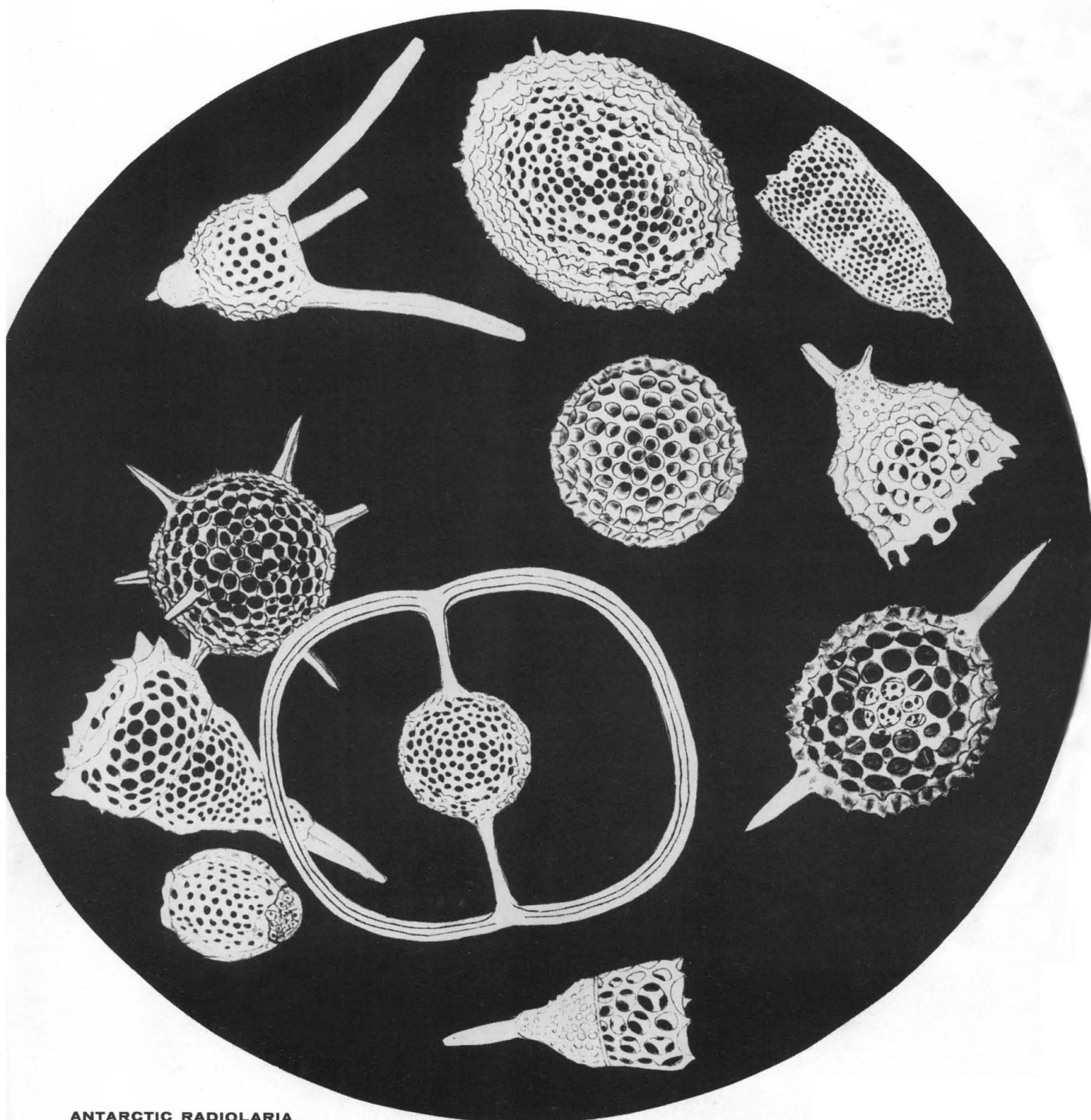


SCIENCE

24 November 1967

Vol. 158, No. 3804

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

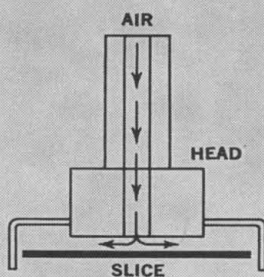


ANTARCTIC RADIOLARIA

How Western Electric gets uplift from a downdraft

Picking something up by blowing a stream of air down on it may seem rather roundabout. But if you want to pick that something up without touching it, it turns out to be a most successful way.

The something in question is a paper-thin, eggshell-fragile slice of silicon destined for transistors. To touch it is likely to contaminate it, and probably to break it. Tweezers are extremely risky. Even a vacuum



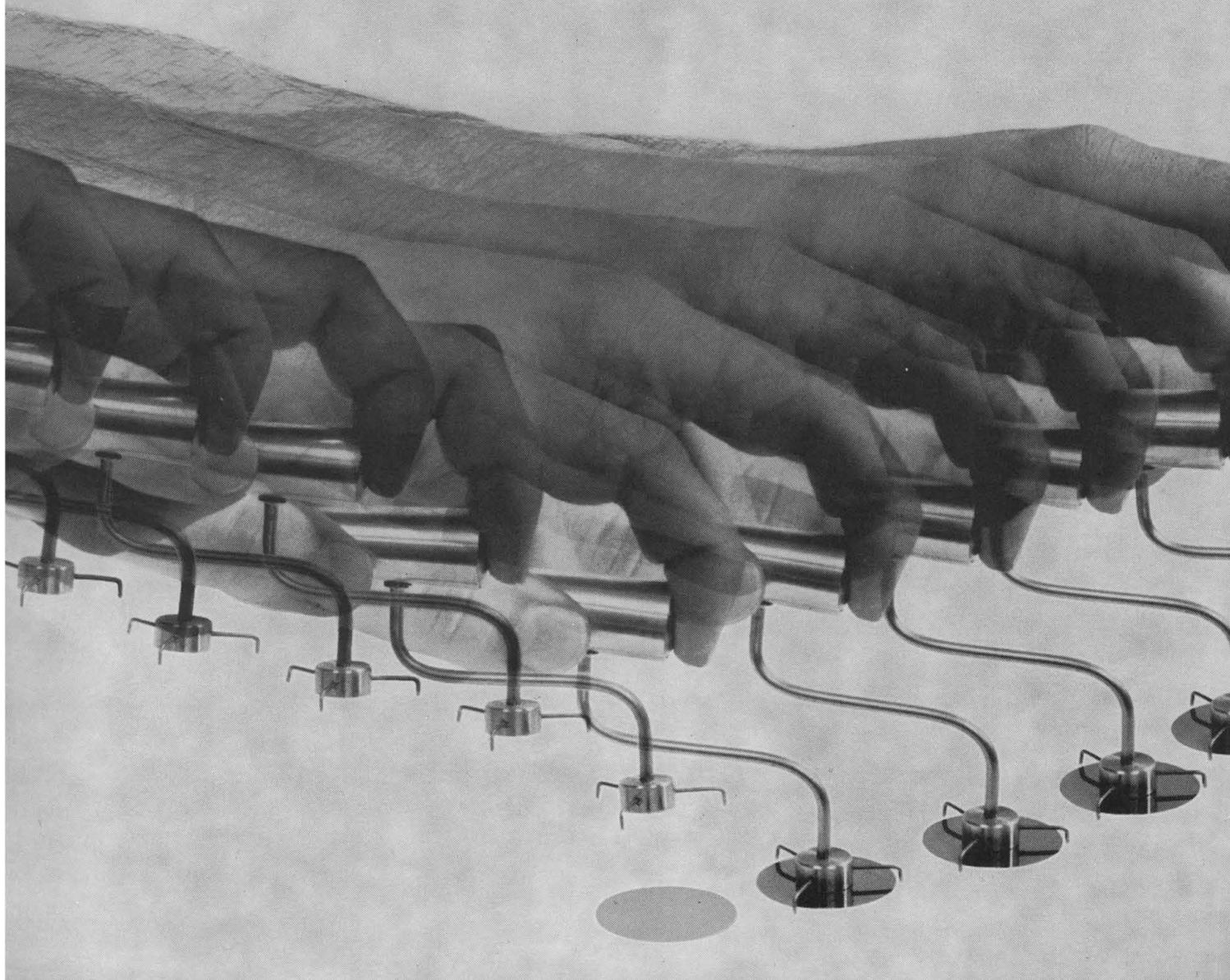
pick-up is dangerous. And so the engineers at Western Electric's Engineering Research Center invoked the Bernoulli principle and solved the problem. They developed a pickup device that directs a thin stream of air down onto the slice. The air flows out across the slice and since it is moving and the air below the slice is not, the pressure below is greater than the pressure above and the

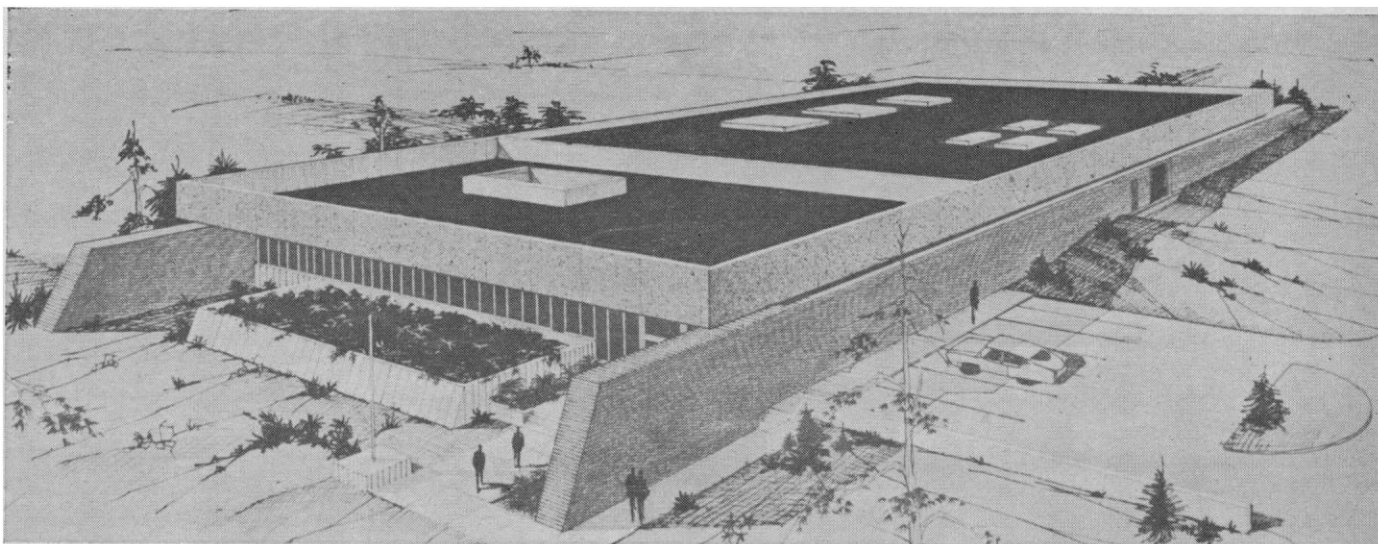
slice floats. And it doesn't touch the head because the air is, after all, blowing down. Wire guides keep the slice from slipping off.

So now the workers in our transistor plants can pick up silicon slices handily, without worrying about breaking or contaminating them. That our engineers reached back to a classical principle of physics to help them do it only shows the extent of the ingenuity Western Electric applies in its job of manufacturing communications equipment for the Bell System.



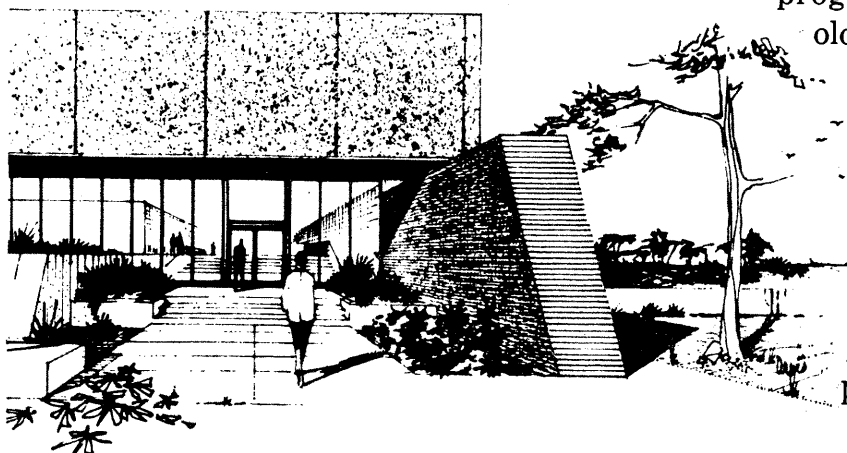
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24 November 1967

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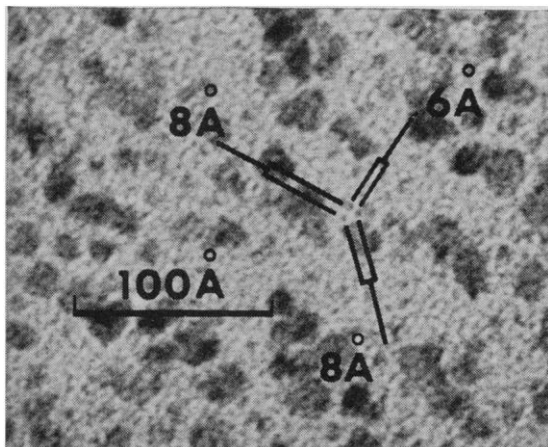
COVER

Various species of Radiolaria collected from antarctic sediments ranging in age from Recent to over 4 million years old. It has been suggested that the disappearance of some Radiolaria may have been influenced by reversals of the earth's magnetic field ($\times 270$). See page 1001. [Joyce Hays, Lamont Geological Observatory, Palisades, New York]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

The new Model HS-8: The most electron microscope for your money.

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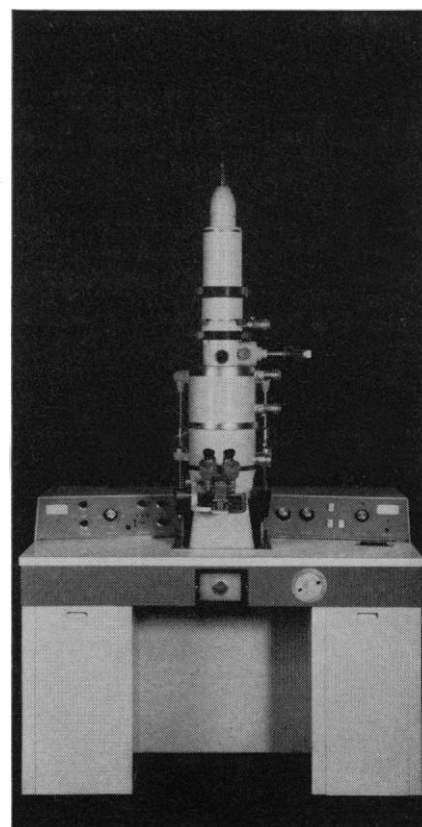
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AAAS ANNUAL MEETING

26-31 December 1967

New York City

The American Association for the Advancement of Science will hold its 1967 Annual Meeting in New York City, 26-31 December. The New York Hilton (1335 Avenue of the Americas) and the Americana (52nd to 53rd Streets and Seventh Avenue) will be coheadquarter hotels. The City Squire Motor Inn (51st & 52nd Streets) will be used for additional housing.

The AAAS Office, Exposition of Science and Industry, Science Theatre, Visible Directory of Registrants, and the AAAS Information Center will be located in the New York Hilton. Both the New York Hilton and Americana Hotels will have Registration Centers.

Meeting Registration

Print or type registration form.

Enclose check or money order payable to AAAS.

Your cancelled check is your receipt.

This card will be used as a registration form and for insertion in the Visible Directory. Legibility (if handwritten) is important.

Advance Registrations accepted only until 30 November 1967.

Program and badge will be mailed 1 December 1967.

Hotel Reservation

Print or type hotel reservation form.

Reservation requests **must** be sent to the AAAS Housing Bureau in New York City.

Definite arrival and departure hour and date must be indicated.

Room assignments will be made in order received.

Notify Housing Bureau promptly of any change in reservations.

Reservations received after 12 December cannot be assured.

Include Zip Code in your address.

Rates (per day)

Hotel	Single	Double	Twin	Suites	Parking
New York Hilton	\$12	\$16	\$19	\$46	\$4.75
Americana	12	16	19	40-up	4.75
City Squire Motor Inn	12	16	19	—	Free

Rooms are subject to a 5-percent city transient room tax. Hotel reservations will be held only until 6 p.m. unless later arrival time is indicated. There is a charge of \$5 for cots.

Tours

See reverse side.

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Registration

PLEASE PRINT OR TYPE

Date

- ☐ Enclosed is \$10 Registration Fee (Program and Convention Badge)
☐ Enclosed is \$15 Registration Fee (including spouse) (Program and Convention Badges)
☐ Enclosed is \$5 Student Registration Fee (16 years and older) (Program and Convention Badge)
☐ Enclosed is \$_____ for tours as indicated on reverse side.

Name of Spouse (if registering)

Present position

Institution or Company

Home Address

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CONVENTION ADDRESS

MIDDLE INITIAL

FIRST NAME

LAST NAME

MAKE HOTEL RESERVATION

MAIL TO: AAAS HOUSING BUREAU, 90 East 42nd Street, New York, New York 10017

Hotel Reservation

Date

Choice of Hotel: First _____ Second _____ Third _____

Room: ☐ Single ☐ Double ☐ Double, twin beds ☐ Suite

Number in party _____ sharing this room will be (list name and address of each person, including your own).

Date and hour of arrival _____ Date and hour of departure _____

Name

(Last)

(First)

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Address

AAAS TOUR REGISTRATION

Price of tickets is \$2.00 each

Number
of tickets

Rockefeller University

New York Botanical Garden

New York Zoological Park (Bronx Zoo)

Boyce Thompson Institute for Plant Research

Lamont Geological Observatory

Aquarium of the New York Zoological Society

Total number of tickets Total amount remitted for tours \$.....

Please indicate on reverse side total amount remitted for tours.

Tours at the AAAS Annual Meeting

The AAAS is pleased to offer tours to institutions of particular scientific interest for registrants at the Association's annual meeting. Personally conducted tours arranged by officials of each institution will afford the visitor a unique opportunity to see special exhibits, displays, behind-the-scenes operations, and scientific activities of various kinds which are not usually seen by the general public. Attendance at each site is necessarily limited in order to give the visitor full opportunity to see and hear about work in progress. At some locations refreshments will be served by the host institution. Details on the special attractions at each site will be published in later issues of *Science*.

Chartered buses will provide round-trip transportation from the New York Hilton Hotel. Afternoon tours will return to the New York Hilton no later than 6 p.m. **Ticket sales are limited to registrants.** A fee of \$2.00 per person is charged for each tour to cover transportation costs. Your ticket is your receipt and is required for transportation and admission. Tickets will be mailed with the *Program* and convention badge. Advance registration for tours will not be accepted after 30 November. Tickets for spaces unsold by 30 November will be on sale at the AAAS Tours desk in the main registration area at the New York Hilton, starting 26 December.

Please use the form to register for tours. Indicate the number of tickets you wish to order for each tour and enclose payment of \$2.00 for the tickets ordered.

Since attendance at each site is limited, early registration is recommended.

Rockefeller University, 66th and York Avenue (limited to 250), Wednesday afternoon, 27 December

New York Botanical Garden, Bronx Park (limited to 250), Thursday afternoon, 28 December

New York Zoological Park (Bronx Zoo), Bronx Park (limited to 150), Thursday afternoon, 28 December

Boyce Thompson Institute for Plant Research, Yonkers (limited to 200), Friday afternoon, 29 December

Lamont Geological Observatory, Palisades (limited to 150), Friday afternoon, 29 December

Aquarium of the New York Zoological Society, Seaside Park (limited to 300), Saturday morning, 30 December



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Take the new Eppendorf automatic micropipet in hand and be prepared to have your pipetting habits changed...radically.

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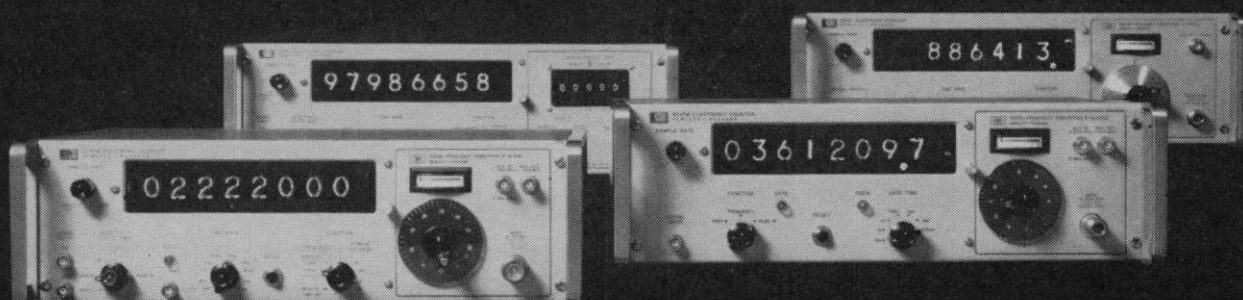
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5245L Counter: highly versatile instrument that measures frequency (0 to 50 MHz), period, multiple period average and frequency ratio. 8-digit readout and time base aging rate of <3 parts in 10^9 /day. Input impedance of 1 megohm 25 pF on all ranges. Accepts all HP counter plug-in accessories and has BCD output... NEW PRICE: \$2450.

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5246L Counter: a stripped-down version of the 5245L, with only 6-digit readout and time base aging rate of <2 parts in 10^7 /month. Extra-cost options include 7- or 8-digit readout, BCD output; uses all 5245L plug-ins... NEW PRICE: \$1750.

5247M Counter counts directly to 135 MHz but, while it's similar to the 5245M, measures frequency only. Range can be extended to 18 GHz by means of the converter plug-ins; accepts prescaler plug-ins, too. Optional BCD output... NEW PRICE: \$2800.

5244L Counter: this counter doesn't accept plug-ins but has the basic measurement versatility of the 5245L—frequency, period and ratio. Range is to 50 MHz with 7-digit readout and BCD output. Time base aging rate is $<\pm 2$ parts in 10^7 /month... NEW PRICE: \$1850.

For more information on the lowest-priced deluxe counters you can buy, call your local HP field engineer or write Hewlett-Packard, Palo Alto, California 94304; Europe: 54 Route des Acacias, Geneva.

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| 5256A Heterodyne Converter, 8 GHz to 18 GHz (and 1 to 200 MHz), \$1750. | 5258A Prescaler, 1 to 200 MHz, 1 mV, \$825. |
| 5255A Heterodyne Converter, 3 GHz to 12.4 GHz (and 1 to 200 MHz), \$1650. | 5261A Video Amplifier, 1 mV RMS, 10 Hz to 50 MHz, \$325. |
| 5251A Plug-in Converter, 20-100 MHz, \$300. | 5262A Time Interval Plug-in, \$250. |
| 5252A Prescaler, DC to 350 MHz, \$685. | 5264A Preset Unit for normalized measurements, \$650. |
| 5253B Plug-in Converter, 50 to 512 MHz, \$500. | 5265A Digital Voltmeter, 6-digit presentation of 10, 100 and 1000 V full scale with 5% overrange capability, \$575. |
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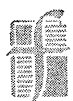
Materials, A SCIENTIFIC AMERICAN BOOK

Here is an authoritative up-to-date review of the new science and technology of materials, with special emphasis on the fundamental nature of materials and the properties shared by all of them in varying degrees. 1967, 212 pages, 79 illustrations, clothbound \$5.00, paperbound \$2.50

The Antecedents of Self-Esteem

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This book is a summary and analysis of the findings of the most intensive study of self-esteem yet made by a psychologist—findings that challenge major theories of personality development. 1967, 285 pages, \$6.00



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switched to circling those I *did* know without recourse to an unabridged dictionary. Time after time I came up with only articles, prepositions, relative pronouns, auxiliary verbs, and a few modifiers such as "only" and "many." But for substantives, it was the old parlor game of "animal, vegetable, or mineral?"

The prize example was a description of experiments which my etymological research revealed hinged on the twitching of a cat's whiskers. I'm a cat lover; I recognized "felis," but I had to look up a dozen words to learn what had been done to puss and how she reacted. Why can't the editors, recognizing the broad base of *Science*, take on the task of interjecting, perhaps in the introductory abstract, an aside such as (Cat to you—Ed.)? This is not a frivolous suggestion. Every discipline has its own vocabulary, not to say jargon. An interdisciplinary magazine has a responsibility to make these disciplines somewhat more intelligible to each other.

The situation becomes serious now that the annual membership fee is to be raised. Why should a nuclear physicist, physical chemist, or mathematician pay the difference to help a biological scientist get into print with a report in which he cannot understand one word out of four? (Immunologists may well feel the same way about solid-state physics!)

NEIL B. REYNOLDS

201 Victory Avenue,
Schenectady, New York 12307

Disenfranchised AAAS Membership

The section entitled "Election of AAAS officers," (29 Sept., p. 1594) gives the initial impression that there is an election in which the membership of the AAAS is somehow involved. Yet a reading of the described electoral procedure reveals that only council members may vote, or in fact, nominate candidates. Since council members are themselves not elected by the membership, it is clear that ordinary AAAS members do not participate in this election at all. Why, therefore, is this disenfranchised membership given such detail about the nominees?

It seems to me that either this material might be omitted from *Science*, or the members of the AAAS ought to be given some direct share in the election. How about permitting mem-

bers to nominate officers upon suitable petition signed by, let us say, 100 members? Or how about having several "at-large" council members elected directly by the membership?

ARTHUR W. GALSTON

Department of Biology,
Yale University,
New Haven, Connecticut 06520

Recorded Hearsay

Nelson's comments entitled "Privacy: how much need you tell a visiting federal investigator?" (29 Sept., p. 1539) moves me to relate my policy with regard to security investigators.

In 1941 an FBI agent (or was it a CSC agent?) asked me my evaluation of a student who was being considered for a research position in a federal military unit. I replied to his questions at some length, being rather flattered as a fledgling instructor that the government was seeking my advice! Incidentally, the student did get the position. In 1952, the same investigating agency sought me out to ask if I still agreed with the statements I had made over a decade before. I immediately asked what their record showed I had said in 1941. The agent explained that this was confidential information and that he was not at liberty to show it to me or to make any comments on it. Of course I told him that his inquiry was absurd. How could anyone comment on the veracity of a transcript of notes made by someone else a decade ago (who, at that time may or may not have recorded accurately my oral statements) without being given the opportunity to study the transcript.

Since that time when an FBI or CSC agent inquires my opinion or evaluation of a student or colleague, I explain that I will reply in writing to the questions he wishes to write out. If he agrees, I give him my reply and keep two carbon copies, one of which I generally send to the person in question. In this way I can be assured that the earlier incident will never happen to me again. Occasionally an agent will refuse to submit questions in this manner, saying that this defeats the purpose of the interview and the value of the results. Other agents comply with my requirements.

NELSON FUSON

Department of Physics,
Fisk University,
Nashville, Tennessee 37203

The hope of doing each other some good prompts these advertisements

Other fish to fry

We are selling out our PbS and PbSe infrared detectors. If neither "state-of-the-art" performance characteristics nor continued availability nor conformance to Kodak standards of predictability matters for the 1-5 μ application you have in mind, but cost does, and if you act while this page is still fresh from the press, you may be in luck. Action consists of sending for "Close-out Price List of Detectors" to Special Products Sales, Eastman Kodak Company, Rochester, N.Y. 14650. Therein a reader who has or can pick up a little grounding in infrared technology will find enough frank technical information to do better than merely reach into a grab bag. As these words were written, detectors were still available at prices from \$2.30 to \$110, f.o.b. Rochester, N.Y., minimum order \$25.

A successful, constantly growing business is constantly deciding in what directions to grow. Decisions represent judgments on where the particular set of talents that have been attracted into the fold can make their best contribution, as compared with the talents that other organizations have attracted. The men who could have kept us out front in development and manufacture of photoconductive detectors were needed in other work for which Kodak was uniquely well fitted. So the lead in the photoconductive art passed elsewhere. We pulled over, waved the new leaders past, and leave it to you to discover their names and addresses.

Meanwhile, note on the bargain counter: D* from 10⁸ to 8 $\times$ 10¹⁰, time constants from a millisecond to 2 μ sec, resistance per square in range of 0.2 to 2 megohms, sensitive areas from 0.02 $\times$ 2.0mm to 20 $\times$ 10mm, room temperature or to be cooled, some resistant to heat and high humidity and some resistant to permanent high vacuum, plug-in mounted or just with leads from the low-sodium glass or KODAK ITRAN 3 Optical Material substrate that passes infrared to 6 μ .

D* is expressed in units of cm/watt-sec^{1/2} by the equations $D^* = \frac{V(\Delta f)^{1/2}}{JNA^{1/2}} = \frac{(A\Delta f)^{1/2}}{[NEP]}$

where V = rms value of signal in volts

Δf = frequency bandwidth in cycles/sec.

J = rms value of radiant energy flux density in watts/cm²

N = rms noise in volts

A = sensitive area of detector in cm²

[NEP] = noise equivalent power, the rms value of minimum radiant energy flux in watts necessary to give signal-to-noise ratio of unity

The colors of nature

It frightens us to see how some scientific workers use color photography. We have too much stake in it to let them go unwarned of where they are misplacing their confidence. That we are reputable and trustworthy they know, and they surmise that we claim our various systems of color photography record, retain, and precisely reproduce all the colors of the real world. *We make no such claim, nor does any other reputable photographic manufacturer.*

How thoroughly our color films and services please vast numbers of people is indicated in part by our financial statements over the years. How sensitive we can make our products to color change explains the great growth of technical color photography, still and motion picture. Otherwise, beware. Just to express what color a thing is—let alone reproducing the color—can be tough once past the level of precision of "oh, a sort of reddish tan."

Absolute methods do exist. They are highly objective, call for a spectrophotometer and some computer hardware and software, and are more feasible for paint manufacturers than for field biologists. Actually, words like "reddish tan" serve quite well, given a large enough lexicon of verbal designators coupled tightly to a set of reference samples.

Of several such systems available, one particularly favored

in current literature is a book of color samples and names issued by Robert Ridgway of the Smithsonian Institution in 1912. Lucky and well funded is the scientist who can acquire a reasonably unravaged copy of Ridgway from a rare-book dealer. Yet many a current author is limiting his communication to readers and a posterity in possession of Ridgway.

Thanks to Marcel Locquin of the Muséum National d'Histoire Naturelle in Paris, it turns out we can help after all. Under the title "Chromotaxia," he publishes a book which comes with a series of KODAK Color Compensating Filters. We make these for professional photographers' use in creating (not recording!) the color balance that artistic intuition demands in a print. For scientists, Locquin has assembled a vocabulary and a technique for using combinations of two or three of these filters to match and designate any of a broad gamut of natural colors—or *Ridgway colors*—with the most elegant precision and no additional instruments. The filters are easy and inexpensive for frequent users to replace annually as recommended, because the photographic artists are helping with the economics. Therein lies the strength of "Chromotaxia."

M. Locquin informs us that his price for "Chromotaxia" is \$40. His address is 14, Rue de Buffon, Paris (5^{me}), France. Directions are in French and color names in French, English, German, and Latin. A certain official weight has been given the system. Locquin has deposited his master set of KODAK Filters with the Bibliothèque Nationale and is relying on our spectrophotometric quality controls for uniformity. That kind of confidence frightens us less. One other point: "Tous excitants (tabac, alcool, médicaments, musique violente, odeurs fortes) doivent être écartés. Ils déforment la courbe de réponse de l'œil."



Marcel Locquin et les filtres

Fresh air in the vault

Common laboratory management problem: how to keep a high-powered young newcomer interested and useful during the critical time that her usefulness is limited by insufficient familiarity with what has been done in the lab over the years before she came.

Another common laboratory management problem: needless repetition of work already done and paid for, simply because the results are too hard to dig out of the vault where the old notebooks have been crammed to save on costly floor space.

One stone for killing both birds: see how she takes to the responsibility for getting the notebooks organized on microfilm.

One part of the undertaking remains tough after our Recordak microfilming and retrieval equipment has made everything else easy. To look at each piece of recorded work and quickly but perceptively select for it a set of, say, four descriptor terms provides plenty of challenge for a possessor of a campus-fresh, up-to-date orientation.

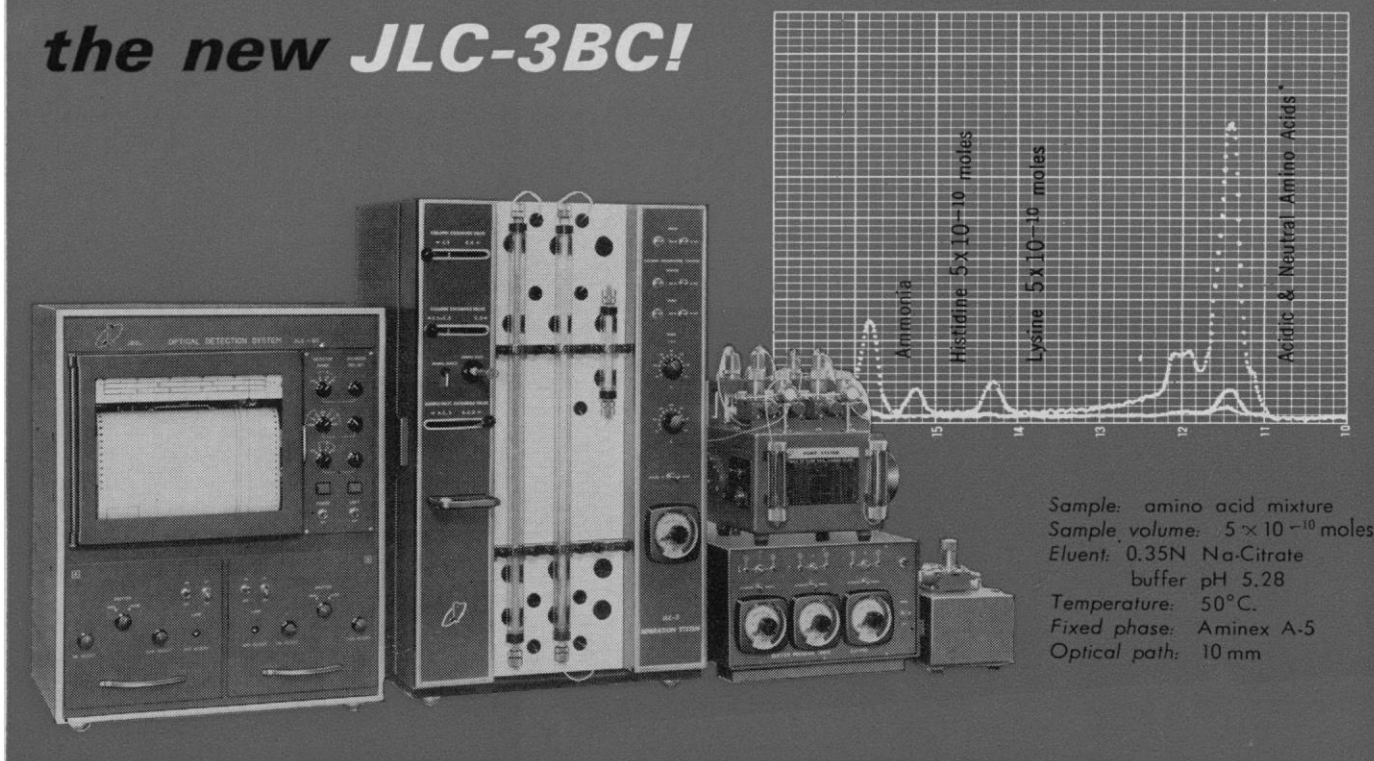
An admirably simple system based on four descriptors has been worked out by the research center of a tobacco company (*Laboratory Management*, June '67, p. 18). They microfilm 15 or more 100-page notebooks in an 8-hour day and bring anything back by the touch of a button.

When you are ready for the details of equipment and service, write Eastman Kodak Company, Business Systems Division, Rochester, N.Y. 14650.

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Soviet Population Theory

A genuine difference of opinion seems to have opened among Russian economists and demographers over the Marxist doctrine that overpopulation can exist only under capitalism and that in a Communist world of constantly expanding production, economic and cultural advances automatically bring population into balance with resources. Primary emphasis on economic and social progress and planning has not been abandoned, but that there is need for concurrent population planning is the message of a number of recent articles in *Literaturnaya Gazeta* and other Russian publications that Robert Cook analyzes in the October issue of the *Population Bulletin*, published by the Population Reference Bureau.*

Some of these articles defend the traditional Marxist position, but others, by a number of authors, recognize inadequacies of the traditional position. Some authors ridicule projections of a possible world population of 3, 4, or even 13 million million people that have been advanced as possibilities if we use solar energy more effectively for photosynthesis, cultivate the land more intensively, and grow plants in the ocean on the scale possible on land. They criticize these estimates as exercises in arithmetic that make no economic or social sense, and contend that we should plan for "a comfortable way of life" for the world's population, that we must "create conditions worthy of humanity," and that the goal should be the "maximum per capita happiness of the people" rather than the maximum number of people.

Several of the authors deny that Russia has a population problem but recognize that many other countries do. And, indeed, population has been growing more slowly in Russia than in most of the less developed nations. Nevertheless, the comparison with other countries makes it probable that Russia will be accused, as the United States has been, of advocating population control measures for the less developed parts of the world but of failing to practice at home what it preaches to others. Russia has, however, already cut some of the ground from under such accusations by several actions that will reduce the Russian birth rate: relegalizing abortion, substantially reducing family allowances, and announcing that the government will no longer support illegitimate children.

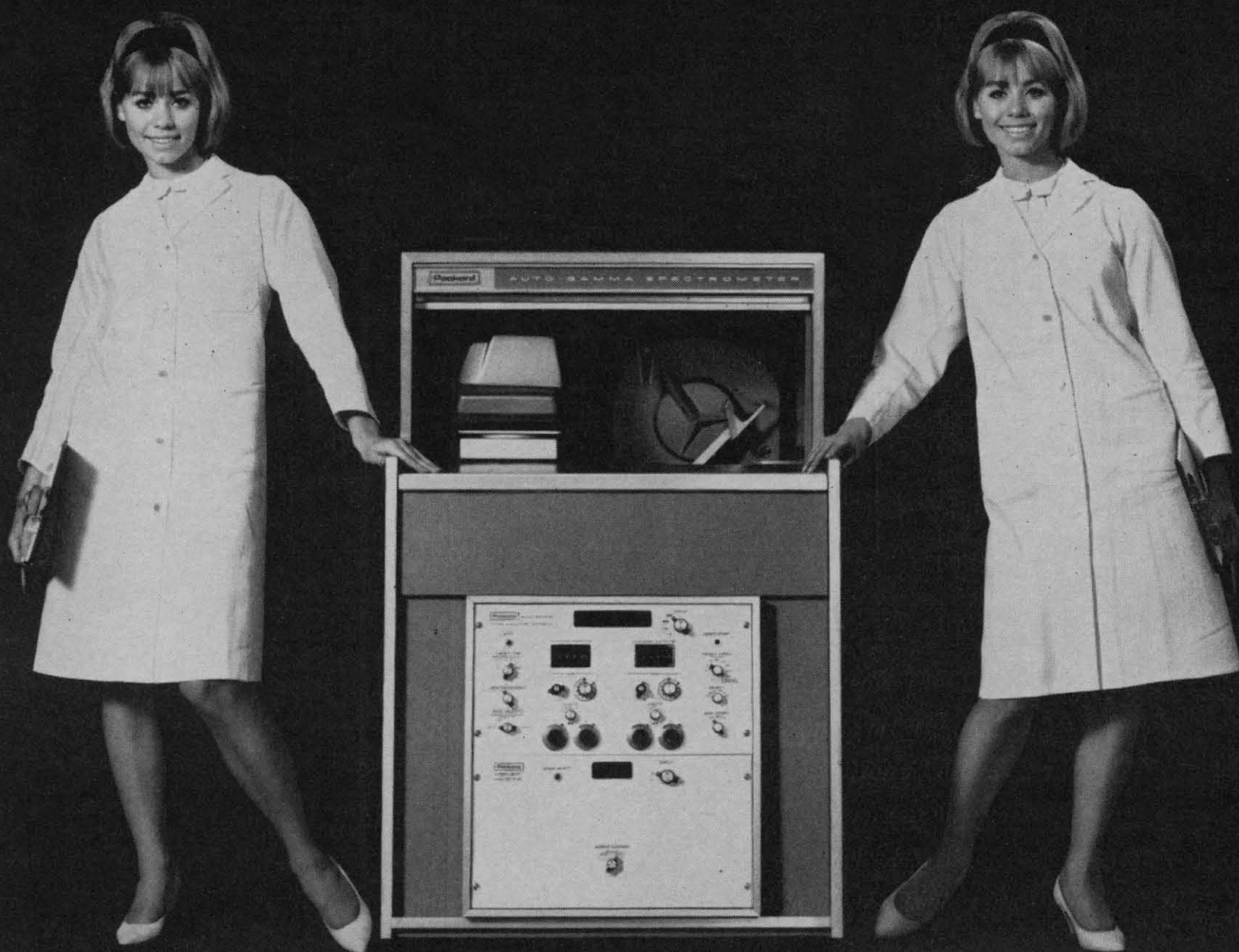
The United Nations Population Commission met in Geneva from 30 October through 10 November. Although observers noted no further change in Soviet attitudes, it is nevertheless noteworthy that three times in 1966 the U.S.S.R. joined with the U.S. and other countries in voting affirmatively on United Nations actions in the population field.

Agreement within the U.N. not only strengthens current U.N. population programs but also increases a bit the likelihood that we may be able to move on to a problem that most of us have been dodging. Recently in *Science* (10 November) Kingsley Davis pointed out that the increasingly widespread endorsement of contraception throughout the world, with justification on the grounds that married couples should be free to decide for themselves how many children they will have, is completely insufficient for reducing the rate of population growth and constitutes only the barest beginning of a social policy on population. The current Russian debate will be most constructive if it helps the U.N., and individual countries, advance to the stage of meaningful analysis of population planning and adoption of measures to curb the runaway growth of the world's population.—DAEL WOLFLE

* Population Reference Bureau, 1755 Massachusetts Avenue, NW, Washington, D.C.

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