

the

# CONCENTRATES



ANNUAL PUBLICATION OF THE

## ORE GANGUE

ORE GANGUE EXECUTIVE

1963 - 1964

President .....	R. Berven
Treasurer .....	R. Johnson
Secretary .....	A. Hogg
Sports Convener .....	R. Blackburn
Social Convener .....	V. Haggard
Concentrates:	
Co-Editors .....	S. Johnston A. Zypchen
Typing .....	Mrs. Sins
Photography .....	D. Churchill S. Johnston

1964 - 1965

President Elect .....	J. Wyder
Treasurer .....	L. King
Secretary .....	A. J. Spooner

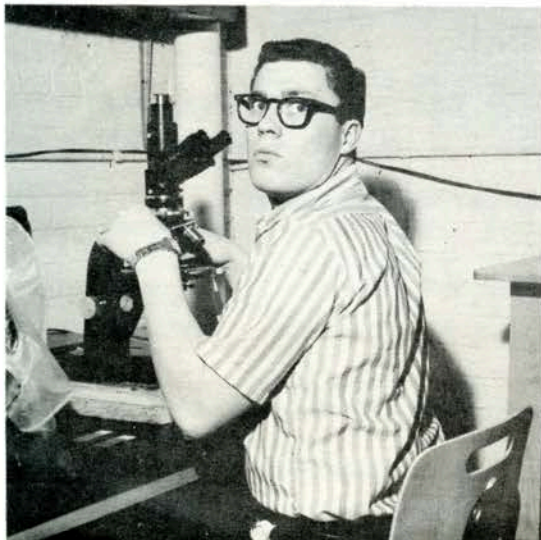
(Other offices to be filled by appointment or coercion as the need arises.)



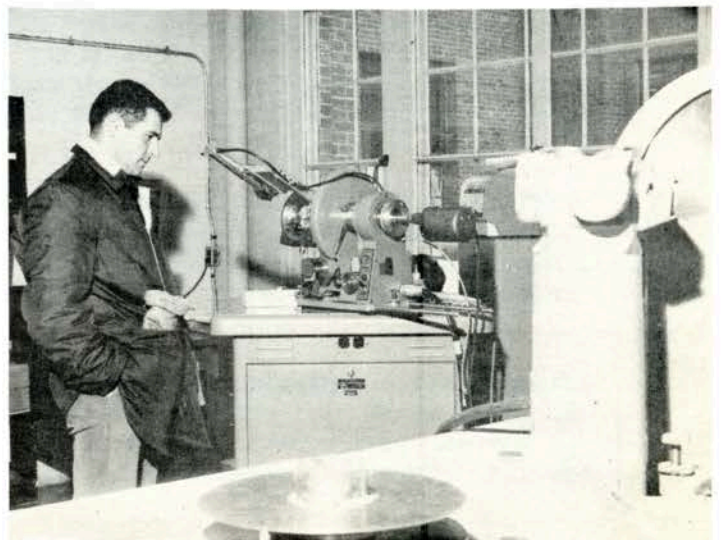
# MEMBERS OF THE ORE GANGUE



BACK ROW, L.T.O.R.: RON BLACKBURN, EMMETT HORNE, DARRYL HOLMES, PETER BYERS, ANNETTE ZYPCHEN, RON McINTOSH, GLEN THAMER, GARY METHERELL, MAURICE KIRBY.  
3RD ROW, L.T.O.R.: WOLFGANG WIENS, ROSS McLEAN, LAWRENCE NAGY, ED SKENE, KEN MOORE, KEN SLATER, VERN HAGGARD, TONY SPOONER.  
2ND ROW, L.T.O.R.: MORRIS LINDSAY, DAVE BOHUN, WAYNE KIPLING, CHARLES BOSTOCK, ADE ADEWUMI, STAN JOHNSTON, AL LUDWIG. FRONT, L.T.O.R.: DICK JOHNSON, AL CLARK, BOB BERVEN, JACK PARK, ALBERT VONHOF, LEO KING.



PRESIDENT BOB



SECRETARY-ELECT TONY.



EDITORIAL

For lack of dirty jokes and philosophical sayings, we have decided to utilize the editorial page to record happenings in the Department of Geological Sciences during the year 1963-1964.

A fall wiener roast was held somewhere north of Saskatoon extremely near the River, on a cold, rainy evening. The girls were sent into the dark bush to gather the firewood, and as a consequence the fire was rarely large enough to ward off the chill. Other remedies were resorted to. The evening was highlighted by the appearance of guest speaker, R. A. McIntosh.

The Fall Banquet of the Ore Gangue was held at the Saskatoon Golf and Country Club. Guest speaker was Dean Booth, who traced the beginnings of the science of geology, drawing analogies with the science of electronics, and finishing on a speculation or prediction that oil will soon be found on the moon. Professor Edmunds presented the Fall Essay Prize to Glenn Thamer (in absentia), the Academic Award to Andy Hogg and the Leadership Award to Bob Berven.

A Bowling Party at the Imperial Bowl and Parktown Motor Hotel saw several Ore Ganguesters become initiated to the game of bowling. The record and bar party at the Parktown ended relatively early and moved en masse to the S. G. Johnston abode and basement.

The Spring Banquet was held at the Saskatoon Golf and Country Club, and steak was the mainstay of the menu. Professor Nind, alias a British Lord, delivered a congratulatory message to the grads in reply to a toast to the faculty by R. A. McIntosh. D. Bohum proposed a toast to the graduates and A. J. Spooner replied. Results of Ore Gangue elections and winners of the photo contest were announced.

A mineral-guessing game and a photo contest were held under Wyder's direction. Park and Hogg tied in the mineral-guessing game, and Park out-guessed Hogg in a playoff. Cash prizes were awarded in numerous classes in the photo contest, the winning photos being filed in the Department.

Open House on campus saw several hundred high school students touring the Geology Department, and an attempt was made to interest them in geology as a career.

The entire geological engineering course has been revamped for presentation next year. The new course is designed to achieve a more quantitative approach to the science, and several deadwood classes have been chopped off. Details of the changes are contained elsewhere in the Concentrates.

A coffee urn was installed and immediately became a money-making proposition beyond the wildest dreams of its proponents. Since the students make the coffee, it never attains a uniform constituency from one day to the next, but has proved highly satisfactory nonetheless. The urn's only problem

is that it contains but 30 cups and usually at least 45 persons converge for coffee. Perhaps a larger urn will be purchased next year.

Congratulations of the students are extended to Professor Nind, who recently had a petroleum production text published by McGraw-Hill.

Professor Edmunds fell ill soon after Christmas, and only now is making an appearance at the Department. Geology students are extremely happy to see him back.

Stan Johnston

Annette Zypchen



PRESIDENTIAL MESSAGE

The Ore Gangue spring banquet and dance are over and the April exam schedule has been posted. These events herald the approaching end of the year 1963-64. It has been an extremely successful year for the Ore Gangue scholastically, socially and financially.

Our membership this past year reached well over the fifty mark and enthusiasm was never lacking for the various projects. One of the major accomplishments of the year was the purchase of a coffee urn for the department which has proven very successful and favorable to all. Another project was a photo contest which proved very interesting.

For those of you who will be graduating and leaving this spring I wish you the best of luck in your chosen fields. I hope you will retain your touch with the geology department in the future through a subscription to the Concentrates.

In closing I would like to thank all the members of the Ore Gangue who so graciously gave of their time, efforts, and ideas to make the year 1963-64 so tremendous. My sincere best wishes go out to the new executive for 1964-65, and I hope you have every success with your efforts.

Good luck to all.

Bob Berven



SOCIAL DIRECTOR'S MESSAGE

As we close the cover on the academic year 1963-64, we in the Ore Gangue can look back upon this year's social events and rightfully congratulate ourselves for a job well done. We must, however, at this moment not forget our friends and fellow Ganguesters who have done so much to make this year successful. It is they who should really be congratulated, for their cooperation and participation in what has made this year what it has been.

For us who will be leaving the Ore Gangue for places anew, this year has been the culmination of a series of events which will long remain with us. From the First Ore Gangue Banquet to the most recent we have tread with friends in an atmosphere of happiness and prosperity. We have at times stumbled, as we have trekked along this path but each time we have been hoisted to our feet by our fellow Ganguesters be it at times only by their well meant laughter.

We can indeed say, "Together we have achieved what the world is greatly in want of".

Thank you for your cooperation and the best of luck in the future.

Vern L. Haggard

## SPORTS REPORT

To get the most out of sports, one must participate. Thus participation is one of the main problems a sports convener must contend with. The Ore Ganguesters are then to be congratulated this year for turning out at the various sporting activities. Several times, for example in hockey, short notice of upcoming games was given, but we still managed to outnumber our opposition.

Our hockey team, judged on past performances was advanced from the Engineering "F" league to the "C" league this year. This jump may have been just a little too much for us to cope with, so we finished out of the playoffs. However, the "downtown" post-game hot-stove league proved to many of our adversaries that we could still win in something. Top scorer this year was Vern Haggard, and Jack "Gump" Park was our top goalie (the only one).

Curling took over the spotlight for three weeks after Christmas. A straight knockout draw was used so that each of the eight teams competing was assured of at least two games. Ron Blackburn and his rink of Andy Hogg at third, Wolfgang Wiens at second, and Charles Bostock at lead won the first event. In the second event, the Robert Lorer foursome came out on top. Supporting Bob were third Lawrence Nagy, second Pete Byers and lead Dave Jordan. Being on one of the winning teams myself, I can say that the prizes were very smooth and refreshing.

I would like to take this opportunity to wish all the Ganguesters the best for the coming summer and next year. Also for all those avid sportsmen going out to the field this summer, the famous Ted Peck quote, "tight lines and straight shooting", would be most appropriate.

Ron Blackburn



ORE GANGUE  
Geological Society

PROFIT and LOSS STATEMENT  
September 27, 1963 to March 20, 1964

Operating Fund

Income

Membership - 52 members at \$1.25		\$65.00
Income - 4 pools		48.50
Coffee urn (Dec. 1, 1963 - March 20, 1964)		
Cost of urn	\$31.88	
Supplies	110.21	
Gross income		188.67
	<u>\$142.09</u>	<u>\$188.67</u>
Miscellaneous		46.58
		16.95

Expenses

Debts inherited from previous years		35.28
Home-coming parade		15.00
Ball Banquet (43 people)		
Meal for guest	2.25	
Loss on dance	7.50	
Place cards	<u>15.95</u>	25.70
Spring Banquet (51 people)		
Subsidy 47 at 0.75	35.25	
4 guests	12.00	
Loss on dance	14.00	
Place cards	<u>7.47</u>	68.72
Miscellaneous		<u>29.67</u>
		<u>\$174.37</u>
Net Profit		<u>\$177.03</u>
		<u>2.66</u>
		<u>\$177.03</u>
		<u>\$177.03</u>

MAWDSLEY-EDMUNDS MEMORIAL SCHOLARSHIP FUND

The Mawdsley-Edmunds Memorial Scholarship Fund has been established by the University of Saskatchewan Ore Gangue and subscribed to by geological graduates and others, in memory of the outstanding services of Dr. J. B. Mawdsley and Professor F. H. Edmunds.

The investment of the monies subscribed to the Fund will be the responsibility of the Controller of the University of Saskatchewan and the returns from the investment of the Fund shall be used for a scholarship or scholarships, to be granted subject to the following regulations:

1. The maximum value of a single scholarship shall be \$300 but as funds are available, additional scholarships shall be offered.
2. The selection of scholarship recipients shall be made by a three-man Awards Committee consisting of:
  - (a) The Head of the Geological Department.
  - (b) A member of the Faculty of Engineering who is involved in the instruction of geological students, to be selected by the Faculty of Geology.
  - (c) The President of the current Ore Gangue or, in the event that this man might be a candidate, some other member of the Ore Gangue Executive who would be chosen by the other two members of the Committee.
3. In selecting a recipient, preference should be given to deserving students who have completed either their first or second year of geology, geological engineering, petroleum engineering, mining engineering, or geophysics.
4. Academic standing, character, and personal need should be considered in making the award.
5. The award or awards should be made annually, provided worthy candidates are available.
6. Applications for scholarships should be made to the Head of the Geology Department on or before April 30th of each year.
7. The Awards Committee has the power to make changes in the regulations governing the awarding of the scholarships subject to the following conditions: University of Saskatchewan graduates in geology, geological engineering, petroleum engineering, mining engineering and geophysics shall be notified in writing of the proposed change or changes and asked for approval. Approval of the majority of those replying will be required.



Funds are now available for a \$300 scholarship for the 1964-65 term. Inquiries and applications should be directed to the Head of the Geological Department.

An Ore Gange (stag) dinner is to be held in Calgary to honour Dr. J. B. Mawdsley and Professor F. H. Edmunds. It will be held at the Palliser Hotel Penthouse on Friday, April 17, 1964.

GUEST SPEAKERS

Dr. G. G. L. Henderson

Dr. Henderson, chief geologist of the California Standard Company, presented an illustrated address on the geology, staking operation and exploration of the Snake River iron deposit carried out by California Standard.

Dr. J. Green

Dr. Green is a geologist engaged in space research with North American Aviation Corporation. He presented an extremely interesting, illustrated talk on the geology of the moon, pointing out many similarities between the craters on the moon and volcanic craters here on earth.

Dr. A. D. Baillie

A well known geologist with the British American Oil Company, Dr. Baillie gave a talk on the relationship of tectonic patterns to oil and gas accumulations in Western Canada.

Dr. J. T. Wilson

Dr. Wilson, a geophysicist from the University of Toronto, presented a very stimulating talk on continental drift. His talk was accompanied by a series of excellent slides from all parts of the world.

Dr. T. Neville George

We were very fortunate in having Dr. George visit our department for several days in the early part of 1964. Dr. George is a professor in palaeontology at Glasgow University and is presently a visiting professor at Northwestern University. He is one of the foremost authorities in palaeontology and evolutionary theory, and several very enlightening discussions were held with Dr. George by members of the student body and staff.

Dr. George also presented a major lecture to the public on "Fossils and the Evolutionary Process" which was very entertaining and educational.

Mr. H. D. Strain

Mr. Strain is the chief geologist for International Minerals and Chemicals Corporation who operate the potash mine at Esterhazy, Saskatchewan. He showed films on the sinking of the mine shaft at Esterhazy and on various aspects of the industrial minerals industry in North America. A discussion period followed Mr. Strain's presentation.

Dr. A. D. Booth

Dr. Booth, presently dean of the College of Engineering at the University of Saskatchewan, was guest speaker at the Ore Gangue fall banquet. Dr. Booth is a world authority on computers. However, he chose to give us some of his own impressions of geologists and of geology as a science. His address was very entertaining.

Dr. R. L. Milner

Dr. Milner, a well known geologist in Western Canada, was guest speaker at the Ore Gangue spring banquet. Dr. Milner presented his views on approaching geological problems and using available information to set up a logical solution. His views and ideas were appreciated by all in attendance.

Dr. H. A. K. Charlesworth

Dr. Charlesworth, a geology professor from the University of Alberta, gave two talks, one entitled "Flow folding and orogenesis" and the other "Structure of the Rocky Mountains". The talks were extremely informative and gave the students and professors a chance to discuss the subjects with Dr. Charlesworth.



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THESES ABSTRACTS

Undergraduates

BOUDINS FROM AXEL HEIBERG ISLAND

(Abstract not yet completed. The following is merely an outline of the work which was done.)

Specimens from gypsum domes of Axel Heiburg containing calcite "boudins" were studied in order to determine their orientation with respect to the maximum stress direction. The maximum strain direction was determined on the basis of extension fractures and direction of regrowth in the anhydrite crystals. The directions of the long axes of the boudin rods were plotted on a stereo net, and it was found that the boudins have formed with their long axes in the direction of the maximum stress.

P. N. Byers  
Supervised by Dr. W. M. Schwerdtner  
and Dr. N. C. Wardlaw

FOLDS IN THE SULLIVAN MINE

The "parasitic" folds, found in the Aldridge formation of late Precambrian age, exposed in the Sullivan Mine near Kimberley, British Columbia, appear to have been formed by buckling forces.

The folds may have been formed by slumping, prior to lithification, in which case the sulphide replacement of the strata probably occurred after the folding, or the folds may have been formed under high temperatures and pressures, coincident with mineralization. An intense study of the relationship of the time of mineralization to the time of deformation would probably yield some useful information.

V. L. Haggard  
Supervised by Dr. N. C. Wardlaw

DIFFERENTIATION OF THE OPEMISKA SILL, QUEBEC

Core from a hole which cuts across the upper 966 feet of the Opemiska Sill, obtained from Opemiska Copper Mines Limited of the Chibougamau district of the Province of Quebec, intersects 128 feet of pyroxenite, 69 feet of a layered sequence consisting of layers of pyroxenite and gabbro, 141 feet of foliated gabbro, and 628 feet of massive gabbro.

The sill contains definite cryptic layering, probable phase layering and rhythmic layering, and possible inch-scale layering. Layering and



contact relations indicate that the sill is the product of igneous differentiation rather than the product of separate intrusions.

Maurice A. Kirby  
Supervised by Dr. F. F. Langford

#### SOAPSTONE OF WAPAWEKKA LAKE, SASKATCHEWAN

The soapstone deposit on Wapawekka Lake was formed through a process of hydrothermal alteration of volcanic rocks, with intermediate stages of serpentization and chloritization. Volcanic rocks affected were andesitic flows, tuffs and agglomerates. Hydrothermal solutions required were probably emitted by the nearby gravitic intrusive.

R. J. W. Lorer  
Supervised by Dr. F. F. Langford

#### GEOLOGY AND HYDROLOGY OF GLACIAL LAKE MELFORT, SASKATCHEWAN

(No abstract was available at press time. The following is a general outline of the thesis.)

The geological and hydrological settings of Glacial Lake Melfort were studied. Information regarding the stratigraphy and a permeable aquifer was obtained from a drilling program of the summer of 1963. The unfossiliferous, lacustrine clays extend down to 54 feet from the surface, and yield a poor but relatively constant water supply.

R. A. McIntosh  
Supervised by Dr. W. O. Kupsch  
and Mr. W. A. Meneley

#### LAMINATED LIMESTONE IN THE WINNIPEGOSIS FORMATION, SASKATCHEWAN

Laminated limestone occurs in the Winnipegosis Formation of Saskatchewan. Minor amounts of dolomite and anhydrite are dispersed throughout the calcite laminae and are concentrated in some laminae.

X-ray diffraction patterns of the interlaminar dark material show illite, dolomite and other unidentifiable materials to be present.

Lamination and the periodic thickening of laminae suggest the presence of rhythms in factors affecting sedimentation.

Sutured structures occur between most of the laminae and, in one case, within a laminae. A study of these structures suggests that they

occurred by pressure solution, probably occurring selectively along planes of interlaminar dark material, where insolubles are concentrated.

R. Gary Metherell  
Supervised by Dr. N. C. Wardlaw

#### POSSIBLE APPLICATIONS OF SHAPED EXPLOSIVE CHARGES IN THE MINING INDUSTRY

By shaping explosive charges in certain ways, it is possible to produce a concentrated directional force upon detonation. This effect was first used in armor-piercing projectiles for warfare; however, in an industry such as mining, where the use of explosives is a major feature of the operation, a directional force should have some application. Shaped charges could be used in secondary breaking, in drilling shallow holes where the use of rock drills would be time-consuming, inconvenient, or dangerous, or in breaking in a heading where a smooth floor or walls is essential. The major factor limiting the use of shaped charges is their high cost.

Alec R. Minty  
Supervised by Professor R. F. Palmer

#### DEFORMATION AND PREFERRED ORIENTATION OF HALITE

Under an axial compressive load of 1,000 pounds per square inch a fine-grained, randomly oriented crystalline aggregate of halite was deformed by 1.73 per cent. No detectable preferred crystallographic orientation was produced.

K. L. Slater  
Supervised by Dr. N. C. Wardlaw

#### LIQUID INCLUSIONS IN GEOTHERMOMETRY

Liquid inclusions in halite, and other crystalline salts, often contain gas bubbles. Presumably these bubbles are not present at the time of inclusion formation but formed on subsequent cooling of the crystal with consequent contraction of the liquid. It would follow from this that the temperature of disappearance of the bubbles on reheating would be the temperature of formation of the crystals.

For this study, halite crystals were grown at controlled temperatures and subsequently the temperature of formation was determined by reheating under controlled conditions to the point of bubble disappearance. Over one hundred determinations were made and the author concludes that vacuole disappearance temperatures yield the temperature of crystal growth, within the

experimental limits of  $\pm 2^{\circ}\text{C}$ . With reheating of crystals above growth temperature, brine leakage occurred and temperatures then determined from the disappearance of the gas phase compared closely to the temperature of reheating.

G. L. Thamer  
Supervised by Dr. N. C. Wardlaw

#### PETROLOGY OF THE PEGASUS LAKE GRANITIC MASS, NORTHERN SASKATCHEWAN

Analyses of modal compositions, plagioclases, microcline and biotite indicate that the Pegasus Lake granitic body of Northern Saskatchewan consists of two distinct intrusions with a related marginal occurrence of radioactive pegmatities. Mesozonal origin is suggested for the three phases of the intrusion by the decrease in percentage of plagioclase and increase of microcline towards the margin, a trend of the plagioclases becoming more sodic, and the refractive index of biotite increasing towards the margin. Microcline has maximum triclinicity throughout the granitic mass.

Annette Zypchen  
Supervised by Dr. F. F. Langford

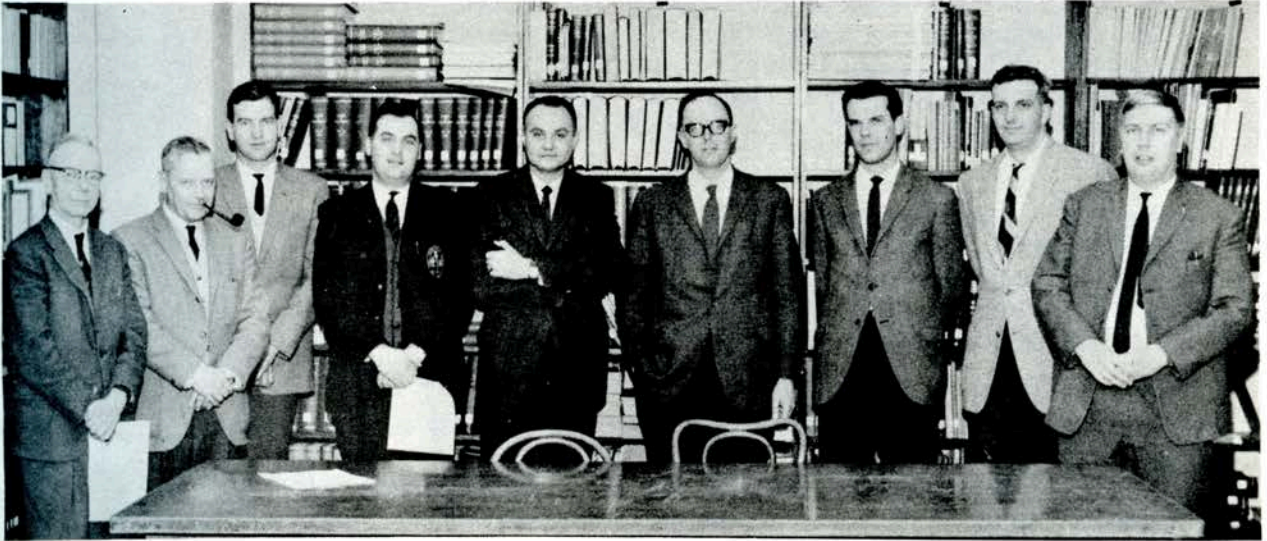




VOTE OF THANKS

Graduating students who have undertaken a thesis this year wish to express their thanks to the supervising professors, who no doubt suffered anxiety as to whether the thesis would ever be completed. These writers are indebted to Mrs. Sins, who undertook to type most of the theses, and very capably too. Cy and Ernie deserve thanks for the way in which they filled our urgent needs in the way of thin sections and other technical assistance. Photographer Dave Churchill handled the photography for the theses in a most professional manner. Thanks to everybody, and we hope the hell we never have to do it again.





L.TOR: F.H. EDMUNDS, A.R. BYERS, N.WARDLAW, W.GE. CALDWELL, W.O. KUPSCH,  
T.E.W. NIND, L.C. COLEMAN, F.F. LANGFORD, K.B.S. BURKE.  
MISSING: J.B. MAWDSLEY, R.F. PALMER, J. ANDERSON-THOMSON.



MRS. SINS



MRS. VONHOF



FACULTY ACTIVITIES

Professor F. H. Edmunds - Summer 1963

Greetings and good wishes to all 'Ore Ganguesters' wherever you may be. The secretary to the edition of this year's 'Concentrates' has just asked me for a contribution with the usual suggestion that I should give an account of my past summer. It is now late March and recollections of last summer are getting dim and my mind more readily contemplates plans for the coming one.

Last summer my wife and I visited the United Kingdom. On the way there we spent a very interesting few days on the rapidly growing campus of Laval University in Quebec City. No one visiting Laval can fail to be impressed by the spaciousness of the buildings already in use and staggered by the plans to cope with well over twenty thousand students within a relatively few years time.

Sailing from Quebec City we reached Scotland in the middle of June. This was just after their summer was over. All over the country, in damp cloudy weather we were greeted with descriptions of the glorious first two weeks they had had in June and which we had missed. We eventually sailed out of the Clyde on a glorious day in late August. The preceding days had been wet and I am told the following day was just as bad. These remarks about the weather are not intended to discourage any of you from visiting the United Kingdom. It can be wonderful between showers and it is my impression that the rain and lack of sunshine there is not as depressing as such conditions would be here. The scenery there looks beautiful even in the rain.

In England I visited the geology departments at Birmingham, Bristol, Liverpool, Manchester and Sheffield and was on the look out for ideas that might be incorporated in our department, when we get a building or new quarters. At Manchester we were entertained by Dr. and Mrs. W. S. Mackenzie. Dr. Mackenzie was with us during the winter and spring of 1962, holder of a Nuffield Foundation Visiting Lectureship. Subsequently he has published a joint paper with Dr. J. V. Smith "Single Crystal X-ray Studies of Crypto- and Micro-Perthites" and acknowledges his indebtedness to the Foundation, and to the National Research Council of Canada, support from which enabled him to make his contribution to the paper while at the Geology Department here.

At Birmingham we met three former Saskatchewan University staff members. Drs. Alty, Garber and Shearn. Drs. Alty (Physics) and Garber (Mechanical) are unlikely to be known by many of the Ore Gangue members, Dr. Shearn, however, was with us in the department from 1955 to 1958 as Petroleum Engineer. They all sent greetings to their former colleagues and friends at Saskatoon.

During this session there have been a number of interesting visitors. Most particularly I would like to mention Drs. Tuzo Wilson and Neville George. Unfortunately I was enduring a 'forced rest' at the time of their visits but have had glowing accounts of them and was able to see Dr. George for a short time when he was here. I am sure that elsewhere in



the Concentrates reference will be made to these visits but I wish to express the appreciation of the department for visits of this kind which aid so much to the building up of interest amongst the students and give encouragement to the staff.

Since publication of the last issue of the 'Concentrates' the department has instituted a spring mapping camp for third year students. This is a three weeks course immediately following examinations and some indication of its success last year can be judged from references made to it by students, Dr. Kupsch and other staff members in this issue.

Moving with the times the department has reorganized the geology curriculum and believes that the course which will be started next session will prove a more logical one. The main changes involve the combination of Mineralogy and Petrology into two classes to be given in third and fourth years respectively, while Optical Mineralogy will be given as a separate half class in the third year. Palaeontology, Sedimentation and Stratigraphy will be combined in two classes in the third and fourth years. It is hoped that these changes will result in a better coordination of the material to be presented and avoid excessive repetition. More details with regard to the changes are given by Dr. Byers.

I look forward to seeing a number of old Ore Gangue members at Calgary on April 17th and am sure I shall have an opportunity of meeting many of you in Regina at the Williston Basin Symposium in September.

Dr. J. B. Mawdsley - Summer 1963

As far as I was concerned the big event last summer was my retiring as Dean of Engineering on July 1. The two years in the chair were most interesting and instructive; it confirmed what I already knew, that we have a first class College of Engineering at Saskatchewan with a faculty having a high esprit de corps.

Early in June I attended the meetings of the Royal Society of Canada in Quebec City. They were held in the new buildings of Laval University which are very modern and will be capable eventually of handling many thousands of students. This is just a part of the tremendous expansion that is taking place in universities everywhere.

After the meetings I flew to London and in six hours was in that interesting bustling city. My sister and I spent three months overseas, two weeks in North Italy among the hill towns and the city of Florence. The churches, palaces and fortifications that even a small town has made you wonder if they took time out for coffee- or wine-breaks in the Middle Ages. Certainly labour must have been cheap, but their skills very great.

After Italy we spent two weeks in Yugoslavia. As we had rented a car for Italy and Yugoslavia we were able to move at our own pace and go

where roads would take us. The Yugoslavian coast along the Adriatic is very scenic, but barren. The bed rock is 95 per cent folded limestones; as a result, farming is present only locally and marginal at best of these rocky fields. The towns are picturesque and the people attractive. They are a proud, independent people with a very storm history. They have definitely made marked progress since the last war. You could not help feeling that geology and geography have done much to shape these people.

The rest of the time we spent in England and Wales, which in spite of the weather we thoroughly enjoyed. One week was particularly interesting. As one of the four representatives of this University I was a delegate to the Conference of the British Commonwealth Universities, which is held every four years. There were delegates of all colours, from all parts of the world. The meetings, held in London, were very interesting and the added entertainment was quite exceptional; the red carpet was laid out in every direction.

Though I had a fine time I was glad to get back for a rest and to start doing a few things I have always wanted to do.

#### Dr. A. R. Byers - Summer 1963

After attending the meetings of the Geological Association of Canada and the Mineralogical Association of Canada held in Montreal at the beginning of June, I spent the remainder of the month on a summer field conference dealing with the Stratigraphy and Structure of the Appalachian. The conference was conducted by The American University of Washington, D. C., and was financed by a grant from the National Science Foundation.

The remainder of the summer was spent in that part of the scenic and geologically interesting Grenville Province which lies in southeastern Ontario.

#### Dr. W. O. Kupsch - Summer 1963

In 1963 the summer field season started very early indeed when we took off for the Little Rocky Mountains on April 21. A three-week stay at Zortman, Montana, not only introduced some young greenhorns to what geology is really all about, but it also provided an opportunity for extending their general education in engineering and the liberal arts. With respect to the latter, special mention should be made of a cooperative effort by students and faculty to paint the local church, which involved some hair-raising steeple acrobatics and ultra-modern paint-spreading techniques which in future will undoubtedly be copied by artists who keep up with the times. Physical exercise in the Miner's Club to the tune of the Limbo Rock should be put on



record as an important factor contributing to the health and welfare of the participants.

After the field camp in the Little Rocky Mountains, the remainder of the season looks very tame in retrospect. Dr. Caldwell invited me to join him on his trip from Zortman to Calgary which almost caused my apprehension by an American law enforcement officer with my pants down, but after that little incident it was time to buckle down to some solid work. Firstly, in Calgary, air photographs were studied of project areas in the Arctic Islands and later, near the end of June, these areas were visited. Field work in the Arctic now appears to become a routine for me and with all the new knowledge accumulating in my head, it is the readers' guess what was covered in the lectures when I took part of Professor Edmunds' course in Stratigraphy and Historical Geology during his absence. Although future students may therefore take a dim view of this, I am planning to go back to the Arctic Islands again this summer and hope to return with yet another box of kodachromes.

Dr. W. G. E. Caldwell - Summer 1963

For some years, our studies of the Devonian brachiopods and corals of the Mackenzie Valley have been hampered by the lack of similar specimens from the European type sections with which to make comparisons, and the pleasant task of obtaining comparative material fell to me during the summer of 1963. Upon completion of our newly established field camp in Little Rocky Mountains, my wife and I journeyed to Europe, and almost our entire summer was spent in Britain, Belgium, France, and Germany.

Upon arrival in Scotland, we visited my parents' home in the Firth of Clyde, and we were joined there by Professor and Mrs. Edmunds, who had come to spend most of the summer in Britain. It was a great pleasure to show Professor and Mrs. Edmunds some of the scenic attractions of the Scottish western seaboard, but regrettably, their visit was marred by some unseasonably wet weather.

In Belgium, France, and Germany, I visited museums and universities, and examined and collected from some of the classic sections in the Ardennes, Eifel, and Rhine valley. As a result of my activities and the kindness of many European geologists, we now have some two thousand pounds of excellent reference fossils in our palaeontological coffers for the perusal of future generations of research students.

Some of my most pleasant moments in Europe were spent with former students of this department. Early in the summer, I visited Owen Dixon in Ireland. Owen is completing the mapping of a basin of Late Palaeozoic rocks on the fringe of the Yate's Country, and the results of his investigations will form the basis of a doctorate thesis to be submitted to the University of Glasgow next year. In London, I met Yvonne Pocock, who likewise is entering the final phases of her research towards a doctorate degree. Yvonne is continuing the investigation of a group of brachiopods that she began here



with us, and her thesis promises to be one of considerable interest to palaeontologists both in Canada and Europe. In Germany, I had the pleasure of Paul Copper's company for about two weeks, and I am deeply indebted to Paul for a long excursion into the southern Eifel, and for his expert guidance to the best fossil localities of this classic region. A revision of the Middle Devonian stryplidbrachiopods of the Eifel is the subject of Paul's doctorate thesis, this study being based on the collections of the Senckenberg Museum in Frankfurt am Main and on collections that he himself has made (and most impressive they are) in Germany. This coming summer Paul hopes to revisit the Eifel and to collect from localities in Brittany and Gotland. We have much reason to be proud of these three Saskatchewan graduates, for truly they have planted the green and white flag firmly on European soil, and they are being a great credit to us.

Professor T. E. W. Nind - Summer 1963

My family and I revisited England this summer, and despite cold and wet weather managed to enjoy ourselves looking up relatives, old friends, and remembered places. We spent two weeks in the Scilly Isles off the western tip of Cornwall. These islands - there are 135 of them - are a delight, and seem to be of another world. All modern comforts such as running water, indoor plumbing and electricity are available on two of the larger islands (where the hotels are situated); but the days are spent on any one of the smaller islands, which have none of the modern conveniences, nor the inconveniences such as cars and trucks and people (only five of them are inhabited) and where it is always possible to find a sandy beach to oneself.

My wife and I also enjoyed two weeks in Ibiza, one of the Balearic Isles in the Mediterranean. She spent her days swimming and painting while I spent mine swimming and collapsed in a deck chair with a copy of the 'Theory of Aquifer Tests' on my knee. However, I found the local topography of more interest: nestled in many of the formations there are small but colourful and well-formed examples of bikiniopods. Evenings drifted by at sidewalk cafes with cognac and coffee.

What with one thing and another there was little time for work while in Europe, although I did spend one day at the Royal School of Mines, where Bill Longstaff is currently studying on an Athlone Fellowship. Both before and after the trip I was busy making final adjustments to my book on oil-well production and preparing the index (a formidable task), and trying to reorganize lecture notes and so on. A one-week course given to the Reservoir Engineering section of the Department of Mineral Resources in Regina rounded out the summer's activities, and it was with some regret that I banished thoughts of sub-tropical islands from my mind and tried to settle down to the harsher realities of winter in Saskatoon.

Dr. N. C. Wardlaw - Summer 1963

Reflecting on the past summer, I feel it could give little pleasure to my readers to learn that I worked, since this sounds unpleasant. But there is also the point that these notes are a type of accounting, a time of reckoning, an answer to the apparent but unasked question, just exactly what did you do last summer?

To most, it must seem that I had a rather unusual experience. I stayed at the University, got on with some analytical studies on the potash deposits, and then took a German language course. I am hoping this will stand me in good stead for the coming summer, much of which will be spent at the University of Marburg, Germany.

In August last, I left Saskatoon, with three friends, for a motoring-camping holiday in the Western United States and Mexico. This was a great deal of fun and especially interesting for me since it was my first visit to these parts.

Dr. L. C. Coleman - Summer 1963

During last summer I resumed a detailed geological mapping project for the Saskatchewan Research Council in the Hanson Lake area, about 40 miles west of Flin Flon. This program which I had started the previous summer with a three man party, was expanded to a mapping party of five consisting of myself, a senior assistant named Bill Gaskarth who will commence work in the Department on his Ph.D. this coming September, and three junior assistants - Gerry Koenderink and two biology majors (Tim Jones and Clayton Van Dyck).

Work on the Hanson Lake project progressed very well and, in the near future, should bear its first fruits in the form of a preliminary map of an area about three miles square to be published by the Research Council. This map, which will be at a scale of 1" = 500', will be accompanied by overlays depicting the distribution of trace metals (Cu, Zn, Ni). The data necessary for making these overlays is presently being obtained at the Council by X-ray fluorescence analysis of some 3,500 samples of bedrock which have been collected as part of our last two summers' work.

Social highlight of last summer was the visit to Hanson Lake of Tony Spooner and Murray Pyke in the course of their duties for the Department of Mineral Resources. The occasion was duly celebrated and resulted in the development of some new techniques in aquaplaning.



Professor R. F. Palmer - Summer 1963

My main purpose this summer was to visit a number of Western mines, studying methods and organization, accumulating descriptive photographs and drawings, and discussing with anyone interested the future for graduates in the mining industry.

Starting with the Mining Field Trip in April, I visited fourteen mines in the three Western provinces and Washington. The Saskatchewan Chamber of Mines and Consolidated Mining and Smelting provided major support for the tour, but all mining companies were most hospitable.

The interest shown was adequate demonstration of the need for graduates in the industry. The specified requirements of these mines alone would demand the 1964 mining graduates of all Canadian Universities. Several mines suggested that geological engineers are considered in the same category as mining engineers. There was also a considerable demand for geologists. The apparent increase in mining graduates from Europe, South Africa, Australia and New Zealand confirms that past requirements could not be fulfilled from Canadian Universities.

Although the mine tours, and subsequent analysis of data occupied much of my time, I was also able to undertake a camping trip on the Oregon coast. Following two weeks of almost continuous rain, and night temperatures ranging from 40° to 50°, it was a real pleasure to complete my holiday in the dry, sunny atmosphere of Saskatoon.

Dr. F. F. Langford - Summer 1963

My activities of the summer of 1963 may be summarized in four points:

1. Accompanied Dr. Coleman to Flin Flon on a couple of occasions.
2. Took holidays in Jasper and Northern Saskatchewan along the road to resources or Lac La Ronge.
3. Worked on statistics of trace elements, Flin Flon region.
4. Continued a life long research on drinking and lounging.

Dr. K. B. S. Burke - Summer 1963

The first few weeks of the summer were spent with one of the Saskatchewan Research Council's resistivity crews in the Allan area of Saskatchewan. This field work was part of a project to examine the use of the resistivity method in the location of aquifers but after almost a month of continuous rain I began to wonder whether surface water or ground water was the problem. Nevertheless a few warm days enabled us to carry out some of the project and develop a healthy respect for the warm prairie sun.



In August, the Department's newly acquired seismic equipment was delivered. After becoming acquainted with the equipment in the laboratory, a series of field tests was commenced with the Saskatchewan Research Council in the Saskatoon area. A weight dropper was used as the source of seismic energy; it being found that 200-300 pounds of concrete hurtling to the ground gave quite a considerable amount of energy.

In late August, it was time for a change of scene and I spent the next two weeks in San Francisco at the 13th General Assembly of the International Union of Geophysics and Geodesy. The Assembly itself was held on the Berkeley Campus of the University of California and many interesting papers were presented particularly in the Upper Mantle Symposium. There were also plenty of opportunities for sight seeing trips in the San Francisco area and excursions into the surrounding countryside with its many vineyards.

In September I took the opportunity to observe and record a large ammonium nitrate explosion in the Maple Creek area of Saskatchewan. This enabled us to test the capabilities of the seismic equipment for Moho shooting. This project completed my first and very pleasant summer in Canada.

#### Dr. M. W. Steeves - Summer 1963

This year has been spent in preparing many of the sedimentary samples for pollen analysis collected from the Eastend and Ravenscrag formations in southwestern Saskatchewan. Also collected were leaf impressions and well preserved, lignitized wood which can be demineralized, embedded and sectioned in the same manner as living wood. It will be very interesting to see if any of these fossils can be identified as modern genera. If such identification is possible, the different types of floras, that is, the pollen, leaf and wood floras, should show differences in generic composition and in the relative percentage of each genus; and the causes of these differences will be analysed. Only rarely is it possible to study a flora so comprehensively. Of course it is hoped that such a study will give a more accurate picture of the vegetational changes during Upper Cretaceous-Tertiary time than it has been possible to obtain heretofore.

#### Dr. W. M. Schwerdtner - Summer 1963

When I started my doctor's thesis on anhydrite rocks, I never dreamt that this might eventually take me into the Canadian Arctic. Anyway, this is how it turned out and last summer Alan Clark and myself wandered the winter wastes of Axel Heiberg Island in pursuit of anhydrite domes.

Incidentally, I learned how to handle a rifle, a part of my education previously neglected. However, no polar bears showed up in spite

of our deep concern about this matter. Instead, we saw plenty of musk ox at a safe distance and I always made sure that Clark was between them and me. If any of you should ever visit the South Fiord or Mokka Fiord Domes you will probably find some Norwegian sardine tins, the remnants of our favourite lunch.

Mr. John Anderson-Thomson - Summer 1963

Most of the summer was spent near Tavanni and the Ferguson River on the westerly shore of Hudson's Bay, surveying staking and investigating iron ore deposits for Giant Yellowknife Mines. In the late summer and early fall some sub-division work was done at Fort Smith, Fort Simpson and at Yellowknife where we did the preliminary surveys on the new Territorial Jail, and tied in the new Seismic Station west of town.

The goose and duck hunting situation in Alberta was also successfully surveyed en route to Saskatoon in October.





## REORGANIZATION OF THE GEOLOGICAL ENGINEERING COURSE

This year the course in Geological Engineering has been completely revised with the approval of the Faculty of Engineering. The revision consists of:

(1) a reorganization of the present classes in Geology given in the third and fourth years, which will also apply to Arts and Science students majoring in geology.

and

(2) the dropping of some third and fourth year Engineering classes and replacing them by classes more closely related to the mining and petroleum industries.

Mineralogy 211 and Petrology 321 have been reorganized and combined into two new classes: Mineralogy and Petrology 221 given in the third year and Mineralogy and Petrology 323 in the fourth year. A new half-class, Optical Mineralogy 222b, the content of which was originally part of Geology 211, will be given during the second term of the third year.

Palaeontology 331, Stratigraphy 441 and Sedimentation 425b have been combined into two classes: Palaeontology-Sedimentation-Stratigraphy 231 and Palaeontology-Sedimentation-Historical Geology 332 to be given in the third and fourth years, respectively.

These revisions will provide the third year students with a basic knowledge of not only Mineralogy and Palaeontology but also of Petrology, Sedimentation, and Stratigraphy which will enable them to benefit more from and contribute more to their third-year summer's field work.

Structural Geology and Mineral Exploration have been combined into one class called Structural and Field Geology 252. A new half-class Structural Geology and Geotectonics 455a will be given in the fourth year.

Two other new half-classes are Mathematical Methods for Geologists and Rock Mechanics, third and fourth year classes, respectively. A half-class in Soil Mechanics is also being added to the curriculum.

Exploration Geophysics has been expanded into a full class, Introduction to Geophysics, which will include Physics of the Earth in addition to Applied or Exploration Geophysics.

Metallic Mineral Deposits 461b and Non-Metallic Mineral Deposits 465a have been combined into Mineral Deposits 461.

The third and fourth year engineering classes which have been dropped are Strength of Materials 342, Fluid Mechanics 301, Applied Thermodynamics 331a, Structures 314a, and Electric Circuits 312a. It is felt that sufficient material covered in the above classes will be given in such classes as Geotectonics, Rock Mechanics, Soil Mechanics, Geophysics, and Sedimentary Aquifers to provide the course with an adequate engineering background.

Students in the fourth year will have the option of taking either Mineralogy and Petrology 323 or Palaeontology, Sedimentation, and Historical Geology, 332.

#### Geophysics Option

Revision of the curriculum for the Geophysics Option involves the following changes. In the third year these classes have been added: Differential Equations (Maths. 237b), Mathematical Methods for Geologists, and Introduction to Mining (Mining 391a), and replace Strength of Materials 342, Fluid Mechanics 301, Materials of Construction 342, and Applied Thermodynamics 331a. In the fourth year Structural Geology and Geotectonics 455a, Sedimentary Aquifers 471b, and Special Problems in Geophysics 484 have been added, and Introduction to Modern Physics 351 has been dropped.

#### Mining Engineering

The revision of the Mining course is similar to that of Geological Engineering with the following exceptions:

1. Fluid Mechanics 301 and Electric Circuits 312a are retained.
2. Optical Mineralogy 222b, Palaeontology-Sedimentation-Stratigraphy 231 and Historical Geology 332, or Mineralogy and Petrology 323 are not taken by Mining students with the exception of the first part of Geology 231 which deals with the elements of sedimentation and stratigraphy.
3. Mining students take only the second half of Introduction to Geophysics 382, namely Exploration Geophysics 382b.

The mining classes remain essentially unchanged and include Mining Practice I (392) and II (495a), Mineral Processing 393a, Mine Design 497, Mine Organization and Administration 498, and Field Trips 394d.



# GRADUATE STUDENTS



BOB BERVEN



CHARLES BOSTOCK



JACK BRANDT



AL CLARK



DENIS DELORME



LEE FORSYTHE



ANDY HOGG



DICK JOHNSON



LEO KING



RUDY KLASSEN



MYLES PARSONS



ALBERT VONHOF



AL LISSEY



PAUL PAWLIW



DOUG WATSON



JACK WYDER



JACK PARK



ALF TOTH



ELWOOD WOHLBERG



GRADUATE STUDENTS

ROBERT J. BERVEN obtained his Bachelor's degree in Engineering in 1963, and hopes to obtain his Master's degree in the fall of 1964. For his Bachelor's thesis, Bob made a study of the aeolian sands of the Haultain area, Saskatchewan. During the summer of 1960, he worked at the South Saskatchewan River Irrigation site on a plane table survey. During the summers of 1961 to 1963 he did wellsite and subsurface geology work for Canadian Superior Oil Ltd. Bob's Master's thesis is a petrological study of the Lower Cardium Sand, Crossfield area, Alberta, and will involve a detailed thin section study of the makeup and diagenetic changes of the sand. The study may also include a heavy mineral study and a map study to determine the geometry of the sand.

CHARLES A. BOSTOCK obtained his Bachelor's degree in Civil Engineering at Queen's University in Kingston, Ontario, but his home town is Ottawa. Last summer Charles worked at the Suffield Experimental Station in Ralston, Alberta. He will spend the coming summer with University Naval Training Division. At University of Saskatchewan he is taking some undergraduate and graduate classes, and is working towards a Master's degree in 1965. He anticipates that the thesis work will deal with surface hydrology.

ALAN R. CLARK obtained his Bachelorate in Engineering in 1962, the thesis of which involved the Buff Beds of Paleozoic age in northeastern British Columbia. Previous summer work include the following: 1959, Topographic Survey, Department of Mines and Technical Surveys; 1960, field work in the Precambrian of Northern Saskatchewan, Saskatchewan Department of Mineral Resources; 1961, 1962, surface geological exploration in northeastern British Columbia and Yukon, California Standard Co., Edmonton; 1963, geological investigation of gypsum domes in the Arctic Islands, Geological Survey of Canada. Al expects to obtain his Master of Science in 1964. His thesis concerns a petrofabric analysis of sylvite and halite rocks from the Prairie Evaporite Formation. To analyse the coarse grained halite and sylvite (obtained from the International Minerals and Chemical Corporation (Canada) Ltd., mine at Esterhazy), a large reflection goniometer was constructed. It was found that both halite and sylvite tend to be oriented such that one (100) crystallographic direction is perpendicular to the bedding plane and a second (100) direction is tending southwest approximately parallel to the regional dip.

DENIS L. DELORME received his B.A. from Saskatchewan in 1959 and his M. Sc. from the University of Alberta in Edmonton in 1962. His Master's thesis was a Stratigraphic Study of the Regina Basin, Saskatchewan. He plans on getting his Ph.D. in 1965. The thesis is a study of Pleistocene and Post-Pleistocene Ostracoda of Saskatchewan. By a study of living forms and fossil forms, it is hoped to determine the ecology, and air and aqueous temperatures in Pleistocene and Post-Pleistocene times.

LEE H. FORSYTHE will be getting his M.A. in 1964. During the summers of 1959 to 1961, Lee did exploration work with the Saskatchewan Department of Mineral Resources. He was party chief in Ontario and Quebec during the summers of 1962 and 1963, while under the employe of the Hanna Mining Co. His Master's thesis is a study of the feldspars of Dome Stock, Red Lake area, Ontario. The study involves determination of the anorthite content of the plagioclases and the triclinicity of the K feldspars. These properties should be related to the thermal history of the cooling granitic magma, and possibly have some bearing on the low-pressure zones to which the residual liquid migrated, forming ore deposits in shears and fractures. Lee has secured a position with the Department of Mineral Resources for the coming year. He will be working in the MacKay Lake area, just north of La Ronge.

WILLIAM A. HOGG is the recipient of an Institute for Northern Studies Scholarship, and he plans to obtain his Master's degree in 1965. This coming summer he will be engaged in field work in northeastern British Columbia, in the employ of Pan American Petroleum Corporation. He worked for the California Standard last summer. Andy's thesis, being supervised by Dr. W. G. E. Caldwell, is a study of Mid-Devonian smooth spiriferoids from the Northwest Territories. By making serial sections and interior descriptions of the brachiopods, he hopes to study phylogeny and homeomorphy in the smooth spiriferoids.

RICHARD H. JOHNSON obtained his B.E. in 1963 at the University of Saskatchewan. His Bachelor's thesis was a study of turbulence and low-permeability core tests. During summer of 1960, Dick worked at precise levelling in Saskatchewan for the Department of Mines and Technical Surveys; in 1961 he did groundwater investory work for the Geological Survey; 1962 summer was spent surface mapping in the Yukon and Northwest Territory with the California Standard; in 1963, Dick was engaged in surface mapping with Canadian Pacific Oil and Gas, Calgary. He hopes to obtain his Master's in 1965, and he is working on a sedimentation study and subsurface mapping of the Upper Shaunavon of southeastern Alberta.

H. LEO KING is working towards his M.A. in 1965, the thesis of which is a study of the Precambrian underlying Southern Saskatchewan and Manitoba. The work will involve a petrological study of core samples and a correlation of geophysical data with the underlying Precambrian strata. During the summers of 1959, 1960 and 1961, Leo worked with the Department of Mineral Resources, mapping in Northern Saskatchewan. From May 1962, to August 1963, Leo did exploration work in Northern Saskatchewan and Manitoba while under the employe of Hudson Bay Mining and Smelting, Flin Flon.



RUDOLPH W. KLASSEN received a B.Sc. degree from the University of Alberta in 1959 and an M.Sc. from the same institution in 1960. Prior to his admission as a Ph.D. candidate at the University of Saskatchewan in the fall of 1962, he attended Ohio State University for one semester. During the summer months of 1957-63 he was employed by the Research Council of Alberta, Texaco Exploration Co., Calgary, British Newfoundland Exploration Co., Montreal, and the Geological Survey of Canada. This coming summer and winter Rudy will be employed by the Geological Survey of Canada while completing a thesis entitled "The Surficial Geology of the Riding Mountain area, Manitoba."

ALLAN LISSEY obtained his Bachelor's in Engineering at the University of Saskatchewan in 1959. His undergraduate thesis concerned Groundwater Resources in the Boggy Creek area of Saskatchewan. from 1959 to 1962, Al was a groundwater hydrologist for the City of Regina. Presently in the employe of the Geological Survey of Canada (Engineering and Groundwater Geology Section), Al is planning on collecting his Master's in 1964. The thesis which goes with the degree concerns the hydrology of the Regina Aquifer. Al has studied the geology and hydrology of the 90 square mile aquifer, and has made a theoretical consideration of a method of safe-yield determination for the aquifer. Al has a problem chosen for his doctorate, and plans on forging ahead for that Ph.D.

JACK M. PARK obtained his Bachelor of Arts in 1963, and hopes to obtain his Master's degree in 1965. Summer employment included working for Pan American Petroleum Corporation in 1962, Geological Survey of Canada in 1963. During the summer of 1964, Jack will be employed by Hudson Bay Oil and Gas Company. His Master's thesis is the biostratigraphic correlation of the Second White Specks. By the use of well samples from Colonsay and Unity, and samples from the Patience Lake shaft, an attempt will be made to determine whether the Second White Specks is diachronous or time equivalent. This will be done on the basis of foraminifera present.

MYLES L. PARSONS received his B. Sc. in Engineering from Saskatchewan in 1960. Undergraduate experience included two summers (1958 and 1959) of employment with the Geological Survey of Canada. Employed by Hudson's Bay Oil & Gas Co. Ltd., from 1960 to 1962, he began work on the Master's degree in 1962. Master's thesis is the Geochemistry of Groundwater in the Upper Notukeu Creek Area, southwest Saskatchewan. Ground water of the Upper Notukeu Creek area is of four chemical types and each type is characteristic of a particular geologic source. Type A, containing calcium-magnesium sulfate ions is from glacial drift; type B, with calcium-magnesium bicarbonate ions from Cypress Hills formation; type C, with sodium bicarbonate ions from Frenchman and Eastend formations; and type D, with sodium sulfate ions from the Bearpaw formation. The change from predominantly calcium and magnesium cations in types A and B to predominantly sodium in types C and D is attributed to a process



of cation exchange. Calcium and magnesium ions in the ground water replace sodium ions in exchanger substances, mainly clay minerals. Myles has accepted employment with the Geological Survey of Canada doing ground water studies in the Maritime Provinces.

JAN ALBERT VONHOF graduated as a Candidate Mining Engineer in February, 1962, at Technical University in Delft, The Netherlands. From January 1963 to August 1963, he took a course in photogeology at the International Training Centre for Aerial Survey at Delft (this course also carried a degree). Albert has done coal mining work in The Netherlands and Germany, and geological field work in Germany and Spain. Coming to the University of Saskatchewan in the fall of 1963, Albert is working towards his Master's degree, the thesis of which is Tertiary gravels in Saskatchewan. The study will involve a lithological inventory of the gravels, plus various other studies on them. Field work for the thesis is being done under the supervision of Dr. Christiansen of the Saskatchewan Research Council and Dr. W. O. Kupsch of the Department.

ELWOOD G. WOHLBERG obtained his B. A. from Saskatchewan in 1961. Elwood's summer jobs include the following: 1956-57, practical prospecting with a small prospecting syndicate in the Lac La Ronge area; 1958, geological assistant at Gunnar Mines; 1959-60, prospecting for Gunnar Mines in Labrador; 1961, laboratory work and field work in the Flin Flon area for the Saskatchewan Research Council; 1962, geologist at Sherritt-Gordon Nickel Mines at Lynn Lake; 1963, underground geologist for Craigmont Copper Mines in British Columbia. Elwood will be getting his Master's degree in 1964. The thesis is a petrochemical study of metamorphic gabbros in the Birch Lake-Coronation Mine region. A chemical analysis using X-ray fluorescence was made of the potassium, calcium, aluminum, silicon, nickel, zinc, iron, and copper of the Ruth Lake sill. The sill, measuring about 15 miles by about 4,400 feet showed higher potassium and iron on the east side and higher calcium on the west. From the data, an attempt will be made to determine whether the origin of the sill is igneous intrusive or metasomatic. Elwood has accepted a permanent position as Mine Geologist for International Nickel, at Sudbury.

JACK E. WYDER is permanently employed with the Geophysical Division of the Geological Survey of Canada, and is presently on education leave. He graduated with a B.A.Sc. from University of British Columbia in 1961. Jack has had one year of post-graduate studies at Dalhousie University, Halifax. His M.Sc. thesis concerns the use of surface resistivity methods to outline near-surface aquifers in the Lake Agassiz plains, Manitoba. Summer employment experience includes: Geological Assistant for C. M. & S., 1959; student assistant on Mobil Oil seismic crew, 1960; Geophysics Division of the Geological Survey of Canada, 1961-1964. Jack plans on getting his Ph.D. and the topic of his thesis will concern the use of geophysical methods as tools for outlining buried aquifers in a Pleistocene environment. The specific problem is to delineate the course of the Preglacial Missouri River in Canada.







SPRING CAMP AT ZORTMAN, MONTANA, 1963

The field trip lasted from April 19th to May 9th. Four professor and thirteen students participated in the class (Geology 354d). The students were: Jeff (Fred) Sample, Peter Byers, Pete Daignault, Maurice Kirby, Gary Metherell, Wolfgang Wiens, Darryl Holmes, Ken Slater, Andy Hogg, Vern Haggard, Annette Zypchen, Hugo Copper and Ron McIntosh.

Zortman turned out to be a tiny but charactered mining town turned resort. Their only cafe, the Elkhorn, opened the day we got there. The bar adjoining had been in business for some time previous to our arrival. Accommodations consisted of four to a cabin plus one in the cabin-owner's home. Of the three cabins, one was a deluxe model, sporting TV, refrigerator, and indoor bathroom, and hence was visited often by the other cabin dwellers, seeking city conveniences.

Student enthusiasm was slightly dampened by the weather. None had brought enough clothes to withstand cold and snow, as we thought we were going far enough south to warrant packing bathing suits and suntan oil. It snowed the first day out, and after a frustrating morning on transits and chains, operations were closed down (in consideration for the transits). The weather, muddy and snowy as it was, was good enough for a compass-pace traverse up Ruby Gulch, where we had ample opportunity to display our ignorance. The cold weather lasted but a few days, whereupon it turned hot enough to give us sunburn. Then came the rains.

Most of us became extremely familiar with the bar, where shepherds and other colourful Montana types came to see us. It was interesting to watch empty beer bottles being thrown through a hole in the floor, by the bartender. The juke box was kept jumping grinding out such tunes as "Tra la la Triangle" (especially popular during the trying days of triangulation), "Topsy Gypsy" and "Listen to the Rhythm of the Falling Rain".

Dr. Kupsch's driving became legend at this time, and we learned to hang on whenever we heard him say "See that outcrop over there?" Mr. J. Anderson-Thomson holds the honour of having found the first tick, while we were traversing Brown's Gulch. Everyone later got more than their share of these insects, and they were feared like the plague. Various entomological theories were propounded regarding the habitat of the ticks; some thought they crawled up through the bar floor boards and others thought they leaped out of trees or brush.

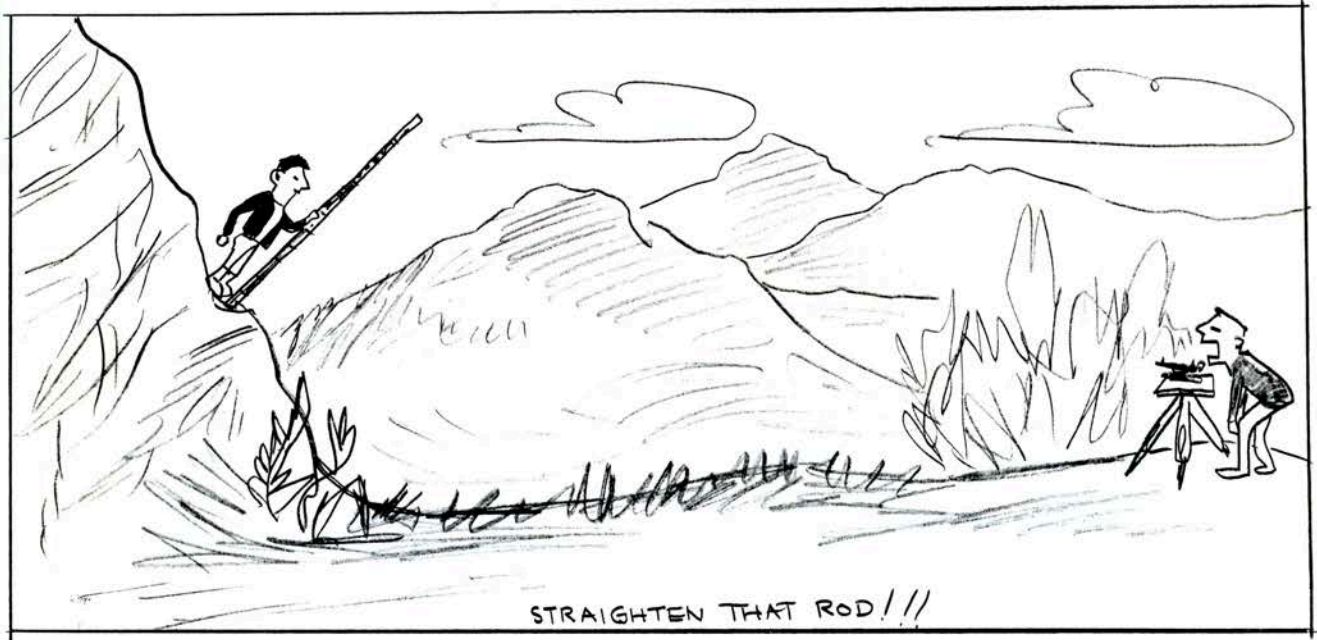
Lest the reader think we did no geology while on the trip, mention should be made of the pace traverses up and down gulches, tour of Ruby Gulch mining property, tour with University of Montana geologists, and plane-tabling of a map area assigned to various parties. While surveying a traverse, several students climbed Zortman "Mountain" five times in one day before the results were satisfactory.



All hands pitched in to help paint Zortman's only church, and geological hammers were set to pounding in loose nails. We magnanimously wrote off this little deed as a goodwill gesture from Canada to United States.

One Sunday we were excused from work so that we could attend a rip-roaring, genuine rodeo. We sat on the top rail of the corral like thirteen old cowhands all in a row. Our throats becoming parched, several of us repaired to the refreshment stand for canned refreshment.

We had a glorious time, brought back some experience, many rocks and fossils, and fond memories. We hope this year's class will have as much fun.



### SPRING CAMP FOR MINERS

The spring of 1963 saw the first Mining Field trip for a spring camp.

Five Mining Engineers and hard rock geologists followed the staff of the Mining Division of the Department of Geological Sciences (Professor Palmer), from Saskatoon to Eldorado and Gunnar, by way of Edmonton. (It was interesting to note that not one of the students thought to take along a bottle of their favorite Scotch).

In Eldorado we were accommodated in their lavish guest rooms - five students in the one suite, and Professor Palmer in the bigger one.

Mornings at Eldorado were occupied by underground tours, following various of the shift bosses around, and seeing all phases of the operation, e.g. climbing ladders, getting wet, walking for miles, etc. Afternoons were spent with members of the Geology or Engineering Department and on surface tours to the various parts of the operation. A two evening mine safety and rescue course was received from Mr. H. Aitchison, of the Department of Mines in Uranium City.

While in Uranium City on these evenings we also learned that beer is bought at fifty cents a bottle, and that if you can only appreciate good beer, you had best not drink in Uranium City.

From Eldorado we went for a two day look at Gunnar Mining Ltd., flying in a ski equipped Norseman, though it was the beginning of May.

Two weeks were spent in the North Country, then we came back to Saskatoon to write a comparative report on the two companies. This latter was especially enjoyed by all the students.

Many thanks naturally go to Eldorado Mining & Refining Company Ltd., for paying for most of our trip and expenses, and it only cost the students fifty dollars (\$50.00) each.

Stan Johnston



A

THESIS

Submitted to  
the College of Engineering  
in Partial Fulfilment of  
the Requirements for  
the Degree  
Bachelor of Science  
in Drinking

First publication anywhere

BEHAVIOR OF PEANUTS IN BEER

During the year 1963-64 an extensive study was undertaken by several Ore Gangue members to determine the characteristic behavior of peanuts in beer. The work was done in various refreshment establishments in the city of Saskatoon.

"Peanuts, when placed in beer, tend to rise and fall in a rhythmic fashion, the period of the movement reflecting the physical and chemical qualities of the peanuts and the enclosing media". (J. Melvin Boozenbarf, 1962, p. 1032).

The shape of the peanuts was found to vary with the number of times it would rise and fall. Angular to sub-angular peanuts were found to rise and fall 3 times as fast as rounded peanuts. This is no doubt due to surface tension and adhesive effects.

The period of rise and fall of the peanuts varies directly with the salt concentration on the surface of the peanut. This fact was determined by placing peanuts with varying salt concentrations into 25 glasses of beer. The beer was then drunk. So was the experimenter. The explanation for the first observation is that the salt reacts with the beer producing  $H_2S$  gas which sticks to the peanuts and causes them to rise. When the surface is reached, the peanut groggily shakes off the bubbles and plunges to subabyssal depths to generate more  $H_2S$  and rise once more.

The rhythms noted in the peanut behavior have been found to correlate with the sunspot cycle, the precession of the polar axis, the four seasons and the Beatles. The results of this investigation should provide a new breakthrough in scientific drinking and may soon replace all field work in sedimentation.

(signed) I. M. Gassed

#### BOOK REVIEWS

How to Deal With Claim Jumpers: - by "Hothead" Smith. This is one "How to" book which should be carried in every geologist's pack sack. Mr. Smith gathered material for this book while in the employ of Finco and is based on a factual case wherein Smith dealt with poachers from Irony Co. Although Smith gives sound advise, he tends to go to extremes. Mr. Smith has left the world of geology but is presently employed on a rock pile in a penitentiary.

A Geologist's Guide to Woodlore: - by Bark Trail. The book covers such essential topics as : how to subsist in the wilds on willow shoots and jacks-in-the-pulpit; how to construct easily visible Help signals; what to do in case of forest fire; what to do in case of snow blizzards; how to befriend bears. The success of this book is questionable, as the author was devoured by a bear soon after the completion of the manuscript.

OIL: - By Fan Slanders. OIL are the initials of the organization devoted to the Obliteration of Illicit Love, founded by Fan Slanders, a well-known authority on the subject. The book promises to be a big hit with geologists in the field and should be as good as Lady Chatterly in this respect. The book comes in a plain wrapper.

Geology of the Pierceland Map-Area: - by M. A. Kirby. This is the author's first publication, and it is an account of a self-sponsored geological sortie into the wilds of northern Saskatchewan. The account is generously sprinkled with hilarious spelling mistakes. We owe this amusing treatise to the fact that Mr. Kirby was unable to find regular employment in the geological world. 291 p. 403 spelling mistakes.



# A DANCE TO GEOLOGY



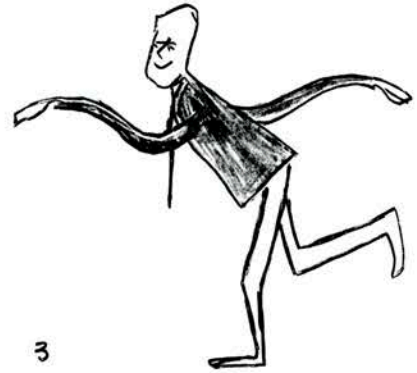
1.

TALL MOUNTAINS WERE BUILT DURING OROGENIES...



2.

AND WERE ERODED DOWN...



3.

THE SEDIMENT WAS WORKED,



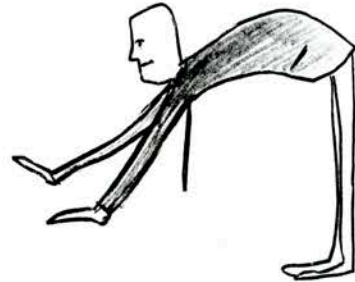
4.

AND REWORKED...



5.

... FAULTED...



6.

AND FOLDED...



7. OIL CAME SEEPING INTO THE TRAPS THROUGH INTERSTICES SUCH



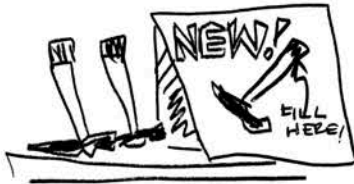
8. AND THEN CAME THE OIL WELLS.

EXCERPTS FROM OLD CONCENTRATES

- 1937: The first attempt to publish an official organ for the "Ore Ganguie" is the result of many lunch hour "bull sessions."
- 1937: October 16th, the Ore Ganguie made a field trip to Eagle Hills and Battleford to study possible oil and gas structures. A 24-hour downpour did not dampen spirits. The night was spent by some around the camp fire while others made night life in North Battleford.
- 1938: Two profitable afternoons are planned to give geologists an idea of sharpening and tempering of steel tools and in mechanics and operation of outboard motors.
- 1938: War and rumors of war are playing havoc with the mining market at the moment, and this may have an adverse effect on employment prospects.
- 1940: Cold water is the best of drinks  
And fit for every being,  
But who am I that I should take  
The best of everything?  
Let Princes revel at the pump  
And Kings the tap make free...  
Champagne, or gin, or even beer  
Is good enough for me.
- 1940: Dr. A. R. Byers has been added to the staff.
- 1941: Dreams of Ore Gangues of the past were realized the other night when the lads collected their Greig Cup for the interfaculty curling championship. There on the cup, in beautiful engraving, is inscribed "College of Ore Ganguie 1940-41." Though some people claim it was just an error by the engraving people, we maintain it is fully justified, and didn't Dr. Mawdsley say, at Color Night, when the cup was presented, "I guess that makes me a dean?"
- 1954: At the Graduand's Banquet, "Pete" McMurtry spoke of the value of education, saying "although your mines may bust, your wells go dry, your woman run off with the drillers, your education will forever stick with you."
- 1954: A course in Petroleum Geology will be offered by the Department in 1955.
1956. Professor Edmunds has taken a year's sabbatical leave to tour the world and his academic duties have been taken over by Dr. H. A. K. Charlesworth, a recent graduate of Glasgow and Cambridge Universities.



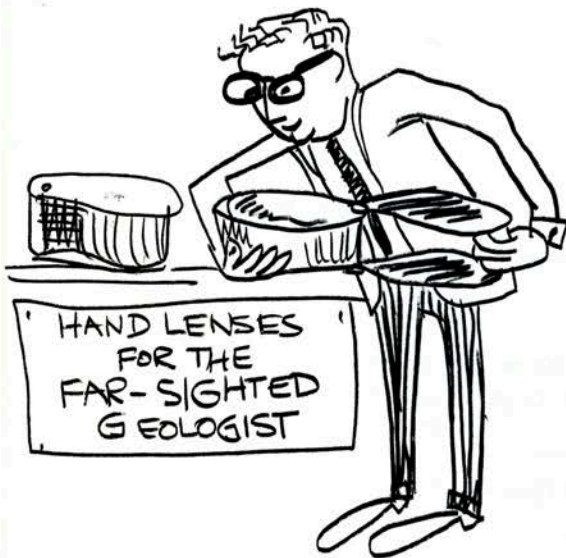
# bargains at the - 42 - GEOLOGY SHOP A Z



HOLLOW  
GEOLOGICAL  
HAMMERS WITH  
A CORK AT  
ONE END



SPECIAL ON  
STREAM-WADERS



CLEARANCE, FLAGS & SIGNS FOR  
ALL OCCASIONS.

## A GEOPHYSICIST

A geophysicist is a person who passes as an exacting expert on the basis of being able to turn out with prolific fortitude infinite strings of incomprehensible formulae calculated with micromatic precision from vague assumptions which are based on debatable figures taken from inconclusive experiments carried out with instruments of problematic accuracy by persons of doubtful reliability and questionable mentality for the avowed purpose of annoying and confounding a hopeless chimerical group of fanatics known as geologists who are themselves the lunatic fringe surrounding the honest and hard-working mining engineer, a bayard who substitutes a powerful dorsal musculature for introspective rationation and whose expenditure of herculean efforts is necessitated by his recalcitrant refusal to recognize as meritorious any innovations concerning conservation of muscular or mental travail, extraneous to his circumscribed experience or issuing from any but his own terrestrial extractive orifice, and who is obdurately incapable of differentiating a jenny of his proper possession from a speleological phenomenon.

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DEFINITION: A laccolith is the pregnant equivalent of a sill.

Copying from one book is plagiarism;  
Copying from two books is research.

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Professor: This is a reasonably good essay. Who wrote it for you?

Sweet young thing: Thank you. I'm glad you like it. Who read it to you?

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### "ALL ALONE"

"Setting out with thirty elephants and two hundred mahouts, trackers and beaters, I was afraid the tiger hunt might prove a man-size undertaking for a woman like me".

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The smart geologist can always be spotted - his views are the same as yours.

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A frustrated geologist is one who must describe the geologic structure of an area with his hands in his pockets.

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On mineral exploration - "In recent years the wandering donkey has been replaced by the trained geologist. The geologist may be more expensive than the donkey, but he is far more reliable".