



# The Geochemical News

Number 18

October 1959

## NOTICE OF THE ANNUAL MEETING

The annual meeting of The Geochemical Society is, as usual, being held jointly with the Geological Society of America and other associated societies at the Penn-Sheraton Hotel in Pittsburgh, Pennsylvania, from November 2-4.

The Council of The Geochemical Society will meet Monday, November 2, at 9:00 A.M.

The business meeting of The Geochemical Society is scheduled for Wednesday morning, November 4, from 10:00-11:00 in the Pittsburgher Room, preceded by the business meeting of the Organic Section from 8:30-9:30 A.M. and the address of the retiring president, Dr. J. F. Schairer, from 9:30-10:00. Dr. Schairer's address will be entitled "The Chemistry of the Rock-Forming Minerals."

Scientific sessions of papers dealing primarily with geochemistry will be held Monday morning and afternoon, Tuesday morning and afternoon, and Wednesday afternoon, all in the Monongahela Room.

## ORGANIC GEOCHEMISTRY SECTION OF THE SOCIETY

A group of organic and petroleum geochemists plan to organize an Organic Geochemistry Section within The Geochemical Society. The purpose of this section is to offer a common forum for research workers who are active in the various fields of organic and petroleum geochemistry. Recent advances in these fields indicate the desirability of the exchange of ideas and of their coordination with modern concepts of inorganic geochemistry and geology. The interest shown by earth scientists in The General Petroleum Geochemistry Symposium, which was held recently at Fordham University, supports this view.

Plans are being made to organize the Organic Geochemistry Section at the 1959 annual meetings of the Geological Society of America and The Geochemical Society in Pittsburgh, Pennsylvania, November 2-4. Information regarding this section may be obtained from the members of the Interim Executive Committee, who are listed below. The members of this committee invite suggestions and comments regarding this matter. It would be helpful if interested individuals could, in advance of the annual meeting, signify their intention to affiliate with the Section whether or not they plan to attend the meeting.

Edward G. Baker  
Esso Research and Engineering Co.  
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Bartholomew Nagy, Chairman  
Department of Chemistry  
Fordham University  
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Paul A. Witherspoon  
Department of Petroleum Engineering  
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The tentative plans of the group listed above have received the enthusiastic endorsement of Dr. J. F. Schairer, President, who has stated that Dr. H. T. Evans, Chairman of the Program Committee of The Geochemical Society, has invited the above group to meet with his committee and help plan sessions for November.

NEW MEMBERS OF THE GEOCHEMICAL SOCIETY  
to August 10, 1959

Glenn H. Allcott  
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Brookings, South Dakota

Walther M. Barnard  
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William Ernest Hale  
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Hajime Kurasawa  
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Ken Shibata  
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### GEOCHEMICAL ACTIVITIES IN AUSTRIA E. Schroll

Geochemical research in Austria is being carried on by the following institutions:

1) Chemisches Institut der Universität Wien, Prof. Dr. A. Hecht. In cooperation with the Austrian Commission of Atomic Energy.

Microchemical analysis for uranium and thorium in rocks, water, coals and peats.

2) Mineralogisches Institut der Universität Wien, Prof. Dr. F. Machatschki; and Chemisches Laboratorium der Bundesversuchs- und Forschungsanstalt (WKS) Arsenal, Wien III, Univ. Doz. Dr. E. Schroll.

- a) An investigation of Austrian and foreign graphites for trace elements has been finished by Dr. E. Schroll and I. Janda. A special double arc-method was developed for the group analysis of volatile elements.
- b) An analysis of selenium in Austrian pyrites, marcasites, pyrrhotines, chalcopyrites and other ores was finished by Dr. W. Rockenbauer; also another work on the composition of Austrian tetrahedrites, tennantites and enargites by Dr. Nazmir Azer Ibrahim/Dr. E. Schroll.
- c) A first investigation of coals and bituminous and other organic sediments of Austria for trace elements by Prof. Dr. W. E. Petrascheck, Leoben/Styria/Dr. E. Schroll and I. Janda, Vienna, has now been finished. The experimental work was carried out by spectrographic procedures (double arc-method and arc-method).
- d) Research for trace elements in magnesites and siderites has been started by Dr. E. Schroll and Dr. M. Brandenstein.
- e) A large-scale investigation of the distribution of trace elements in Austrian granitic and diabasic rocks is being prepared by Dr. E. Schroll in cooperation with Prof. Dr. H. Wieseneder.
- f) A sensitive analytical procedure for the determination of volatile elements, especially for mercury, is in development by Dr. E. Schroll and I. Janda. An investigation on the geochemistry of mercury has been prepared.
- g) Research for geological indication of marine and freshwater sediments in the Tertiary sediments of the Viennes basin (Wiener Becken) is now being started. The geochemical balance and the recent sediments in the salty lakes on the eastern borders of Austria (Neusiedler See und Zicksee) is under study.

3) Lehrkanzel für Geologie und Lagerstättenkunde, Montanistische Hochschule Leoben/Styria, Prof. Dr. W. E. Petrascheck.

Research on geochemical prospecting for lead and zinc and other metals in river- and mine-waters with the dithizon-method and development of other field methods (such as for gypsum).

## CONFERENCE ON GEOCHEMICAL PROSPECTING

On April 29, about a hundred persons gathered in the Abbaye de Royaumont near Paris, at the invitation of the Bureau de Recherches Géologiques, Géophysiques et Minières, the Bureau minier de la France d'Outre-Mer, the Commissariat à l'Energie Atomique, and the Compagnie Générale de Géophysique. Their object was to compare the results of French organizations and societies in this field, in France as well as in the oversea countries. Geochemical prospecting methods have been developed considerably in French countries during the past few years.

In the morning the contributors met in four groups, each discussing prospecting conditions and the results of prospecting, giving a view of research pertaining to a particular metal or group of metals. The groups were 1) uranium, 2) copper, 3) lead and zinc, 4) other metals--Au, As, Ni, W, Mo, Sb, Hg. The discussion was animated by chairmen who possessed all the data provided by each contributor. It was stated that methods of geochemical prospecting have been used under highly varied conditions (detailed prospecting, recognition prospecting in residual soils or covering formations, various chemical methods); the main part of the work has dealt with copper, lead, uranium and zinc, and almost all sampling has been composed of soils and alluvium. The successes thus obtained are of various kinds, but the contributors agreed that these methods have generally brought positive results which enable mining research to be developed.

The afternoon session was devoted to discussion of some problems of general consequence: organization of prospecting surveys, net costs, technician training, and information exchange.

The review of these works will be published in the next issue of "Sciences de la Terre." Copies of several reports may be obtained at "Secrétariat de Prospection Géochimique", 8 rue Léonard de Vinci, Paris XVI<sup>o</sup>.

Paris, May 18, 1959  
C. Beaumont

## GEOCHEMICAL PROSPECTING

at the BUREAU des RECHERCHES GÉOLOGIQUES, GÉOPHYSIQUES et MINIÈRES

The B. R. G. G. M. (Bureau de Recherches Géologiques, Géophysiques et Minières), when establishing in 1954 a department of geochemistry, prepared the way for geochemical research and prospecting in France as well as in French overseas countries, for all elements but the radioactive ones. The main objectives of this department were to determine various methods of determining traces of elements, either in soils or rocks, water or plants, and to apply these methods broadly in the field, by means of mobile autonomous units (laboratory trucks immediately analyzing the samples collected by prospecting groups); to ensure the training of geological engineers, prospectors, chemical engineers; to publish papers about geochemical prospecting and methods; and to look for further knowledge on geochemical dispersion phenomena by means of scientific studies.

Since 1954, geochemical prospecting applied to systematic research for heavy elements, such as Pb, Zn, Cu, W, Mo, Sb, As, has had a rapid extension over all French countries. Two kinds of prospecting techniques are used: strategical and tactical.

### Strategic Prospecting

They are based on sampling of soils or alluvium, collected by wide-grid method along hydrographical lines. Their essential objective is to determine rapidly the anomalies which will be discussed afterwards in a more detailed way.

Thus, in Bretagne, the area to be prospected for Pb and Zn extends nearly 2.000 km<sup>2</sup>, and the anomalies already discovered and confirmed in the first prospected zones showed how convenient this method of sampling and analysis is with regard to such problems.

Similar prospecting in the western and northwestern parts of Massif Central (Département des Deux-Sèvres et Charente) stressed the efficiency of geochemical research in the sedimentary formations of Lower Jurassic (Middle Lias), and pointed out new structures and numerous mineralized points confirmed by further works (trenches, borings, etc.). The areas thus prospected cover an area of nearly 2.000 km<sup>2</sup>.

Geochemical studies in connection with alluvial prospecting for cassiterite, tungsten, niobotantalates, etc., on the northern border of the Massif Central (surface under study, about 7500 km<sup>2</sup>) generally agreed with alluvial prospecting results, and showed new anomalous zones, where supplementary studies have to be made.

Attempts to apply geochemical prospecting methods to igneous or metamorphic formations in la Chaîne des Blonds (Massif Central), by a kilometric grid, showed considerable areas in which research for W, Mo and U could be continued. This kilometric grid has also been used with less success in the sedimentary Liassic strata of the Détroit Poitevin.

#### Tactical Prospecting

In particular instances (such as study of lode ranges, research of mineralized faults, etc.) sampling is made on close profiles and grids.

The distances between profiles, and collecting of sample, as well as the size of the grid in detailed studies, vary according to the information on the dispersion of the metal and the accuracy required for mining or geological studies. They vary from 100 to 300 meters for profiles and from 20 x 20 meters to 100 x 100 meters for meshes.

It must be mentioned that most tactical studies have been made on clay - limestone surfaces, the thickness of which sometimes reaches nearly 60 m.

The results obtained during these detailed prospecting surveys often allowed mineralized structures to be determined, thanks to anomalies and confirmation by further work. Strategical and tactical prospecting are made in connection with Department of Geophysics, the concordance of geochemical and geophysical anomalies determining more likely the existence of mineralization.

#### Methods of Analysis

They are essentially colorimetric ones: Pb, Zn by dithizone; Cu by cuproine; Mo, W by dithiol; Sb, Ga by rhodamine B; Sn by galleine; F by alizarine zirconium lac; As by the modified method of Gutzeit, etc.

All these methods have been discussed over and over again in order to improve constantly the reproducibility of the result; for a good accuracy is required for the search of anomalous zones, even though it has often been insisted that geochemical prospecting, being a statistical method, must therefore be satisfied with semi-quantitative determinations. Thus, in the case of lead, for instance, the significant halos of dispersion suggesting mineralization may be differentiated from the background in various ways, according to the thickness and nature of the cover. An anomaly of 80 ppm on a background of 50 may present as much interest as an anomaly of 800 ppm.

This led us to consider the width and shape of these anomalous zones rather than their absolute value. The true knowledge of the shape of anomalous zones implies a fine determination of the marginal parts of anomalies and therefore the use of very accurate analytic methods.

Spectrographic methods have not yet been applied in systematic analysis. They are rather used for particular works, especially for research and semi-quantitative determination of traces of elements in the minerals, rocks and ores.

#### Studies

Systematic studies made on ore-bearing zones detected by trenches have shown that it was possible to search for an element which has mechanical characteristics of dispersion by means of a tracer element chemically dispersed. Samplings made for As have thus determined W mineralization.

The primary dispersion of known elements such as Pb, Zn, W, and Mo observed in rocks collected near the ores varies on account of syngenetic or epigenetic phases of mineralization and of the fracture porosity in host rocks. Experiments are actually taking place for the study of secondary dispersion of lead and zinc in synthetic soils.

## BOOK REVIEWS

**HIGH ALTITUDE AND SATELLITE ROCKETS.** A symposium sponsored by The Royal Aeronautical Society, the British Interplanetary Society and the College of Aeronautics held at Cranfield, England, 18th-20th July, 1957. 136 pages. The Philosophical Library, Inc., 15 East 40th Street, New York 16, N. Y. \$15.00.

Although the symposium was held before any satellites had been put into orbit, the book is a compendium of timely and valuable information. The first paper is a general introduction by Massey on the scientific applications of rockets and satellites. This is followed by twelve papers, seven by British authors, four by American, and one by a Russian. The papers extend from hard-headed engineering design data to theoretical excursions into the problems of flight outside of the earth's atmosphere. Each paper is followed by discussions from the floor which are critical and illuminating.

Rosen gives a detailed description of the U.S. Vanguard satellite. This is followed by a paper by Stephens on the Skylark, the British upper atmosphere sounding rocket, designed to carry a payload of 100-150 pounds to about a 100 miles altitude. Problems of rocket propulsion are discussed by Baxter and by Shephard, and the design features of large rockets by Bossart. The U.S.S.R. paper by Pretov gives no information, merely the conventional experiments which one might expect to do with a satellite.

High temperature materials in relation to satellite re-entry into the atmosphere are dealt with by Murray, and instrumentation, telemetry and guidance by Lines. Hilton gives an original treatment of the problem of re-entry to the earth from space. He assumes that the approach path must be tangential; a little below this will cause the vehicle to plunge too rapidly into the atmosphere and burn up. A sphere will not have the correct drag in the atmosphere, the vehicle must have a flat plane surface. The pilot is on the underside and upside down. However he feels that he is right side up since centrifugal force still over-balances the earth's gravity. On entering the atmosphere he introduces air drag by a rolling manoeuvre; problems of heating are critical. Phenomena of respiratory metabolism in sealed cabins are discussed by Clamann, and the psycho-physiological hazards of satellite flight by Henry.

E. O. Hulburt

**THE UPPER ATMOSPHERE.** H. S. W. Massey and R. L. F. Boyd. 333 pages, 6 plates in color, 21 plates in black and white, and many figures. Philosophical Library, Inc., 15 East 40th Street, New York 16, N. Y. 1959. \$17.50.

The book is easily written and easily read; it is mainly descriptive physics with little mathematics. It is a splendid text for advanced college classes, or for graduate reading, or for anyone engaged in upper air research. The figures and plates are very clear.

Chapter I assembles the relevant physics. It deals with the motions of charged particles in magnetic and electric fields, chemical reaction between molecules, ions and electrons, life times of excited states and light emission of atoms and molecules. These things are perhaps well known to the expert, but the beginning student does not find them in any single university course.

Chapter 2 is a brief survey of the known phenomena of the atmosphere up to about 250 km. Chapter 3 gives engineering details of rockets and balloons, and their uses in upper air observations. Chapter 4, on probing with sound waves, is interesting but is mainly of historical interest for the few facts about upper air temperatures derived from the sound waves have been entirely superceded by rocket exploration. Chapter 5 describes probing with radio waves, with some facts about the ionosphere, radio astronomy and whistlers. Chapter 6 is a conventional chapter on the solar spectrum, the ozonosphere and the ionosphere. Chapter 7 on lights in the night sky describes the aurora, its distribution over the earth, altitude, spectrum and relation to magnetic storms; likewise for the night air glows, but for some reason or other Roach's extended maps of the night air glow are not used. Chapter 8 on aerial tides and magnetic effects, a long chapter, is a mixture of facts and theory. The effects are small, many factors are unknown, and the relations are so complicated, that even in the

hands of such clear writers as Massey and Boyd they are difficult to understand.

Chapter 9 on solar, magnetic and ionospheric disturbances is the best summary of the facts that I have seen. About five pages are devoted to the Chapman-Ferraro theory of magnetic disturbance, which although thirty years old is still a fruitless and incomplete theory. About a page is given to Singer's recent shock-wave theory of magnetic storms, but the Bennett-Hulburt magnetic self-focussing theory of aurorae is not mentioned. Chapter 10 is an interesting account of the optical and ionizing effects of meteors in the upper atmosphere. Chapter 11 on cosmic rays is very fine but has of course little to do with the upper atmosphere. Chapter 12 on artificial satellites gives the story of these remarkable engineering achievements through Sputnik III which was launched May 15, 1958.

E. O. Hulburt

#### PUBLICATIONS RECEIVED

Photostat copies of any of the publications listed below may be received by any reader who wishes to pay for the cost of their reproduction plus postage. Please specify if negative is sufficient (cheaper) or positive is required.

- AMSTUTZ, G. C. Syngene und Epigene in Petrographie und Lagerstättenkunde. Schweiz. Min. Petr. Mitt., V. 39, 1-84, 1959.
- BORCHERT, H., and KREJCI-GRAF, K. Spurenmetalle in Sedimenten und ihren Derivaten. Bergb.-Wiss. 6, 9/10, 205-215, 1959.
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- BROTZEN, O. On zoned granitic pegmatites. Stockholm Contr. in Geology, V. III:3, 1959.
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- FISH, R. A., GOLES, G. G., and ANDERS, E. The record in the meteorites. I. The possible role of short lived radioactivity in the development of meteorites. Univ. of Chicago, Enrico Fermi Inst. Nuclear Studies, 1959.
- FRANCO, R. R. Contribuição ao conhecimento de rochas termometamórficas da Série S. Roque. Univ. de São Paulo, Fac. de Filosofia, Ciências e Letras, Bol. 189, Miner. 14, 1958.
- FRIEDRICH, O. M. Erzminerale der Steiermark. Leykam, A. G., Graz, 1959.
- HAGEMANN, F. On the petrography of the Silurian shales from Hadeland, Norway. Norsk geologisk tidsskrift, Bd. 37, h. 2, 229-246, 1957.
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- MASON, B. H. The intrusive rocks of the Kaikoura Mountains, Marlborough, New Zealand. Trans. Royal Soc. New Zealand, V. 85, pt. 2, 247-262, 1958.
- NEUMANN, H., and BRYN, K. O. X-ray powder patterns for mineral identification. IV. Carbonates. Avhandl. Norske Videns.-Akad. Oslo, I. Mat.-Naturv. Kl. No. 1, 1958.
- SAHAMA, T. G., and MEYER, A. Study of the volcano Hyiragongo, a progress report. Inst. des Parcs Nationaux du Congo Belge, Brussels, 1958.
- SCHAUBERGER, O., and KÜHN, R. Über die Entstehung des alpinen Augensalzes. N. Jb. Geol. Paläont., Mh. 6, 247-259, 1959.

- SHIDO, F. Calciferous amphibole rich in sodium from jadeite-bearing albitite of Kotaki, Niigata Prefecture. *Journ. Geol. Soc. Japan*, V. 64 (758), 595-600, 1958.
- VAN WAMBEKE, L. Applications des rayons x a l'etude des mineralisations radioactives. Centre d'Etude de l'Energie Nucleaire C.E.N., Brussels, 1958.
- WEISS, E. H. Zur Petrographie der Hohen Wildstelle (Schladminger Tauern). *Abt. Mineral. Landesmuseum Joanneum, Graz*, H. 2, 1958.
- WYLLIE, P. J., and TUTTLE, O. F. Synthetic carbonatite magma. *Nature*, V. 183, 770, 1959.

#### CALENDAR

##### Oct.

- 15-16 Am. Ceramic Soc., Glass Div., Radiation Effects Symposium. Galen Hall, Pa.
- 19-22 Electrochemical Soc., "Bulk electronic, thermal, and physico-chemical properties and details of preparation of elemental and compound semiconductors." Columbus, Ohio.
- 26-28 Analytical Chemistry in Nuclear Reactor Technology. Gatlinburg, Tenn.
- 26-28 Assn. of Analytical Chemists, Anachem Conf., Ann. Mtg. Detroit, Mich.
- 26-29 Analytical Chemistry, Oak Ridge Nat'l. Laboratory. Gatlinburg, Tenn.
- 27 Assn. of Consulting Chemists and Chemical Engineers, Ann. Mtg. New York City.
- 27-29 1959 AIME-ASME Joint Solid Fuels Conference. Cincinnati, Ohio.
- 28-30 Am. Assn. of Petroleum Geologists, Midcontinent Regional Mtg. Wichita, Kansas.

##### Nov.

- 2-4 Geochemical Society, Ann. Mtg. Pittsburgh, Pa.
- 9-12 Soc. of Exploration Geophysicists, Ann. Mtg. Los Angeles, Calif.

#### ION-EXCHANGE COLUMN

President J. F. Schairer announces the following nominations: For official delegate to the XXI International Geological Congress, to be held in Copenhagen, Denmark, Aug. 15-25, 1960, Professor T. F. W. Barth, Director of the Mineralogisk-Geologisk Institutt, Oslo, Norway.

For representative on the Advisory Board of the Office of Critical Tables, July 1, 1959 - June 30, 1962, Dr. E. W. Roedder.

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The Deutschen Mineralogischen Gesellschaft held its annual meeting in Wetzlar from September 8-12, 1959. Pre-meeting excursions were held on the 9th, and in the evening of that day there were introductory and welcoming addresses. Scientific sessions were held from the 9th until the 11th. The regular annual meeting came in the afternoon of the 11th, and on the following day were further excursions to the immediate vicinity of Wetzlar (Biedekopf-Gladenbach-Vogelsberg-Eisenerzlagernstätten).

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The meeting of the International Mineralogical Association was held in Zürich September 1-7. The program included a symposium on September 1-2 on Alpine cleft minerals. On September 3



there was a symposium on the formation of twins. During the period from Friday, September 4, until Monday, September 7, two excursions were held: a western excursion whose route included Lucerne, Grimsel, Fiesch, Binn, Andermatt, Sedrun, Lukamnier, Disentis; and an eastern excursion which included Göschenen, Gotthard, Biasca, Locarno, San Bernardino, Maloja, Bergell, Bivio, Oberhalbstein.

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News of the Membership

Professor Denis M. Shaw has a visiting appointment to the *École Nationale de Géologie Appliquée* at the University of Nancy and will be working during 1959-60 in collaboration with Professor Marcel Roubault.

Dr. G. C. Amstutz of the Missouri School of Mines has been on a lecture tour in Europe, speaking at institutions at Heidelberg, Freiburg, Zürich, and other places.

Dr. F. S. Turneure of the Department of Geology, University of Michigan, has made an extended visit to ore deposits in Scandinavia and Germany during the summer.

Dr. George W. Morey of the Geophysical Laboratory, Washington D. C., will receive the Howard N. Potts Medal of the Franklin Institute on October 21. The medal citation reads: "In consideration of his researches culminating in the production on a commercial scale of glasses composed of rare earth oxides and little or no silica, possessing a high index of refraction and a low dispersive power."

Dr. Wallace R. Griffiths of the U. S. Geological Survey, Denver, Colorado, informs us that the U. S. Geological Survey has had translated the following article from the Russian: "Specific features of mineralogy and genesis of tin-beryllium-fluorite deposits of the Far East" by M. M. Govorov, *Izvestiia Akademii Nauk, SSSR, Geologic series*, pp. 62-73, No. 1, 1958. Copies are being deposited for general use in the Survey libraries at Washington and at Denver, and at the John Crerar Library, where they may be consulted by interested parties.

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Sand-in-the-Gears-of-Learning Department

"Diagenesis--all changes that occur in a sedimentary accumulation before and after deposition."

"Runoff: a Russian geologist who works on minerals."

Identification of a specimen by an unhappy student during an examination: "It is a metamorphized conglomerate."

Repeat from previous issue of *The Geochemical News*: Unakite--a most impotent rock in Virginia. (This shows how difficult it is to strike a happy medium in proofreading, once not enough and the second time too much.)

See you in November!

E. Wm. Heinrich  
Editor

Department of Mineralogy  
The University of Michigan  
Ann Arbor, Michigan