# Meetings

## Strata Control and Rock Mechanics

New techniques for combating the earth forces created by underground mining operations were discussed at the fourth international conference on strata control and rock mechanics, held in New York City, 4–8 May 1964.

Robert Merrill (U.S. Bureau of Mines) reported on an experimental program to determine the changes in the stress field surrounding a mine drift in a block caving operation when the undercut slot is created a fixed distance above the drift. The positioning of the stress meters was based on a two-dimensional photoelastic study of the problem. From the information obtained to date, it may be concluded that the general stress picture predicted by the photoelastic study is present around the mine drift in this block caving operation.

The theory of beams on elastic foundations has been used for a number of years to predict the convergence phenomena surrounding a longwall mining operation. With the rapid development of the mechanization of mining processes, a number of new problems have arisen which cannot be explained by this theory. Polish mining engineers gave the results of an extensive 10-year testing program that was designed to modify this theory. The roof subsidence phenomena in front of an advancing longwall face was found to be best approximated by a functional form $y = ae^{bx}$. For subsidence behind the longwall face the functions $w = w_1(1 - e^{-bd})$ and $w = [(d)/(a + bd)]$ gave the best approximation, where $a$, $b$, and $d$ refer to material and geometric parameters.

European developments in underground support were of great interest to the American mining engineers. Probably the most fascinating development is the use of powered longwall supports or self-advancing hydraulic supports. These supports have been developed to cope with the problems generated by rapidly advancing longwall faces. Traditionally a 300- to 400-yard longwall face was advanced at the rate of 27 feet per week. Modern mining equipment has made it feasible to advance faces at three to four times this rate provided proper control of the strata at the face can be obtained.

English experience indicates that an important aspect of self-advancing support design is its ability to resist lateral movement of the strata. This movement results in distortion of the support system and causes less resistance to convergence. A further important conclusion is that an increase in support load density up to ¾ to 1 ton per square foot of exposed roof reduces roof-to-floor convergence. Increase in load density beyond this amount brings about roof and floor fracture and a general deterioration of strata control conditions without materially changing roof-to-floor convergence.

Experiments with self-advancing supports in France and Belgium take account of the more difficult coal mining conditions on the continent. Here the majority of the coal fields have been repeatedly affected by tectonic movements, and consequently have extreme irregularities in the geometry of the deposits and in the physical characteristics of the strata. Support stability in dipping strata, the increment of support advance, the density of support, and the methods of mining appear to have a more pronounced effect on the utility of self-advancing hydraulic support in the continental coal fields.

Jacobi (Steinkohlenbergbauverein) reported the results of testing a large model of a longwall face. The face model was constructed on a scale of 1:10 and was 30 feet long, 6 feet high, and 1½ feet wide. Strengths were reproduced on the same scale and the load pressure was produced by a system of hydraulic jacks and corresponded to a mining depth of 2000 feet. The effect of mining on the model was to produce a shear fracture system which gave rise to wedge-shaped blocks of strata. The fractures extended over the seam in advance of the mining. The coal face moved inwards. On the basis of this model testing, self-advancing supports were designed to meet these anticipated operating conditions. Further testing is in progress.

A general mathematical formulation of the deformation of a macrogranular body under mining processes was presented by Jerzy Litwiniszyn. Litwiniszyn, using a set of heavy spheres in a gravity field as a model, derived a fundamental solution for the probability that a given amount of macrogranular material would move under mining processes from position $(x, z)$ to $(x_0, z_0)$ where $z > z_0$. Under the system of postulates that we have a unique operator $F$ and that $F$ is linear and nonnegative, Litwiniszyn showed that the movement of macrogranular material can be defined by the Chapman-Kolmogorov equation. This is the fundamental equation of the theory of stochastic processes and a media whose displacement is described by this equation is defined as a "stochastic media." Evaluating the parameters of a "stochastic media" requires subtle experimentation and therefore the degree of correspondence between the mathematical formulation of the problem and nature needs further proof and remains questionable at this time.

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## Atherosclerosis

Supplying data for an atlas on atherosclerosis in various animal species was the purpose of the conference on comparative atherosclerosis (spontaneous and experimental) which took place in Beverly Hills, California, 30–31 January 1964.

There were discussions of fish and reptiles (Vastesaeger), cetacea (Roberts), wild animals (Fiennes), pigeons (Prichard, Lofland), turkeys (Middleton, Gresham), fowl (Siller, Pick), rats (Wilgram, Thomas, Priest), rabbits (Haust, Constantinides, Pollak), minipigs (Zugibe), swine (Luginbuhl, Getty, Moreland), canines (Luginbuhl, Geer, Straus), and subhuman primates (Clarkson, Taylor). Gonzales reported on the histochemistry of com-

parative atherosclerosis. However, the conference did lack papers on the many other species, comparative histology, and various experimental approaches.

In analyzing the results of the meeting, three summaries must be noted: the "comparison of spontaneous animal and spontaneous human lesions" (Wissler), the "comparison of experimental animal and spontaneous human artherosclerosis" (McGill), and the "charge for the future" (McMillan).

In discussions on terminology it was noted that a lesion should not be labeled "early" because of its small size or its morphologic appearance. Conversely, a lesion should not be called "advanced" because of its character. There is much doubt about time relationships. The terms "spontaneous" and "experimental" may be used only if one is aware that they are but convenient substitutes for the correct designations of alterations, such as "unintentional" and "intentional." Many of the defects described, whether as chance findings or as experimental, do not warrant the designation of "atherosclerosis." Thus, it may be advisable to change the name of the atlas from "Comparative Atherosclerosis; Spontaneous and Experimental" to "Comparative Arteriopathies; Unintentional and Intentional."

The meeting was sponsored by the Council on Arteriosclerosis of the American Heart Association and by the Los Angeles County Heart Association. It was supported by the National Heart Institute of the National Institutes of Health. Proceedings of the conference will be published in the near future and will include coverage of 26 formal lectures and seven discussion periods.

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## Surface Contamination

Broad areas of interest related to redispersible and evaporable contaminants, including radioactive, biological, chemical, and abrasive contaminants were covered at the first international symposium on surface contamination, held in Gatlinburg, Tennessee, 8–12 June 1964. Coverage was confined to contamination of limited areas—for example, rooms or other semi-isolated environments.

There were about 170 registrants; about 20 foreign participants attended and were primarily from the United Kingdom and France. Professionally the participants represented several fields, including engineering, health physics, and chemistry. The sessions on fundamentals dealt with aerosol physics, surfaces, adhesion-redispersion, and transport and deposition. The session on surfaces was concerned primarily with adsorption at gas-solid interfaces. S. Ross (R.P.I.) described the adsorption of neopentane gas by solid adsorbents carrying thin films of nonvolatile oils. The volume of adsorbed gas per unit volume of liquid film increased as film thickness decreased. J. F. Pudvin (Bell Labs) reported on a modified condensation method and a contact angle measurement method for detecting surface contamination by hydrophobic films. The wetting of clean metal surfaces required the presence of an oxide film; gold surfaces which possessed no such film were hydrophobic. Measurements of the evaporation of thin oil films from contaminated surfaces have been made by J. L. Anderson (Space Research, Inc.). The rate of evaporation was determined by labeling the film material with $C^{14}$ and placing a counter window above the surface. Films evaporated more rapidly from dirty surfaces than clean surfaces.

G. B. Morgan (University of Florida) reported on the adsorption of radioisotopes on materials commonly used in the laboratory handling of solutions. Neoprene in particular showed high adsorptivity for all of the isotopes studied. Polyethylene and polypropylene were recommended as vessel materials.

In experiments on the adhesion and redispersion of particles at surfaces, Fish and co-workers (ORNL) sonically vibrated a surface over which glass beads, 16 microns in diameter, were dispersed. The equipment was of a type used previously by Deryagin, but his results could not be reproduced. K. Stewart and I. S. Jones, of the United Kingdom, and Fish and coworkers reported measurements of empirical resuspension factors. These measurements relate air concentrations of radioactivity (in microcuries per cubic meter) to surface activities (in microcuries per square meter) indoors. Friedlander and Pasceri described the use of a rotating disk for the diffusional sampling of particles in the range from 70 Å to 0.1 micron in diameter. The particle size distribution function for particles in room air showed a maximum at about 0.03 micron diameter, but the maximum changed with time.

The meeting was sponsored by the American Association for Contamination Control (AACC), the Health Physics Society, and Oak Ridge National Laboratory. Proceedings of the symposium will be published at a later date.

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## Forthcoming Events

### September

*8–10.* **Gas Chromatography**, 5th intern. symp., Brighton, England. (Organizing Office, 61 New Cavendish St., London, W.1, England)

*8–10.* **Nonsteroidal, Antiinflammatory Drugs**, intern. symp., Milan, Italy. (S. Garattini, Instituto di Richerche Farmacologische "Mario Negri," Via Eritrea 62, Milan)

*9–11.* **Applied Spectroscopy and Analytical Chemistry**, 11th symp., Ottawa, Ontario, Canada. (Chemical Inst. of Canada, 48 Rideau St., Ottawa 2)

*9–11.* Kinetics of **Pyrolytic Reactions**. Ottawa, Ontario, Canada. (K. J. Laidler, Dept. of Chemistry, Univ. of Ottawa, Ottawa 2)

*9–11.* European Organization for **Quality Control**, 8th conf., Baden-Baden, Germany. (Secretariat, Weena 700, Rotterdam 3, Netherlands)

*9–11.* International College of **Surgeons**. North American Federation, congr., Chicago, Ill. (Secretariat, 1516 Lake Shore Dr., Chicago 60610)

*9–12.* Society of **General Physiologists**, Woods Hole, Mass. (R. Milkman, Dept. of Zoology, Syracuse Univ., Syracuse, N.Y. 13210)

*9–12.* American **Political Science** Assoc., annual, Chicago, Ill. (The Association, 1726 Massachusetts Ave., NW, Washington, D.C. 20036)

*10–13.* **General Practice**, 6th intern. congr., Salzburg, Austria. (K. Engelmeier, Intern. College of Medical Practice, Lange Str. 21a, 474 Oelde, Germany)

*11–12.* **Diseases Common to Animals and Man**, annual West-Northcentral conference, Omaha, Nebr. (N. G. Miller, College of Medicine, Univ. of Nebraska, Omaha 5)

*11–12.* Scandinavian **Neurosurgical** Soc., 18th annual, Oslo, Norway. (K. Kristiansen, Neurosurgery Dept., Ulleval Sykehus, Oslo)

*11–14.* German Soc. of **Metallurgy and Mining**, general assembly, Hanover. (Gesellschaft Deutscher Metallhütten und Bergleute, Paul-Ernststr. 10, Clausthal-Zellerfeld, Germany)

*13–16.* **Electrical Insulation**, conf., New York, N.Y. (J. Lenkey, Anaconda Wire