "Hysteresis" as an organ of the A.E.U.S. provides the student with some information of what is going on in and around the faculty, of who is who around the faculty and also of the type of "interesting experiences" that may be had by members of such a faculty. However, to initially catch the students interest, it is often advisable to appeal to his more earthy side first, before appealing to his intellect. Hence spice—

Of days of old there still linger some traces of the "old engineering reputation". Assuming that some of this spirit still exists, here follows some verse—near and dear to the heart of every engineer—which it is hoped may revise the old traditional way of life. Though it may feel degrading to have to turn to poetry, we must acknowledge a man of true spirit, and Keats is very specific, when he cries,

"Give me women, wine and *'stuff'* (N.B. snuff is out of date)
Until I cry out 'hold, enough!'
You may do so, sans objection
Till the day of resurrection;
For bless my beard, they aye shall be,
My beloved Trinity."

No statement of fact could be closer than this lusty cry—a cry for life as an engineer should live it.

In case there are some among us who wonder how to best use the mentioned "commodities", Keats again comes to our rescue. Though the picture may be unfashionable the ideas are current and suggestions applicable,

"Where be ye going, you Devon Maid?
And what have ye there in the Basket?
Ye light little fairy just fresh from the dairy,
Will ye give me some cream if I ask it?
"I love your Meads, and I love your flowers,
And I love your jubets mainly,
But 'hind the door I love kissing more,
O look not so disdainly.
"I love your hills, and I love your dales,
And I love your flocks a-bleating—
But O, on the heather to lie together,
With both our hearts a-beating!
"I'll put your Basket safe in a nook,
Your shawl I hang up on the willow,
And we will sigh in the daisy's eye
And kiss on the grass-green pillow."

As good engineers we should also be aware of the need for lubrication to keep "all systems go"! Now Keats advises:—

"Hence Bergundy, Claret, and Port,
Away with old Hock and Madeira,
Too earthly ye are for my sport;
There's a beverage brighter and clearer."

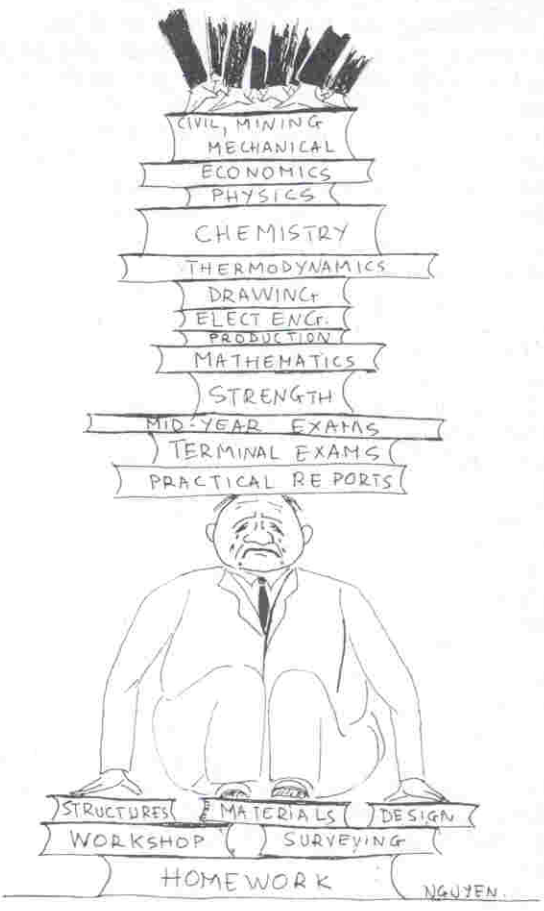
which could be concluded fittingly with,

That does not leave the belly austere,
What else could it be, but Australian Beer!

It may have been noted that "stuff" has been substituted for "snuff", and that it has not been defined, so we will let it stand for anything else that may bring pleasure, including, it is hoped, exams (or more specifically passing of them). So it might be appropriate to leave you with a helpful soliloquy for some occasion, when you are working towards this final pleasure. Again Keats (with some prompting) rises to the occasion,

"Fill for me a brimming bowl
And let in it drown my soul:
But put therein some drug, designed
To banish women from my mind:
For I want not the stream inspiring
That fills the mind with—fond desiring,
But I want as deep a draught."

—*That may promote some useful thought!*



Compression Test

BUILDING AND RACING A CLUBMAN

Bob Burke

4th year, Mechanical

"Four weeks my eye—it'll take you four months at least!" This was the disillusioning remark which greeted us as we rolled proudly home, complete with a shiny new Elfin Clubman frame and body, and boldly announced our intentions of entering the S.A. Tourist Trophy a scant four weeks away. Four months indeed—the job was quite straightforward: just bolt an engine, gearbox and diff in, plus a few odds and ends, and we were mobile. Quite so! Just five months and two weeks later, at 2 a.m. on Easter Monday, 1963, the Clubman first moved under its own power.

In retrospect it seems incredible that my brother Terry and I, two of the world's least knowledgable motoring enthusiasts, should have made a success of this venture; but enthusiasm, coupled with plenty of advice and assistance from other enthusiasts, can apparently accomplish anything. In fact, of course, we were correcting mistakes made in those early weeks for many months afterwards, but we were learning all the time, and now firmly believe we have had the best possible motor racing apprenticeship.

In selecting the Elfin Clubman more or less by chance, we stumbled upon virtually the ideal beginner's car—light, strong, and potentially very well handling. We decided early that a sports car was the answer, in order to get maximum use from our investment, and when Garrie Cooper offered us a new frame, body and suspension for £300, we realised that we could not hope to equal this value. For another £300, we reasoned, we would have a real flier—once again our preliminary estimate proved somewhat optimistic, but not quite so sadly this time.

The Clubman is basically a tubular steel spaceframe, using tubes varying from approximately $\frac{5}{8}$ to $1\frac{1}{4}$ in. square, with rivetted-on aluminium panels giving added rigidity. Detachable body parts, including mudguards, nose cowl, etc., are of fibreglass, which makes for easy repairs in minor shunts. The front suspension provided with ours was a swing axle setup made by cutting a Ford 10 axle and pivotting the halves at the centre. Armstrong coil/shocker units were supplied for all corners, and what proved to be a very efficient trailing arm and panhard rod setup for the rear.

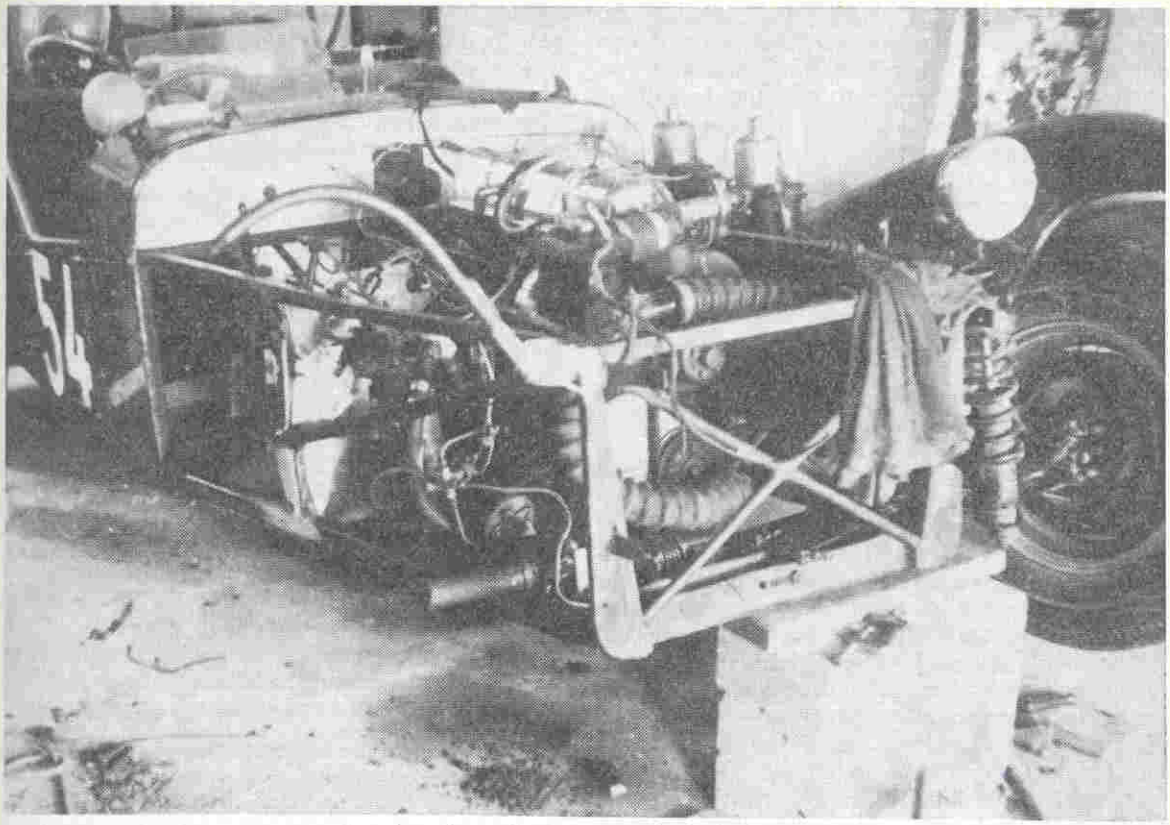
Our first problem was space, and it was very nearly the old story of the man who built a boat in his shed and couldn't get it out—we took over a pigeon loft owned by our very good friends the Kakoschke Bros. (of dragster fame), and had to knock the wall down to get the car out!

More serious problems followed—primarily a choice of components. A 1,500 c.c. power unit was our aim, and from such motors as Hillman,

The finished article—weight in this form was 8¼ cwt.

Victor, Fiat, Cortina and Consul, we chose a Mark I Consul, for reasons of cost and precedent—there were already about four others racing in S.A. A four-speed gearbox was required, so the Consul one was ruled out, and we looked at MG's and things. Bruce Went then enlightened us—the Morris 10 box had similar ratios to the MG TC, and cost only one-fifth as much. Finally, the rear end; since the car was designed to take a Farina A40 housing, we disregarded the higher cost and followed suit, more so in view of the competition Sprite ratios available to fit. But naturally these parts all came from wrecking yards, without which many racing cars would never have left the drawing board; notably a certain Elfin Clubman!

Every night of the week, until midnight and after, and all weekend as well, was the rule of the workshop for many weeks thereafter—often in shorts and thongs only for the heat. We stripped the motor, and sent parts all over the place—for boring, crank grinding, planing, and racing cams; and began to think we were pretty good. But our friends' experience soon altered that—the pistons had to be cam ground, oil relief grooves cut, tolerances worked out, and many laborious hours spent porting the head. One tenth of an inch was removed from head and block, and then on to the other problems.



Repairs after a shunt — note the light frame.

Cardboard patterns were made for the gearbox adaption, then a ⅝ plate had to be planed flat and parallel, then drilled and tapped for both sets of holes. The gearbox mainshaft was too long, and cutting the case-hardened shaft proved beyond our resources, so more expense, as an engineering works did the job. An A40 clutch and plate were selected as the maximum size to suit the splines and space, and then the Consul flywheel was lightened to increase r.p.m. and adapted to this clutch. Stronger springs in the clutch gave the greater grip necessary for racing gear changes. Finally, the whole rotating and reciprocating assembly had to be dynamically balanced for the increased speed we hoped to have—we wanted to use 7,000 r.p.m., so the balancing was done to 8,000, way above the original 5,000 or so.

Many more nights went into fitting the engine and gearbox into a space not quite big enough for it, welding in a cross braced series of small tubes to take the engine mountings, devising and constructing a Heath Robinson type clutch linkage—and so it went on. The Tourist Trophy came and went and we laughed at our earlier brashness, while viewing with dismay the masses of work still to be done. Inlet and exhaust systems provided further headaches, as we spent days bending pipes through impossible angles to fit past frame members, generator, mountings, etc. A choice of carburettors proved difficult—SU's were desirable but expensive, and finally we contented ourselves with the hotrodders-delight, Stromberg 97's—necessitating holes in the bonnet, but by then we were past caring about appearance. Still the car was standing on blocks, as Morris Major brakes and hubs had to be adapted to the Ford stub axles. Brackets were welded onto the rear axle housing by Elfins to their design, and the rear end went together like clockwork. The tailshaft was yet another hybrid, using Morris 10 and A40 ends. The existing Morris steering box was operated through a VW universal and a light tubular shaft, and the end was at last in sight. A Minor radiator was cut and soldered to fit, and then a last-minute rush of fuel fittings, wiring, lights, instruments, etc. made it appear that we might just make the Easter Monday meeting at Mallala.

About midnight on the night before race-day the last bolt was tightened, and the car was towed into the street to be started. Spirits were high

as the object of our labours rolled quietly down the drive behind the tow-car, but then disappointment rapidly quenched our enthusiasm as attempt followed attempt to get the fool thing started. An hour of checking and re-checking and more attempts reduced us to a state of abject despair; we always knew it would never go; something was basically wrong, the camshaft must be upside down—we'll never get it going now. "You sure the firing order is 1-3-4-2?" our learned friends quietly asked—"Some 4-cylinder engines run on 1-2-4-3, you know". And of course, that was it, as a mighty unmuffled roar advised the neighbourhood of our success (who in turn advised the law, who found nobody at home, but that's beside the point!).

The following six hours saw us cruising up and down the Main North Road at a steady 50 to run the motor in before subjecting it to the torture of our first meeting. Home for a shower and breakfast then into the whirl and excitement of our first race. In the paddock all was confusion—we were late and still had to be scrutineered before being allowed to practise. Finally our turn came and as item after item was checked off we began to congratulate ourselves—but too soon as our lack of knowledge caught us out: where's the door? They wanted to know. Door? Said we blankly, then hurried off to construct one out of tin plate and wire. No good, they decreed, you'll have to run as a racing car; but by then we'd missed our practice session, so we tried to work out the maze of carby jets, and had a fumbling go at getting the tappets and ignition right while waiting for the bike races to finish. Suddenly it was lunch time and we were allowed a short burst—the car's first time on the track. A couple of laps were sufficient to show us that all was still not well—the thing went like a rocket to 4,000 r.p.m. and then almost stopped. Back to the pits, and after some discussions we decided that really we were horribly tired, and happily for the other competitors we retired for the day.

Such was our brilliant entry into motor racing; but better things were ahead of us. At our second meeting, six weeks later, we won a handicap race, and learnt two important things—the car understeered badly, and Strombergs gave tremendous throttle response but were messy to tune. Meeting followed meeting, at Mallala and Calder (Vic.), and the car began to go faster as we learnt more about driving and tuning. SU's replaced the Strombergs, and negative camber plus wide back wheels made it handle properly. Our mistakes began to show up in the form of a sheared drive on the oil pump we hadn't renewed, costing us a crankshaft and bearings; a broken valve which ought to have been a new one and wasn't, costing a piston and head; a broken clutch linkage, robbing us of a certain win; and oil surge in an imperfectly baffled sump, resulting in one set of bearings per meeting for some time.

We had our share of spills as well, like when Terry lost the RH front wheel at about 60 in a left-hand corner, or when I shunted a spinning Sprite head-on while in third place with half a lap to go, and it seemed for a while as though it was just one darned thing after another. But we were getting more and more good racing, and finally came to know the feeling of giving the car a polish and change of plugs only by way of race preparation. Of course, there was a certain amount of road use as well, including one memorable 100 m.p.h. burst down the Mt. Barker Road, but as the compression became higher and cam hotter, etc., the car became more fussy, and not such a pleasure to drive in traffic. I make no attempt to describe the thrill of the sport itself—you have either experienced for yourself the exhilaration of speed, the up-tempo reactions and decisions, and the delicate balance, or else you cannot hope to comprehend it.

Finally came the regretful decision to sell, and concentrate on studies for a few years, and so some lucky types in Melbourne have taken over our pride and joy, and we certainly wish them good racing with it. We learnt a lot, and had two glorious years of tears and triumphs in what is to us the greatest of sports.

From an engineering viewpoint, the experience was incomparable. Perhaps the most important single point we discovered was that when you double the power of an ordinary production engine, you are stretching the design factor of safety pretty close to its limit, and there is no place for fatigued second-hand parts. All in all, two years we wouldn't have missed for anything— why not try it? After all, when your racing starts intruding on study-time you can always give it up—study, that is!

Practical example of "from the sublime to the ridiculous"—a certain West Terrace firm's range of motor vehicles.

☆ ☆ ☆

A famous critic was asked her opinion of a very poor book.

"Well, I think you could call it pithy, for one thing," she commented.

"So you think it has some merit after all?"

"Yeth."

ALCOHOLICS' ANTHEM

What's the use of drinking tea
Indulging in sobriety
And tee-total per-ver-sity
It's healthier to booze.
What's the use of milk and water,
These are drinks that never oughter
Be allowed in any quarter;
Come on, lose your blues.
Mix yourself a Shandy!
Drown yourself in Brandy!
Sherry Sweet,
Or Whisky neat,
Or any kind of liquor that is handy,
Theres' no blinking sense in drinking
Anything that doesn't make you stinking!
There's no happiness like sinking
Blotto to the Floor!

Put an end to all Frustration,
Drinking may be your Salvation,
End it all in dissipation
Rotten to the core!
Aberrations metabolic,
Ceilings that are hyperbolic,
These are for the Alcoholic
Lying on the Floor!
Vodka for the Arty,
Gin to make you Hearty,
Lemonade was only made
For drinking if your mother's at the Party.
Steer clear of home-made beer,
And anything that isn't labelled clear,
There is nothing else to fear
Bottoms up — My Boys.

It was a rough crossing of the English Channel and spray was flying over the decks. The captain called down below deck: "Is there a mackintosh down there big enough to keep two young ladies warm?"

"No," came the reply, "but there's a McPherson willing to try."

Laudeamus Igitur Rulum Slidendum

The Engineer of Student days
Gives very little thought,
Except on just how much he pays
To books and things he's bought.
That slide-rule drained a pretty sum,
Its use was much in doubt
Till twelve months proved the outlook glum
If it were done without.

That instrument is praised, we know,
By every Engineer
Who's found a right result below
The cursor line so clear.
The slide is moved to calculate,
Say two by seventeen;
The answer—thirty-three point eight—
Upon Scale "D" is seen.

With all its scales in such demand
The "guessing stick" provides
For Engineers a true right hand
Which work by four divides.
So if you, after chance success,
Say "Look what brains will do!"
Your brain dimensions—could you guess?
Are:—twelve by half by two.

—Scale "C."

The civilized man has built a coach, but has lost the use of his feet.

—Emerson.

Next to a beautiful girl, sleep is the most wonderful thing in the world.

The couple were sitting out the dance.

"That Peter Smith," she said. "I nearly fainted when he asked me for a kiss last night."

"Honey," he replied. "You'll die when you hear what I'm gonna say to you."

WHYALLA -- WINE, SONG, BUT NO WOMEN!!

Being an account of a recent invasion by 13 Final year Mechs and 2 misguided staff members in 4 cars into that gloomy hell. Consider the vital statistics of the town; a man-woman ratio of 5:1; average marrying age of 16; average childbearing age of 16.5 years. Thus if you are a deaf mute teetotaller, Whyalla has nothing to offer.

Now to return to the subject of our intrepid adventurers. The invasion covered from Tuesday to Friday, on which latter day, the adventurers retired, covered in red dust, to the home base (or nest in view of the high proportion of nearly married men in the party, poor souls!).

[*Opinions expressed by bachelor authors are not necessarily those of the editors.—Ed.*]

In spite of the long dry journey up there, all cars arrived safely, after depositing money in the hands of various publicans in various quantities on the way.

The resultant partial anaesthesia of some members prepared them for assimilation into the general atmosphere of the town, which rapidly depressed everyone into a short siesta before tea at the hotel. Suitably fortified and with much enjoyment from the good food, the majority of us headed for the only den of iniquity allowed by law in that town, the bowling alley, where many new techniques, notably from WUN HUNG LOH and ARGUS HUTTON, were demonstrated, much to the amazement of the rest of the party and local inhabitants. Thereupon after ramming the lost hotel with a Holden and 9 people, sleep, "like that of a dead cat lying in the gutter" (unquote) was welcomed by all.

Then in the morning and all subsequent mornings the "temptation in the wilderness" appeared. At 7.30 a vision of loveliness (blonde, of course) entered our rooms, poised at the door, bosom thrust forward, and in a honeyed voice announced "milk'n sugar in yer tea?" But even this did not shatter the vision for lo! she reappeared and came closer, that tender smile, that figure of Venus in disguise, bent over one's head and . . . put the cup of tea down!

Ah! but to return to the purpose of our excursion! the town of B.H.P. We were shown nearly everything in various visits to sections of the works, but due to lack of time were not able to investigate any one section thoroughly, in fact much of the plant seemed to be non-operating at the time or only operating spasmodically. The Company did its best to make up for this by supplying free lunches in the staff canteen, however, but this was only partial compensation. The visits flowed smoothly and as most of us had never visited a steel works before all aspects were interesting. One had to keep constantly in mind the scale of the operations; this steelworks was small in comparison to those in Eastern States, which are small by world standards.

As our time was limited, our criticisms were generally connected with this factor, for example in the shipyard it was not really necessary to view the living conditions of the crew in preference to the engine room, and again once you have seen 6 ft. of conveyor belt and storageshed, there is no need to walk all 1,000 yards of it and back again.

We were more or less prepared for the blast furnaces, rolling mill, etc., from pictures in books, but the greatest impression seemed to be made in the machine shop, the enormity of lathes, gear cutters and milling machines, with beds of 10's of ft. long.

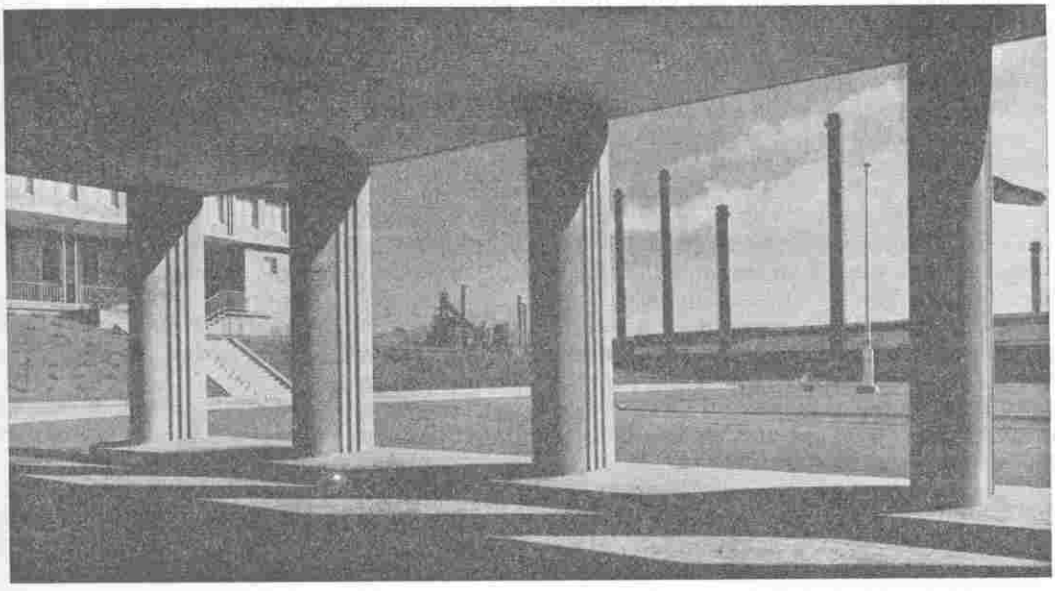
One could not help feeling that it would have been more interesting to view a complete process, e.g. loading, running and pouring of the electric arc furnace or oxygen blowdown plant, instead of small snippets of the process before being taken somewhere else. Iron Knob and Iron Monarch were visited too, and the tour was well-conducted, with time out to decoy a mob of dopey tourists into a dead end.

The evenings passed smoothly, coming to a head on the last night when the staff kindly started a frank discussion, in the company of some jugs of that delicious amber fluid supplied by them. Some more gifts of Bacchus magically appeared, and when the staff retired (hurt), the evening was spent in riotous card-playing and singing. At the conclusion of the evening a variety of entertainments were offered—Bob Boas projecting himself into a trance (practised often during the visit), Hutton demonstrating the art of floor crawling between press-ups (to the amazement of an elderly female guest who thought better of venturing out to the bathroom), and finally Wong expounding the ancient rights of man to keep mistresses and concubines—an art widely practised in his home (town I think he meant!).

Thus we left—sober, poorer, but wiser, and returned home, with a small interlude at the Port Augusta Power Station and its pie and chips lunch; carrying with us memories of good times, and one disappointment (the vision of loveliness was married), plus the satisfaction of having at last discovered whether B.H.P. is, in fact, God's gift to engineers.

(Contributed by P. Dean, who prefers to remain anonymous.)

MAKE STEEL YOUR CAREER



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RESEARCH IN THE CHEMICAL ENGINEERING DEPARTMENT

by Dr. T. N. Smith *Senior Lecturer in Chemical Engineering*

The main stream of research activity in the Chemical Engineering Department during the last ten years has been heat transfer to boiling liquids. Our interest in this field has centred on the climbing film and falling film systems.

In the climbing film system liquid is introduced to the bottom of a vertical tube which is heated externally. As liquid boils a central core of vapour forms and accelerates up the tube, dragging the liquid with it as an annular film. In the falling film system liquid flows down the surface of a heated vertical tube under gravitational acceleration. In both systems the liquid film is thin and is disturbed by motions of the vapour-liquid interface so that it offers a low resistance to the transfer of heat from the tube surface.

It is the small film resistance in these systems which has commanded our attention. Heat transfer equipment capable of handling large heat fluxes is essential in certain services such as the removal of heat from nuclear reactors. Indeed, our work in the department has had the support of a grant from the Atomic Energy Commission because of its possible application in this field.

Stemming from the heat transfer studies is an investigation of the mechanics of the flow of gas-liquid entrained film systems. The stability of the gas-liquid interface in a horizontal system has been studied and the nature of the interfacial waves has been examined. The analogy between momentum transfer and heat transfer in entrained film systems is being pursued with particular attention to the convection induced by the interfacial disturbances.

In the last three years our activities have diversified. One field of interest is the settling of particles from suspension in a liquid. The settling of mixed size and density species is a very complex process and our current investigations are on a strictly fundamental level with simple systems containing limited numbers of particle species.

Another avenue of research is chemical process dynamics. The response of a reactor system to various patterns of process changes is being investigated with the object of developinig stable control systems.

Certainly our furthest departure is a study of decompression sickness of "bends", a malady to which divers and aeronauts are subject. As a Chemical Engineering problem it involves the kinetics and thermodynamics associated with the diffusion of gases in a very complex medium, human tissue.

INEXPERIENCE

This is the story of an engineer who took over a new and interesting job, and describes the first time he tapped a barrel. All the gear needed was provided—mallet, auger and vent peg. The first thing he did was to see that the bunghole was clear so that there would be no trouble in getting the corkhole and the bunghole on the same level.

To achieve this, he bored an eyehole near the corkhole on about the same level as the bunghole.

Unfortunately there was a porthole near the manhole in the cellar floor, and in trying to drill the eyehole, he slipped, and instead of inserting the bung in the bunghole, he drove it up his asshole, and out through his earhole. This annoyed him, and left him in somewhat of a dilemma.

He could either insert his arm in the corkhole and draw the barrel through the bunghole, or put his foot through his armhole and pull the barrel through his asshole.

He decided to do neither, but cut a new hole near the corkhole in the bunghole, and eased the barrel through his earhole, which was blocking up his asshole.

The eyehole (or peephole) enabled him to see his earhole through his asshole, but prevented him from tapping the barrel, because in putting his foot through his armhole, he caught his testicles in the bunghole.

So, in desperation, he stuck a pipe in the corkhole near the bunghole, and laid the barrel on the manhole near the pothole, drove a wedge between his testicles and bunghole and pulled the barrel backwards through his asshole. Apart from a little discomfort caused by abrasions to his testicles through being drawn backwards and forwards through the bunghole, and then his asshole through his earhole, he was then able to tap the barrel with little further inconvenience.

MORAL: An engineer is not a tradesman.

. . . 008

THE SENTIMENTAL N.S.T.

with Sincere apologies to the Memory of C. J. Dennis

Ever head of Nashos?
Unlucky —— coots,
All is —— orders
Like "CLEAN YER —— BOOTS!"
Yer a guest o' —— Menziers,
They treat yer —— well.
Food and bed laid on,
Like —— —— ——!

Chorus:

Chargin' —— dummies,
Firin' —— guns.
Throwin' —— hand grenades,
Gives yer the —— runs.
Revally in the mornin',
Oot o' —— bed.
Arf an 'ours drlilin'; Hell,
Yes — —nearly dead.
The chow is filthy muck,
Stews an' —— hash.
Then yer made ter sleep
In a pally —— ass.

Chorus.

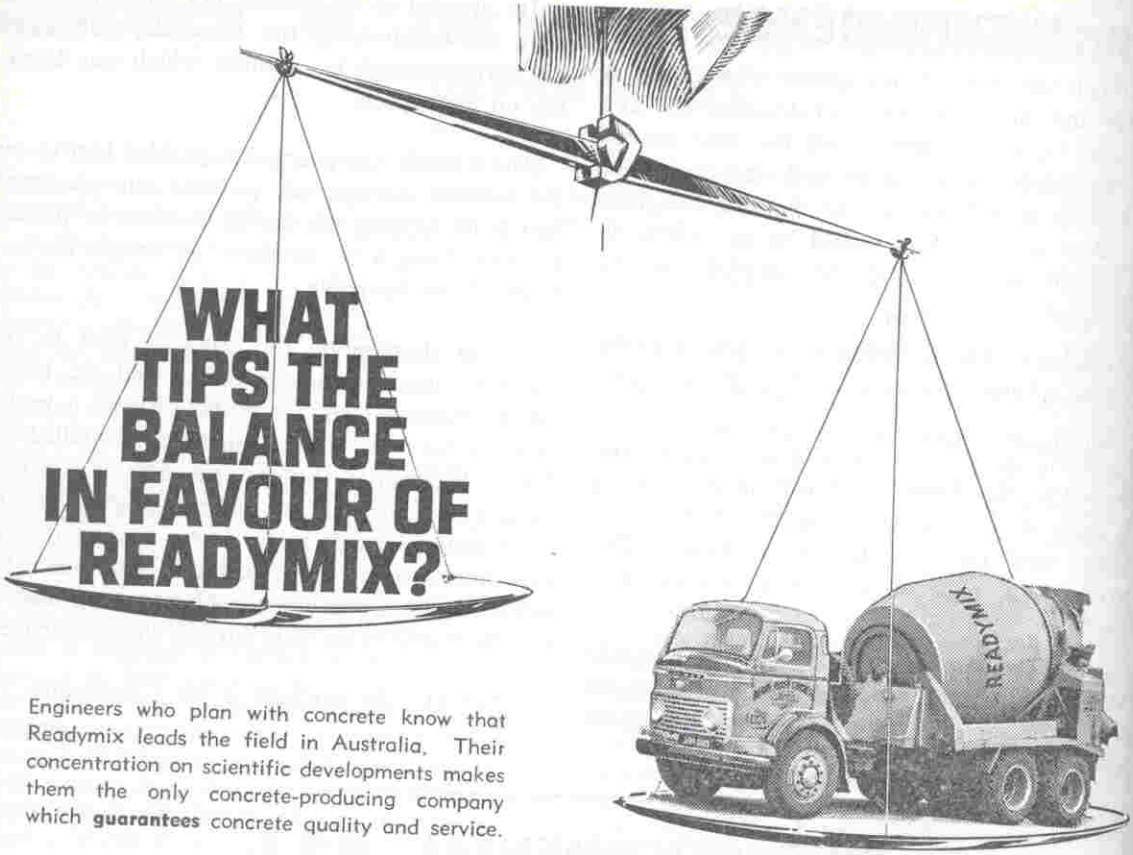
A week o' kitchen duty,
Dishin' —— slops,
Peelin' —— spuds —
And pushin' —— mops.
Next yer on a root march,
Luggin' —— packs.
Fightin' —— nothin',
That's bivo —— wacks.

Chorus.

When yer thinkin' o' some sleep,
Hell, Bed's —— hard,
Sleep? Sex —— Sarg.
Yer on —— guard.
Wot's the uset o' moanin',
Obey the —— Sar.
They say it's, fer the good
Of Australi —— ar.

Chorus.

ANONY——MOUS.



WHAT TIPS THE BALANCE IN FAVOUR OF READYMIX?

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VACATIONAL EMPLOYMENT IN THE SNOWY MOUNTAINS

D. Treloar

Final year, Civil

During the last long vacation I was fortunate enough to be offered employment with the Snowy Mountains Authority at Cooma. I arrived on a Sunday early in the New Year after travelling by 'plane from Melbourne. As it was the weekend, there were no preliminary interviews that day, and after obtaining my key from the Duty Clerk, I decided to have a look at what would be my home for the next two months.

The accommodation facilities of the S.M.A. are divided into two main groups, each having its own mess. The first is called East Camp and is for single men who work on a wages basis, and the second is for single men and women who work on a salary basis. Each section consists of a number of blocks with twenty separate rooms in each block. Although student trainees stayed at East camp, we are in the mess provided for men on salaries.

The next morning we were addressed as a group on the attitude expected from us while working there. This was followed by a medical examination, a couple of films and a quick look over the Scientific services division.

On Tuesday morning we started work. My job was in the strength of materials testing laboratory in Cooma, but many chaps had to go to jobs in other isolated regions. My job consisted of testing various engineering materials. Some of the tests were unique I think, to the S.M.A., i.e. in Australia. These included explosion bulge tests and crack arrest test, in which I was an assistant. These tests were on the high tensile steel to be used in Murray No. 1 pressure pipeline. Other tests were conducted to establish a correct welding procedure for the field welds in the pipeline.

While working for the S.M.A. all students were given the opportunity to go on a conducted tour of the Scheme. The tour lasted two days, and was generally conducted over the weekend, one night being spent at Cobramurra. The tour consisted of visiting many of the major completed construction works. These included Eucembene Dam, Tooma and Tumut Ponds Dam as well as Tumut 1 or Tumut 2 underground power stations. The latter are reached by walking down an access tunnel (dripping water all the time), into the machine halls. These are impressive in that they are tiled and have polished stair bannisters instead of hunks of steel. The water makes a racket as a turbine is started to cater for increased load. On the second day we saw Murray 1 and 2 Power Stations under construction. These will be really spectacular.

The picture of snow and greenery often projected onto the mind when one thinks of the Snowy Mountains area in contrast to the dust which we encountered. It was as bad as Leigh Creek dust! Cooma is a town of about ten thousand people, this number swelling considerably in the tourist season. There are about seven hotels selling three types of keg beer, a picture theatre, a string of shops and some motels in the town. There are also two night clubs with floor shows, and coffee lounges. The floor shows are a bit second rate, but the bands make a reasonable sound.

Another source of entertainment was the poker machines. The first time or two I was allowed to win or break even, but from then on I started to help pay for the establishment.

Some of us also had a shot at snow ski-ing. This was most exhilarating, but also frightening. Contrary to my previous ideas, it was easy to get up speed but difficult to stop, unless you sat down. We often swam in the swimming pool or the Murrumbidgee River which is about five miles from the town.

In conclusion, I can say that I enjoyed my trip, and learnt a bit about the Snowy Mountains Scheme and Engineering. I would advise students who go in the future to take a car with them if possible, otherwise they may have to do a lot of walking, depending on how thirsty they get.

Faculty sports made a welcome re-appearance—here

SURVEYORS' PARADISE

George Bereznai
4th year, Electrical

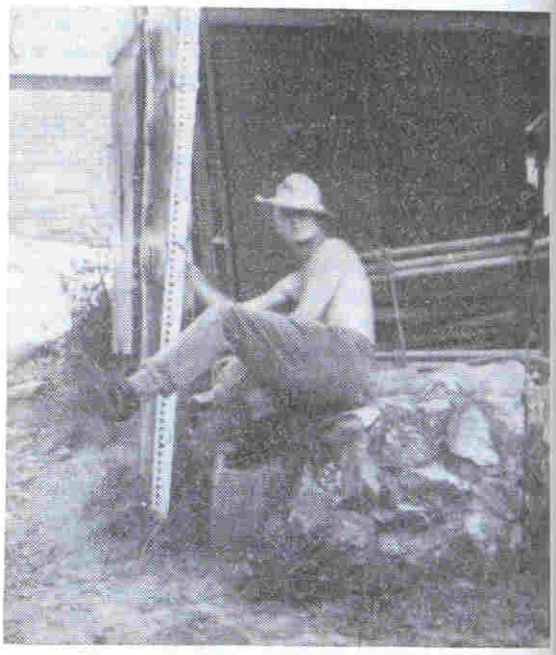
As from this year, electrical engineering students are deprived of the pleasure of joining their more fortunate civil and mechanical colleagues for a fortnight's holiday in survey camp, near Mylor. Here is a short account of last year's camp, to let you know what you are missing out on.

The memories of a hard year, and in particular of the last two weeks were quickly forgotten during the pleasant drive through the Adelaide hills. The party of about 30, used nearly as many cars to make the trip, each well packed with sleeping bags, bathers, cards, suitable paper-backs, copies of Clark, football and soccer balls and other essential surveying instruments. Bringing a rubber was compulsory, pencil and paper optional extras.

The camp was opened by a match between football and soccer enthusiasts, each following the respective rules of their game. This most important exercise had to be interrupted for the sake of walking around the camp, noting (and instantly forgetting) the position of the various stations, the location and altitude of which were to be determined (or estimated, guessed or rigged) by us during the next two weeks. The use of last year's field books was supposedly countered by several of the pegs being removed and hammered into new positions by Mr. R. Of course we took mental note of these shifts (to six sig. figs!) and during the next two weeks we used these "measurements" to modify the previous year's record, and also adjusted the instruments, stretched the chain, and suitably bent the staffs, to get readings which agreed within one part in a million with the desired values. As you should appreciate, this was no easy feat, so we were expected to spend two hours in the evening calculating and forgetting any errors made during the day. (Hence the reason for needing rubber, and never using anything but pencil for recording vital measurements.)

Knowing little about surveying, the list of exercises to be carried out by us, presented considerable excitement. "Plane table"-ing (with armchairs provided) obviously meant playing cards, while most of us wanted to do "Levelling" on the morning after the night before. "Curve setting" caught everyone's imagination, but when instead of the expected 36 to 46 inch range we were faced with 200 footers, we could not help the feeling of being overwhelmed.

Mr. T. told us in his "opening address" that a camp is only as good as its cook. Well, we certainly had no complaints about either the quantity, quality or frequency of the meals made by "Rocky". In fact, one was getting the impression, that we were being fattened up for Christmas. Having a big breakfast, a two-course meal for lunch, three courses for tea, and supper at 8.00, we were lying on our backs most of the time, recovering from the previous meal. This became apparent when our group complained to Mr. T. about sun-burnt stomachs.



The expert staff-man shows how it's done.

Spending two weeks with some of our lecturers, we made the discovery that they also appear to belong to the class known as "homo-sapiens", even if they are in a slightly different category than us. To support the above hypotheses, we made some interesting observations during an experiment, in which Mr. T. and Mr. B attempted to fix an electric (!) desk calculating machine. After removing every screw in sight, they held it upside down, and proceeded with the latest version of the "shake". Then the machine was attacked in turn with pliers, a hammer, two arrows (surveyor's) with suitable accompanying words, but to no avail.

The interest of our lecturers in star-gazing also supported our theory. Mr. T. even went to the trouble of setting up a telescope on several nights and pointed out the better known stars to us

Counting the stars was a very promising occupation, for example one could count five for Jupiter, however its preferred use could not be realised in an all-male camp.

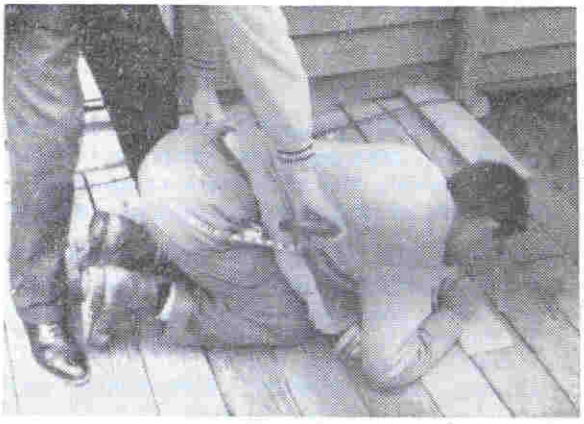
The good opinion we were forming of our lecturers was only shaken once. Mr. C. brought the Strength papers with him to mark. As a part of the above-mentioned experiment, we set up a theodolite at a safe distance, and observed his marking procedure. The fact that he appeared upside down did not disturb us (after all he only left England about a year ago), but his excessive use of red pencil on our good exam papers revealed such an unhumanistic spirit, that we decided to terminate our observations. As there was still a week of the camp ahead of us, we did not want to spoil that period by finding out our marks.

A number of rules have to be very carefully observed when surveying. The No. 1 is that you must never lean the staff against a tree. When holding the staff, keep the bubble in the centre of its run. A snapshot of one of the students who got a credit in the subject, shows how the experts hold the staff. Note how he fixes his eye on the bubble, which is (supposedly) held against the back of the staff. The outstretched leg provides a reference to the horizontal, thus doubly ensuring that the staff is exactly vertical.

Considering all the fun we had, it seems amazing that we completed all the work. Thinking back, one mostly remembers playing table-tennis or football during the day, and having pillow fights and joke sessions during the night. We particularly excelled in the last two occupations. The speed, courage and determination of all of us during the two-hour long pillow-fight of the last night would have made the National Fitness Council proud of us, even if it was their pillows that were wrecked!

It was good to see signs of strong friendships developing in the two weeks we spent together: once a party disturbed a four-foot snake. They all ran for their lives, leaving one bare-footed friend to battle it out, which he did, bending a ranging pole in the process. On the last day, the same chap had a small difference of opinion with the same friends, at the end of which he was helped to cool down in the dam, which was not recommended for swimming because of the sewerage pipe passing near to it!

Students of Surveying IA (excepting those doing civil) usually ask, what is the use of the subject to me? Apart from the academic arguments, I have so far tried to give you one good reason for doing the subject, namely to have a jolly good time at the end of the year with your mates and lecturers in survey camp. However,



De-tail surveying.

to do justice to the subject, I would also like to add, that at the end of the fortnight you feel that at least you can have a decent go at using a theodolite or level, with which you will most likely meet during your engineering career. You also learn through your own efforts (or lack of them) just how good your measurements have to be to give results which make sense to you afterwards.

It seems a real pity to me, that under the pressure of more scientific knowledge being required of us, we have to drop such a thoroughly engineering subject as surveying, and to have even less opportunity to see other students and our lecturers apart from inside the lecture room or laboratory.

Little Billy with a grin,
Drank up all his Daddy's gin;
His mother said when he got plastered—
"Go to bed you little Bad Boy."

☆ ☆ ☆

"Drink?"
"No."
"Neck?"
"No."
"Well, do you eat hay?"
"Of course not!"
....
"Gad, you're not fit company for man or beast!"

☆ ☆ ☆

A woman saw an elephant in her yard and immediately called the police. "Officer," she said, "there's a queer looking animal out here in my backyard. He's picking flowers with his tail".

"Oh yes," said the sergeant, "and what does he do with them after he's picked them?"

"Never mind," was the answer, "you wouldn't believe me if I told you."

CIRRUS -- COMPUTING IN THE CLOUDS

by R. J. Potter and G. A. Rose

The CIRRUS project began in 1959 when a group, led by Dr. M. W. Allen, with some ideas on low cost computer structures decided to build a digital machine—the challenge being to provide the maximum computing power within a limited budget. At the time the precise form of the machine was as nebulous as CIRRUS's atmospheric namesakes.

Two years later the detailed logical design was completed, prototype circuits developed and package and frame layouts specified. Some 4,000 transistors, 10,000 diodes, thousands of other small components and over 100,000 soldered joints were involved. Construction and assembly began in 1961, the bulk of the repetitive wiring being carried out by Philips, Hendon, from detailed models wired at the University. Machine checking and test program running followed in 1962.

The machine came into general use in mid-1963. CIRRUS in its present form, (mid-1965) has the following configuration:—

(1) A medium speed control processing unit which performs a variety of numerical and non-numerical operations, e.g. additions of two ten-digit numbers can be performed at the rate of 20,000 per second, and multiplications at 2,000 per second.

(2) A main memory unit capable of holding over 8,000 ten-digit numbers, any of which may be read from memory, modified and returned to memory in six-millionths of a second.

(3) Three operating consoles; two for use by programmers, the other for engineering maintenance operations. Each programmer's operating console consists of four peripheral units, viz. a keyboard, a typewriter-printer, a high speed paper tape reader (1,000 characters per second input to CIRRUS), and a paper tape punch (110 characters per second output from CIRRUS).

(4) A time shared multiprogram operating system, whereby each console operates independently of, but apparently simultaneously with the other console; each console making use of the central processing unit, the main store and the peripherals associated with that console.

(5) An integrated language system in which programs may be written for the computer.

Plans are in hand to provide a further 16,384 locations of memory. With this additional storage plus several other small technical modifications (expected to be complete in the 3rd quarter of 1965), extremely large problems may be tackled or alternatively the number of programs sharing the computer may be increased with the consequent improvement of operating efficiency.

In addition to this basic extension to the machine, an analogue interface facility is planned. This facility will allow CIRRUS to accept analogue data for processing rather than the normal digital data. (Analogue data is continuous non-discrete data where the value of a voltage represents the value of a parameter. Digital data on the other hand consists of a set of discrete pulses, the pulse pattern then represents the value of the parameter, e.g. a slide rule is an analogue device, but a common desk calculator is essentially digital in nature.)

This analogue interface will convert analogue signals into digital data suitable for manipulation within CIRRUS, and it may also reconvert digital quantities into analogue form for subsequent output. This will allow the computer to perform functions associated with data logging and analysis of physical systems and will also allow the computer to control real time processes on-line (a real time process is an operation occurring outside the computer, e.g. chemical factory operation, servomechanisms, rocket guidance, reservation and enquiry systems, etc.).

Recently, a cathode ray tube (C.R.T.) display was fitted to CIRRUS so that graphs and diagrams could be plotted automatically from internal calculations in the machine. The display had the attraction of a new toy and within a few days displays of polar graphs, letters and numbers, circles, clock faces, and the solution of some non-linear differential equations (one in oscillator theory and another in neurophysiology) appeared. The C.R.T. used is a storage tube, so that the display consists of a series of calculated points which when plotted remain indefinitely until the whole picture is erased by the operator. A "light pen" of novel design is now being fitted which will enable the operator to input manually any curve for machine analysis—a first step in

automatic handwriting recognition. Alternatively, the pen can be used as a pointer to refer to any point of a display for computer attention, e.g. a request for rescaling or modifying part of a display. Applications of this display to engineering problems are widespread, some notable examples being the calculation and display of field plots from manually input boundary conditions, stress analysis displays, surveying contour construction and display from spot readings, isothermal plots for heat flow problems, dynamic motion of bar linkages, etc., etc.

This article has described some of the hardware features of CIRRUS. Lest it appear that these considerations overweigh the use of the machine, here is a partial list of topics about which programs have been written. These problems commonly originate within research projects currently being undertaken in several University departments:

Digital machine structures and design.
Aerial and antenna radiation patterns.
Solution of high order, non-linear differential equations.
Simulation of nerve cell action.
List processing.
Formal computer language translation.
Pseudo random number generators.
Function evaluation.
Experimental data reduction.
Non-linear elasticity problems.
Game theory.

OBITUARY

MR. GEORGE ELLESWORTH

It is some months since Mr. George Ellesworth's sudden death after many years of valuable service, and it came as a sad blow to us all.

As a Reader in Electrical Engineering he was a key member of the staff of the Department, and due to his obvious energy and ability he played an important role in its development and administration.

As a born teacher and lecturer he left his mark on the students and planned many ingenious projects for their solution.

The standard of our servo-mechanisms laboratories owes much to many years of persistent effort on his part, and considering the funds at our disposal, it is of remarkably high standard.

Some years ago he planned a refresher course in Automatic Control for practising engineers which proved a resounding success, and led to valuable associations with industry.

He was engaged on a long-term research on the interface equipment between analogue and digital computers and binary random noise generators, and it is a great disappointment that it was not possible for him to complete this work, although from student projects he was able to train a number of engineers in this field.

A strong personality and clear thinker, his contributions to the Faculty of Engineering were considerable and of great value to the Electrical Engineering Department.

He took a keen interest in the students; was of kindly disposition with a dry, pleasant humour, and is sorely missed by his colleagues.

We all deeply sympathise with Mrs. Ellesworth in her sad loss.

E. O. WILLOUGHBY.

IS IT ALRIGHT WITH THE DEAN?

John Patterson*

*(*Does not claim any relationship with Banjo Patterson.)*

When decisions have to be taken,
Whatever their nature or mean,
Be sure of not being hasty,
And see that it's right with the Dean.

I went down one night to the city
To visit the club cabaret.
The beautiful girls came on dancing,
Then started to strip things away.
"With your consent," said a redhead,
"We take off the lot in this scene,"
When a voice over there called out in despair
"But is it alright with the Dean?"

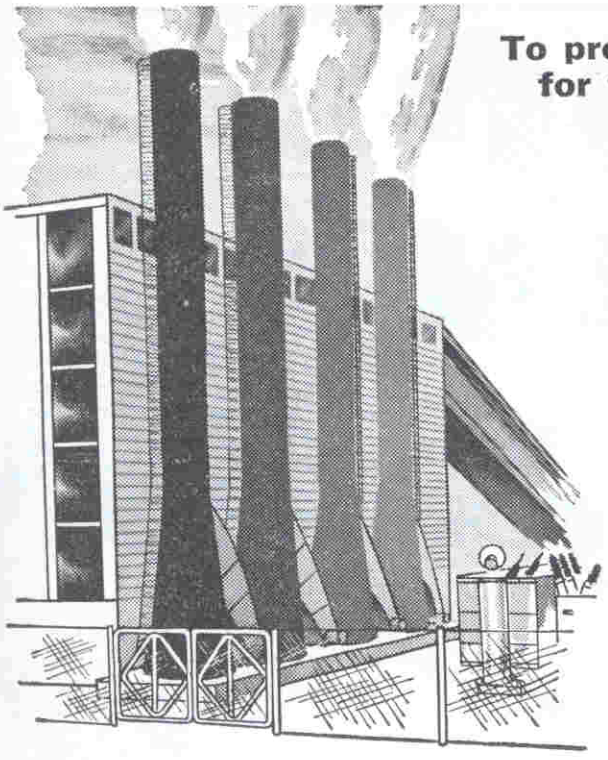
I know it's alright with the party
And I would not suggest it's not clean,
I wish not to destroy what the ladies enjoy,
But is it alright with the Dean?

I went for a walk with a honey,
Sat down on the seat just to spoon.
She started to feel so romantic
Under the spell of the moon.
Soon we were quite close together
That nothing could come in between.
My moment drew near till she cooed in my ear
"Darling—but is it alright with the Dean?"

"I know that it's alright with mother,
And the law does not think it obscene,
I have seen it as well at the branch R.S.L.,
But is it alright with the Dean?

I sat down and wrote out a letter
Concerning the way students dress,
And all the political aspects,
And posted it off to the press.
An answer came back from the news room,
My letter was easy to screen,
The editor said it was the best he had read,
But was it alright with the Dean?

He knew it was right with the Vice—
And Sir Robert got Yes from the Queen,
Kruschev and de Gaulle did not mind at all,
But was it alright with the Dean?



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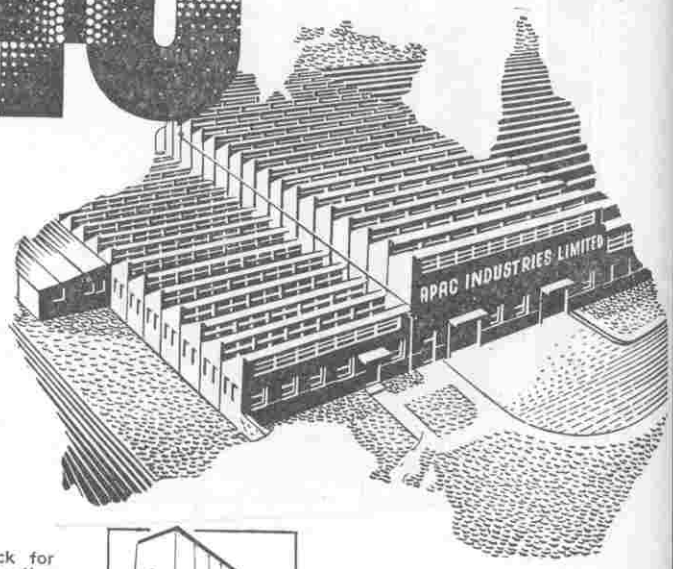

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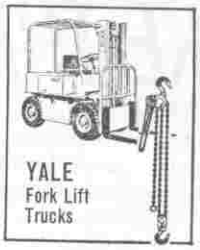

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STUDENTS' SANATORIUM

It all began on Wednesday, 12th May, 1955, at about 12.30 p.m. Passengers on the East-West express were the first to notice it. They had just left Adelaide and were contentedly reclining in foam-backed seats admiring the lush pastures of their sunburnt country, when their serenity was violently disturbed by the raucous adenoidal authority of a railway guard. Then 13 unshaven young men slouched discontentedly out of the 1st class compartment to resume their entertaining game of 7-card-stud in the 2nd class section. Peace again settled uncertainly.

Ten hours later, 13 less exhuberant young men disembarked from a cattle truck at a railway station, referred to in polite circles as Telford, to be chaffeur-driven to the luxury motel, where they were to spend the next 16 days in solemn meditation:

"Damn, damn, damn!"
"Where's me bluddy slide-rule?"
"Who flogged me bluddy cup?"
"You—son of a—, get out of the—way!"
"How do you—well do this—problem?"
"Excretum!"

The above are a few of the more polite quotations, introduced here to demonstrate the possible (and probable) degeneration of the average young man when marooned in the central location of an evaporated, and therefore extinct, sewerage farm; cut off from humanity, sleep, sex, sleep, family, sex, sleep, and the niceties of parental influence!

Of course parental guidance was not entirely lacking at this particular Survey Camp, owing to the timely taming of a hitherto fierce gentleman, who became everybody's friend and confessor. In fact we were under the influence often.

One gentleman, however, was soon found to be (most interestedly) in a state of paranoic schizophrenia. His sensory response to external moral stimuli were inextricably intermingled with his own nebulous hypotheses, thus engendering a chronic state of hyperbolical procrastination.

No doubt this was because he was engaged.

Various engineering works were engaged upon, but it was discovered that morning work effected was negligible, as the latent heat required for the thawing out of the human body after a 3-mile ride through the fresh morning air (on the more exposed portion of a naked or uncovered truck) was not available from natural or unatural sources before approximately 03.30 hours G.M.T.

. . . and marbles aren't the only things he rolls, either!

Evening works consisted mainly of studying cloud formations, and watching stars set.

Exciting trips were made on both Sundays, which were naturally enjoyed by all. The first of these trips introduced us to our most exciting and absorbing study of the camp—the planning and pre-plotting of the paths of irregular solid objects when projected in three-dimensional space, with respect to smooth regular bodies of comparable size restricted to 2 degrees of freedom by a semi-infinite solid. Yessir, these trips would have been most boring if we hadn't been chucking rocks at bottles from the truck!

One other spontaneous, absorbing pastime was the tracking of a long, fairy-like, white-whisper, train of caterpillars, which delighted us with its quaint characteristics. One of our lecturers happened to be a fierce nature-lover, and it was found that over the past 64 years he has become quite a fierce caterpillist. It was remarked that the caterpillars looked like the remains of one of those delightful old English pastimes—the taffy-pull.

After hours of frantic scramble the camp came to a close, and we were farewelled at the railway station by our now very good friends, Robbie, Morrie and Taffy.

KNOX.

ENGINEERING CADETSHIPS

For those students who, for one reason or another, would like financial assistance while studying, we present here the details of some of the many cadetships and studentships available to Engineering students. Although we have attempted to be as representative as possible, we stress that this list is not necessarily all-inclusive.

1. Commonwealth Government Cadetships.

Engineering Cadetships available in the following Departments, PMG, Works, Supply, Army, DCA, Territories. Not all offered each year.

Qualifications—Nominally matric., but usual to recruit at more advanced level.

Bond—Cadets have to sign a bond to remain in employment for the number of years assisted plus one, after graduation. Maximum liability five years or £1,000.

Salary—varies from £621 p.a. at -18 years thru £1,177 at 23.

Refund of fees—100% for salary less than £1,055, sliding scale to zero for salary over £1,238.

Advertised—June to September in Press, radio and TV, and Commonwealth Gazette.

Apply to—Commonwealth Public Service Inspector, Da Costa Building.

2. S.A. Public Service Studentships.

Studentships provide full-time study facilities for University courses and for subsequent appointment to positions in the State Public Service.

Qualifications—At least one year's satisfactory work in the course, or passes in appropriate Leaving Honours subjects.

Bond—Student required to enter into a bond for a specified period.

Salary—Varies from £305 to £350 with year of course, plus £100 p.a. living allowance where applicable.

Refund of fees—All fees except statutory fee are refunded.

Advertised—During November.

Apply to—State Public Service Commissioner, Education Building.

3. Electricity Trust.

Several Cadetships awarded each year for all types of Engineers, but mostly Electrical.

Qualifications—Matriculation.

Bond—No written bond, but graduates expected to remain with ETSA.

Salary—£11 p.w. in term, more in vac. depending on age.

Refund of Fees—No provision except for Commonwealth Scholarship holders.

Apply to—Personnel Officer, ETSA, Greenhill Road, Eastwood.

4. Railways.

Railway cadetships have been discontinued, but may be resumed at a later date.

5. University of Adelaide.

Part-time cadetships are awarded by the University itself in many faculties. These involve roughly twenty hours a week work in a University office, and part-time attendance at lectures. Fees are refunded in full, and an allowance of the order of £300 p.a. is paid. These are not necessarily awarded every year; further details from the Registrar.

6. Private Industry.

Several large firms provide assistance of various kinds to Engineering students, but usually to staff members only. Contact individual firms for details; e.g., Shell, BHP.

CAREERS WITH SHELL

The Shell Group of Companies, the largest petroleum organisation in Australia, offers outstanding career opportunities for graduates in Arts, Commerce, Economics, Law, Engineering, Science and Agricultural Science.

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Each year the Shell Group of Companies in Australia offer scholarships, tenable for two years post-graduate studies at Cambridge, London or Oxford Universities. These scholarships are open to Honors Graduates in Arts, Economics, Commerce, Law, Engineering, Science and Agricultural Science.
Each scholarship carries an annual grant of £950 Stg. Fares to the U.K. and return are payable by Shell, provided the return trip is undertaken within 12 months of completion of studies under the scholarship.

For further information on careers or scholarships apply to the Secretary, Appointments Board, University of Adelaide, or to

Personnel Officer,
THE SHELL COMPANY OF AUSTRALIA LIMITED,
SHELL HOUSE, 170 NORTH TERRACE,
ADELAIDE.

PUBLIC SERVICE OF SOUTH AUSTRALIA

VACANCIES FOR GRADUATES IN ENGINEERING

Positions exist in the following Departments, which are engaged in design, construction and operational work throughout South Australia. Headquarters may be Adelaide or the country, but no applicant will be allotted to a country position against his own wishes. Houses are available for rent in country positions.

ENGINEERING & WATER SUPPLY DEPARTMENT
(water supply and sewerage)

HARBORS BOARD DEPARTMENT
(harbor and port facilities)

HIGHWAYS & LOCAL GOVERNMENT DEPARTMENT
(main highways and bridges)

WOODS AND FORESTS DEPARTMENT
(construction and operation of large softwood milling plants)

SALARY:—Commencing salary will be fixed in relation to qualifications and experience. It will be not less than £1,515 nor more than £2,347. Opportunities exist for further promotion depending on ability.

Applications, accompanied by testimonials, must be forwarded to the Public Service Commissioner, 31 Flinders Street, Adelaide. Applicants should state full names, date of birth, address, marital status, qualifications, practical experience, and particulars of war service (if any).

A Dramatik and Vivid Account
of the vile filth currently rampant
amongft Engineeringe Studentf
and of its caufe
and of the need for a Societee
to konfine thefe immoral impulfef.
Newly Revifed and Augmented by the author:
Dale Hockinge
who if to be found at the Oriental Hotel.

THE FILTH BUG

The Engineers are widely known:
"From where", you ask, "has their filth grown?"
In former years they were as clean
A group of folk as could be seen.
But now, Dale Dirty are they all,
Gamlen Black be their fall!
In these short years they have attained
Such filth to be forever stained;
"How", you ask, "might this have passed . . ."
The FILTH BUG is the answer.

This bug, too small for human eye,
Or even microscope to spy,
Lurks in corners, there unseen,
To wait and pounce upon the clean:
The once-clean mind to then assert,
To ruin, degrade, reduce to dirt.

But what is more, these little germs
Loosen up the victim's sperms;
For with an illness, as one knows,
Straight to bed the victim goes;
There dark happeningss oft take place . . .
The vice squad has another case.

The victim's mind is not his own,
In company, with painful groan
He rings his bell, and cries "Unclean!" . . .
Defiled, debauched, degraded, obscene.

Engineers! We must fight back
Ere we be made blacker than black.
There are two ways that we can fight
This gruesome filth's grimy might:
The first—to sit for sixty hours
Under purifying showers;
Our second strength against this power
Is the pure Lily flower!
Cover bastardy's black shame
With the Lily's sacred name,
Confine every vile impulse
Cast out urges, black and false;
Imitate the Lily's purity
And pay your SCIIAES fees with surety.

DALE HOCKING.

SCIIAES

PURITY PAGE

Under the astute direction of our president, Mr. Robert N. Fry (D.Ox.), the Society for the Confining of Immoral Impulses Among Engineering Students (SCIIAES) can boast of an unrivalled year, marked by a vast membership drive, the establishment of a new world record, highly successful social functions, the formation of a racing team and the appointment of a residential poet laureate among other notable achievements.

The 1964 SCIIAES Breakfast held on Prosh morn. in the East Parklands attracted over 200 Purists all set on confining their normal impulses to the beer available. It is prophesied that this year's breakfast will reach new heights and we must thank the Uni. Jazz Club for the quartet that they provide.

Two pre-Orientation Week stunts were pulled off. The first stunt was the breaking of the existing world record for sitting under a shower, formerly set at 60 hours by an American student. SCIIAES-sponsored Mr. John Kerr braved the elements (and was *considerably* purified!) in the front window of Clarksons for 66 hours. This was triumphantly celebrated by a victory procession in a boat through Rundle Street at peak hour on Saturday morning ("holding a procession without a licence", "disrupting traffic", "riding in a towed vehicle without permission", etc.), and also by a Nazi-type party at the *new* headquarters in Halifax Street. Our second disruption of the establishment was the joyful launching of a raft, the Kun-Tiki, upon the mighty Torrens; not impressed by its welcoming slogan and beckoning "throne of Purity", the Adelaide City Council later towed it away, which is a pity because "toilet bowls don't grow on trees".

The Orientation Week min-bike Derby was hotly contested by the SCIIAES racing team (Messrs. Hocking, Fry, Hetherington and Robilliard) wearing full racing leathers (imported from Rowley Park especially for the occasion). However, foul treachery eliminated us from the final.

Our Orientation Week Welcome was held in the Union Hall, where many eloquent speeches were made to the large crowd. A passionate plea was made to confine immoral impulses (i.e. to confine them to SCIIAES members who are trained to handle them in a mature fashion) and this resulted in a throng of new members.

The SCIIAES Car Trial was entered by 44 cars. The rough course caused great wear and tear to many a layback seat, and also caused great fuel consumption (two 18-gallon kegs at the ding held afterwards to be precise).

A highly successful innovation was our informal dance, the Purity Ball, where a band appropriately named the Pilgrims, assisted greatly

in confining many, many immoral impulses. Purists were so shocked by the dancing, the bawdy-type songs, the striptease and the impromptu hambone that they vowed to return to the path of Purity and never to practise the evils demonstrated.

Each of these world-shaking events was left to posterity in the form of immortal verse by our poet laureate, Mr. D. Hocking; copies being stored in the SCIIAES archives.

And now, what of the future? At the time of writing, the SCIIAES egg-throwing team was drilling for the Med-Engineer' Tug-O-War and Prosh is still to come. Of course we shall have the Breakfast, build yet another float for the Procession, and bid for the victory laurels at the Drinking Horn, but what stunts? What deeds? What daring? It makes you think, doesn't it?

I shall leave you for now with that famous motto of the SCIIAES:

BE PURE (AS THE LILY).

Signed:

XAVIER XERXES THROGMORTON,
Chief and Foremost Purist of the
SCIIAES.

CLASSICS FROM SUNDAY SCHOOL

To illustrate the lesson one child drew a bear with eye trouble.

Asked what it was, he confidently replied, "Gladly, thy cross-eyed bear".

☆ ☆ ☆

Another drew an aeroplane, which of course was the flight into Egypt, with Pontius Pilot.

☆ ☆ ☆

Then there was a nativity scene featuring a rather fat rotund man—Silent night! Holy night! Round John Virgin, Mother and Child.

☆ ☆ ☆

Meanwhile 2 kids were arguing what God's name was, and indeed quoting the Lord's Prayer to justify their arguments. One said: "It's Wichard, (he couldn't pwonounce his R's), 'cos you say 'Our Farver, Wichard in Heaven'." The other, (who couldn't eiver) replied equally convincingly: "No it ain't, it's Hawold, cos you say 'Hawold be thy name'."

☆ ☆ ☆

Then when uncle Herb, a fisherman by trade, and not a regular churchgoer since childhood, was asked to say grace, he thought for a moment, then blurted out, "Lord, let's have a piece of cod which passeth all understanding."

SOME ACTIVITIES OF THE CIVIL ENGINEERING DEPARTMENT

G. Sved
Reader in Civil Engineering

In the 1880's, long before Rudolf Diesel built his first stationary engine, English railway engineers designed and built several bridges in what was then the Colony of South Australia. Several of these bridges are still in service and carry modern Diesel-electric locomotives. Our department was asked to investigate the stresses in these bridges under actual working loads and to carry out tests to check whether the load-carrying capacity of these bridges was impaired in any way by nearly eighty years of continuous service.

We saw only one way of finding out what the stresses really are: measuring them with strain gauges under actual working conditions. Since the bridges were some 400 miles from Adelaide, and the mountain would not come to Mohammed, Mohammed had to go to the mountain: we packed a lot of strain gauges, miles of wires, several racks full of amplifiers and pen recorders, and finally three staff members into the departmental van and departed.

The first working day was spent with sticking strain gauges to one of the 20 ft. long spans of a bridge. We drove the van into the sandy creek-bed under the bridge; by the time we managed to extricate the van it lost every desire to move backwards. We had to accept for the next week or so that the van had no reverse gear, although all forward gears operated satisfactorily.

To show our faith in the bridge, we spent the following day under the bridge while a 60-ton Diesel electric locomotive made about 25 passes over our heads; the speed during these runs varied from crawl to 35 miles hour.

A similar two-day session was devoted to strain gauging a 40 ft. long span; this time two coupled Diesel locomotives were used to provide the loading. The gauges were fixed and wired up one day; measurements were then taken the following day. Two unexpected consequences of this one-day delay were that we had to listen all night to the throbbing of the Diesel engines (railway engineers consider that the one gallon or so of fuel oil used in keeping the engine just "ticking over" is a small price to pay for the reduction in corrosion gained by keeping the engines warm all the time), and that we had some anxious moments as the coloured wires used in connecting the strain gauges were attracting the attention of the local bird population.

After returning to base at the completion of our tests, in the special train consisting of the two Diesel engines and two "compo-vans" (the only special train any member of our department is ever likely to have), two difficult tasks

Showing our faith in the bridge!

remained: to drive the van home some 400 miles without a reverse gear and to analyse all the results collected. We nearly came to grief at lunch-time on the drive home when a pie shop made us forget our disabilities and we drove up to "angle park" near the curb; a last minute warning came from the navigator averted disaster. Alas, the analysing ol the several rolls of pen records collected was a much more tedious task, taking several weeks to complete.

The field tests gave excellent information regarding the strains (and stresses) on the bridge under actual running conditions; we needed further tests to determine the strength of the bridges.

Opportunity to test bridge girders similar to those strain-gauged was afforded when a number of these became "surplus to requirements" by being slightly (?) damaged by a derailment. These girders were shipped to Adelaide, where they were re-assembled on the strong-floor in our laboratory in the engineering annexe.

The girders were strain-gauged to provide a comparison with field tests. Loading was applied in a pattern similar to the one caused by a Diesel electric locomotive; all loads were increased simultaneously. After establishing the stresses in the elastic range, the loads were increased until failure occurred. Four tests were made all told: two 20 ft. and two 40 ft. long girders were

tested to destruction. The 40 ft. long girders, approximately 40 inches deep, with about 12 sq. ins. of wrought iron in each flange, just about stretched our testing facilities to their limit. Although some of the failure patterns were of a surprising complexity, the test results were in reasonable agreement with calculated values and verified the safety of the structures.

Another interesting problem tackled in our department concerned the yielding of steel. We wanted to measure accurately the upper and lower yield points of some steel samples, so we cemented several strain gauges on a test piece and loaded it in one of our testing machines. To prevent the sudden release of the strain-energy locked up in the machine frame when the test piece yielded, we made use of a device first described by Robinson and Cook in 1913; namely we placed two high tensile "guard rods" in parallel with the part tested. As the test piece yielded, the load was taken over by the guard rods which were still in the elastic range and prevented a sudden elongation of the test specimen. To our surprise, we found that although the strain gauges attached to one end of the test piece showed the large increase in strain one usually associates with yielding, the gauges cemented to other parts of the specimen showed decreasing strains. A little thinking convinced us that we should not have been surprised: the drop in strain was caused by the elastic unloading corresponding to the drop in load from that required to start yielding at the upper yield point to the load necessary to continue yielding at the lower yield point.

The experiments were continued and we explored first the propagation of the yield front along a uniform section, later beyond a part with an increased diameter and finally we had a look how the yielding proceeds in a bar that had initially an enlarged diameter portion that was reduced by machining subsequently to the diameter of the portion that had started to yield already.

Only two projects have been mentioned in some detail, although we were involved in many others. To mention a few: model studies on the effect of rock failure on stresses in dams; computer, model, and full-scale field tests on stresses in pipelines around supports; model tests on the piers of Chowilla dam; studies on the cracking in end-blocks of prestressed concrete beams; calculations on the elasto-plastic behaviour of bars subjected to tension and torsion.

THE STRESS ANALYSIS OF A STRAPLESS EVENING GOWN

(This article was originally written by Charles E. Siem of the CALIFORNIA ENGINEER and has been run in a large percentage of the college engineering magazines in U.S.A., and is now being reprinted for your enjoyment. This article has attained the title of being a "classic" of those articles written for engineering magazines.)

Since the beginning of recorded history, the human being has worn some type of clothing either for protection or warmth. However, the present trend among the "fair sex" is to wear clothing not for protection or warmth, but solely to attract attention of the opposite sex. To be more specific, it is through the use of clothing that the female most effectively catches the eye of the very appreciative but totally unsuspecting male.

A variety of methods are employed to bring about this libido awakening infliction on the poor male. One very popular method employed by the female is to wear transparent, or seemly transparent, cloth to good advantage in certain areas. A common example of this type of clothing is the transparent nylon blouse. Another powerful attention-gathering device is the tightly fitting garment. A well known example of this type of weapon is the sweater. Yet another provoking method is by actually reducing the amount of body area covered by cloth. A good example of this method is the modern bathing suit. A delightful device which has sufficiently aroused the notice and curiosity of the masculine sex is the use of durable but fragile appearing cloth which gives the impresssion that at any moment the garment will slip down or that, better yet, certain parts might slip out of place. The best example of this method of attracting the attention of the weak and susceptible male is the strapless evening gown.

Effective as the strapless evening gown is in attracting attention, it presents tremendous engineering problems to the structural engineer. He is faced with the problem of designing a dress which appears as if it will fall off at any moment and yet actually stay up with the small factor of safety. Some of the problems faced by the engineer readily appear from the following structural analysis of strapless evening gowns.

If a small elemental strip of cloth from a strapless evening gown is isolated as a free body in the area of plane A of Fig. 1, it can be seen that the tangential force F, is balanced by the equal and opposite tangential Force F. Also the downward vertical force W caused by the weight of the dress below plane A is balanced by the force F acting vertically upward due to the stress in the cloth above plane A. Therefore, since the

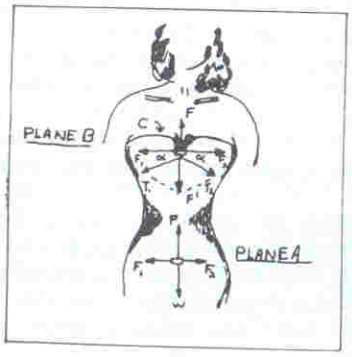


Figure 1

algebraic summation of vertical and horizontal force is zero, and no moments are acting, the elemental strip is in equilibrium. But consider an elemental strip of cloth isolated as a free body in the area of plane B of Fig. 1. The two tangential forces F_1 and F_2 are equal and opposite as before, but the force W, due to the weight of the dress below plane B, is not balanced by an upward force F because there is no cloth plane B to supply this force. The algebraic summation of horizontal forces is zero but the algebraic summation of vertical forces is not. Therefore this elemental strip is not in equilibrium but it is imperative, for social reasons, that this elemental strip be in equilibrium. If the female is naturally blessed with sufficient pectoral development, she can supply this very vital force and thereby place the elemental strip in equilibrium. Is she is not, the engineer has to supply this force by artificial methods.

In some instances the engineer has made use of friction to supply this force. The friction force is expressed by F=IN where F is the frictional force, f is the coefficient of friction and N is the normal force acting perpendicularly to F. Since for a given female and a given dress, f is constant, then to increase F, the normal force N has to be increased. One obvious method of increasing the normal force is to make the diameter of the dress at line C, Fig. 2 smaller than the diameter of the female at this point. This has, however, the disadvantage of causing the fibres along line C to collapse and if too much force is developed the wearer will experience undue discomfort.

As if the problem were not complex enough,

some females require that the back of the gown be lowered to increase the exposure and correspondingly attract more attention. In this case the horizontal forces F_1 and F_2 are no longer acting horizontally, but are acting downward at an angle *a* with the horizontal as shown by T_1 and T_2 of Fig. 1. Therefore, there is a total downward force equal to the weight of the dress below plane B plus the vector summation of F_1 of the two inclined forces. T_1 and T_2. But this vector sum F_1 increases in magnitude as the back is lowered because $F_1 = 2T \sin a$ and the angle *a* increases as the back is lowered. Thus the vertical upward force F which has to be supplied for equilibrium is greatly increased for low-back gowns. Also since there is no cloth around the back of the wearer, the force acting through the elemental strip B, perpendicular to the vertical axis of the female, is greatly reduced and it is this force which keeps the evening gown of the lady from falling forward, away from the wearer—attracting attention by this method is considered unfair tactics among females. Therefore, for very low-back evening gowns the engineer has to resort to bone or wire frameworks to supply sufficient perpendicular forces.

If the actual force supplied is divided by the minimum force that is required to hold the dress up, the resulting quotient defines a factor of safety. This factor of safety should be as large as possible, but there the engineers run into difficulty of keeping frameworks light and inconspicuous. Therefore, a compromise must be made between a heavy framework and a low factor of safety. With ingeniious use of these frameworks, the backs of strapless gowns may be lowered until cleavage is impending. Assuming the female is naturally endowed to supply the vertical force F still leaves the problem incomplete unless an analysis is made of the structures supplying this force. These structures are of the nature of cantilever beams. Fig. 2 shows one of these cantilever beams (minus any aesthetical details) removed as a free-body (and indeed many such beams can be, in reality, removed as free-bodies). Since there are usually two such divided, the force acting on any one beam is F/2. This force is distributed over the beam from A to F of Fig. 2. More exposure and correspondingly more attention can be had by moving the dress line from A toward B. Unfortunately there is a limit stress, P = vertical force F/2, and Area = area over which the bearing stress acts, then

$$S = P/A = \frac{F}{2} \times \frac{1}{A}$$

Since F/2 is constant, if the area A is decreased,

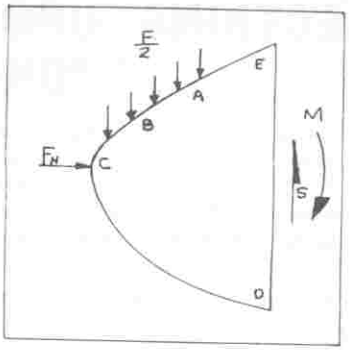


Figure 2

the bearing stress S must increase. The limit of exposure is reached when the area between B and C is reduced to a value which causes the bearing stress to increase to the "danger point".

A second condition exists which also limits the amount of exposure. The vertical force, F/2, is balanced by a shear force S acting on the area from D to E and by an internal moment M, Fig. 2. The moment M causes tension in the fibres of the beams between E and A and compression in the fibres between C and D. As the dress line is moved from A toward B the moment M is increased, thereby increasing the tension and compression of the fibres. The second limit of exposure is reached when the tension and compression stresses in these critical areas reach the "danger point".

Since these evening gowns are worn to dances, an occasional horizontal force F shown in Fig. 2, is accidentally delivered to the end of the beam causing impact loading. This impact loading causes compression in all the fibres of the beam. This compression tends to cancel the tension in the fibres between E and B but it increases the compression in the fibres between C and D. The critical area is at point D, as the fibres here are subjected not only to compression due to moment and impact, but also to shear due to the force S. With the combination of a low, heavy dress and impact loading, the fibres at point D can be stressed to the "danger point".

There are several reasons why these properties have never been determined. For one, there is a scarcity of these beams for experimental investigation. Many females have been asked to volunteer for experiments along these lines in the interest of science, but unfortunately, there have been no co-operative subjects., Also, there is the difficulty of the investigator having the strength of mind to ascertain purely the scientific facts. Meanwhile, trial and error and shrewd guesses will have to be used by the engineer in the design of strapless evening gowns until thorough investigations can be made.

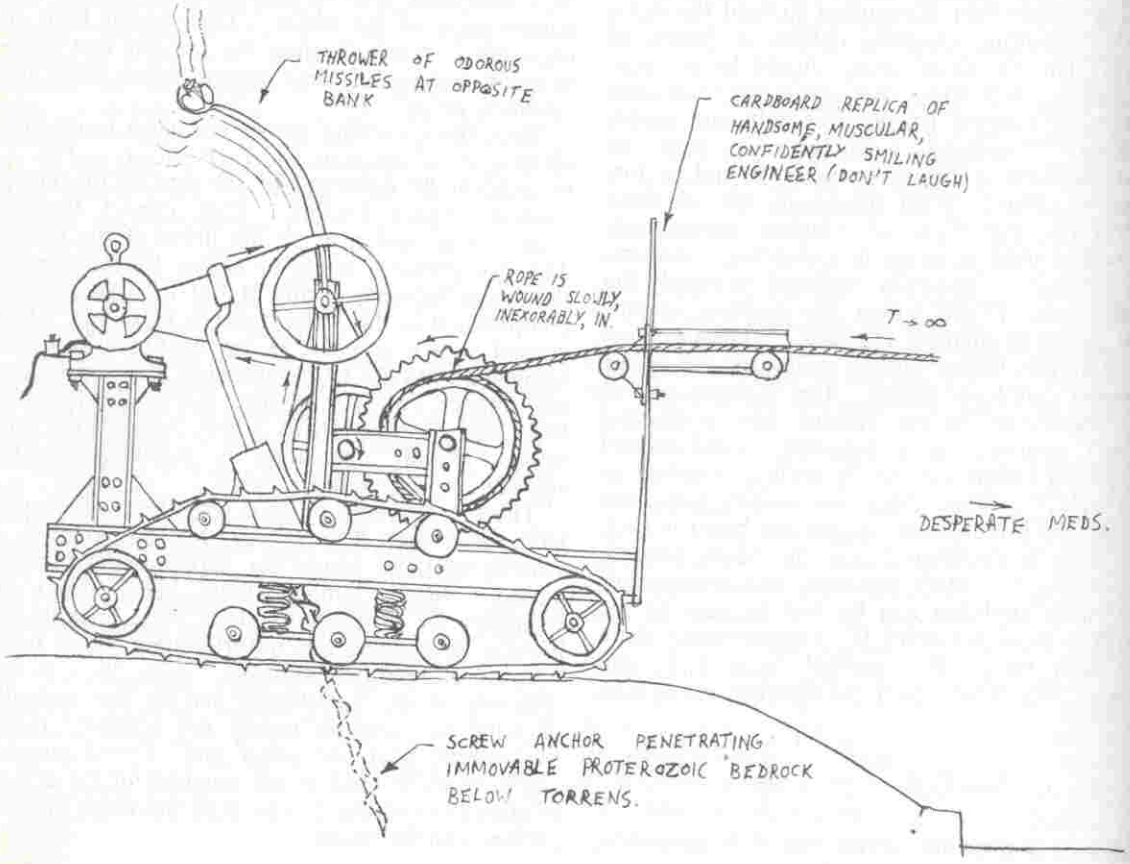
REFLECTIONS UPON WITNESSING A SAD AND IGNOBLE DEFEAT

The Meds have once again proved their superiority to the Engineers in the Annual Trans-Torrens Tug-O'-War. 'It is clearly time that something was done about this state of affairs. Never enjoying a great amount of prestige in the eyes of the rest of the University we Engineers are, I feel, missing in this Tug-O'-War a unique opportunity of demonstrating our prowess to the University at large.

Let us examine the situation more closely. The Meds spend their time learning about the various functions of the human body. It is only natural that they, being concerned with the problems of making the most of man's puny physique, should be as good as, or better than, any others at feats of physical exertion, pulling included.

We, on the other hand, are concerned with harnessing the great forces of nature for the use and convenience of man. When we want to move 1,000 tons of earth, we find it more convenient to use some kind of bulldozer or mechanical shovel than lots of little men with bare hands. To travel long distances we go by car, train, plane, ship, etc., rather than walking, running, or swimming. If we are erecting long span electrical transmission lines, a winch is more useful and convenient than bare hands.

It seems inconsistent therefore, that when we want to exert enough tension on a rope to pull a lot of med. students into a river, we should use our bare hands. The word "engineer" originally meant someone who is ingenious, not as is commonly believed, someone who collects the rubbish in a big silver truck, or someone who drives a train. So let's be ingenious.



Civil engineers can design a structure which can be moved over the footbridge or can float across the water, and can be anchored immovably on either bank.

Elecs can design an electric motor, or pinch an old one from the hydraulics lab, and devise a simple means of hooking up to ETSA power lines. They might also design a radio control system for the machine, so the engineers can conveniently control it from a distance and so avoid the missiles. This gives scope for both power and electronics engineers.

Mechs can design a gear train from the motor to a winch for the rope, and a deadly missile thrower.

Chems can design—(a) An effective smoke screen so the meds can't see that they are up against an unbeatable machine, thinking it a lot of engineers hit by a smoke bomb from one of their supporters. Otherwise they might give up immediately, and rob the spectators of an event that would improve our reputation enormously. (b) Missiles which explode in a cloud of exothermic fury near the bank, emitting vapors of a nauseous variety so the meds will relax thinking they are back in the safety of the med school.

Someone with an artistic touch could design a cardboard replica of an engineer to hang on the front of the machine, so it can be seen dimly "thro' dust of conflict, and thro' battle flame" by the desperate band of unhappy docs-to-be on the far bank.

These things being designed in true ED & D style with God on our side, there is no reason why we should not score a resounding victory next year—and show 'em all what "Engineer" really means.

"There's lots of good fish in the sea . . . maybe . . . but the vast masses seem to be mackerel or herring, and if you're not a mackerel or herring yourself you are likely to find very few good fish in the sea."

D. H. LAWRENCE.

1965 A.U.E.S. DINNER

Since the Dinner was in fact still to be held at the time we went to press, your editors, rather than deprive you of the chance to read all about it, have come up with the first ever "do-it-yourself" Dinner Report. All you have to do is cross out the non-applicable words, and there is your comprehensive, up-to-date story.

THE DINNER

The 1965 Society Dinner was held at the . . . Lennons Broadbeach/South Australia/Oodnadatta/Country Club . . . Hotel.

It was attended by . . . two/four hundred/lots . . . of the members.

The food was . . . fantastic/orright/lousy/burp!

The guest speaker was from . . . Outer Mongolia/Spain/Mile End/Canada.

He spoke about . . . Engineering/women/beer/I forget.

Pritchard/Peewee/Dr. Ansley/Mrs. Walls . . . got absolutely stonkered.

Two/seven/most . . . of the plate glass windows were accidentally broken.

Smith/Smith/Smith . . . made a fool of himself as usual.

The floor show was . . . non-existent/rude/scary/very rude.

We all had a . . . marvellous/terrific/fab/glorious . . . time, and we will be back next year if they'll have us.

Anger is an expensive luxury in which only men of a certain income can indulge.

—George William Curtis.

☆ ☆ ☆

Action is the proper fruit of knowledge.

—Thomas Fuller.

☆ ☆ ☆

Love is a gross exaggeration of the difference between one person and everybody else.

—Bernard Shaw.

MEMOIRS OF A FINAL YEAR B.E.(C) STUDENT

by Ray Neuling
Final year, Civil

"To be, or not to be: that is the question:
Whether it is nobler in the mind to suffer
The slings and arrows of ourtageous fortune,
Or to take arms against a sea of troubles,
And by opposing end them?"

William Shakespeare was the first to recognise the immortality of these lines and the deep despair of hopelessness behind their writing. They appealed to him instantly when, on a summer's day at Oxford University, he noticed them inscribed in stately Gothic characters upon a desk in the Engineering building.

Picture, if you can, the modern version of "taking arms against a sea of troubles". It is the view of a trusting fresher—rushing eagerly towards the swell and surge of a B.E. course, clothed in only text-books, and brandishing lecture notes.

Are you sickened? Filled with nostalgia? Do you shed a silent tear of remorse? Do not be ashamed, my friend: come, you are now ready for a refresher course, as together we trace through the pages of our pantomime . . .

Oh foolish lad—hearken now to my words of wisdom. As I survey the dim past, I would urge you to repent! Now, even now, 'tis not too late—resign—retire—enlist for National Service! Once I, too, was a fresher like you: distinguished only by the fact that I could not afford a shiny new brief-case. If your basic desire is merely to impress your mum—do arts! If you wish to impress your girl-friend—do medicine! If, however, you sincerely desire the letters B.E. after your name, I implore you, settle for the readily available O.B.E. or M.B.E.

I took up Engineering because I got a cadetship.

I entered 2nd year as pleased as punch. Life was great, and I loved it! After all there's no Engineering in 2nd year, it's just general B.S. that can be handled with common sense, not needing knowledge. "The course is too general!" we all cried, oozing self-satisfaction. "We want more specific Engineering subjects!" But it was fun! The hardest part was worrying about whether we could live up to the famous standards of that hard-drinking, fast-gambling, love-'em-and-leave-'em rake—the traditional Engineering student!

Support in this regard from the puritannical staff was singularly negative, but we tried. We tried very hard to repudiate religious beliefs we had been fed from childhood, so that we, too, could become sneering, petitioning, aetheistic, clever and superior, like fair-dinkum Uni. students. We found we lacked the library and oral eloquence of law and arts students to publicise our academic awakening, and our conversion to universal student bigotry, but we satisfied ourselves.

Yessir, 2nd year was great—I enjoyed it so much, I did it again the following year.

"A little learning is a dangerous thing;
Drink deep or taste not the Pierian Spring:
There shallow draughts intoxicate the brain,
And drinking largely sobers us again."

The course was still too general, but this time I passed.

MORAL: "Desperation is the secret of success".

It was during 3rd year that we really decided the course was too general, and we also began to worry about the lack of communication between lecturers and students. By this, I do not refer to the unfortunate fact of lecturers' notes being horrible garbage that remains to be deciphered with a text book in Swot-Vac. (actually I think most students will agree that our lecturers, although they don't like 3rd years and know that most of them will fail anyway, unintentionally deliver quite acceptable notes). I mean that the lecturers deliver notes, period. That doesn't make them human, does it? I mean, they don't really eat and drink and breathe normal air do they? After all, any 3rd year student knows that enthusiasts pass exams, fanatics get credits, and lunatics become lecturers.

This was also the year that shattered (for our lost, homeless souls) the popular notion (inspired by such popular American propaganda comics as the notorious "Archie") that Universities are friendly, embracing social centres. Life was miserable! Disappointing! Disillusioning! Then, gradually, we discovered God's gift to Engineering Students, that remarkable woman—Mrs. Walls. Henceforth she became our Mother-

away-from-Mother. We still had to pass, however!

Fourth Year brought a shocking revelation—lecturers crack jokes! We decided that D.H.T. must have been filling in for some absent member of the staff. He did a very good job, but he couldn't be called a LECTURER!—after all—he was human!

Dissension arose in the ranks about the course. Some still thought it was too general, others thought it was O.K., while others complained of the narrowness of its scope—despite the choice offered between "instant death" and "slow torture" (Maths. III and Economics).

That brings us back to Final Year. Oh joy! Gentlemen, I can assure you that final year brings mixed blessings. Of course, reclining in a luxurious chair in the Final Year library, observing a friendly game of 3-D noughts and crosses, with the tinkling sound of Mrs. Wall's voice caressing your ears and the fragrance of fresh coffee infiltrating your nostrils IS a very pleasant experience. However, one sees vivid pictures of the £1,515 which one will not receive next year if one does not pull one's finger out. This disturbs us regularly at 4.59 p.m. on Fridays.

Most of us now agree that the course is quite balanced, but there are a few on either side.

We find that when you have at last bridged the gap from the hundreds in first year, through the dozens in 3rd year, to the several in 5th year, the lecturers begin to take an INTEREST in you! They introduce fun-games into your course, such as: "Counting ers and ums in speeches", by Prof. Bull; "Mass Hypnosis", by G. Sved (Don't let him scare you—George smiles! Have you herd ze vun aboud ze over-inspired logarissmick spiral?).

"Culverisms", by R. Culver.

One gentleman exhibits fluctuating tendencies towards ferocity, undoubtedly due to a lack of student sympathy for his passion for gardening. We don't mind, because he's really a good guy at heart, and anyway, WE used to make mud-pies ourselves. (Besides, he WAS the Dean!)

Well, that's it!! Back to the mad hurly-burly of the technological rat-race! (Culverism: Vol. II, No. 3). If you get this far, you will (with us) agree that, if you pass this final test, it will have been well, well worth it. You'll love the place, and even the staff (?): for, as almost anyone will tell you:

"IT'S A GOOD TRADE".

REWARD

A reward of 500 micro-farads will be paid for the capture of Hopalong Capacitor who escaped from the primary cell last night.

This man is dangerous and may be armed with a carbon electrode. He is wanted for the induction of an 18-twin coil which was found burnt out just outside an oscillatory circuit. He is also wanted for driving a d.c. motor over a wheatstone bridge when crossing the electron stream and refusing to let the band pass.

If captured he will offer great resistance and must be neutralized.

The potential difference between him and any other criminal is that he always returns to the scene of oscillation by means of a complete circuit.

He was last seen riding a kilo-cycle.

Will any self-respecting milli-henry please report any information to the chief proton?

—From the Summer 1960 issue of the magazine of "Manchester University Engineering Society.

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 bank 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.

L'ALLEGRO AND 'IL PENSEROSO . . .

To disprove the theory that Engineers are illiterate and have little or no understanding of English, we reproduce an essay written as part of a Leaving English assignment—contributed by a certain Mech. student who looks a lot like Chris. Mobbs, but he certainly prefers to remain anomalous.

One poem is about a sad man who is not really sad. Actually he is happy but he does not like being happy. So to strike a happy (or sad) medium he is only happy when he is sad. As you can see, it is all very complicated.

The other poem is easy to understand. It is about a happy man. The other was also about a happy man, but he was a happy sad man. This poem is about a happy happy man, which is really happy. He would make a good Father Christmas because he is happy happy and laughs a lot.

The happy happy man believes that laughter is the best medicine. He went to hospital to have his appendices removed. After the operation he laughed and laughed. Now he is dead and I'm glad because all that laughing was getting on my nerves. And anyway, I don't believe in Father Christmas.

The poems are similar because someone called Milton wrote both of them. They are also similar because they are both wet and weedy. So is Father Christmas.

Allegro and Penseroso are a couple of Russian spies. They must be with names like that. I reckon Milton was a Russian spy too, or else he wouldn't write poems about his comrades, Allegro and Penseroso.

Some men are like musical glasses—to produce their finest tones you must keep them wet.

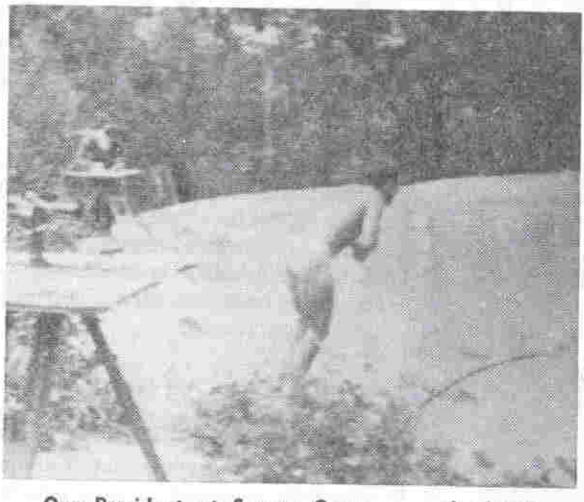
—S. T. Coleridge.

An expert—one who gets to know more and more about less and less.

—N. M. Butler.

He that never changed any of his opinions never corrected any of his mistakes.

Tailpiece.



Our President at Survey Camp . . . shocking!