The Geochemical News

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THE GEOCHEMICAL SOCIETY

Because the Council of the Geochemical Society believes that some potential members of the Society may not be aware of the organization and in order to maintain its position of eminence in furthering the discipline of geochemistry, the Council of the Geochemical Society urges its current members to bring the existence and stated aims of the Society to the attention of possible new members. A membership application form is included with this Newsletter; additional copies may be obtained from

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PURPOSE

The object of the Geochemical Society (GS) is to encourage the application of chemistry to the solution of geological and cosmological problems.

BENEFITS OF MEMBERSHIP

Geochimica et Cosmochimica Acta - The official technical journal of the Geochemical Society and the Meteoritical Society (published monthly by Pergamon Press).

Geotimes - A general publication covering the Earth Sciences (published monthly by the American Geological Institute).

The Geochemical News - A newsletter concerned with the activities of the Geochemical Society (published several times a year).

Membership in Organic Geochemistry Division (Optional) - For GS members interested in organic geochemistry. Organic Geochemistry Division Newsletter (published about four times a year).

Provides a forum for discussion at technical meetings and symposia at the annual meeting of the Geological Society of America (November of each year).

Provides occasional publications on geochemistry at lower cost than to non-members.

MEMBERSHIP REQUIREMENTS

Any person of good character and unchallenged basic scientific integrity and honesty, regardless of sex, nationality, residence, employment, prominence or proficiency, may become a member providing only that he or she:

(a) will subscribe to the declared purposes of the Society, and

(b) can evidence a general understanding of the field of endeavor by at least a Bachelor's Degree in one of the following fields: physical science, biological science, mathematics, or engineering; or by three years or more of activity in any of these disciplines including teaching, research, application, bibliographic and editorial service).

COSTS

Annual dues of all members are $15.00 to be paid in U.S. currency and in the correct amount. The name of the member must accompany his or her payment. Payment must be in to the Treasurer by January 31 of each year.

REPORT OF DISCUSSION MEETING ON DOMESTIC AND INTERNATIONAL REPRESENTATION FOR THE U. S. IN GEOCHEMISTRY

On February 7, 1971, a meeting was held under the auspices of the National Academy of Sciences with representatives of the Geochemical Society, the International Association of Geochemistry and Cosmochemistry, and the U. S. National Committee for Geochemistry to discuss domestic and international representation for the United States in the field of geochemistry. The discussants were John C. Maxwell, who acted as Chairman, F. R. Boyd, Bruce Hanshaw, Earl Ingerson, Warren G. Meinschein, Joseph W. Berg, and Albert N. Bove. The following is adapted from Dr. Bove's minutes of the meeting.

The discussion summarized some of the early history of the Geochemical Society. The Society has been very successful; it has grown substantially and has supported a very excellent technical journal. The question came up early in the history of the Society as to whether it would be an international or a national group. The decision was made at that time to be an international Society, but this aim of the Society's founders was never totally fulfilled because many foreign geochemists persisted in regarding it as an American society rather than as one that was truly international. The IAGC was recently set up better to serve the international needs of Geochemistry.

Dr. Ingerson stated that the question of individual memberships came up very soon after the IAGC was organized. Because some councilors opposed individual IAGC memberships, a compromise was agreed to whereby this classification of membership was written into the statutes of the IAGC but there was to be no open campaign to bring in such members, In spite of this, there were soon about 150 individual members. It was argued that individual memberships are needed, largely because many foreign countries do not have national groups and, therefore, desire direct contact with the Association through individual membership. Such countries include the Scandinavian countries, the Benelux countries, and others. The recent campaign to increase IAGC memberships has resulted in an increase of about 500 making a current total membership of about 700.

IAGC has recently considered adoption of a journal. Dr. Maxwell summarized the main questions with respect to adoption of a journal as follows: (1) Is it needed? (2) Would it harm geochemistry in any way? (3) Would it do harm, through competition, to any other existing journals?

Dr. Ingerson stated that the IAGC Council for the most part has opposed the idea of proliferation of journals. The Council agreed, however, that adopting an already existing journal would be an appropriate approach. The Council investigated the possibility of adopting the Elsevier Journal, *Chemical Geology*. Dr. Ingerson informed the group that no contract had been signed as yet with Elsevier. Over 200 individual members of IAGC have expressed an interest in subscribing to *Chemical Gology* if it is adopted by the Association.

Dr. Boyd remarked that it was difficult for individual members in communist countries to participate and to pay dues to international organizations. Moreover, the adoption of a journal which predominantly publishes in English would further polarize the Association. With individual members and an English-language journal the Association would be in danger of becoming another Geochemical Society.

The need for a permanent secretariat for the IAGC and how to support such a secretariat financially was discussed. It was generally agreed that a permanent secretariat is needed and that sufficient and reliable funding should be sought. It was noted that if the funds needed to support a secretariat could be found from some other source, then individual membership might not be needed. On the other hand, the group was reminded once again that many of the foreign members desire individual membership because they do not have national groups adhering to IAGC.

An estimate of $2000 to $2500 per year as required funding for a secretariat - to pay for salaries, issuance of a newsletter, various kinds of announcements (meetings, publications, etc.), and other activities of the secretariat - was thought too low. It was generally agreed that the actual cost would likely be three to four times that much.

The group agreed to go on record as affirming that the IAGC has a need for funds for a permanent secretariat and that an effort should be made to find an adequate source of funding.

It was pointed out that there are two basic ways to get funds for this purpose: (1) through individual memberships, and (2) through adhering societies. It was noted that the dues from national committees, although providing a much-needed source of funds, are inadequate for support of all of the activities of the Association. The IAGC has 15 member nations paying $30 to $300 per year, and the total received is not adquate for the Association's needs. The group agreed generally that this problem could best be solved if all countries adhering to IAGC were represented by national groups or societies the major part of the Association's support came through this source, either through a direct payment of some sort each year or through assigning a portion of the dues to the societies' members to support of the international Association. It was noted, further, that UNESCO, although it provides funds for certain activities of the international societies, particularly meetings and publication of proceedings, does not provide funds for administrative purposes.

Any comments regarding the IAGC, individual memberships thereof, the adoption of *Chemical Geology* as its journal, or other thoughts on the two organizations should be addressed to: Dr. F. R. Boyd, Jr., Geophysical Laboratory, 2801 Upton Street, N. W., Washington, D. C. 20008

GOLDSCHMIDT AND CLARKE MEDALS

Through the action of its Council the Geochemical Society intends to make two awards as follows:

V. M. Goldschmidt Medal This award, consisting of a gold medal and a certificate, shall be awarded for major achievements in geochemistry or cosmochemistry. Such achievements may consist either of a single outstanding contribution, or a series of publications that have had great influence on the field. The Goldschmidt Medal will normally be awarded annually, but may be reserved at the discretion of the Council.

F. W. Clarke Medal This award, consisting of an appropriate medal and a certificate, shall be awarded to a young scientist for a single outstanding contribution to geochemistry or cosmochemistry, normally published within five years of the completion of his formal studies. Independence and originality shall be important factors. The Clarke Medal will normally be given annually, but may be reserved at the discretion of Council.

The awards are normally not shared, except in highly unusual cases, such as independent discoveries or joint work where the contributions of the co-workers are essentially equal.

All duly documented nominations will be considered by specially designated medal committees and will remain active for a total of three years, unless the candidate becomes ineligible on the grounds of membership in the Council of the Geochemical Society, or, in the case of the Clarke Medal, by the passage of time beyond the five-year limitation. Past recipients of each award are ineligible for renomination. There is no other restriction on eligibility, except for the time limit on the Clarke Medal. Neither citizenship, nor membership in the Society shall enter into consideration. The society will reimburse travel expenses of award recipients only in exceptional cases.

For the initial year the chairman of the V. M. Goldschmidt Medal Committee is Paul Barton; the chairman for the F.W. Clarke Medal Committee is Gary Ernst.

Nominations, together with documentation, should be in the hands of the Secretary of the Geochemical Society no later than January 15 for committee action and final selection by the Council the following November.

INTERIM REPORT OF THE TREASURER
for the period
January 1, 1970 to October 27, 1970

ASSETS:

Operating Fund		
Cash on hand and in banks	$12,188.25	
Accounts receivable	0.00	
		$12,188.25
Publications Fund		
Savings account	4,829.45	4,829.45
		$17,017.70

LIABILITIES:

Operating Fund		
Balance of 1970		
AGI assessment	$ 1,000.00	
Members equity	11,188.25	
		$12,188.25
Publications Fund		
Account balance	4,829.45	4,829.45
		$17,017.70

Fund Balance

January 1, 1970		
Operating Fund		
Checking account	$ 9,122.46	
Savings account	2,108.57	
Publications Fund		
Savings account	4,613.54	
		$15,844.57
Excess income over expenses for first ten months of 1970		1,173.13
October 27, 1970		
Operating Fund		
Checking ccount	$ 7,018.45	
Savings account	5,169.80	
Publications Fund		
Savings account	4,829.45	
		$17,017.70

Statement of Income, Expenses, and Changes in Fund Balances
Operating Fund

Income:		
Dues	$8,710.82	
Interest on Savings account	61.23	
Reprint sales (Educational Series)	11.75	
Total Income		$8,783.80
Expenses:		
Executive Editor	$1,250.00	
Printing Charges	1,009.82	
AGI assessment	1,950.00	
Bank Services	7.86	
Mailing service (AGI) and advertising	1,904.88	
Secretarial services		
Treasurer	707.00	
Secretary	351.00	
Postage and telephone	282.07	
Geochemical News	292.95	
Miscellaneous	6.00	
Transfer to Abelson Fund	65;00	
Total Expenses		7,826.58
Excess income over expenses		
Abelson Fund Royalties Income	85.52	
Abelson Fund Interest Income	115.39	
Total Income		200.91
Transfer from operating fund*	15.00	15.00
		215.91
No Expenses	0.00	$ 0.00
Excess income over expenses		$ 215.91

* To make up minimum deposits of $100.00 for high interest account.

BOOK REVIEWS

FELDSPARS, by T. F. W. Barth, 261 pages, 147 figures, 47 tables. Wiley-Interscience, New York, 1969, $14.50.

Barth's new book presents an excellent summary of the naturally occurring feldspar minerals. Consisting of six chapters with abundant clear illustrations, it is a high quality printing bound with hard cover. The author begins with a chapter on the general mineralogy and classification of the rock forming feldspars. This is followed by a chapter on pseudosymmetry and twinning. The structure of the feldspars is discussed in detail in the next chapter, then two chapters are devoted to the physical and thermodynamic properties of the feldspars. The final chapter is a short, but interesting section on the origin of feldspar terminology.

Although feldspars have been intensely studied they remain one of the most puzzling of the mineral groups. In this, the first concise summary of the voluminous feldspar literature, Barth points out many of the uncertainties and problems of feldspar mineralogy. Determinative methods are not described, but the results of significant studies are clearly summarized. A thorough reference list, complete through early 1968, follows each chapter. The book is equally useful to the feldspar specialist as a basic reference and to the non specialist as clear up-to-date summary of the state of feldspar mineralogy.

Dwight G. Moore, Jr.
Humble Oil & Refining Company

ORGANIC GEOCHEMISTRY, edited by G. Eglinton and M. T. J. Murphy, xxiv + 828 pages, illustrated. Springer-Verlag, New York, 1969, $49.00

This work contains an exposition of the majority of the fields of organic geochemistry. Such a book is indispensible because of the rapidity with which knowledge in geochemistry is developing. No question can be studied in depth without calling on chemistry, geology, biology, and microbiology.

The sum of the knowledge gathered into this book comes from specialists who have made a coherent exposition starting from data taken from numerous documents (books, scientific reviews, analytical data). Each subject so treated gives a view which can serve as a basis for further work.

The knowledge of the environment during the course of geological history is particularly important; it will not, unfortunately, always be obtained and numerous interpretations of analyses will often be difficult.

The work carries as sub-title: "Methods and Results"; the latter especially applies to the analyses.

Chapter 1, Introduction, by G. Eglinton and M. T. Murphy.

The editors give a short resume of each of the chapters of this work.

We shall retain the following important remark: "The chapters are written by scientists of several nations and of a wide range of backgrounds but in general, the approach is that of the organic chemist rather than the geologist. So far those who call themselves 'geochemists' are few in number and the chapters have been written with two types of reader in mind; geologists who have some chemical knowledge and organic chemists who have an interest in but little knowledge of geology."

There indeed, in fact, is the difficulty of geochemical studies. The results are furnished by chemists (often very specialized), but the interpretation is difficult because of the lack of geological knowledge on the history of the specimen. Considerable effort is needed in this domain in order to contribute precise data useful in geochemistry.

Chapter 2, Organic Geochemistry. The Organic Chemist's Approach, by G. Eglinton.

This chapter is a note of introduction to organic chemistry for the use of readers who are familiar neither with this type of knowledge nor with the techniques employed.

The exposition is limited, nevertheless, to compounds of carbon and to the methods of determination of chemical structures.

The author explains the possible relations between biolipids and geolipids. The contribution of the "chemistry of natural products" to chemical ecology can be very important, but for the moment it is still modest. It is, however, a necessary point of departure.

Another remark to retain concerns organic chemists who are accustomed to reactions in which equilibria reach a maximum in several hours, whereas in geology the time is counted in millions of years. There is then a problem of reactions at very slight rates, which is not resolved. Relatively few matters are known on the organic reactions in sediments.

The author insists on the precautions necessary for studying samples; to these should be added collecting as complete geological information as possible. He mentions also pollution, which can change the evolution of organic material.

Several examples of analyses of alkanes in recent and ancient sediments are given.

The problem of the abiogenic or biogenic origin of organic materials in Precambrian sediments and for the origin of life is evoked.

Chapter 3, Analytical Methods, by M. T. J. Murphy.

The analytical methods are mainly physical: extraction, separation on solid absorbants, clathration.

The author points out some chemical methods such as saponification, esterification, ozonolysis.

Chapter 4, Mass Spectrometry in Organic Geochemistry, by A. L. Burlingame and H. K. Schnoes.

This chapter is the application of a particular method of analysis to the characterization of organic material: mass spectrometry, which can be coupled with gas chromatography. After having given a view of this type of analysis the authors report the results obtained. As for hydrocarbons there are compilations of mass spectra to which one can refer: alkanes, isoalkanes, cyclic compounds, steranes, triterpanes, and aromatics. Among the oxygen compounds are especially the carboxylic acids, which have been the most studied because they are the most frequent in petroleums and sediments. In general they are transformed into methylesters, and some mass spectra of these compounds are given.

The interpretation of mass spectra for nitrogen compounds is very much more sensitive and it is necessary to appeal besides to other physical (ultraviolet) and chemical methods.

The porphyrins have also been studied by mass spectrography so as to elucidate the components fixed on the pyrrole nucleus. Sulfur compounds, particularly abundant in certain petroleums, constitute a difficult problem of identification to which mass spectrography contributes some aspects for interpretation.

One paragraph treats extra-terrestrial organic material (meteoritic and lunar) which has been analyzed by mass spectrography. There are numerous bibliographic references.

Chapter 5, Gas Chromatography, by A. G. Douglas

This chapter gives, for the non-initiated reader, a description of a technique of separation and of identification of substances by gas chromatography. A small paragraph indicates certain results obtained in geochemistry, where it has been applied for a short time. This technique, which is susceptible to improvement, will aid effectively in the resolution of the problems of geochemistry.

The author cites an abundant bibliography and indicates Gas Chromatography abstracts as a source of information.

Chapter 6, Isolation Procedures for Kerogens and Associated Soluble Organic Materials, by W. E. Robinson.

The nature of kerogen has been the object of very numerous studies for a long time, but up to the present no one has yet found a good standard analytical method. However, as the author indicates, in certain shales the organic material can be concentrated by methods such as those of Quass and of Luts.

But concentration by means of acid attack alter the organic material to an unknown and variable degree depending on the sample. This is, however, the most widely used. The author indicates the results obtained on bitumens, organic acids, amino acids, carbohydrates, and porphyrins.

The author recalls that further research is necessary, in particular the relations between organic materials and minerals. This question is the subject of chapter 31 of the present work.

Chapter 7, Paleobiochemistry, by M. O. Dayhoff and R. V. Eck.

This chapter was very necessary in a treatise of organic geochemistry. This exposition of general ideas recalls for chemists who are not familiar with biochemistry a certain number of facts which must be considered in their conclusions.

Chapter 8, Fossilization Process, by W. D. I. Rolfe and D. W. Brett.

This is an extremely difficult process to explain on account of the number of important phenomena which have operated on sedimented organic material during the course of geological time.

The phenomena which follow the death of an organism, such as autolysis and the attack by microorganisms during burial in recent sediments, are understood relatively well. The author gives a review of this "biostratinomy" and describes the action of certain factors: selection, mechanical destruction, oxidation-reduction, microenvironment, salinity, temperature, selective solubility. After this primary stage of transformation come diagenesis and metamorphism on which there are at hand some observations, and some hypotheses have been made to explain the mechanisms of the phenomena.

Chapter 9, Introduction to Sedimentology, by B. J. Bluck

The editors have had reason to introduce this chapter into the work. But, as its title indicates, it is only an introduction with general ideas on the classification of rocks and their transformation through diagenesis.

Chapter 10, Organic Matter in Sediments, by D. H. Welte.

It is to be regreted that the illness of the author has not permitted him to develop this chapter with the competence which is due the subject.

Chapter 11, Geomicrobiology and Geomicrobiological attack on Sedimented Organic Matter, by L. R. Moore.

After having recalled the mode of accumulation of organic material in marine and fresh water sediments, the author details the presence of bacteria in rocks, even the most ancient; their forms resemble modern ones. One finds also some actinomycetes and some fungi which are revealed through their spores and filaments. Another class of organisms consists of microscopic algae of which certain ones (Botryococcus) are contained in large proportion in Boghead coal and several kinds of "bituminous" shales.

So far as the action of microorganisms is concerned the author demonstrates the attack on spores and on cellular tissue. In the formless mass of organic material the remains of microorganisms (bacteria) are visible. It seems that certain ancient organisms (Botryococcus) have resisted the attack of microorganisms; likewise resinous substances do not appear to be destroyed.

Ancient organic material is the stable part which has escaped physico-chemical and microbiological attacks. The latter appear starting from the Precambrian.

The author mentions the intervention of bacteria in the formation of a copper rich peat. This microbial action on the genesis of mineral deposits is a phenomenon which is not developed here.

Chapter 12, Biogeochemistry of Stable Carbon Isotopes, by E. T. Degens.

Before explaining the subject the author draws attention to the causes of isotopic fractionation in living material. Because of the difference in the content of ^{13}C. in CO_2 in air and in the inorganic carbon of the oceans, there exists also a difference between continental and marine plants. Following through the metabolism, the constituents of the plant do not have the same $\delta^{13}C$. Finally, the metabolism having influenced the living medium, one finds, for example, that marine plankton having lived at $22^{o}C$ do not have the same content as plankton at $1^{o}C$. Several tables show the distribution of carbon isotopes with geological age for diverse substances (sediments, coal, petroleum, kerogen).

There is also a paragraph on the carbon of igneous rocks and of meteorites.

One diagram shows the importance of carbon isotopes in recognizing the natural cycle of this element.

In an appendix the author gives the distribution frequency of isotopes for substances of diverse origins. This distribution is often very dispersed.

Chapter 13, Hydrocarbons Saturated, Unsaturated, and Aromatic, by W. G. Meinschein.

The author discusses the possible relations among petroleum hydrocarbons and products of organic origin. Certain ones are direct as those between the alkanes and fatty acids, but there exist possible evolutionary reactions for certain fossil hydrocarbons which do not exist in natural products.

Ideas on source rocks and their detection are developed. In particular the presence of alkanes with more than 15 carbon atoms and their origin in the petroleums is discussed.

Chapter 14, Fatty Acids and Alcohols, by P. L. Parker

Fatty acids in living organisms constitute a well developed subject of study. They are found in different proportions in recent and in ancient sediments, and in particular few unsaturated acids remain.

The author reviews studies on fatty acids extracted from ancient sediments, but the references on natural alcohols are less numerous.

One paragraph is dedicated to the extraction and identification of fatty acids contained in sediments (gas chromatography and infrared spectrography).

Chapter 15, Fossil Carbohydrates, by F. M. Swain.

This important chapter treats, on the one hand, some analytical methods, and on the other the results obtained on sediments.

Whereas carbohydrates are important in living organisms they are very feebly present in quantity in ancient rocks.

The author shows the interest in their study in order to resolve a certain number of problems, in particular on the conditions of metabolism in primitive organisms and on the paleontological environment, as well as on the mechanism of their evolution.

Chapter 16, Terpenoids--Especially Oxygenated Mono-, Sesqui-, Di-, and Triterpenes, by M. Streibl and V. Herout.

These substances, which are not so abundant, have, however, geochemical importance because certain ones which are sufficiently stable have been found in ancient sediments, coals, and petroleum. It is a question above all of the triterpenoids

and of sterols. These substances, due to their rotatory power, are relatively easy to isolate and constitute reliable biological tracers of the molecules of living organisms.

The authors report the results they have obtained on a brown lignite from Bohemia.

Chapter 17, Carotenoids, by Richard B. Schwendiger.

These substances also make good geochemical tracers. The author develops especially the identification techniques (spectrophotometry and chromatography).

Chapter 18, Geochemistry of Proteins, Peptides, and Amino Acids, by P. E. Hare.

After a paragraph on the known amino acids, the author gives a view of certain of these acids identified in fossils, sediments, soils, meteorites, and the atmosphere.

Several applications are possible in geothermometry and geochronology; but indeed some problems are yet to be resolved concerning pollution of the samples and the stability of amino acids under geological conditions. Knowledge of the environment in the course of the geological history of the analysed sample is an important point for drawing valid conclusions.

Chapter 19, Porphyrins, by Earl W. Baker

This chapter gives an important development for the analysis of porphyrins: extraction, isolation and characterization by spectral methods and mass spectrography.

It is remarkable that the tetrapyrrole group is sufficiently stable to be discovered in ancient sediments.

The transformation of chlorophyll has been studied well and its evolution is a geochemical marker for estimating the environmental conditions which existed in the sediments.

Chapter 20, Fossil Shell "Conchiolin" and other Preserved Biopolymers, by Marcel Florkin.

The study of organic material living in place in a fossil test of an organism brings a new aspect to the problem of paleobiochemistry.

The author presents photographs of conchiolin of living and fossil organisms. The analyses show a diminution of the total quantity of amino acids and even the disappearance of certain ones among them.

The graptolites studied give results notably different from those obtained with the fossil shells of mollusks.

This field of study is sufficiently new to demand research development in analytical and experimental areas.

Chapter 21, Organic Compounds in Gas Inclusions of Fluorspars and Feldspars, by Reimar Kranz.

The aim of these studies is to determine the conditions of formation of the minerals and of the rocks.

The author presents the results he has obtained on gas occluded in a fluorspar by a spectrometric analysis. These are the products of decomposition of organic material, of high molecular weight, by bacterial and also radiochemical action.

Very dilute solutions of humic and amino acids play an important role in the formation of minerals and in particular of ores of uranium, thorium, and rare earths.

Chapter 22, Chemistry of Humic Acids and Related Pigments, by F. J. Stevenson and J. H. A. Butler

The authors treat especially the chemistry of humic acids and principally of the analysis of functions containing oxygen. Infrared spectra permit fixing the arrangements of these functional groups.

For the authors, humic substances are heterogeneous mixtures of compounds for which there are no unique satisfactory structural formulas; Several recent formulas are noted. This field of geochemistry has not been developed.

Chapter 23, Soil Lipids, by R. I. Morrison.

The proportion of lipids in soils is slight and it is difficult to determine it with precision. The identification of lipids is generally made by physical methods, which are summarized.

The principal constituents are glycerides, waxes, phospholipids, acids, alcohols, hydrocarbons, ketones of steroids, terpenoids, and carotenoids.

The origin of the lipids is to be sought in the remains of plants and animals. But the lipids themselves undergo degradation by numerous soil microorganisms.

The influence of soil lipids on plants appears still to be poorly known.

Chapter 24, Earth Waxes, Peat, Montan Wax, and Other Organic Brown Coal Constituents, by V. Wollrab and M. Streibl.

The authors give only a glimpse of the very vast subject taken up in this chapter, where moreover substances of very different composition and origin, such as ozocerite and peat, appear.

One finds here again physical methods of separation and identification (chromatography).

In respect to mineral waxes the composition of ozocerite is reported.

After having defined peat, the authors give the composition of the principal constituents: wax, resins, and humic acids.

Montan wax, which has industrial utilization in Central Europe, is the subject of a very long paragraph in which its principal constituents are reported: hydrocarbons, acids, alcohols, ketones, waxes.

A very short exposition gives some indications on the components of "brown lignites" whose industrial importance is still considerable.

Chapter 25, Kauri Resins -- Modern and Fossil, by B. R. Thomas

In order to show the relations which can exist among the fossil resins derived from wood, lignites, and coals of New Zealand the author reports several constituents of coniferous resins of the genus Agathis. These are principally acids and hydrocarbons with the terpene structure.

Separation is made by chromatography and the identification of the constituents by mass spectrography.

Chapter 26, Kerogen of the Green River Formation, by W. E. Robinson.

After having recalled the geographic position and the geologic situation of the Green River formation, the author explains the methods of analysis used: elemental composition; oxidation; thermal degradation at different temperatures, followed by extraction; reduction by hydrogen, by aluminum hydride, and by lithium.

Different solvents give extracts whose percentage varies from 1 to 5.

The quantity of extract obtained with the same solvent increases in general with depth between 1036 and 1983 feet and in the extract the quantity of normal alkanes increases also. As to the yeild of oil with respect to organic carbon, it varies rather inversely to the quantity of extract.

Twenty five percent of the oxygen of the kerogen is represented by carboxyl. The quantity, moreover, decreases with depth, which expresses the geochemical phemonena which take place.

Some analyses of kerogen are reported, such as infrared spectra, ultraviolet spectra, X-ray diffraction, and carbon isotope.

The study of this particular shale can serve as a model for the understanding of other samples.

Chapter 27, Crude Petroleum, by G. C. Speers and E. V. Whitehead.

Petroleum is only one of the products resulting from the transformation of sedimented organic material; therefore, its study brings only one contribution to the understanding of the geochemical process which has given it birth. Immediately after its formation it is submitted further to the phenomena of "maturation" and it is transformed also by migration. These remarks made, the knowledge of the constituents of petroleum is important in geochemistry.

The principal constituents are the hydrocarbons. The authors insist on certain cyclo-alkanes, which have the structure of natural terpenes. Moreover, the authors have separated the triterpanes and the steranes in the crude oils of Nigeria and of Libya. They note the analytical method. Of the sulfur compounds, so abundant in certain petroleums, only molecules with low molecular weights are recognized.

Oxygenated substances are few in number, but certain ones show interest as relics of the initial material.

Other than as ammonia, nitrogen is in heterocyclic form. Porphyrin complexes especially have been studied.

The bibliographic references are numerous.

Chapter 28, Fundamental Aspects of the Generation of Petroleum, by E. Eisma and J. W. Jurg.

After having cited the theories on the biogenic origin of petroleum, the authors explain the results of their work on the thermal decomposition of behenic acid. It forms an extended range of hydrocarbons from ethane and ethylene up to molecules with 28 carbon atoms, which explains the formation of alkanes with high melting points.

Chapter 29, Organic Geochemistry of Coal, by B. S. Cooper and D. G. Murchison.

Since coal has generally resided in its place of formation, one can penetrate it and reconstitute the environment of its genesis. This the authors recollect. A table summarizes the petrography of coal: macerals and microlithotypes. Photographs of these diverse constituents illustrate this chapter.

The formulas of the principal constituents of plants are indicated, as well as those of humic acids and of the principal vitrinite compounds of coals.

The stages of coalification can be followed by chemical analysis

The importance of coal for energy has caused it to be studied for a very long time; in spite of that, there remains still a great deal to learn.

Chapter 30, Pre-Paleozoic Sediments and Their Significance for Organic Geochemistry, by Preston E. Cloud, Jr.

The author recalls several notions on the Precambrian. The organic material which is found there is perhaps prebiological, that is to say, at the beginning of the origin of life. It is difficult to find sediments of this age which have not been metamorphosed. In certain ones bacteria and microscopic algae, have been recognized. Some hydrocarbons (isoprenoids, steranes, and alkanes) have been detected.

The author suggests studying the organic material of pre-Paleozoic sedimentary phosphates.

Chapter 31, Organic Derivatives of Clay Minerals, Zeolites, and Related Minerals, by Armin Weiss.

The organic derivatives of minerals are of interest, not only theoretically, but also for their practical importance. They have perhaps played a role in the abiogenic formation of life. They have a catalytic action which is exerted in rocks and which is also utilized in industry.

The author explains the different forms of fixation of organic material on minerals (surface, ion exchange, complexing). The influence of organic material on the spacing of sheet structures is indicated for several minerals.

One paragraph is devoted to uranium micas and another to the vanadates.

A table gives the composition and volumes of openings (for the water) of different types of zeolites.

The affinity of organic substances (amino acids, proteins) for several aluminosilicates is summarized in several tables. The degradation of organic material fixed on argillaceous minerals is the subject of one paragraph.

Several catalytic experimental reactions are noted.

Numerous bibliographic references are mentioned.

M. Louis
Peymeinade, France
(translated from French
by P. L. Cloke)

CALENDAR

December	
6 - 9	Underground waste management & environmental implications, by U. S. Geological Survey & American Assn. of Petroleum Geologists; Houston. (H. R. Gould, Esso Production Research Co., Box 2189, Houston, 77001)
26 - 31	American Association for the Advancement of Science, ann. mtg, Philadelphia. (D. W. Thornhill, AAAS, 1515 Massachusetts Ave. NW, Washington, D. C., 20005
February	
9 - 15	Intl symposium on oceanography of the South Pacific; Wellington, New Zealand, (National Commission for Unesco, Department of Education, Private Bag, Wellington, New Zealand)
21 - 24	Society of Mining Engineers of AIME ann. mtg, San Francisco. (J. C. Fox, AIME, 345 East 47th St., New York 10017)
25 - 27	Environmental Communication Workshop, St. Louis, Mo. (Environmental Communication Workshop, School of Law, St. Louis University, St. Louis, Mo. 63108)
March	
20 - 22	American Society of Limnology & Oceanography, ann. mtg, Florida State University, Tallahassee. (G. W. Saunders, Zoology Dept., University of Michigan, Ann Arbor, 48104)
April	
5 - 7	International Association for Great Lakes Research, fifteenth conf. on Great Lakes research, Madison, Wis. (Dr. Gregory D. Hedden, Director, University Extension Sea Grant Program, 610 Langdon St., Madison, Wis. 53706)
17-- 20	Intl geochemical exploration symposium, London, (Secretary, Institution of Mining & Metallurgy, 44 Portland Pl., London W1N 4BR, England)
17 - 21	American Geophysical Union, ann. mtg, Washington, D.C. (AGU, 2100 Pennsylvania Ave. NW, Washington, D.C., 20037)
April 30/ May 4	Institute of Environmental Sciences, ann. mtg, New York City. (Institute of Environmental Sciences, 940 E. Northwest Highway, Mt. Prospect, Ill., 60056)
June	
5 - 14	Intl symposium on mine surveying, mining geology & geometry of mineral deposits, Budapest. (Mine Surveying Working Committee, Hungarian Mining & Metallurgical Society, Szabadsag ter 17, Budapest V)
July	
11 - 20	Feldspars, NATO advanced study institute, Manchester, England, (W. S. MacKenzie, Dept. of Geology, University, Manchester M13 9PL, England) Application deadline: Feb. 1
August	
21 - 30	Intl Geological Congress, Montreal. (J. E. Armstrong, Secretary-General, 24th International Geological Congress, 601 Booth St., Ottawa 4)
September	
11 - 14	Clay minerals society, ann. conf., Woods Hole. (J. C. Hathaway, Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543)
November	
10 - 12	Precambrian iron formations of the world, field trip & symposium by the Society of Economic Geologists; Duluth. (Paul Sims, Minnesota Geological Survey, University of Minnesota, 1633 Eustis St., St. Paul, 55108) Invited: regional papers on North & South America, Africa, Australia; topical papers on origin, age & metamorphism.
13 - 15	Geological Soc. America, ann. mtg, Minneapolis. (GSA headquarters, Box 1719, Boulder, Colo., 80302)
13 - 15	Geochemical Society, ann. mtg., Minneapolis, Minn. (Dr. Ernest Angino, State Gological Survey, Univ. of Kansas, Lawrence, Kansas 66044)

GEOCHEMICAL SOCIETY

Membership Application
Candidature au titre de membre
Antrag auf Mitgliedschaft

Date _____

Name _____
(Nom – Name)

Address _____
(Adresse – Anschrift)

Date and Place of Birth _____
(Date et lieu de naissance – Geburtsdatum und -ort)

College Degrees (with dates) _____
(Diplomes universitaires – Akademische Grade)

Fields of major interest _____
(Domaines d'intérets – Interessengebiete)

Present position or occupation _____
(Situation présente – Gegenwartiger Beruf)

Membership effective (year) _____
(Membre a dater de (annee) – Aktive Mitgliedschaft seit (Jahr))

Important – Do you wish to be affiliated with the Organic Geochemistry Division? ☐ Yes ☐ No

Signature _____

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