Tales of Restless Nuclei

The molecules in a solid may be tumbling, rotating, or jumping. Or just quietly vibrating. What they do can affect the characteristics of bulk matter. This is not news . . . but the way we can relate specific motions to physical properties is.

Physicists at GM Research are using Nuclear Magnetic Resonance (NMR) to study molecular motion as temperature or composition is changed. This new branch of spectroscopy uses magnetic nuclei to probe many phenomena on a molecular scale. From it, for example, our NMR physicists are developing new knowledge of electron densities, molecular configurations, and the basic nature of that strange squishy state of matter—the plastic crystal.

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The motions of the nuclei tell the tale . . . and help General Motors find a better way.

General Motors Research Laboratories
Warren, Michigan

Effects of plasticizers on NMR spectrum of neoprene. The best plasticizer produces spectral line narrowing (due to increased molecular motion) at lowest temperature.
—From a recently published GMR paper.
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All definitions are worded to maximize rapid understanding. Pronunciation is clearly indicated. Anatomical terms are now organized so that you will find the full definition under the first word you check or the first term to which you are referred. The latest Nomina Anatomica term carries the main entry. Consistent NA terminology is a hallmark of this edition.

Hundreds of drug names have been added. Common drugs are entered under generic and proprietary names, with brief statements on structure, action and use in the generic listing. Entries in microbiology, hematology, and dermatology have been particularly reworked for accuracy and timeliness.

Several hundreds of new illustrations have been added; many existing ones have been redrawn. The addition of many electron photomicrographs is notable. Valuable tables list chemical elements, stains and staining methods, weights and measures, etc. A concise section on “how to use the dictionary” clearly explains entry arrangements, alphabetization, etymology, pronunciation, etc. A new, more durable paper has been utilized for this edition. The highly legible typeface has been retained, along with flexible binding and thumb-indexing.

Reed and Reed’s

MENTAL RETARDATION: A Family Study

Results of a monumental project reporting the mental status of more than 80,000 individuals

E. L. W. REED, Ph.D., and SHELDON C. REED, Ph.D. Both at Dight Institute for Human Genetics, University of Minnesota, Minneapolis, 719 pages, 7¼" x 10¼", with 290 figures. $16.50.
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Sherif, Sherif and Nebergall’s

ATTITUDE AND ATTITUDE CHANGE

The Social Judgment-Involvement Approach

A revealing study of vital socio-cultural issues

C. A. W. SHERIF, Ph.D., Research Associate, and MUZAFER SHERIF, Ph.D., Director and Research Professor, Institute of Group Relations; and ROGER E. NEBERGALL, Ph.D., Associate Professor, Department of Speech. All at the University of Oklahoma. 264 pages, 6½" x 9¾", illustrated. $8.25.
New—Published in March!

Any social scientist or researcher interested in a better understanding of attitudes and communication in today’s complex world will find this to be a fascinating book. The authors, well-known social psychologists, trace in detail the psychological processes of the individual in his acceptance or rejection of persons, groups, ideas, and events. This volume clearly sets forth and emphasizes the differentiation of attitudes into discernable classifications of acceptance, rejection, and the vital area of noncommitment. Studies conducted on desegregation, ethnic groups, reapportionment of state legislatures, farm policy, labor-management issues, Prohibition, prices of consumer goods, and the 1960 Presidential campaign provide rich psychological material on how groups and individuals come by the opinions they hold.

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1270

SCIENCE, VOL. 148
• Simultaneous parametric programming on both the right-hand side and the objective function may be used.
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While unknown only 20 years ago, linear programming techniques are now being used to cut costs in applications like aluminum alloy blending, gasoline blending, ice cream mixing, meat packing, electric arc furnace steel making, blast furnace burdening, production planning and a whole range of marketing problems.

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of legal redress were not utilized. And, while the actions of the demonstrators were shocking, even more shocking was the inept handling of the situation by the university administration.

Although many of the statements in the Langer report can be challenged, certain of those in part II are most misleading. To say that “it is only Berkeley that has placed the university as a whole in a position of leadership in American higher education” does a disservice to the other campuses of the University of California. The majority of students and faculty are located on other campuses, and the implication is that these are inferior to the Berkeley campus. Yet the entry requirements are as stringent at the other campuses as they are at Berkeley. The quality of scientific research is not inferior at these campuses. And certainly neither the teaching nor administration is inferior. The university's great position in higher education is attained in a large measure through its multi-campus concept. Each campus can point to something it offers academically that Berkeley does not. When put together, these make the University of California great. All are an integral part of a single educational system.

The actions of the administration, faculty, and students at the other campuses with respect to this controversy have been admirable and certainly acceptable by community standards. Neither students' rights, education, nor research have been compromised on these campuses. The “tradeoff between...student 'beantniks' and...academic distinction,” to use Langer's phrase, does not seem to be necessary at these campuses. Langer says that many Californians want a “respectable” rather than a great university. I do not know how many; I do know that the majority of Californians would agree on and strive to maintain what we have had in the past: a state university both great and respectable.

RONALD L. KATHREN
14744 Washington Avenue,
San Leandro, California 94578

The Basic Priorities

The articles on the Berkeley “student revolt” constituted excellent coverage of that unhappy situation. Although Science's articles touched on the basic problems involved, most of the editorials and news stories I've seen missed the mark by a wide margin.

The American public (including many scientists and educators) evinces an appalling lack of understanding of (i) the aims of education, (ii) the current pressures on students, and (iii) the nature of university administration. Education should encourage all possible freedom of thought, speech, and action that will contribute to the intellectual, moral, and physical growth of the learner. At Berkeley this dictum was forgotten or overlooked by all four groups involved—students, faculty, administrators, and regents. Owing to several factors—such as enormous enrollment increases and plant expansion, emphasis on faculty and graduate research, disregard for undergraduate teaching and guidance, inept administrative and board decisions—pressures on students blew the safety valve.

One solution to the dilemma is for all of us to recognize that each of the four campus-related groups has a specific or primary role. When these roles are reversed, or otherwise mixed up, serious dislocations occur. At the risk of oversimplifying, scholars of higher education have suggested the following basic priorities: Students are on campus to study; faculty members are there to teach; administrators should manage, negotiate, and facilitate; trustees and regents should establish the governing policies. The American public is composed of these four academically related groups, plus hundreds of other interested groups such as parents, alumni, donors, and legislators. Each person in each group can make a significant contribution to the alleviation of such pressures as caused the “revolt” at Berkeley. The first step should be in understanding the dimensions of the three numbered points above. The second step should be the acceptance of a position on these points. The third step should be a willingness to express this position by suggesting appropriate action. Really constructive criticism is in short supply!

This nation is great at least partly because of the education provided its citizens. It should be the responsibility of every citizen to take the steps necessary to insure that our schools, colleges, and universities will continue, if not improve, their important function of educating for freedom, democracy, and justice.

GERALD P. BURNS
Independent College Funds of America, Inc., 7004 Empire State Building,
New York, New York 10001
The chemist's lot eases further

Just before 5 on the afternoon of March 1, 1965 a strong movement toward the ballroom of the Penn-Sheraton was under way. These people must have done their homework by giving careful advance scrutiny to the program of the great Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. Within the hour, what we had done to thin-layer chromatography was animating conversation in lines waiting for tables in restaurants all over the Golden Triangle.

What we had done was to break the news that Eastman Chromagram Sheet had arrived to take the mess out of TLC by providing silica gel properly coated on a snippable base of polyethylene terephthalate. What we had failed to do was to provide a minimal-volume, fast equilibrating chamber in which to develop the stuff. This we are about to put on the market as Eastman Chromagram Developing Apparatus. To minimize delay, place order now, along with your order for the sheet. Upon delivery, proceed as follows:

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But biological scientists, who have a bit less need than high-energy physicists to cluster together in huge establishments with huge budgets and huge, highly specialized purchasing departments, are invited to speak right up on their own for their requirements in autoradiographic emulsions to Eastman Kodak Company, Special Applications, Rochester, N.Y. 14650. We even have a new pamphlet for them.

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### MICROHEMOCIRCULATION: Observable Variables and Their Biologic Control

*By Ello Maggio, Univ. of Illinois, Chicago, Ill.* New and original information and photomicrographic evidence concerning the variables of microhemocirculation. Discusses methods of studying the observable variables of microhemocirculation, anatomico-physiologic variables, biologic control of the physiologic variables, pathologic variables, and the part played by microhemocirculation in tissue response to injury. About 344 pp. (6¾ x 9¼), about 93 il. (23 in color), 6 tables. In Press

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B. G. Hemmendinger examines one of the digital circuit packages used in the central control unit of the new Electronic Switching System developed at Bell Laboratories. In these circuits, logic functions such as AND, OR, and AND-OR are built up with various combinations of a basic AND-NOT gate. About 27,000 transistors and 90,000 diodes are used in two duplicated central control units for one electronic central office.

**Stored-program control—flexibility for telephone switching systems**

Modern systems that switch your telephone calls use complex control equipment to operate the switches that make telephone connections. Such “common control” equipment is time-shared by many telephone lines. In electromechanical systems, common control apparatus consists of hardware—an array of hundreds of relays wired together to do the switching jobs of a particular telephone exchange.

By contrast, common control in the new Electronic Switching System (ESS) developed at Bell Laboratories is exercised by a multitude of general-purpose digital circuits whose actions are directed by “software”—programmed sequences of instructions stored in memory. The operation of ESS, including the specific telephone services provided, can thus be changed merely by changing the magnetization pattern of memory cards like that shown at left, with little or no hardware rearrangement or rewiring.

More specifically, ESS common control consists of an electronic data processor with a large memory. The memory contains instructions for processing all of the different kinds of calls handled by a central office. Guided by this stored program, the data processor receives and interprets dialed digits, sends signals to appropriate switches, and at the same time detects and diagnoses circuit malfunctions.

With this flexible common control, combining hardware and software, ESS can efficiently provide the various telephone services available today as well as any new services needed for the future.

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Memory card, 6½ by 10½ inches, used for storing the ESS control program. Useful information (64 forty-four-bit words) is carried by the card in the form of magnetized spots (“zero”) and unmagnetized spots (“one”). The random-access memory stores the control program and other data on 2048 such cards (131,072 words). The control instructions themselves require a minimum of 100,000 words.