

CMS News

A Publication of The Clay Minerals Society

December 1990

Rainy clay days in Columbia

Walter Keller had a birthday party. And three hundred clay mineralogists came to help him celebrate his 90th birthday—they stayed for the 27th annual meeting of The Clay Minerals Society, October 6 through 11, which was hosted by the Department of Geological Sciences, University of Missouri, Columbia, with support from their administration. In addition to the financial support provided by the host institution, A.P. Green Industries, Aquafine Corporation, Coors, E.C.C. America, Inc., General Refractories Company, Harbison-Walker Company, Hecla Mining Company, and Thiele Kaolin Company provided general financial support. Rheox Inc., a subsidiary of NL Industries, helped support the Pioneer Speaker, and Exxon and Mobil supported the *Clays in Sandstone* Symposium.

Jack Burst and Bill Johns were general chairs for the local committee; however, by their own admission, much of the work was ably handled by Jim Stitt. The technical program

continued on page 10



New CMS President, Thomas J. Pinnavaia
High Iron Photos

Regulatory issues committee formed

During The Clay Minerals Society annual meeting in Columbia, Missouri, an ad hoc Committee on Regulatory Issues was formed to address some of the regulatory, mineralogical, and health issues commonly encountered by mineral producers, users, and researchers. The need for this committee grew out of the recent government trend toward establishing increasingly restrictive regula-

continued on page 26

Second CMS workshop volume published Pollastro named Special Publications Editor

Electron-Optical Methods in Clay Science, edited by I. D. R. Mackinnon and F. A. Mumpton, Volume 2 of the CMS Workshop Lectures, was published in September. Chapters and authors include an Introduction by I. D. R.

Mackinnon, "Transmission Electron Microscopy: Scattering Processes, Conventional Microscopy, and High-Resolution Imaging," D. R. Veblen; "Electron Diffraction of Clay Minerals," Necip Güven; "Selected Applications of

Analytical Electron Microscopy in Clay Mineralogy," C. R. Hughes, C. D. Curtis, J. A. Whiteman, Sun Heping, C. K. Whittle, and B. J. Ireland; "Low-Temperature Analyses in the Analytical Electron Microscope," I. D. R. Mackinnon; and "Application of the Electron Microprobe and Im-

continued on page 19

Inside ...

Interview: Jan Srodon
Estonian Clay Studies by Warren Huff
London Meeting by D. R. Pevear
Kyoto Meeting by J. B. Dixon
Missouri Field Trip by R. B. Hall
Council Resolutions
1990-91 CMS Committees

Clay fax

The Society Office now has a fax machine; the number is (303) 444-2260. The fax number for Ken Towe, Editor of *Clays and Clay Minerals*, is (202) 786-2832.

The Clay Minerals Society



President Thomas J. Pinnavaia,
Michigan State University
Vice President Robert C. Reynolds, Jr.,
Dartmouth College
Secretary Don Scafe, Alberta Research
Council
Treasurer and Editor-in-Chief Kenneth
M. Towe, Smithsonian Institution
Immediate Past President Brij L.
Sawhney, Connecticut Agricultural
Experiment Station
Vice President Elect David R. Pevear,
Exxon Production Research
Company
Office Manager/Newsletter Editor
Patricia J. Eberl

CMS News is published quarterly by
The Clay Minerals Society. Contribu-
tions of articles, letters, commentary,
photographs, and drawings are welcome.

The newsletter is distributed to all
CMS members. Membership rates are as
follows: full membership, including a
subscription to *Clays and Clay Minerals*,
\$35.00/year; student membership,
\$17.00/year; nonsubscribing member-
ship, \$10.00/year. Institutional subscrip-
tions to *Clays and Clay Minerals*,
\$125.00/yr (\$140.00 overseas). Please
contact the Society Office for informa-
tion regarding membership and subscrip-
tions, and for a copy of our publications
list.

CMS News welcomes advertising.
Inquire about rates to the Society Office.
Articles and other contributions submit-
ted to *CMS News* are subject to editing
and are published on a space available
basis. All opinions expressed herein are
the opinions of individual contributors,
and not of The Clay Minerals Society.

Copyright © 1990

The Clay Minerals Society

The Clay Minerals Society
P. O. Box 12210
Boulder, Colorado 80303 USA
(303) 444-6405
FAX (303) 444-2260

Many thanks to our advertisers this
month, **Micromeritics**, **Radix**
Instruments, and **Jim Stauer** for
helping make the newsletter possible.

Letters

Flint clay—a double oxymoron?

Editor:

Do we need to correct Mr.
Webster's dictionary (not Bob Bate's
and Julie Jackson's Glossary Bible of
Geology), and/or if "flint clay," as in
Missouri, is a double oxymoron.

Webster says *flint* is a "massive
impure variety of quartz....," and *clay*
is "an earthy substance, plastic
when wet...."

We saw tons of flint clay on the
field trip, but it is (a) not quartz, and
(b) characterized by not becoming
plastic when *wetted*. So, good
Missouri flint clay is neither Web-
ster's flint nor clay; is it a double
oxymoron?

When we visited a "refractory
plastic clay" pit, we picked up on our
shoes two to five kilograms of sticky
mud, but the flint clay at the Schae-
ferkoetter pit was clean, clear, and
non-sticky. Must we revise Webster,
or a double oxymoron—ask the clay
doctor.

Walter D. Keller
Columbia, Missouri

Thanks...

To the following
people who contributed
to this issue:

Peter Adolphi
Joe B. Dixon
Dennis D. Eberl
Jessica Elzea
Robert B. Hall
Warren Huff
Walter D. Keller
Dewey Moore
David R. Pevear
T. J. Pinnavaia
R. M. Pollastro
Herman Roberson
Don Scafe
Jan Srodon
K. M. Towe

Suggestions for new editor

Tom Pinnavaia, CMS President, has
accumulated a list of promising
candidates for Editor of *Clays and
Clay Minerals*, but notes that addi-
tional suggestions are still welcome.
He can be contacted at (517) 355-
2150; fax: (517) 355-355-2146;
address: Department of Chemistry,
Michigan State University, East
Lansing, MI 48824.

Houston in '91

The next CMS Annual Meeting
will be held in Houston from
October 5-10, 1991. General
Chair is D. R. Pevear (713-965-
4452), and Program Chair is J. B.
Dixon (409-845-8323). More on
the meeting on page 20.

Jackson Award

The honorarium associated with the
Marion L. and Chrystie M. Jackson
Mid-Career Clay Scientist Award will
be \$1000. The award will be
presented for the first time at the
CMS Annual Meeting in Houston in
October, 1991.

Membership Directory Changes

Please check the form on page 24
if you would like to make changes
or corrections or to add a fax
number or electronic mail number
to your listing in the membership
directory. A number of members
have especially requested fax
numbers to be included. Please
print clearly.

Standing orders for workshop series

Interested people can place standing
orders for the workshop lecture series
by contacting the Society Office.
Volume 3 is at the printers, and Vol-
ume 4 is expected some time in 1991.

K-Bentonite Studies in Estonia

As a result of a dinner table conversation during the 5th International Ordovician Symposium in St. John's, Newfoundland, in 1988, Dennis Kolata (Illinois Survey), Stig Bergstrom (Ohio State), and I decided to extend our work on the stratigraphy, mineralogy, and tectonic setting of Middle Ordovician K-bentonites to the Baltic region where beds very similar to those we had been studying in North America were well known. We suspected that andesitic volcanism was coeval in the two areas and that there was at least an outside chance that the Baltic and North American beds originated from common source volcanoes during the Taconic orogeny. If this was so, then we should be able to identify several time lines on both sides of Iapetus (the ancestral Atlantic) using chemical fingerprinting, which would be of enormous value to stratigraphers who for some time have been wrestling with the problem of trans-Atlantic Ordovician correlations. In addition, we would be describing some of the largest plinian (explosive) volcanic eruptions known in the geologic record. Finally, we would also be able to extend the range of environ-

ments and diagenetic histories represented by the dominantly illite/smectite-rich clays in the K-bentonites and perhaps learn more about the origin of these fascinating minerals. With funding from NSF we had planned to spend roughly three weeks this past summer collecting in Estonia, Sweden, and Norway. It was clear from the beginning that the success of this trip would depend heavily upon the cooperation of various individuals in these countries whose assistance we would need to gain access to the localities and cores we wanted to sample, and who would be intimately familiar with Ordovician stratigraphic relations in the various countries. Sweden and Norway presented little problem due mainly to Stig's close association with his former colleagues and students, but Estonia was another matter.

In many parts of the Soviet Union, the Geological Surveys routinely core to basement as part of their regional mapping programs, and consequently there is an incredible wealth of subsurface information stored around the countryside in barns and warehouses. In Estonia, coring is controlled partly by the Institute of

Geology at the Academy of Science and partly by the Geological Survey. At the administrative level, there is little formal cooperation between the two organizations, but at the regional level the geologists are in regular contact with one another and share information freely. During the Murchison Symposium in England early in 1989, I spoke with Dimitri Kaljo, Chairman of the IUGS Silurian Subcommittee and former Director of the Institute of Geology in Tallinn. He was very enthusiastic about our proposed project and suggested we extend it upward stratigraphically to include the Lower and Middle Silurian, which has a number of well-preserved K-bentonites known throughout Baltoscandia and the UK. In return, he offered to provide transportation and the necessary contacts to get at the material we wanted. To prevent the project from getting too big, we finally agreed that we would concentrate on the Ordovician but include selected Silurian horizons of interest to Kaljo and his group. On that basis, we set about making travel arrangements, getting visas, and so forth. As anyone who has worked in the Soviet Union will

continued on page 18

Archival materials and photographs requested

At the meeting in Columbia, a number of members expressed an interest in seeing the Society collect and make available certain archival material. Jack Burst kindly made the first contribution with the conference program and other materials from the First Clay Conference in 1953, held in Columbia, Missouri. We invite any members who have other such materials to send them to the Society Office in Boulder. We are especially interested in labeled photographs. A suggestion was made that members

also think of bequeathing such materials to the Society.

Another request was that we make available slides of well-known figures in clay science for use in teaching. Don Scafe, Secretary of the CMS and official photographer as well, (High Iron Photos) is going through his files to put together a selection of such slides. People with an interest in using them are encouraged to contact the CMS Office with ideas about whom to include.

Positions Available Please

As a service to clay scientists and to interested institutions and companies, *CMS News* would like to publish not only Positions Sought, but also Positions Available. If you are aware of openings of potential interest to clay scientists, please send all the relevant information to *CMS News*. Please see page 13 for a research assistantship position available and page 18 for a position sought.

Interviews with the clay scientists

Jan Srodon

Dr. Jan Srodon is a research scientist at the Polish Academy of Sciences, Institute of Geology, in Cracow, Poland. He is the only Polish member of The Clay Minerals Society, and he is an associate editor of Clays and Clay Minerals. Dr. Srodon was interviewed in Paris and Manchester in early July, 1990, by D. D. Eberl.

CMS: What is your favorite clay mineral?

SRODON: Illite. It is my *only* clay mineral. I'm an illitist. I almost haven't done anything outside of the illite-smectite business...which is sort of narrow-minded, perhaps. The only justification is that this group of clays accounts for about 30% of the mass of the Earth's sedimentary cover.

CMS: You are a geologist and a clay mineralogist. In the future, how do you see clay mineralogy aiding the science of geology?

SRODON: I don't see a clear perspective. Clay mineralogy seems to be an autonomous science developing out of geology, bridging towards soil science and chemistry. My case is an example: I always wanted to do geological studies, but ended up doing other things.

CMS: What sort of studies are you pursuing now in clay mineralogy?

SRODON: Recently, I've been interested mostly in electron microscope work, trying to reconcile information obtained by X-rays and by different electron microscope techniques, such as Pt-shadowing and high resolution. I think I've got quite a good feeling for what's going on, and the first paper with French colleagues is in press with *Clays and Clay Minerals*. I'd like to continue along these lines, in particular to investigate the most illitic end of illite/smectite series in more detail. There is a problem that I do not understand.



Drawing by M. J. Nash

CMS: What is going on, and what *don't* you understand?

SRODON: I know that more smectitic illite/smectites do occur in nature as mixed-layer crystals, and I know that pure illites do occur in nature as fundamental particles, and that there is a transition zone between the two which I don't have a clear picture of. The other problem is the Ostwald ripening of clays. I'm not totally convinced that the idea is correct, so I would like to do some more work on verifying it.

CMS: You will be going to Strasbourg next fall to work for a year with Norbert Clauer and others?

SRODON: Yes. From my standpoint, the major goal of this trip is to try to use isotopes to verify Ostwald ripening, as applied to clays. Also I want to learn French in an easier way than from a textbook.

CMS: What do you think is the best work you've done so far?

SRODON: I think the most useful work was the techniques of illite/smectite identification, based on Bob Reynolds' program. They have been used around the globe, except in Poland. It is most difficult to be prophet in your own country.

CMS: In Poland two years ago there was the third national Polish clay conference, attended by about 100 people. Poland is not a large country to have a clay conference with 100 people. Is clay science healthy in Poland?

SRODON: No, I don't think so. It's in much better

continued on next page

Srodon, *continued*

shape in other Central European countries—Czechoslovakia, East Germany, Hungary. The historical reason is that these countries have a tradition of ceramic industry. We do not have this tradition because we did not have much good quality material for ceramics. The Polish oil industry has never promoted clay science. Polish soil establishments also don't seem to be very interested in clays. These are the three major sponsors of clay science, as I see it. You've got to have at least one of these interests to develop clay mineralogy, and we don't have any.

CMS: Poland was under Russian and Communist domination for 40 years or so. Did this gravely affect science in the country, and how has it changed now that the politics have changed?

SRODON: The Communists spent, in relation to the money they had, quite liberally on science. I do not mean that they spent a high percentage of the GNP, but that they gave away money without many strings attached. Probably one of the reasons was to keep the scientists quiet; and the other reason was just the general inefficiency of the system. They didn't bother to check what was done. Their chief concern was to do planning, to construct a plan. So if we knew how to construct a plan, we were in good shape. As a result, I think that Polish science has been spoiled, has degenerated in exactly the same way as the industries and the other sectors of the society.

It's a paradox, but the scientific community that contributed heavily to the destruction of Communism in Central Europe now winds up the victim of its victory as the new government tries to balance its books. We probably will have to cut quite a lot of fat, which *does* exist; but we are terribly underfinanced by Western standards. Our salaries are very low even by Polish standards, and funding for research is very small—we do not have equipment, books, terminals, etc. Nevertheless, there's terrible inefficiency in the scientific community, and we have to get rid of it.

CMS: How much money does a typical scientist make in Poland?

SRODON: Scientists of my age, which is middle age, make less than the national average, about 100 dollars per month. Our currency is convertible now, so I can go to a bank and change my monthly salary into 100 bucks...and try to survive on it.

CMS: How has your institution changed with the coming of the revolution?

SRODON: My institution is terrified. We've been fi-

nanced automatically without any need to produce anything, basically. The only fundamental need was to produce a plan. Now we are going to be evaluated by the scientific product, so our institutes are trembling now and trying to fix themselves, which is good, which is as it should be, because other sectors of the country's life will be fixed by the free market.

CMS: Do you think your research now will be directed toward applied matters?

SRODON: No, I don't think so. Current thinking is quite the opposite. We have too much applied research, which is so low in quality that nobody wants to buy it.

Clay science...is in much better shape in other Central European countries—Czechoslovakia, East Germany, Hungary.

It's called applied, but the state pays for it, and industry doesn't want to use it. Now it's considered a waste of money; so probably in the coming years it will be easier to get funding for fundamental research, if this research is good quality. We think that quality will count more than practical research.

CMS: How was science directed in Poland, then and now?

SRODON: There was a strong control of the Communist Party over all institutions which were politically sensitive, like history, sociology, political sciences, literature: everything having to do with communication was politics. In these places, they would locate their people, party members, as directors. In science they let us alone, more or less; but the problem was the feudal structure of science. It still exists in Poland. The system for choosing the director has been changed: now we are electing our directors for fixed terms, rather than having them appointed from above.

CMS: This sounds more democratic than most American institutions.

SRODON: Yes. We are in a very radically democratic mood now. It's too democratic by my standards. Everybody wants to elect people to every post. Everybody wants to decide everything by committees, by meetings, which may be democratic, but it's a terribly ineffective way of running things. I hope we'll strike a balance pretty soon.

continued on next page

Srodon, *continued*

CMS: You and your institution were active during the Solidarity movement. You even ended up spending some time in jail. Can you tell us about that?

SRODON: For three years, 1980-83, I almost didn't touch a clay; but I do not regret it—it has been the most exciting period in my life. First, I helped to organize Solidarity in the Polish Academy of Sciences and other scientific institutions. Then, for the 16 months that Solidarity was legal, I edited a monthly bulletin of the Solidarity organization in the Academy, with a circulation at 2000 nationwide. We had our own printing equipment which was brought from Norway by a friend. The authorities tried to arrest me when martial law was declared on December 13, 1981, but I managed to avoid arrest.

CMS: How did you avoid it?

SRODON: By hiding in our house in a very tiny secret compartment that was used during World War II in the same way. Six police searched my house, but they didn't do a very good job, probably because they had been

It's a paradox, but the scientific community that contributed heavily to the destruction of Communism in Eastern Europe now winds up the victim of its victory as the new government tries to balance its books.

searching many houses before. They were exhausted, so I made it. Then I edited one of the first Solidarity underground daily bulletins for the first two weeks of martial law, on my typewriter, hiding at someone else's apartment. The bulletin was based on the news friends could gather during the day (we had a total blockade of information: radio and TV did not work, phones were cut off, newspapers were not printed, private cars couldn't move, etc.) When I saw my wife after a week, we found that we were doing the same thing: supplying information to the American consulate in Cracow. Our friend was visiting the consul's wife, carrying information under her hat.

Then I went back to the surface, and they didn't come after me until a year later. During the next months, I worked like anonymous Medieval men, writing perhaps a hundred or so shorter and longer articles and notes for the underground press. We were effective: after a month or

two, Polish emigrées released hundreds of balloons from the Swedish island of Bornholm, carrying leaflets with articles written in Poland and smuggled to the West. I was pleased to find that I had authored half of these texts. Also, I helped to organize the underground Solidarity structure, and a network for information exchange between underground publishers and smugglers who took their production to the West. As a result of these activities my name got somehow to the police, and I got arrested. The next fall I spent six weeks in jail, where I celebrated Christmas.

CMS: Was this a time you could devote to clay mineralogy instead of to politics?

SRODON: Not entirely, but to a larger extent than outside of jail. I remember I reviewed a paper by Phoebe Hauff on XRD preparation techniques. Another thing I did in jail was to teach English to my roommate, who was a police spy trying to extract my secrets. I offered him free lessons in English, using Milton Friedman's *Free to Choose*. We translated the first few pages of it; then he got bored, and never finished.

CMS: You're working on reforming science in Poland?

SRODON: Last year, when Solidarity became legal again, I was elected leader of the Solidarity unit at the Polish Academy of Sciences in Cracow. So I have about 1000 members in my own organization that I have to take care of, which is quite a job. I couldn't refuse to take this responsibility. It turned out to be quite interesting, but terribly time-consuming, because we are in a period of changing everything, including the whole legal system in Poland. In particular, we were interested in how funding is being directed, how you make a budget at the Polish Academy of Sciences; before, it was just decided from above.

Our second line of interest is defending the Academy against her enemies, which are numerous. The Academy is perceived in many circles of the Polish scientific community as a strict Stalinist dinosaur, and they want to extinct it. We think it is a credible institution which evolved with time and can be fixed—there are many things to fix, but they can be fixed—so we are working hard at defending our institution. It's mostly a political fight in the media: in newspapers, in radio, on television. So I've been writing articles, talking, giving interviews: Radio-free Europe, Polish radio, all kinds of media, to publicize and promote our case. It's frustrating because our opponents hold government positions now, so it's very difficult to fight them because they're in a position of power. Nevertheless we were able to change their thinking to some extent.

continued on next page

Srodon, *continued*

CMS: How did you first learn English and come to the West?

SRODON: I was getting lessons in English since I was a teen-ager, but that's a very inefficient way of learning. I think I learned English reading *Clay Mineralogy* by Dr. Grim when I started working on my master's thesis. My advisor, Jan Kubsz, gave me Grim's book and asked me to read it first. This was a terrible challenge because I had

I think I learned English reading Clay Mineralogy by Dr. Grim.

never read a book in English before. I dug through these hundreds of pages, and this was a breakthrough in language. When I got a post-doctoral Fulbright scholarship in 1975, I chose Cleveland as a place to go. When I came to the United States, I was completely lost. I couldn't understand anything. I couldn't understand announcements at the airport. I had never taken a plane before. I had never seen a superhighway. I was just a person from the bush, from the jungle, coming to civilization. English and western civilization combined made me completely terrified.

CMS: You worked with John Hower in Cleveland at Case Western Reserve?

SRODON: Yes. I finished my Ph.D. on mixed-layer illite/smectite in 1974. I did not have an advisor when I did my thesis, because my advisor died in a car accident. Judging from the literature, because I didn't know anybody personally, I decided that John Hower was the right person to work with on my Fulbright. These were his best years for clay studies, so I think I made the best choice, partly because he had a big group of people associated with him; so I think I found myself in the best place in the world at the time.

CMS: Did coming to America contribute to changing your political beliefs, and help you decide to fight for Solidarity; or would that have happened anyway?

SRODON: That's an interesting question. Everything was so different that I couldn't help rejecting the American way of life totally. At least for Central Europeans, American culture is so exotic that your first natural reaction is to reject it (at least if you are not planning to immi-

grate), and to think that our solutions are better. Only after three months did I start to understand it and to like many aspects of it. After more or less three months, and I know that three months is critical because I have talked to many people about it, and this seems to be a reproducible pattern, you start to understand the reasoning behind it; you start to understand the arguments, and you start to like it. You start to accept it.

I may say now, I just love America. It's Platonic in the sense that I've never considered changing my homeland. There are not so many solutions directly applicable that we could just mimic in Poland; but certainly some could be copied, like the concept of free speech, which, as radical as it is in the United States, is an American invention. Very exotic to Central Europeans. I try promote it because I think it's great.

Back in Poland, I exploited my personal experience with free market economy in an underground journal, writing about the superiority of capitalism over communism. I think John Hower would suffer a bit if he could read this. He was a socialist at heart, and kept a big picture of Trotsky in his office. We used to argue for hours about politics, which helped me to clarify my own ideas. I hope I convinced him to some extent that socialism is a blind alley of evolution. He was more successful with me in the clay domain. I hope he liked what I've done in the following years under his strong influence.

CMS: Somebody who works in your institute, Krzysztof Görlich, visited me in Illinois, and we enjoyed ourselves sitting and talking on my front porch, drinking brandy and smoking cigars together. He was hitchhiking around the country, through Mexico and up to Illinois. He seemed like a real bohemian, a free spirit, and now he has been elected deputy mayor of Cracow. He's a sedimentologist and a clay mineralogist. What are his plans for Cracow? He is interested in the environment. What sort of environmental problems do you have there?

SRODON: First of all, we don't have many problems with marine glacial sediments that he specialized in, so his professional training is going to be quite useless in his present occupation. But he has always been interested in environmental issues. In fact, he is one of the founders of the Polish Ecological Club, which was started in 1980, the same time as Solidarity was born. This was the beginning of the environmental movement in Poland. At the time, he was very successful politically also, because he was one of the key persons who succeeded in shutting down an aluminum smelter that was the worst single source of pollution in the vicinity of Cracow. Now we are in the process of restructuring the steel mill, which is the biggest single polluter in the whole country as far as gases and particulate matter.

continued on next page

Srodon, *continued*

CMS: Krzys told me that in downtown Cracow during the winter, they measured the oxygen content of the atmosphere one day and it was 15%. Is that right?—and that many people develop lung problems and asthma in Cracow, and that the Vistula River is an ore deposit. Is this true?

SRODON: Yes, unfortunately all these things are true. We are still in the phase of using very inefficient coal-burning stoves in old housing in Cracow. This is the worst source of pollution in winter. President Bush gave us some money to deal with it, so we will be switching to alternative sources of energy. Our problem now is not the lack of political will to change things, but the lack of money.

CMS: Do you think that clay science can offer anything to help solve Poland's pressing environmental and economic problems?

I just cannot imagine doing science without this international contact.

SRODON: I think that the best thing a clay mineralogist could do for his country is to give up his science and become a politician.

CMS: We emphasized how polluted Cracow is, but it is a beautiful, medieval city. It seems to me that most people who are born in Cracow don't leave, and they undergo their entire education there. Of course they travel, but they always come back home, and they have lots of friends whom they have known since they were very young.

SRODON: These roots are not entirely our free choice. There is a shortage of living space in Poland which makes us totally immobile. It has its pluses and its minuses. The advantage of this situation is that our everyday life is extremely interesting. I can compare the quality of my intellectual life in Cracow and in America, where I have lived for three years—that's a good sampling period. Thanks to our immobility, you end up knowing people all across the society; you have friends who do all kinds of things. So we do not stick to a professional ghetto, as you do in United States, because you move so often. In America when you go to a party, you talk first about all kinds of things, such as climbing, football, perhaps politics, but



Keith Goulding, M. J. Wilson, Jan Srodon, and Victor Drits in Warsaw, 1989.
Photo courtesy D. D. Eberl

finally you end up talking about science, because you all are more or less from the same field. I've experienced it many times. It doesn't happen in Poland at all because we do not associate on a professional basis; so we talk about all kinds of things, but we don't talk about science. This is bad for science because it distracts your mind from the field. But it's interesting. It adds a dimension to one's life which I appreciate very much.

CMS: Because you know everybody in town, this made the underground movements possible. Is that right?

SRODON: Sure. It's been extremely important for the effectiveness of this movement, because you could trust people. The network of our organization was more based on this informal friendship type contact, rather than on any formal organizational contact. We knew that these contacts were safest because they were practically impenetrable to the police. So for my own circle, I know that after ten years of underground illegal activity these ties remained mostly impermeable to the police.

CMS: You travel a lot. Do you think that this travel is important to science?

SRODON: I just cannot imagine doing science without this international contact. If I go out for long period, and get back into this exchange, it's like charging a battery. I'm full of ideas. Then I go back to Poland, where there are only a few people to talk to about this particular field, and my enthusiasm and my ideas decay with time. Very soon my major conversation topics are different, and I get to a point where I feel exhausted of new scientific ideas. Worse than this, I start feeling that this subject is not so important, that there are so many more important things happening around me. I'm tempted to do other things,

continued on next page

Srodon, *continued*

like politics. It's happened three times already in my life. These foreign trips save me as a scientist. I am perhaps an extreme example, but I believe the problem is general.

CMS: Poland is a very Catholic country. Do you see any conflict between Catholicism and science? The popes have not always been friends to scientists. Many materialistic scientists see a conflict between being a scientist and being a Christian. How do you resolve this problem, if it is a problem? If the Pope told you that illite was nothing more than fine grain muscovite, would you have to believe him?

SRODON: I think you should rather direct this question to those of our Russian colleagues who for years used to start their scientific papers (also geological ones) with quotations from Lenin or Stalin. We Catholics do not have this kind of a conflict with the church, which just encourages us to look for truth. I can imagine problems, perhaps, in the sciences that touch on the issues very vital for the Catholic church, like birth control and euthanasia, but I don't see the conflict in geology. This was resolved several hundred years ago. The present Pope is very interested in science, but he asks scientists for advice, not the other way around. So I think that if he got interested in illites, he would ask me, his fellow Cracovian. And I would tell him that illite is a separate mineral with a layer charge density of 0.9 equivalents per half unit cell, according to my current knowledge of the problem.

Catholicism contributes greatly to intellectual life in Poland. Cracow is probably one of the monasterial centers

The best thing a clay mineralogist could do for his country is to give up his science and become a politician.

of the universe. The density of monks per square kilometer in the center of Cracow is highest in the world. The Dominicans, in particular, inspired to quite an extent our dissident movement. They helped intellectually in overtaking communism. For example, after 40 years of Communism, we really didn't know democratic procedures. People who were with the Flying University, a group organized to give free lectures on issues like history, political science, economy, and so forth, wanted to elect their ruling body, and they didn't know how to do it. That's correct—they didn't know the details of the voting proce-

dures (secret ballot, etc.). One member of this group was a Dominican monk, and he ran the election, adopting the procedures that the Dominicans had been using for the last seven hundred years in their monastery, because they elect their officials every two years. It's an old democracy, and it served the purpose.

CMS: How does the educational system work in Poland?

SRODON: The program for high school is much more demanding than in the United States: our kids have to work much harder. The opposite is true for the university, which I think is in much worse shape. In fact we try to model our universities now, to a big extent, after the American universities. Our universities have an ancient

The present Pope is very interested in science, but he asks scientists for advice, not the other way around.

system of grading scientific degrees, which is very elaborate and dysfunctional for our science, giving older people proportionally too much control over scientific life of the country. We are right now in the process of fighting this tradition.

The person who gets his Ph.D. degree in Poland practically has no rights as a scientist: he cannot have his own Ph.D. students; he cannot review Ph.D. theses; he cannot sit on Ph.D. committees. You get all these rights only after achieving the next degree, which is called Docent. To get it, traditionally, you are expected to present a big thesis, probably two or three times thicker than a Ph.D. I think that this is a very dysfunctional tradition, because during the best years of your scientific life you think about producing a big book, instead of doing research which is really interesting. This practice is fading away, and you now can get this degree just by presenting separate papers instead of one big book. That's how I got my second degree. Then you have two more degrees: two professor degrees, for which you are nominated by your peers. These are degrees for life; so this practice is, in fact, probably the last remnant of the feudal system in Poland. It's like becoming a prince or a duke in the sense that you can quit your university and still be called professor. But that's an old tradition. I don't mind.

Annual meeting,

continued from page 1

was divided into three parts: a symposium on clay minerals in sandstones convened by Dave Houseknecht and Ed Pittman, the Keller-90 symposium convened by Haydn Murray, and a general session. Every year we claim the papers were good. That makes it hard to distinguish a meeting when the papers were noticeably better, but that is the case for this meeting. The program was quite full, and there seemed to be more mature workers reporting broad, interdisciplinary, long-range syntheses of the work they or their group had been doing.

The meeting began with a short-course titled *Neutron Scattering*



Dennis Eberl, who introduced the speaker, watches as outgoing CMS President Brij Sawhney presents the Brindley Lecture Award to 1990 lecturer Alain Baronnet of Marseille.

High Iron Photos

Technology for Clay Mineral Investigation, which was led by Fred Ross of the Research Reactor facility at the University of Missouri-Columbia. The 41 participants heard from Dave Bish from Los Alamos National Laboratory, D. A. Neumann from the National Institute of Science and Technology, Ahmed Moini of Mobil Research and Development, Robert Von Dreele from Los Alamos National Laboratory, D. L. Worcester from the Department of Biological Sciences at the University of Missouri-Columbia Research Reactor fa-

cility. Three important points from this session for the clay mineral community to keep in mind are: that inelastic scattering of neutrons yields information about the character and orientation of organic

and water molecules in the interlayer space; that small angle neutron scattering (SANS) gives information on the level of aggregation of clay-sized particles; and that Rietveld techniques are not yet applicable to deciphering clay mineral structures.

The meeting began with a plenary session, first featuring the George W. Brindley Lecture

given by Alain Baronnet, Centre de Recherche sur les Mecanismes de la Croissance Cristalline, Marseille, France. His topic was *Crystal Growth and Reactivity of the Layer Silicates*. Using superb HRTEM images, he showed intergrowths of brucite-like and talc-like layers with chlorite in a low grade metamorphic rock. These phases showed transitions perpendicular to the c-axis as well as parallel to it. Two CMS Distinguished Member awards were made. Joanne Hower accepted the award for John Hower, given posthu-

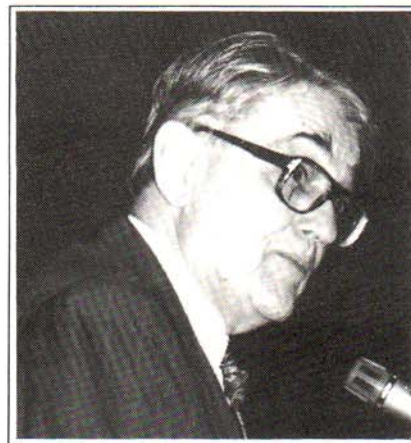


Joe White receives the CMS Distinguished Member Award from President Brij Sawhney as Charles Roth, who introduced Dr. White's lecture, looks on.

High Iron Photos

mously. Joe L. White accepted the award and then spoke, mostly tongue-in-cheek, on *Non-Bragg Reflections*. John W. (Spike) Jordan then gave the Pioneer of Clay Science lecture, *Bentonite: Off the Water Wagon, A Review*.

After the plenary session, the meeting adjourned to a luncheon in honor of Walter Keller, one of the founders of The Clay Minerals Society. Walter was the entertainment for his own party. Few stand-up comedians could



Bill Johns, Co-chair of the 1990 Annual Meeting.

High Iron Photos

have done as well. He reminded 163 of us that the first formal meeting of The Clay Minerals Society was held in Columbia in 1953...and that the registration was \$4.00. He asked how

continued on next page

Annual meeting, *continued*

many in the crowd had been to that meeting in 1953, and surprisingly enough, there were maybe 8 to 12



John "Spike" Jordan receives the Pioneer in Clay Science Award from President Brij Sawhney. Looking on are son Bill Jordan and his wife Lynn. Meeting co-chair Jack Burst and John's wife Norine hold an engraved glass presentation plate. Bill Moll, who introduced Jordan's lecture, also looks on.
High Iron Photos

hands raised. Then, as a reminder to all those junior to him, and that was everyone in the room, he said to remember that it's not the young sap wood that holds up the tree—of knowledge—it's the old dead wood. He showed us a 37-inch-long birth-



Jack Burst, Co-chair of the 1990 Annual Meeting.
Jo Eberl, for High Iron Photos

day card he had received from former student Ye Zhizheng, Class of '48, Director of the Nanjing Institute of

Geology and Mineral Resources. The card has 100 ideograms in the old Chinese writing, each wishing good health, long life, happy birthday, or some variation on that theme.

He left us with a thought about what really matters in education: it's "not how much the professor teaches, but how much the student learns and takes away." It was announced that another for-

mer student, Jack Tlapek, '64, had established a scholarship fund of (\$125,000) in Walter Keller's name. Walter just may have a longer-lasting effect on the community of clay scientists in particular, and society in general, because of his teaching rather than because of the substantial and formidable body of his published works.

The technical sessions were dominated by two symposia: one on kaolinites and related minerals and processes, in honor of Walter Keller; and the other on clay minerals in sandstone. The Keller symposium, organized by Haydn Murray, filled three sessions. On Monday afternoon, participants heard a review of the state of thought about halloysite from Bull Bailey, followed by a series of papers suggesting two kinds of kaolinites:

continued on next page



A large group of clay scientists from the former German Democratic Republic (East Germany) attended the meeting. Back row, left to right, Fernando Völsgen, Dieter Schmidt, Jörn Kasbohm, Peter Adolphi, Thomas Vogler, Rüdiger Ernst. Front row, left to right, Angela Fricke, Birgit Vogler, Michael Paul.
High Iron Photos

The 27th CMS Annual Meeting was held one week after the German Union. All attendees could feel this, due to the presence of a large group of participants coming from the Griefswald University, which is situated on the East German Baltic Coast. The research group of Dr. Manfred Störr promptly took the chance given by the political changes there. The graduate students and their teaching companions wanted to feel both the scientific level and the atmosphere of the meeting since Dr. Störr is chairman of EUROCLAY '91, which will be held in Dresden next August, and they are responsible for many posts of this European Clay Groups Meeting. A two-week field trip was the final activity of their first long trip West.

Peter Adolphi, Griefswald

Annual meeting, *continued*

those from feldspathic terrains and those from slate belts or other source areas with 2:1 minerals. On Tuesday morning, kaolinite and kaolinitization in England and New Zealand were described; the detection of K/E; pseudomorphic replacements of kaolinite; and kaolinite-dickite stabilities. In the afternoon, there was a well-organized paper on a deposit exhibiting a gibbsite-halloysite-kaolinite sequence and a very good student paper on the Maoming Kaolin from South China. On Wednesday, the kaolinite crowd went on the field trip.

The other symposium was organized by David Houseknecht, and it filled four sessions. Beginning on



Charles Stack holds the speaker as co-leader Jim Westcott gives some details at Stop 2 of the field trip. Sam Patterson listens. *HighIron Photos*

Tuesday afternoon, participants were treated to a clear and concise review of critical point drying and some of the resulting illite textures that are preserved by this process. Paul Nadeau showed textures of clay minerals in sandstones that he had produced in the laboratory, and they looked very much like natural ones. On Wednesday morning, the first three papers focused on North Sea sandstones and their clay minerals. Wednesday afternoon focused on clay coatings on quartz grains and their relation to porosity. David Houseknecht led off with a simple

and elegant study in which he coated quartz grains in the laboratory, used SEM to record the textures, and then matched these with textures in sandstones from the Gulf Coast. Ed Pittman thoroughly and comprehensively covered the characteristics of detrital and diagenetic clay mineral coatings. Rob Lander showed evidence for two types of illite maturing within a few mm of one another in sandstone from China.

The Thursday morning session began with four excellent review papers, and then we heard a clear, simple model for the clay mineral zonation in an Eocene sandstone on Barbados, West Indies. Talks from the

Tuesday sessions and the Wednesday morning one indicate that there is agreement that clay mineral coatings on quartz grains help maintain and protect porosity, but there is not agreement on whether these clay mineral coatings are detrital or diagenetic.

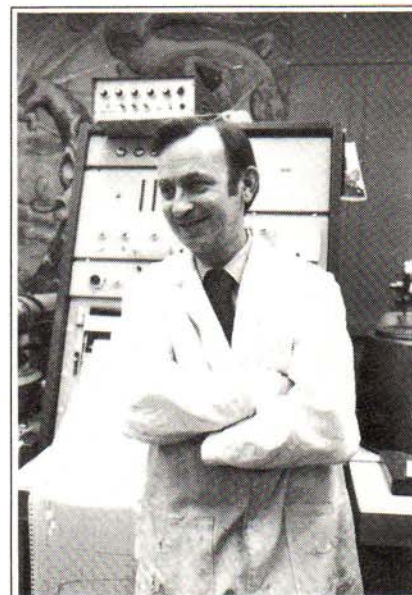
The three general sessions also offered some important papers. For example: Bob Reynolds showed how he had determined the degree of stacking order in the Zemplini illite by using lab techniques and his *hkl* modeling program; Warren Huff reported on his efforts to extend strati-



Only a small audience witnessed the performance of "The Folies Bergère Palygorskite Chain," as the French demonstrate their understanding of interparticle diffraction. From left to right, Jean-Pierre Girard, Robert Klimentidis, Alain Baronne, Norbert Clauer, and Jean-Pierre Muller. French attendees not present in photo: Claudine Durand, J. B. d'Espinose, Bruno Lanson. *HighIron Photos*

graphic correlations using bentonites of Silurian and Ordovician rocks; and Dave Bish presented the world's latest and best refinement of the structure of kaolinite, including the H atoms.

On Tuesday afternoon, everything stopped at 4:40 pm for a look at the posters and to have a beer. There were 27 posters on a full range of



John Hower, in Cleveland in 1972. *Courtesy CWRU Geology Department*

subjects related to clay-sized minerals. One would be hard pressed to identify the most interesting poster:

continued on next page

Annual meeting, *continued*

perhaps the one that clearly demonstrated that there are three interlayered components in the CMS Special Clay "Cor-Wa-1" authored by Klimentidis, Pevear, and Robinson.

Eighty-four participants took a one-day, mid-meeting field trip that was conducted by Charles Stack of A.P. Green Industries, James Westcott, who is retired from A.P. Green, and Randy Miles of the University of Missouri-Columbia School of Natural Resources. John Whitfield of the Missouri Department of Natural Resources provided valuable information and insight regarding the Pleistocene section at several stops. The trip crossed the dissected till plains, the Missouri River system, and the Ozarks Border area of Mid-Missouri, stopping at selected clay mines to observe the sequence from high alumina clays closest to the Ozark Dome to the less alumina-rich plastic clays farthest from the Ozark Dome. Walter Keller was an active participant, out of the bus and up on the outcrops, to share his 60-year perspective of these clay deposits.



Jim Stitt, Professor at the University of Missouri-Columbia, who was a power behind the scenes in organizing the conference.

High Iron Photos

The best oral and the best poster presentations by students were recognized with prizes. The best paper was *Rare Earth Element Patterns* in



Walter Keller, 90 in '90, describes the kaolin outcrop at Stop 5 of the field trip.

High Iron Photos

Smectite from the Cretaceous Clay Spur Bentonite (USA) by Jessica Elzea, a student of Haydn Murray. The runner-up paper was *Volumetric Relations Between Kaolinite and Dissolved Plagioclase: Implications for Aluminum Mobility in the San Joaquin Basin, California* by Michael Hayes, a student of Jim Boles. The best poster was *Clay Mineral Diagenesis, Sespe Sandstone, Ventura Basin, California* by L. A. Hathon, a student of David Houseknecht, and the runner-up poster was *Coalification: Cleat Formation and Syngenetic Kaolinite Mineralization* by C. P. Ambers, another student of Haydn Murray.

In the Council meeting, President Brij Sawhney reported that despite general economic conditions, The Clay Minerals Society enjoys financial health with a 6% growth in the endowments and an increase in membership to 920. He also reported that Editor-in-Chief Fred Mumpton, who has so devotedly served the Society and through whose efforts the journal has achieved an excellent reputation for quality of format and content, has

resigned effective October 1, 1990. Ken Towe has agreed to be the Interim Editor for one year while a search is made. At least one strong candidate has been identified. The Teller's Committee reported that Dave Pevear is the Vice President-Elect for 1990-91; both the Secretary and Treasurer remain the same, Don Scafe and Ken Towe respectively. New council members are Philip Low, Dewey Moore, Paul Nadeau, and Rich Pollastro. Joe Dixon will be next year's Distinguished Member, and Tom Pinnavaia will be the Brindley Lecturer. At the close of the business meeting on Thursday, leadership of the Society passed from Brij Sawhney to Tom Pinnavaia.

Next year's meeting will be held October 5-10 at the Nassau Bay Hilton, about 20 miles south of the center of Houston, Texas. The general chair for the meeting is David Pevear (713/965-4452). Joe Dixon is the program chair (409/845-8323). Four symposia are on the program: Clay Chemistry, Clay Geothermometers and Geochronometers, Extraterrestrial Clays, and Soils and Clays in Environmental Research. In the works for 1992 is a joint meeting with the Soil Science Society of America to be held in Minneapolis, November 1-6. The contact person is Wayne Hudnall (504/388-1344). The 1993 meeting is slated for San Diego, and Dick Berry (619/594-5586 or 619/594-6394) is the contact person.

Dewey Moore
Urbana, Illinois

Assistantship Available

Twelve-month, four-year, three-quarter-time Ph.D. assistantship for someone with an MS in geology, soil mineralogy, soil chemistry, soil morphology and genesis, or chemistry, someone with a thorough knowledge of x-ray diffraction theory and technique and an interest in research in soil mineralogy. Contact Michael L. Thompson, Agronomy Department, Iowa State University, Ames, Iowa 50011. (515) 294-2415.

Meetings

International Congress of Soil Science, Kyoto

The 14th International Congress of Soil Science met in the beautiful and functional Kyoto International Conference Hall in Kyoto, Japan, on August 12-18, 1990. Some 1400 scientists participated in the program on the theme "Improving Soil Management for Man and the Environment," aimed at optimum utilization of the World's soil resources to increase biological production and to protect the environment. The plenary sessions, symposia, and regular sessions were supplemented by field study tours in China, Japan, and the U.S.S.R. in pre- and post-congress tours. This meeting offered a vast selection of research reports on soils from many parts of the world (80 countries were represented).

Major program areas of interest to clay scientists are in Commission I, soil physics; Commission II, soil chemistry; Commission V, soil genesis; and Commission VII, soil mineralogy. Many specific subjects are dealt with by work groups, such as Surface Chemistry that is publishing two books on colloid interactions and surface properties of colloids. This work group is being replaced by two other working groups—one on mineral organics and microbes and an-

other on solute movement in soils. These working groups often have special intercongress meetings to share research on specific topics. Subcommissions also follow this pattern as illustrated by the very active one on micromorphology of soils that regularly has intercongress meetings and publishes proceedings volumes.

A major characteristic of the ICSS meetings is the diversity of topics that are presented. While one country is using the most advanced electron microscopy methods to investigate problems in clays and soils (e.g. R. J. Gilkes in a plenary talk from Australia), other countries are emphasizing maximum yield of crops, and still others controlled fertilization to avoid environmental pollution. Both oral and poster presentations are employed. In Kyoto the instrumental exhibits were varied and interesting for field and laboratory earth scientists. Of particular interest at Kyoto were the many reports on soils that contain allophane, imogolite, and halloysite. These minerals (allophane has not been approved as a mineral) are found widely in soils,



Joe Dixon on the rim of a dry volcanic crater in Japan last August.
Courtesy J.B. Dixon

particularly those containing volcanic material. Also of interest on field excursion B, attended by the writer, was the influence of loess from China in soils of Japan.

In 1994, the 5th International Congress of Soil Science will be held in Acapulco, Mexico. Several intercongress functions are planned, too. Pertinent to clay scientists are the field trips and sessions in Australia in conjunction with the AIPEA meetings in 1993. The newly-elected ICSS Secretary-General is Dr. Winfried E. H. Blum, Institut für Bodenforschung und Baugewandbau, Universität für Bodenkultur, Gregor-Mendel-Strasse 33, A-1180, Vienna, Austria.

J. B. Dixon
College Station, Texas

IGCP Project 294

Low Temperature

Metamorphic Processes in

Contrasting Geodynamic Settings

Auckland, November 8-21, 1991

Abstract deadline May 31, 1991

Registration deadline Aug. 31, 1991

Conveners, Geothermal Institute

University of Auckland

Private Bag, Auckland, New Zealand

Tel: 64 9737 999, Fax: 0064 09 371 183

Euroclay '91

Dresden, August 26-30, 1991

Submission of abstracts deadline—

February 15, 1991

Manfred Störr

Mehringstrasse 48

DDR-2200 Greifswald

Germany

ACS

The Colloidal and Surface Chemistry of Clays Symposium

Atlanta, April 14-19, 1991

Co-organizers

Philip Low

Tel: (317) 494-4772

Fax: (317) 494-6508

and Patricia M. Costanzo

Tel: (201) 943-7100, Ext. 2677

Fax: (201) 943-5653

2nd International Symposium on Environmental Geochemistry

Uppsala, 16-19 September 1991, Abstracts due—March 28, 1991

Prof. Dr. Mats Olsson, Tel: 46 18 672212, telefax: 46 18 300831

Meetings

Geochemistry of Clay—Pore Fluid Interactions Meeting, London

About 90 people participated in this symposium-like meeting held 17-18 September, 1990, in the venerable quarters of the Geological Society in Burlington House on Piccadilly. The meeting was organized by Professor David A. C. Manning, Geology Department, University of Manchester, and hosted by the Geochemistry and Clay Minerals Groups of the Mineralogical Society and by the Petroleum Studies Group of the Geological Society. Sponsors were BP Research, Enterprise Oil, and GeoScience Ltd. The Society's rather modern small auditorium was perfect for the 24 presentations and discussion; during breaks we were free to wander among marble busts of Sedgwick and William Smith or to examine the impressively penned charter of the Geological Society, signed by King George the Fourth. The latter, in its humidity-controlled glass case and with a great seal hanging from the bottom, bore an uncanny resemblance to the Magna Carta. It's nice to know the King will allow some of us to be geologists!

Participants came from seven countries, but most were from the U.K. Oil and oil-related companies represented were Amoco, BP, Exxon, AGIP, Statoil, Enterprise Oil, IFP, Exlog, Schlumberger, Int. Drilling Fluids, and Core Labs. The European nuclear industry and associated government agencies were well represented. University participation was also heavy, with an especially large number from Manchester, where there is a burgeoning program on clays and diagenesis. However, the ringleader of this program, Professor Charles Curtis, was conspicuous by his absence; apparently he had an-



J. R. Mossman, BRGM, Orléans, and Joe Small, Manchester, in London
Photo courtesy D. R. Pevear

other gathering to attend, most likely one regarding university funding. The meeting was divided into four sessions: 1) Theoretical and Experimental, 2) Clay-Pore Fluid Reactions in Petroleum Production, 3) Clay-Pore Fluid Reactions in Natural Systems, and 4) Applications to Waste Disposal.

For me the highlights of the first session were two papers on molecular dynamic and Monte Carlo simulation of the smectite-cation-water system, by N. T. Skipper, K. Refson, and their mentor, Professor J. D. C. McConnell, University of Oxford. Using some breathtaking computer graphic simulations, they were able to convince me that their model reasonably predicted swelling behavior and interlayer spacing. Especially interesting was their modeled density for interlayer water of Na-smectite of 1.15 g/cc—denser than normal pore water or the "ice" structure sometimes proposed for interlayer water. Further excitement involves their structure for Na-smectite-water: the Na is not in the center surrounded by water (as is Mg), but is attached to the silicate layers. This extraordinary result is thought to explain the well-known swelling properties of Na-smectite. I look forward to hearing the end of this story! Tim Primmer and others

at BP Research have been experimentally growing clays in hydrothermal bombs and quantitatively determining the chemistry of the run products using analytical TEM. The results for both solutions and products were then used to construct ion activity diagrams which were compared with published diagrams based on end-members in internally self-consistent thermodynamic datasets.

In the Petroleum Session, Peter Hall (Schlumberger Cambridge Research) gave an interesting review of overpressuring mechanisms—he concluded that there are many mechanisms and all may operate depending on the particular geologic setting. H. F. Shaw (Imperial College) with L. Wensaas, P. Aagaard, and H. Dypvik (U. of Oslo) and K. Gibbons (Statoil) discussed patterns of diagenesis in overpressured mudrocks of the Gullfaks area (Northern North Sea). This study relied heavily on BSE SEM images which were said to show higher porosity in overpressured areas. More significantly, perhaps, they do not see a direct relationship between illitization and present-day overpressure. At Manchester, Joe Small has been simulating the morphology of reservoir clays in hydrothermal experiments, and has used XRD, SEM, and ATEM to study the run products. Although natural morphologies were generally capable of being synthesized, his detailed description of methods and problems pointed out the extraordinary difficulty of characterizing (in some cases even identifying) the chemistry and structure of very fine-grained materials. He had an apparent mixture of mordenite and fibrous illite which was difficult to comprehend.

continued on page 17

The Keller 90 "Bonus"

On October 10, 1990, as part of the Keller 90, 27th CMS meeting in Columbia, Missouri, two busloads of eager clay addicts were treated to a nice bonus in the form of a one-day field trip through east-central Missouri to visit deposits of fireclay. The trip was organized and led by Jim Westcott, Charles Stack, and Glen Goulson of A. P. Green Industries, Inc., Randy Miles of Missouri University School of Natural Resources, and John Whitfield of Missouri Department of Natural Resources. Also prominent among the leaders was Leader Emeritus Walter D. Keller who enlightened (and delighted!) the assembled multitude with his own inimitable morsels of wisdom.

The Missouri fireclay district comprises two main zones. The northern zone, including parts of Callaway and Audrain Counties, contains deposits of mainly plastic fireclay. An intermediate zone, including part of Montgomery County, contains mainly semi-flint fireclay. The southern zone, which lies south of the Missouri River and on the northwest flank of the Ozark Uplift, including a large portion of Gasconade County, contains flint clay, "burley" flint clay, and diaspore-rich "clay," (perhaps better called rock as it is hard and compact). Unfortunately for the Missouri refractories industry, the diaspore-rich deposits in the state are virtually exhausted, according to Professor Keller.

The several fireclay categories are differentiated as follows: (1) Plastic: Kaolinite dominant but commonly with significant amounts of illite, chlorite, and quartz. (2) Semi-flint: Kaolinite generally equals or exceeds 90 percent. Contaminants such as illite and chlorite are sparse or undetectable. Quartz rarely exceeds a few percent. (3) Flint: Well-ordered kaolinite is the dominant clay mineral, and quartz is absent or undetectable.



Sam Patterson and the Ol' Perfesser discuss problems of fireclay genesis on a cool, soggy, October morning in Missouri. The eavesdroppers appear to be amused.

Photo courtesy Bob Hall

Texture is compact, coherent, so that the material breaks with a smooth conchoidal flint-like fracture, hence the name. Unlike plastic and semi-flint clays, which slake readily in water, true flint clay resists slaking even when immersed for a considerable time. (4) Burley flint: Contains small (1-2 mm) oolite-like nubs or "burls" of diaspore in a matrix of kaolinite. Fracture surface is rough because of protruding burls, not smooth and conchoidal like regular flint clay. Some burley flints contain boehmite as well as diaspore. (5) Diaspore: As implied by its name, this hard compact refractory raw material contains diaspore as the dominant mineral phase. Commonly a minor amount of kaolinite also is present, and illite and chlorite may be detected in X-ray powder diffraction patterns. Quartz is absent. Alumina content commonly equals or exceeds 70 percent.

The refractoriness as measured by pyrometric cone equivalent (PCE) increases with alumina content from plastic to diaspore-rich, the latter being the most refractory of the five categories.

According to Professor Keller and his disciples, the Missouri fireclays

constitute a major part of the Pennsylvanian-age Cheltenham Formation. Peludal sediment was deposited over a regional unconformity having an irregular karst surface that was developed on pre-Pennsylvanian carbonate rocks. Part of the Cheltenham clay is residual from weathering of the carbonates during Mississippian time, but the greater part is derived from weathering of the peludal mud that was laid down over the karstic surface. Leaching of the mud created a kaolinite-rich residue eminently suitable for

refractories. South of the present Missouri River, deep slump pockets were formed in the karstic surface. After being filled with mud, subsequent extreme leaching of these localized slump pockets took the process beyond kaolinite and into a bauxite-like residue, thus creating the burley flint and high-diaspore products. Dr. Keller explains the flint clays as having formed from a colloidal gel having stoichiometric proportions of alumina and silica approximating that of kaolinite. Subsequent diagenetic transformation and solidification of the gel created a near-pure, well-ordered kaolinite with "mutual boundary" interlocking grains analogous to feldspar grains in a granite or syenite freezing from molten magma. The tight interlocking grain texture causes the compact coherent clay to break with a smooth conchoidal fracture like flint. Keller calls this concept his "poison," presumably alluding to skeptics who may be reluctant to accept this hypothesis. Most CMS members have found the various Keller "poisons" to be quite palatable and altogether salutary.

An added bonus to our bonus was a lesson in paleobotany by former Soci-

continued on next page

Field Trip, continued

ety President, Sam Patterson, who found fossil fragments of *Calamites* (do I have that right, Sam?) in coaly seams in a plastic fireclay pit. *Calamites* is a Pennsylvanian rush, possibly ancestral to our modern scouring rush, *Equisetum*. Organic acids derived from plants and trees such as the *Calamites*, *Lepidodendron*, and *Sigillaria* growing in the Pennsylvanian mud-filled swamps are thought by Keller and others to have played a role in the genesis of the fireclays.

Fireclays were the principal but not the only topic taken up during the field trip. Soils developed on Pleistocene glacial till which overlies the fireclay horizon were discussed by Whitfield at several stops. Those of us who are not versed in soil science tend to be mystified by the soils classification system and its jargon. For example, how many of you non-soil types can explain the meaning of *Aquic Haludalf* or *Mollic Albaqualf*?

Many non-clay people do not know what fireclay based and other refractories are, or how they contribute to our modern industrial society. Missouri fireclay refractories are of critical importance to the steel, cement, and glass industries.

Society members who did not attend the field trip but wish to learn more about the geology, composition, and origin of Missouri fireclays will find the guidebook and its list of references of great value. The guidebook is available from the Society Office.

R. B. Hall
Lakewood, Colorado

Towe comes up with new theory

K. M. Towe, in the November 1 issue of *Nature*, theorizes that the amount of oxygen in the atmosphere during the Archean era was a trillion times greater than previously thought. As reported in the December 1 issue of *Science News*, Towe suggests that aerobic respiration, rather than iron in the oceans, kept the levels of oxygen down, but not as low as believed. Prevailing theories have held that aerobic organisms were not widespread until after the Archean.

London, continued from page 15

The Session on Natural Systems for some reason dealt almost entirely with mudrocks (shales), a situation certainly to my liking. At least one reason for this may be their importance as barriers in waste disposal,



Dave Manning and Colin Hughes, both of Manchester, in London
Photo courtesy D. R. Pevear

but another is that as diagenesis and petroleum migration studies are placed in a basin-scale perspective, the vast volume of mudrocks must be considered. A. P. Aplin and E. A. Warren (BP Research) gave an excellent review of mudrock diagenesis in which they pointed out that mudrocks constitute 60% of the rocks (in sedimentary basins), but are the subject of only 20% of the research papers. If this meeting is any indication, the numbers may be changing. These authors emphasize the lack of data on the chemistry of mudrock pore waters, and our poor understanding of reaction mechanisms. They suggest that the stable isotope geochemistry of formation waters appears to be

strongly influenced by clay reactions in mudrocks. In this same vein, so to speak, J. D. Marshall, with M. Wilkinson and S. F. Crowley (U. of Liverpool) have devised an intriguing arithmetic (computer model) for the oxygen isotope evolution of pore fluids in mudrocks during burial. The

model assumes major importance for smectite-to-illite reaction kinetics, and is applied successfully to published data from the Gulf of Mexico. E. I. C. Rae and D. A. C. Manning (Manchester) report on experimental diagenesis of the Kimmeridge Clay in hydrothermal bombs at 150-310°C and 500 bars. They made lots of Na-Ca

feldspar and a host of organic species (ketones, phenols, carboxylic acids, etc.), but the fluids were unsaturated WRT quartz. There was no evidence of organic complexing of metals, and no Al was detected.

In the Waste Disposal Session, C. R. Hughes and E. I. C. Rae (Manchester) reported on experimental reaction between several individual clay mineral species and calcium hydroxide solutions at 70°C and 1 bar. Careful phase characterization using ATEM and SEM revealed surprises in some products: an iron-rich hydrogarnet-like phase and other Fe-rich phases. This work should apply to reactions possible during cementing of casing in wells, and also to injection and waste disposal.

The Mineralogical Society intends to publish a proceedings volume; if it contains most of the papers given at the meeting, and if issued in a timely fashion, this volume will be well worth reading.

D. R. Pevear
Exxon Production Research Company
Houston

Estonia, *continued from page 3*

tell you, business-type visas require a formal invitation from a host institution. Kaljo was quite willing to prepare these invitations but expressed concern about the unreliability of the postal system to effect a timely transfer of our documents. We discovered, for instance, that mail destined for Tallinn from the U.S. frequently went through Budapest where it might be delayed for weeks. But the magic of fax got the job done, and we were on our way in early August, 1990.

Getting luggage into Estonia takes a lot longer than getting it out. Everything is X-rayed (searching for weapons, we were told) before going through passport control. Our guide and principal contact person for the week, Heikki Bauert from the Institute of Geology, had carefully arranged a taxi to take us to the hotel. But the driver's patience expired before our luggage was ready, and we were without means to get downtown from the airport. What sounds at first like a trivial matter immediately becomes complex when one discovers most cab drivers want to be paid in hard currency. Thus an Academy of Science representative meeting foreign guests and able to pay in roubles could (and did) have troubles. Heikki eventually found another cooperative driver, however, and off we went.

As is well known, Estonia has declared its intention to be independent from the Soviet Union, to which Moscow has responded with minimal enthusiasm as well as with a reduction in the supply of gasoline. For the time being, every vehicle is allotted 20 liters per month, with the only exceptions being for busses, police vehicles, and ambulances. Needless to say, these were not optimum conditions for planning an intensive week of field work. The Institute and Survey people really scrambled to

come up with suitable transportation, and we minimized our travel needs by working out of centrally located field stations. In a country roughly the size of Vermont and New Hampshire combined, one can cover a lot of terrain in a week's time.

That the economy is in need of a major overhaul is obvious everywhere you go, although Estonia is probably better off in many respects than some other areas of the Soviet Union. Tallinn is a major port on the Baltic, and the country's historic ties to Scandinavia provide a more or less steady flow of goods and services across the Gulf of Finland. Estonians and Finns speak a very similar language, so much of the television programming is either Finnish, Swedish with subtitles, or American MTV (which seems to have a universal language). Many of the nicer restaurants in Tallinn are open only to foreigners or locals with hard currency, and a bouncer at the door serves as judge and jury on all admittances.

There are very few surface exposures of Ordovician and Silurian beds in Estonia, so we wound up with about 60 pounds of samples from the best of several dozen cores, thanks to the enormous good will of a number of Academy and Survey personnel. The problem, of course, was how to get all this material to the U.S. safely. The consensus on surface shipment was that it would probably go from Tallinn to Moscow, and maybe, perhaps, eventually, it would reach the U.S. But at the very least this would require documented export permission from the Ministry of the Interior in Moscow, which could take months and might not happen at all. It was too much to carry with us through customs without proper documentation. Once again, Estonian resourcefulness came up with a solution that was fast, foolproof, and legal. Stockholm is less than three hours away by ferry from Tallinn, and Estonians may travel to Sweden

without visas provided they return the same day. We purchased a round-trip ticket for one of our Estonian associates who hand-carried the samples to the State Museum of Natural History in Stockholm, where they were held for us until our arrival by plane. From there, combined with our Swedish and Norwegian samples, surface shipment to the U.S. was no problem.

So what about the Baltic K-bentonites? Are they the same as the North American ones? We're working on it. Stay tuned.

Warren Huff
Cincinnati, Ohio

Position Sought

I am seeking a position in educational and technical scientific research specializing in the areas of **mineralogy and materials research using electron microscopy and diffraction** methods. Education: Ph.D. (1982) in mineralogy from Geological Institute of the Academy of Sciences (USSR), and an Engineering Degree (1975) in Radio Engineering from Moscow Electrotechnical Institute of Communication. Experience: Senior Researcher at the Geological Institute of the Academy of Sciences of the USSR, where I studied the structure and crystal chemistry of clay minerals by X-ray diffraction, electron diffraction and electron microscopy methods; Consulting work with the Universities of Moscow and Leningrad, Institute of Microbiology of the Academy of Sciences, Petroleum and Gas Institute (Krasnodar, USSR), Institute of Inorganic Chemistry (Bratislava, Czechoslovakia). Resumé and references available on request. Please write: Dr. Semeon J. Tsipursky, 7915 Fifth Avenue, Bay Ridge, NY 11209.

CMS research grants available

Purpose:

The research program is designed to provide partial financial support of masters and doctoral research for graduate students of clay science and technology in United States universities.

Selection:

Applications will be judged on a competitive basis. The qualifications of the applicant, the financial need of the research project, and the design of the research project shall be considered. Applicants selected will be nominated by a five-member CMS committee and approved by the CMS Council. Members and nonmembers of the CMS are eligible. Applicants must be U. S. citizens and not affiliated with a foreign university.

Application:

Each applicant must complete an APPLICATION FOR RESEARCH GRANT form available from the CMS office and must obtain confidential evaluations from two faculty members at his or her university.

Use of Funds:

Individual grants will not exceed \$2,500. Grant money may be used only for the costs of travel by the grantee to conduct research or to present the results of his or her research at the CMS annual meeting, room and board associated with research-related field work, or for the costs of equipment, supplies, and analyses required to complete the research. Recipients can apply for grants on subsequent years. Application forms and appraisals (7 copies) must be postmarked by August 1 and sent to the Society Office.

Volume 2, continued

age Analysis in the Study of Clays," R. E. Ferrell, Jr., and P. K. Carpenter. Also included are two case studies: "Transmission Electron Microscopy of Phyllosilicate Minerals from Low-Grade Chlorotoid-bearing Rocks, North Wales," A. J. Brearley; and "Chemical Composition and Variation of Authigenic Illite, Rotliegende Sandstone (Permian), Southern North Sea," E. A. Warren.

With 159 pages, numerous graphs and photographs, including color photographs, the volume is available from the Society Office (PO Box 12210, Boulder, CO 80303) for \$18.00 plus \$2.00 postage, in U.S. funds. Future volumes in the series, expected to be published within the next few months, include *Thermal Analysis of Clay*

Materials and Rheological Properties of Clay Minerals.

Rich Pollastro has agreed to take on a new position within the CMS, that of Special Publications Editor. As such, he will take over where Fred Mumpton leaves off on the Workshop Lecture Series and also edit any special volumes the Society sees a need to publish. (Fred Mumpton, although retired from the post of Editor-in-Chief, continues to spend a great deal of time finishing his responsibilities for the Workshop Series.)

Pollastro, a research geologist at the USGS in Denver, is also the Society Office Advisor, a newly-elected CMS Council Member, and Chair of the Teller's Committee.

Don't be afraid to show off your feats of clay



From the front—conservative, dignified, and demure.
From the back—makes a statement wildly expressive!

CMS polo shirts are available from the Society Office. On the left front is a small logo with the Society seal. On the back is a large drawing of a 1:1 clay mineral structure and the inscription "Feats of Clay." The shirts are navy blue and sized medium, large, and extra large. Price is \$15.00 postpaid. These make great presents for friends and family who never tire of hearing about clay.



The Clay Minerals Society 28th Annual Meeting

October 5-10, 1991 Houston, Texas

Hosted with the Lunar and Planetary Institute (LPI)

- **SYMPOSIA:** Clay Chemistry, Clay Geothermometers & Geochronometers, Extraterrestrial Clays, Soils & Clays in Environmental Research
- **WORKSHOP:** Mössbauer Spectroscopy
- **VISIT:** Johnson Space Center (NASA) Facilities
- **FIELD TRIP:** Including Historic Galveston

Headquarters: Nassau Bay Hilton & Marina
3000 Nasa Road 1, Houston, TX 77058
(about 20 miles south of Houston center)

General Chair: D. R. Pevear (713) 965-4452, P.O. Box 2189, Houston, TX 77001
Program Chair: J. B. Dixon (409) 845-8323

ANALYTICAL X-RAY SERVICE



JS TECHNICAL SERVICES

James Stauver
Field Service Engineer
P.O. Box 23324
Denton, TX 76204

Qualifications:
14 years experience in
maintenance and repair
of powder diffractometers
and spectrometers.

Telephone consultation:
Available at no charge
Monday - Friday
8 am to 5 pm
(817) 382-2934

Feats of Clay



Herman Roberson

Herman Roberson is taking at least a one-year leave of absence from SUNY-Binghamton to work as program director of the Instrumentation and Facilities Programs at the NSF.

Steve Guggenheim is spending the year in Canberra, working with **Tony Eggleton**.

Joe Snowden has recently accepted a position as Dean of the College of Science and Technology at Southeast Missouri State University.

Haydn Murray was elected President of the American Institute of Professional Geologists.

Gene Whitney is spending several months in Paris, working with **Bruce Velde** at l'Ecole Normal Supérieure.

Steve Altaner was granted tenure at the University of Illinois. He was also awarded an NSF grant for "Relations Between Diagenesis of Organic and Inorganic Phases and Tectonic Processes: Formation of Anthracite Coal."

Craig Bethke is spending the year at l'Ecole Nationale Supérieure des Mines de Paris in Fountainbleu. He was also awarded an NSF grant for "Hydrogeology and Sediment Diagenesis, Emphasizing use of Supercomputers."

James Boles was awarded an NSF grant for "Isotope Investigation of Mass Transfer in a Sedimentary Basin."

Laura Crossey was awarded an NSF grant for "Environments of Sedimentation and Controls on Diagenesis of the Creed Formation, Colorado."

W. Crawford Elliott was awarded an NSF grant for "Evaluation of the Role of Basaltic Volcanism at the Cretaceous Tertiary Boundary in Scandinavia."

Warren Huff was awarded an NSF grant for "The Tectonomagnetic and Event-Stratigraphic Significance of Lower Paleozoic K-Bentonites in the Iapetus Region of North America and NW Europe."

Lee Kump was awarded an NSF grant for "Phanerozoic Chemical Weathering, CO₂ Budgets and Global Climate."

Enrique Merino was awarded an NSF grant for "Self Organization in Agate: Textures, Composition, and Dynamic Crystallization Modelling."

Donald Peacor was awarded two NSF grants for "Mineral Transformations in Low Grade Rocks" and "Radiogenic Isotopic Study of Diagenesis and Low-grade Metamorphism Pelites."

Garrison Sposito was awarded an NSF grant for "Collaborative Research: Studies on the Electrical Double Layer at the Surface of Clay Minerals."

Charles Weaver was awarded an NSF grant for "A Petrologic and Geochemical Study of Authigenic/Diagenetic Clay Minerals in Upper Mississippian Platform-Tidal Flat Carbonate Rocks."

CMS Research Grants were awarded this year to **Wayne Jepson** and **Peter Ryan**, students of **Gray Thompson**, and **Jeffrey Stevens**, a student of **Sharon Anderson**. CMS Best Student Paper and Best Student Poster Awardees were **Jessica Elzea** and **Clifford Ambers**, both students of **Haydn Murray**, **Michael Hayes**, a student of **Jim Boles**, and **Laura A. Hathon**, a student of **David Houseknecht**. Newly elected CMS Council members are **Philip Low**, **Dewey Moore**, **Paul Nadeau**, and **Rich Pollastro**. Vice President Elect is **Dave Pevear**.

Ask the Clay Doctor

(Not a real doctor)

Dear Clay Doctor: I am looking for a good book on the identification of clay minerals. Do you have a suggestion?

Illite Illiterate, Chicago

Dear Illite Illiterate: Let me recommend a book entitled *X-ray Diffraction and the Identification and Analysis of Clay Minerals*, by Moore and Reynolds. This book is a good investment because, should the text become obsolete, the binding can be used as a replacement spring for your screen door.

Dear Clay Doctor: Why is it, through the years, that the French have had such a strong research interest in clay minerals?

Cherchez le Feuillet, Brussels

Dear Cherchez: The French nation has some of the world's finest wines and restaurants, and, perhaps, the finest lifestyle altogether. Therefore, it is natural that they should want to study the world's finest minerals. In addition, French scientists long have realized that research on "la clé" will lead to a key understanding.

Dear Clay Doctor: Help! I am desperate. I am a clay mineral in an alpine fault, and I am not ripening any longer. You should know my nickname is "Ostwald."

Too Long By Train To Prague

Dear Too Long to Prague: Do not panic. Relax. Have a glass of wine. Put on a Johnny Mathis record. Change your nickname from "Ostwald" to "Julio." You will be ripening again before you know it.

Dear Clay Doctor: I have long been confounded by the origin of the word fireclay. Is it an anglicized word from Chinese or is there some historical basis for it in ceramics?

Puzzled, Cincinnati

Dear Puzzled: Thank you for the opportunity to set the record straight once and for all on this scientific conundrum. As it turns out, neither of your suppositions is correct. The word fireclay originated in obscurity. Its first recorded public usage was during the height of a pre-

Prohibition Octoberfest celebration in Hermann, Missouri, when the Mayor, a rotund immigrant from the Rhineland, apparently attempted to make a public speech from the balcony of the town's only hotel. During the climactic moments of his remarks, the floorboards gave way under the weight of the Mayor and the Town Council, and the lot fell into the sausage pot directly below, creating a veritable tsunami of wursts. A spontaneous cry went up from the crowd, which, to the casual observer, sounded like "fireclay." Actually, it was an old Rhineland expression which, loosely translated, means, "Hooray, do it again!" Since that time, it has been used as a friendly greeting by workers in Missouri clay pits and misused by British mineralogists for ceramic raw material.

Dear Clay Doctor: If you are a bona-fide Doctor of Clays, not a sap-onite, you should work sympathetically with, or serve, the ill-ites and/or montmor-ill-onites, prescribing kaolin kaopectate for vermi-culites, and controlling their apatites, assuming they are living biotites. Non-tronites are exclusive, all-ophanes are all-inclusive, and halloy-sites were almost hallowed. Friendly paly-gorskites musically cheer on: "atta-pulgite," old boy sepiolite, down by the old beidell-ites. Even though you are a trick dick-ite, keep your nac-rite. If there is a new unique clay mineral in the K-T boundary, it should be named dinoend-ellite. Old clay mineral names do not die, they just slake away. Does that smect-ite (Deutsch)?

Mud Dauber, Columbia

Dear Clay Doctor: When people talk about common clay, aren't they really talking about mixed-layer illite/smectite? This clay seems to be very common in the pages of *Clays and Clay Minerals*.

Bemused, Lakewood

Dear Bemused: Yes, mixed-layer illite/smectite is uncommonly common in clay science journals. However, it is now being recognized that the mud slung in recent political campaigns is even more common. This mud consists mainly of calumnyite, which is amorphous to X-rays and invisible in SEM. Calumnyite was first reported in 1816 by Gioacchino Antonio Rossini (under the pseudonym Don Basilio) in a classic paper titled "La Calumnia."

Finally. An affordable, easy-to-operate alternative to high cost diffractometer automation.

The Databox.

The acquisition package:

The Databox is a stepping motor driver and data collection system specifically designed to control your diffractometer, all in the space of a two-wide NIM module. Just talk to it from a computer terminal or your PC using an incredibly friendly command language, and all your data acquisition needs are satisfied.

The analysis package:

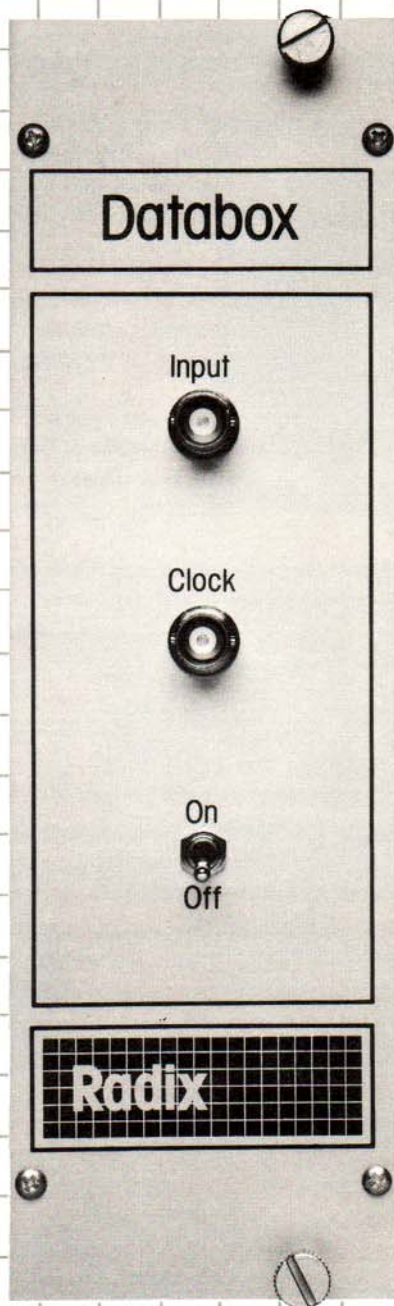
You can also buy the Databox bundled with MDI's Peak Identification and Micro-ID Search/Match software to run on your IBM PC (or compatible), giving you a complete x-ray control, acquisition, and analysis system.

The bottom line:

For well under \$5000, the Databox will fully automate your x-ray equipment. Add the analysis software, and the total cost is just over \$10,000.

Finally. A system with proven reliability and performance at a reasonable price. To learn more, contact us at:

Radix Instruments
3312 Febo Court
Carlsbad, California 92009
Phone/FAX: (619) 753-4646



New Members

We welcome the following new members of The Clay Minerals Society.

Dr. Alain Jean Baronnet
CRMC2-CNRS
Campus Luminy, Case 913
13288 Marseille Cedex 9
France

Dr. Silvana R. Bertolino
1005 East 10th St.
Bloomington, IN 47405

Ms. Janice L. Bishop
Chemistry Department, Box H
Brown University
Providence, RI 02912

Dr. Ernst Bolter
Geology Department
University of Missouri-Rolla
Rolla, MO 65401

Mr. Jeffrey C. Bruns
P.O. Box 1056
Sandersville, GA 31082

Dr. Steven Che Hung Cheung
2048 Rothesay
Winnipeg R2G 3 P9
Canada

Dr. Jinbeom Choi
College of Natural Sciences
Gyeongsang National Univ.
Chinju
Korea

Mr. Clement Columbe
Dept. of Soil & Crop Sciences
Texas A & M University
College Station, TX 77843

Mr. David E. Cornell
2316 South Pacific Highway
Talent, OR 97540

Prof. Kurt A. Czurda
Dept. of Applied Geology
Karlsruhe University
Kaiserstr. 12
Karlsruhe D-7500, Germany

Mr. James S. Dailey
Chemistry Department
Michigan State University
East Lansing, MI 48824

Mr. Thomas L. Dunn
Dept. of Geol. & Geophysics
University of Wyoming
Laramie, WY 82071

Ms. Angela Fricke
Ernst-Thaelmann-Ring 8/20
0-2200 Greifswald
Germany

Mr. Georg H. Grathoff
Geology Department
University of Illinois
Urbana, IL 61801

Mr. Junichi Inagaki
Mie Ceramic Research Center
788 Higashiakuragawa
Yokkaichi, Mie 510
Japan

Dr. Jörn J. W. Kasbohm
Bachstr. 33
0-2200 Greifswald
Germany

Dr. Eva Kocsardy
Geology Department
Indiana University
Bloomington, IN 47405

Ms. Lisbeth A. Kovach
1212 No. Grant St., #4
Bloomington, IN 47401

Mr. Dougal K. McCarty
Geology Department
Dartmouth College
Hanover, NH 03755

Dr. Roland S. Merkl
Südchemie AG
Lenbachplatz 6
8000 Munich 2
Germany

Mr. Daniel O. Nelson
68 S. Jackson St.
Elgin, IL 60123

Mr. Joseph L. Scaries
U. S. Silica Company
P.O. Box 187
Berkeley Springs, WV 25411

Mr. Vladimir Sucha
Geological Institute
Slovak Academy of Sciences
Dúbrovská esta G
814 73 Bratislava
Czechoslovakia

Dr. Barbara J. Tilley
BAB 1000
Fort Saskatchewan
Alberta T8L 3W4
Canada

Ms. Birgit Vogler
E. Thälmann Ring g/26
Greifswald, 0/2200
Germany

Mr. Robert F. Ylagan
Geology Department
University of Illinois
Urbana, IL 61801

Address correction:
Dr. Mingchou Lee
Mobil Research & Dev. Corp.
13777 Midway Road
Dallas, TX 75144-4312

Your chance to make changes in the CMS membership directory is here!

The new CMS Membership Directory will be prepared soon. Please send a copy of the form below to the Society Office if you would like to make any changes in your listing or to add a telephone, fax, or electronic mail number. Please print clearly.

Name _____
(Ms., Mr., Dr.) First Name Initial Last Name

Mailing Address _____

_____ Telephone _____

Fax number _____ Electronic mail number _____

micromeritics[®]

SETTING INDUSTRY STANDARDS IN ANALYTICAL INSTRUMENTATION.

Micromeritics offers a complete line of instruments for surface area, porosimetry, particle size and density analysis. Shown below is a partial representation of our product line



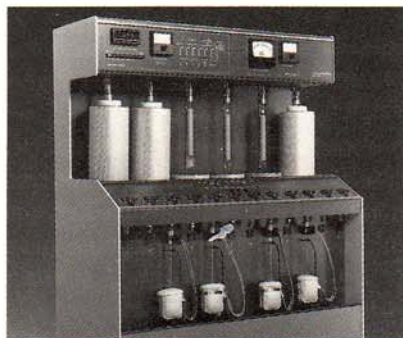
SediGraph 5100. High Speed Particle Size Analyzer.

Revolutionary new SediGraph 5100 particle size analyzer offers fully automated high speed analysis with high accuracy and total sample accountability of sedimentation analysis.

The 5100 permits storage of up to 6000 sample analyses and production of over eleven different graphical reports for particle size analysis in the 300 micrometers to 0.1 range.

ASAP 2000, a fully automated analysis system.

The ASAP 2000 is a compact analysis system that performs single-point and multi-point surface area analyses plus pore size and pore volume distribution. It also generates analysis results. And it does all of this, completely unattended. An easy-to-operate control panel sets operational parameters for sampler preparation and analysis vacuum. The ASAP 2000 is the most technologically advanced, fully-automated system available.

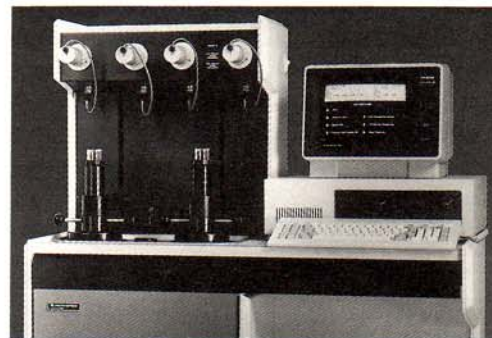


ASAP 2400. Accelerated Surface Area/Porosimetry Analyzer.

Micromeritics' ASAP 2400 provides high sample throughput and fast analysis time. This computer-driven instrument can automatically determine the surface area, pore volume, and pore size distribution of six different samples simultaneously. Uniquely designed ports assure high accuracy.

AccuPyc 1330. Fully-Automated Density Analyzer.

Micromeritics' fast, new AccuPyc 1330 measures the absolute density of solids having volumes from 0.1-100 mL, with ten times the precision of any other helium pycnometer. Using a single key-stroke, analyses can be initiated, data collected, calculations performed, and results accurately displayed. In addition, innovative software offers multi-lingual, in-depth reporting in English, French, Spanish or German.



AutoPore II 9220.

Automated Mercury Porosimeter

Micromeritics' AutoPore II 9220 provides both high speed and high sample throughput in one computer-driven instrument. Up to 250 pressure points from as many as ten different pressure tables may be selected. The 9220 measures pore openings from 360 μm diameter to 0.003 μm diameter.

micromeritics[®]

One Micromeritics Drive, Norcross, Georgia 30093-1877 Telephone (404) 662-3633 FAX (404) 662-3696
International Offices: Beijing CHINA, Creil FRANCE, Neuss WEST GERMANY, Basingstoke ENGLAND, Brussels BELGIUM

Product Information

Council resolutions passed in Columbia

At the CMS Council Meeting, Sunday, October 7, 1990, in Columbia, Missouri, several motions were passed that should be of interest to Society members.

The Policy and Administration Committee recommended a clear definition of the financial responsibilities of the Society and of each CMS conference host to the Brindley Lecture, Pioneer in Clay Science, and Jackson Midcareer Clay Scientist speakers. Moved by Bob Reynolds, Jr., second Pat Costanzo, that the Brindley, Jackson, and Pioneer lecturers be chosen by a CMS Awards Committee and that an honorarium of \$750 and expenses up to \$500 be offered by the Society. Expenses anticipated to exceed \$500 are to be negotiated with the CMS Executive Committee. Moved by Dennis Eberl, second Randy Hughes, that the local committee supply a hotel room for each of the Brindley and Pioneer lecturers. Carried.

Currently, persons, institutions, foundations, or corporations that contribute \$100 or more to the Society, in any year, are called Sustaining Members, and those that contribute \$1000 or more are Patrons. There have been no Patrons for a while, but there are several contributors of over \$500. In

order to recognize these contributors, the current by-laws were changed. Moved by Randy Hughes, second Ken Towe, that persons, institutions, foundations, or corporations that contribute \$500 or more to the Society, in any year, shall be called Sustaining Patrons, and those that contribute \$1000 or more shall be called Benefactors. Carried.

The need for liability insurance for directors and officers of the Society has been recognized, and initial research has taken place. A sample policy was reviewed that would cost \$1800 for \$500,000 coverage. Proposals from other companies will be requested. The need for independent advice from someone familiar with the insurance industry also is recognized. Moved by Gray Thompson, second Ken Towe, that up to \$500 be allocated for an independent consultant's fee, and up to \$3000 as the premium for liability insurance for directors and officers of the Society. Carried.

The Research Grants Committee recommended that grants, not to exceed \$2500 each, for Wayne E. Jepson, Peter E. Ryan, and Jeffrey J. Stevens be approved. In addition, the Committee proposed that students receiving CMS Research Grants be

allowed reimbursement up to \$500, from the grant, for expenses incurred while presenting a paper at the CMS conference on their thesis research. The third recommendation is that a grant of \$1000 be offered, for expenses, to the student who submits the best letter of justification for attending and the best abstract for a paper to be presented at the 1993 AIPEA Conference in Adelaide, Australia. Moved by Randy Hughes, second Bob Reynolds, Jr., that the recommendations of the Research Grants Committee be accepted. Carried.

The AIPEA Liason Committee recommended that a subscription to *Clays and Clay Minerals* be offered to the best two student abstracts submitted for the 1993 International Clay Conference. The Council preferred to conform to an offer made in 1989 to student winners at AIPEA conferences. Moved by Randy Hughes, second Pat Costanzo, that the winners of the Best Student Paper and Best Student Poster at the 1993 International Clay Conference, Adelaide, Australia, receive a complimentary, one-year subscription to *Clays and Clay Minerals*. Carried.

Don Scafe
CMS Secretary
Edmonton, Alberta

Regulatory issues, *continued from page 1*

tions, many of which impact the clay minerals industry either directly or indirectly. For instance, in 1987, the IARC (International Agency for Research on Cancer) determined that crystalline silica is a probable human carcinogen and as such is regulated under the Hazard Communication Standard. In response to this ruling, mineral producers have had to characterize and quantify (to levels $\leq 0.1\%$) the silica phases present in bulk materials and in dust.

Other minerals that are currently regulated, or are being considered for regulation, include erionite, sepiolite, attapulgite, kaolin, talc, mica, chrysotile, and diatomaceous earth. Questions concerning analytical procedures, detection limits, crystallinity, and nomenclature have been raised and must be addressed. Another concern that has

been voiced by the scientific community is the need for (1) carefully identifying, and (2) characterizing the morphology (particle size, particle shape, particle size distribution) of minerals used in epidemiological studies.

The goal of the Regulatory Issues Committee is to provide information to the scientific community in an effort to bring together the expertise of medical professionals, mineralogists, legal professionals, and regulators. Some of the short term goals of the committee are to provide information about what minerals are regulated, what the regulatory issues are, and how we, as scientists, might more actively participate in the regulatory process.

Jessica M. Elzea
Westmont, Illinois

The Clay Minerals Society Organization and Committee Personnel 1990-1991

EXECUTIVE COMMITTEE

Thomas J. Pinnavaia, President
Robert C. Reynolds, Jr., Vice President
Don Scafe, Secretary
Kenneth M. Towe, Treasurer
Kenneth M. Towe, Interim Editor
Brij L. Sawhney, Immediate Vice President
David R. Pevear, Vice President Elect

COUNCIL

S. P. Altaner '91
C. V. Clemency '91
P. M. Costanzo '91
G. R. Thompson '91
B. L. Allen '92
K. S. Brady '92
F. J. Longstaffe '92
J. L. Post '92
P. F. Low '93
D. M. Moore '93
P. H. Nadeau '93
R. M. Pollastro '93

STANDING COMMITTEES

Finance & Budget

B. L. Sawhney '93, Chair
J. W. Hosterman '91
A. R. Mermut '92
*K. M. Towe, Treasurer
*D. R. Pevear, Vice President Elect

Policy & Administration

R. L. Burtner '91, Chair
D. L. Bish '92
R. E. Hughes '93
*B. L. Sawhney, Imm. Past President, Chair Finance & Budget
*D. R. Pevear, Vice President Elect

Nominations

G. S. Austin '91, Chair
R. C. Reynolds, Jr. '91
S. P. Altaner '92
K. S. Brady '92
M. M. Mortland '93
M. G. Reed '93

Publications

J. R. Glasmann '93, Chair
L. M. Coyne '92
S. Guggenheim '91
*K. M. Towe, Treasurer and Editor
*R. M. Pollastro, Special Publications Ed.

Program Development

P. M. Costanzo '93, Chair
T. D. Thompson '91
W. H. Hudnall '92, Chair 1992 Meeting
C. T. Johnston '92
R. C. Jones '93
*J. R. Walker, Chair Continuing Education
*D. R. Pevear, Chair 1991 Meeting

AD HOC COMMITTEES

Program Advisory

R. W. Laham, Chair
R. F. Giese, Jr.
S. Y. Lee
J. L. Post
*D. R. Pevear
*J. R. Walker

Continuing Education

J. R. Walker, Chair
S. J. Chipera
M. H. Ebinger
D. G. Horton
D. R. Pevear
*R. M. Pollastro

Nomenclature

R. T. Martin, Chair
S. W. Bailey
D. S. Fanning
S. Guggenheim
N. Güven
H. Kodama
D. R. Pevear

Regulatory Issues

J. H. Elzea, Chair
L. M. Coyne
G. D. Guthrie
N. Güven
J. M. Hemzacek
W. J. Miles
*W. D. Johns, Source Clays Curator

Research Grants

D. D. Eberl, Chair
W. F. Bleam
J. B. Dixon
R. T. Wintsch
*K. M. Towe

Advisor-Society Office

R. M. Pollastro

Tellers Committee

R. M. Pollastro, Chair
H. M. May

Awards

W. D. Johns, Chair
M. B. McBride
M. G. Reed
D. G. Schulze
G. R. Thompson

Sustaining Contributors

J. F. Burst, Chair
H. H. Murray
M. G. Reed

Membership

J. M. Hemzacek, Chair
C. B. Roth
M. A. Velbel

Source Clay Minerals

J. L. Post, Chair
W. D. Johns
G. D. Guthrie
W. F. Moll

Liason Representatives

AIPEA—S. Guggenheim
SSSA—W. H. Hudnall
MSA—D. L. Bish
JCPDS—J. E. Post

Publicity/Public Relations

D. M. Moore, Chair
N. R. O'Brien
J. L. Wood

*Ex officio

Books available from the CMS

The Clay Minerals Society offers a number of publications at a significant discount to its members. Below is a list of available books and slide sets. To order, please send the required amount plus \$2.00 postage per book, in U.S. funds on a U.S. bank, to The Clay Minerals Society, P. O. Box 12210, Boulder, CO 80303. Call 303-444-6405 with questions.

Crystal Structures of Clay Minerals and Their X-ray Identification, Min. Soc., Monogr. 5, Brindley & Brown, editors, **\$70.00**

Chemistry of Clays and Clay Minerals, Min. Soc., Monogr. 6, Newman, editor, **\$87.50**

Both of the above, package price, **\$135.00**

Serpentines, Chlorites, and Other Non-Mica Phyllosilicates, MSA Review Series, Bailey, editor, **\$18.00**

Clay Minerals for Petroleum Geologists & Engineers, SEPM Short Course, Eslinger & Pevear, editors, **\$28.00**

X-Ray Diffraction and the Identification and Analysis of Clay Minerals, Moore & Reynolds, Jr., **\$22.00**

Modern Powder Diffraction, MSA Review Series, Bish and Post, editors, **\$20.00**

Mica Polytype Slide Set, Prepared by Audrey C. Rule for the CMS, **\$15.00**

Crystallography Slide Set, Symmetry Drawings of the Seventeen Plane Groups, Prepared by Audrey C. Rule for the CMS, **\$32.00**

Quantitative Mineral Analysis of Clays, CMS Workshop Lectures: Volume 1, Pevear & Mumpton, editors, **\$14.00**

Electron-Optical Methods in Clay Science, CMS Workshop Lectures: Volume 2, Mackinnon & Mumpton, editors, **\$18.00**

Feats of Clay, navy CMS polo shirt, sizes M, L, XL **\$15.00 postpaid**

CMS Membership Application

To join the CMS, please send a copy of the application below, along with the required dues in U. S. funds, drawn on a U.S. bank, to The Clay Minerals Society, P.O. Box 12210, Boulder, CO 80303. Subscribing members receive *Clays and Clay Minerals*, the journal of the CMS.

Name _____
(Ms., Mr., Dr.) First Initial Last

Organization _____

Mailing Address _____

Telephone _____ Fax number _____ Electronic mail number _____

Subscribing Member (Dues cover calendar year indicated, beginning January 1)—\$35.00 _____

Subscribing Student Member (Must be countersigned by student's advisor)—\$17.00 _____

Nonsubscribing Member—\$10.00 _____ Calendar year _____ Total enclosed \$ _____



The Clay Minerals Society
P.O. Box 12210
Boulder, Colorado 80303

Non-Profit
U.S. Postage
PAID
Permit No. 52
Evergreen, Colorado
80439