25 September 1981 • Vol. 213 • No. 4515 $2.00

SCIENCE

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Special Offer: As an introductory offer, we'll give you $200 off the price of a new Microfuge 11 or 12 with trade-in of any Beckman, Eppendorf, or Fisher microcentrifuge, regardless of its condition. Offer limited to one trade-in per new Microfuge 11/12, valid in the U.S. and Canada only; expires June 30, 1981.

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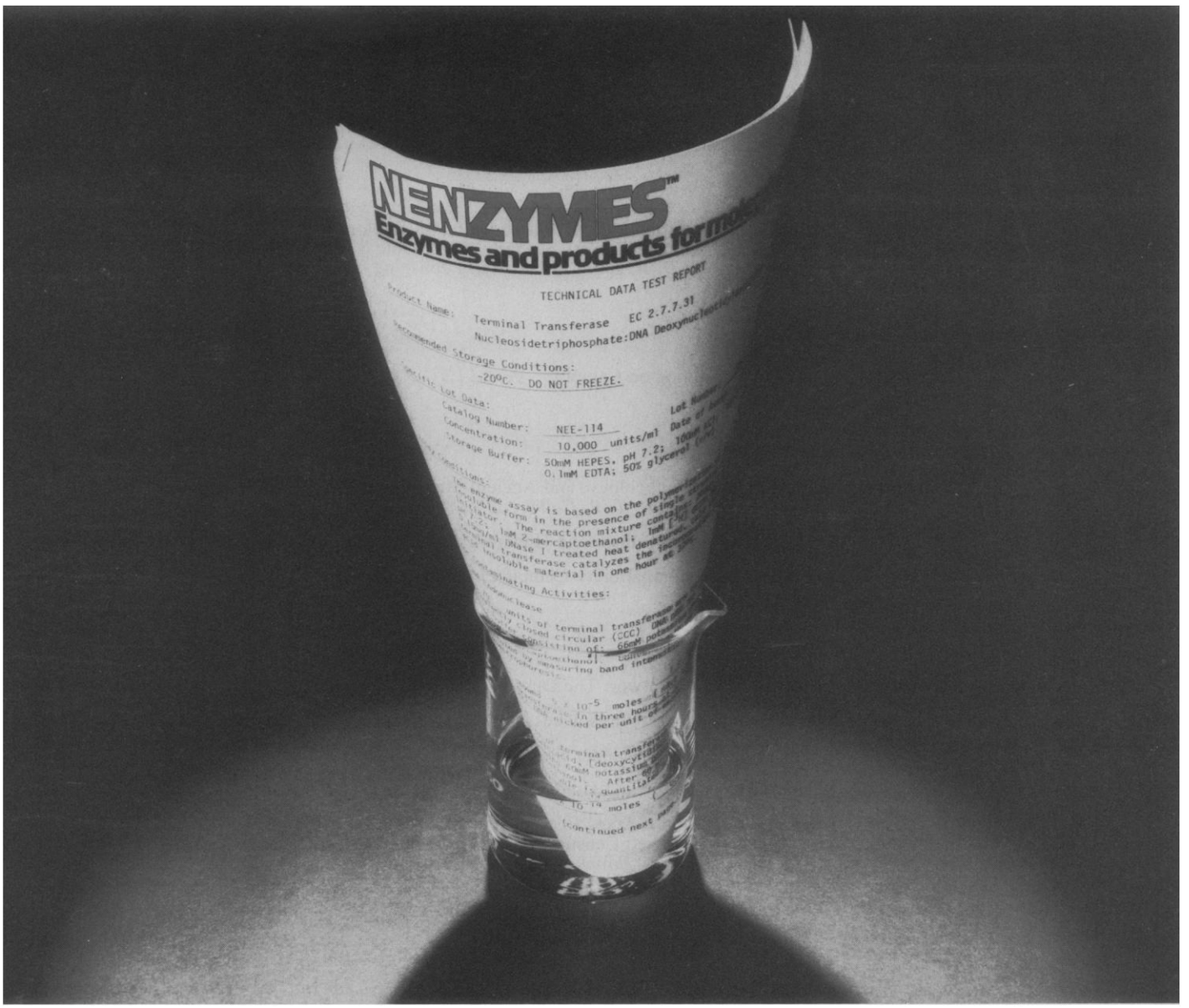

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ISSN 0036-8075

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COVER

Nucleotide sequence of the gene for an aminoacyl-tRNA synthetase. The polypeptide sequence is translated from and shown next to the DNA sequence. Regions of the polypeptide checked by mass spectrometric analyses are indicated by darker shading. The top section (amino terminal) is shown tightly organized into a core which is resistant to proteases, while the bottom half is a looser structure. See page 1497. [Computer-assisted, gene-polypeptide representation by Alan Wechsler, Benson Margulies, Francea Linden, Scott D. Putney, and Paul Schimmel (Massachusetts Institute of Technology Computer Center and Department of Biolo-

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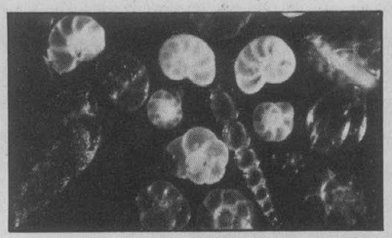

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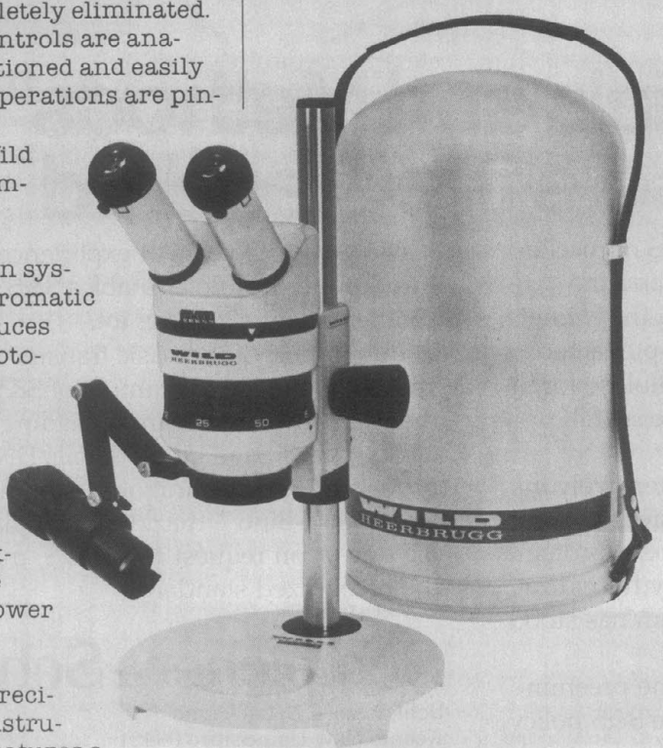

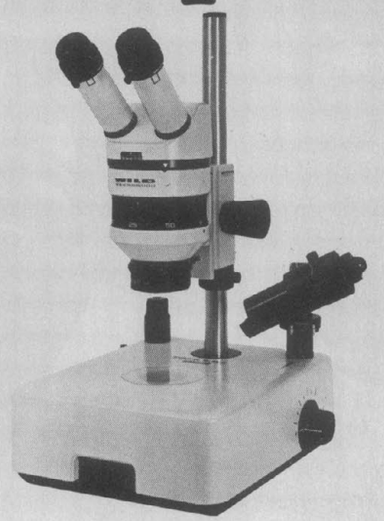

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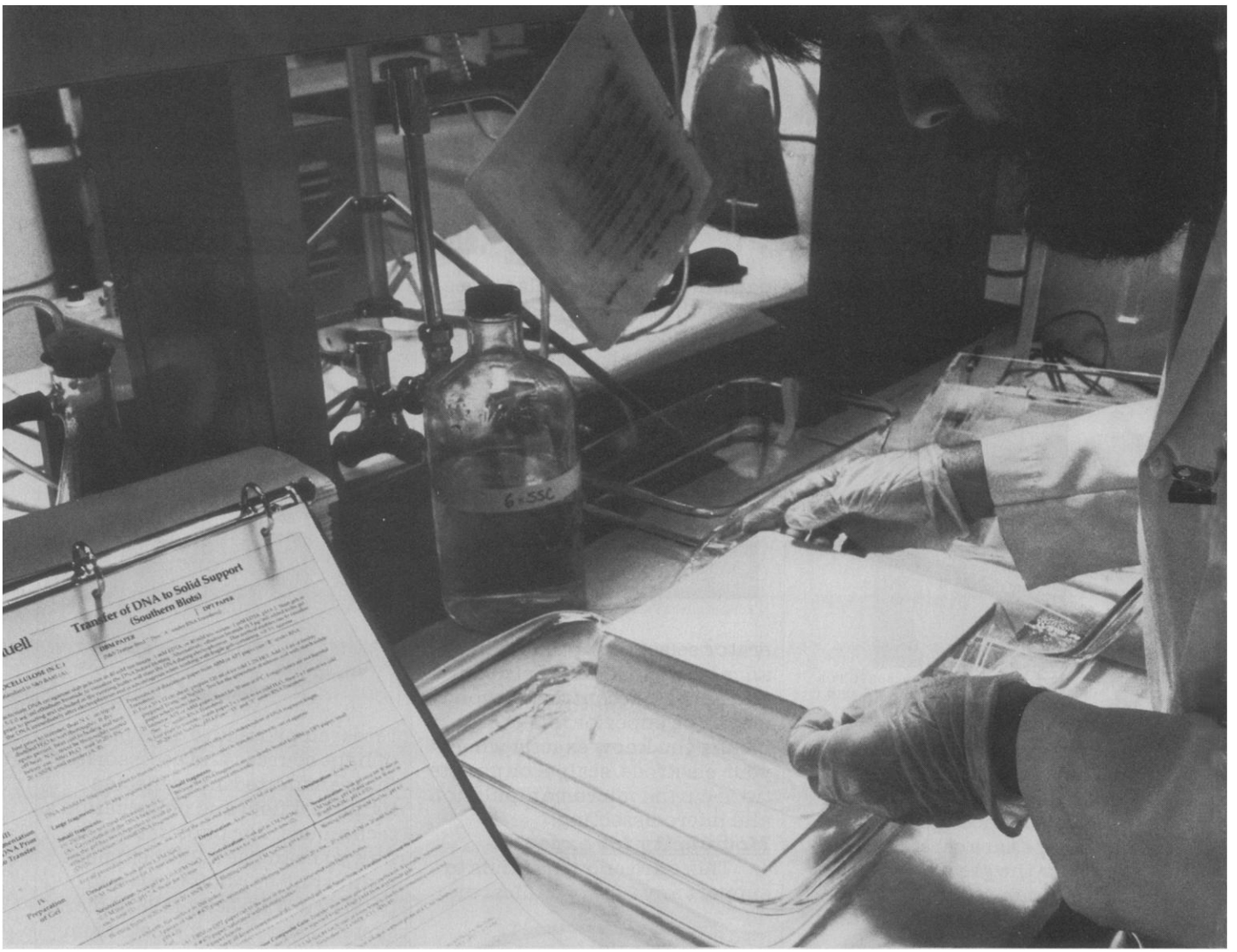

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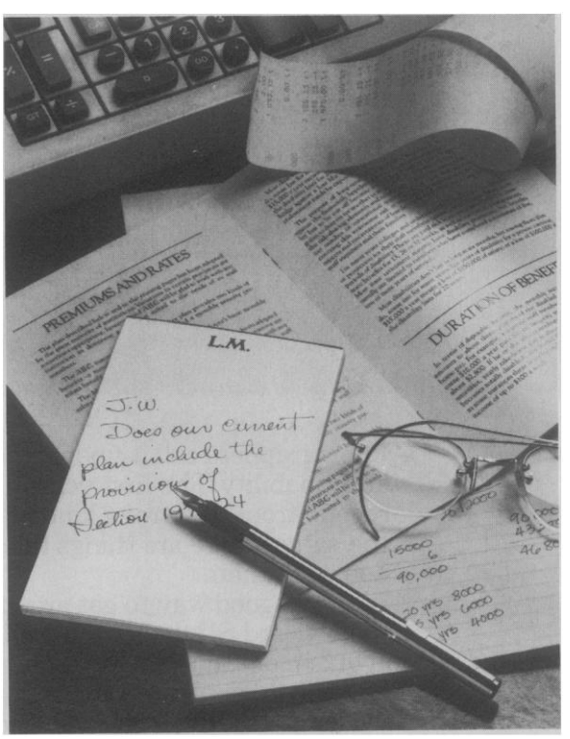

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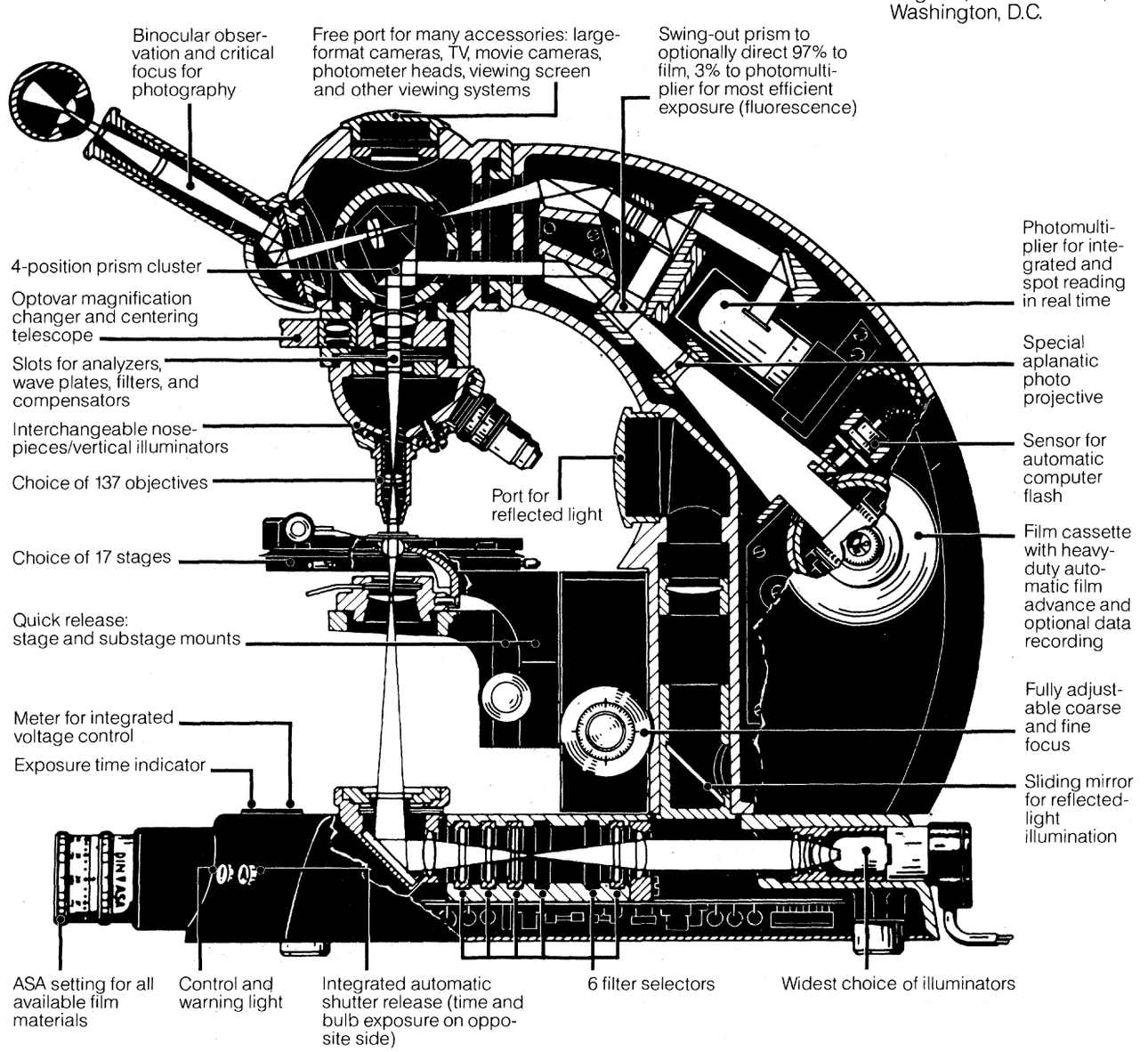

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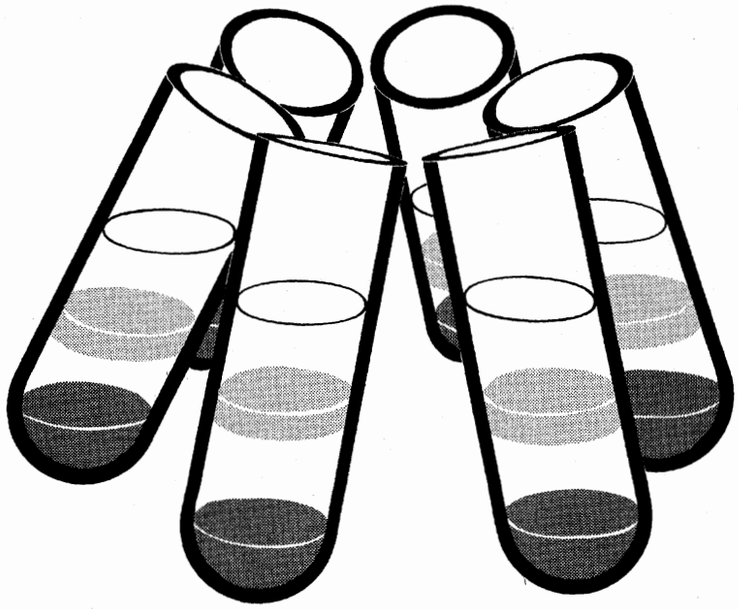

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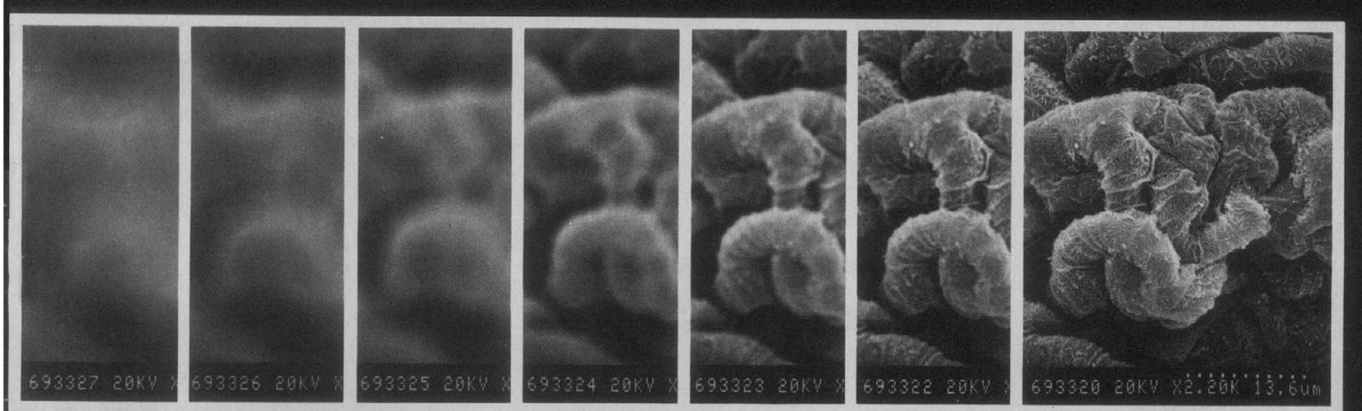

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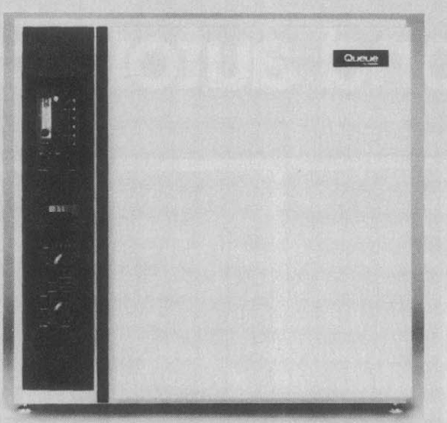

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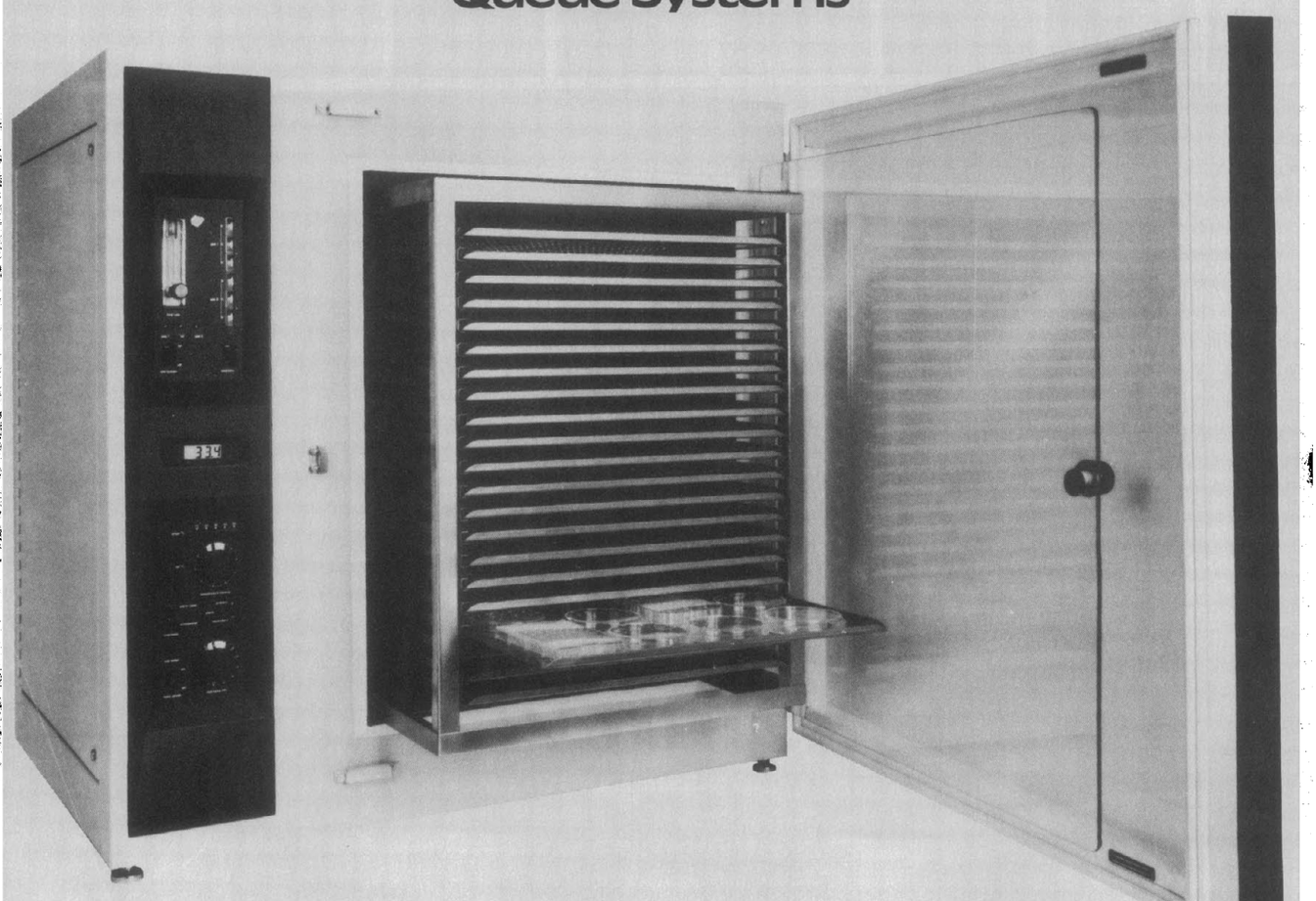

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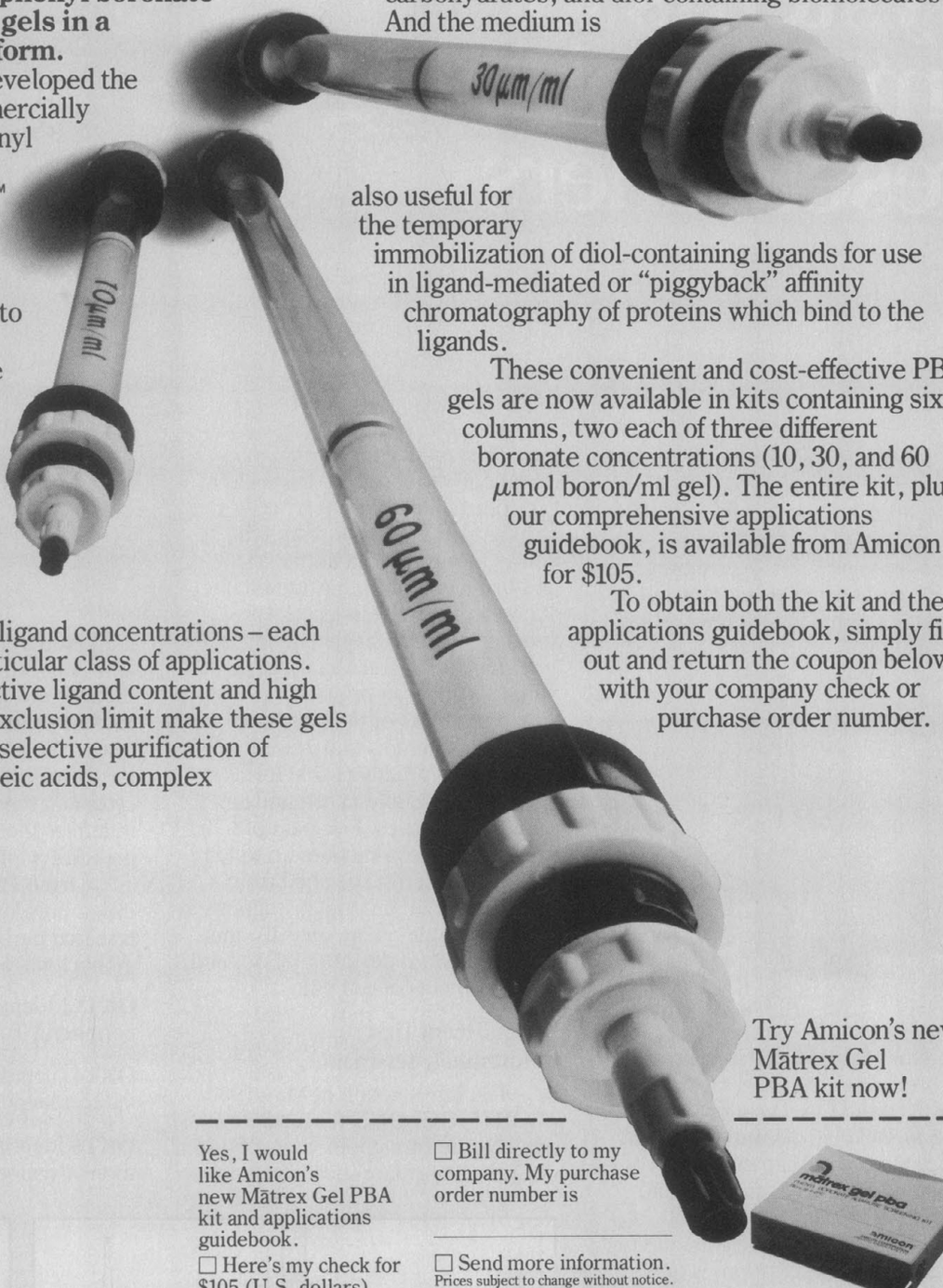

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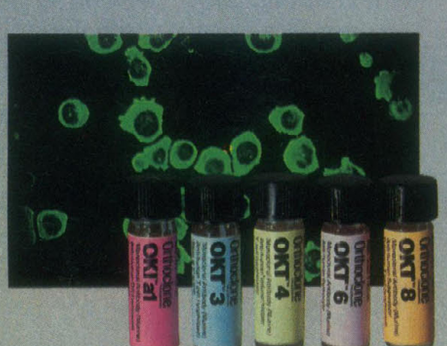

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The Ortho Systems 30/50 flow cytometry instruments can now be ordered with the Model 2150 Computer System to provide unparalleled analytical power. Model 2150 can control multiparameter cell sorting functions while simultaneously acquiring data in the list and histogram modes. Additionally, it performs totally independent functions such as single and multidimensional histogram analysis, etc. while sorting is in progress.

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A significant first in immunoassessment

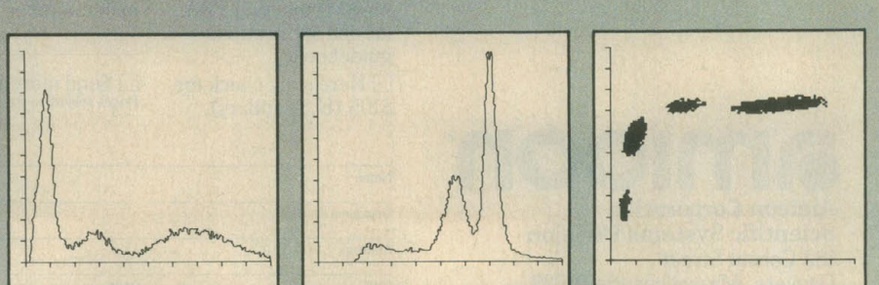
The introduction in May, 1980 of ORTHOCLONE reagents developed by the Immunobiology Division of Ortho Pharmaceutical Corporation marked the first commercially available panel (for research purposes only) of murine monoclonal antibodies reactive with *human* T lymphocytes. The panel is fully characterized for the identification of T lymphocytes and their subsets. Additionally, it defines the ratio of helper to suppressor lymphocytes.

Ortho Pharmaceutical Corporation presently has available, for research purposes only, the following monoclonal antibodies:

OKT*3 Identification of human peripheral T lymphocytes

OKT4 Identification of the human inducer/helper T lymphocyte subclass

OKT6 Identification of human "common" thymocytes

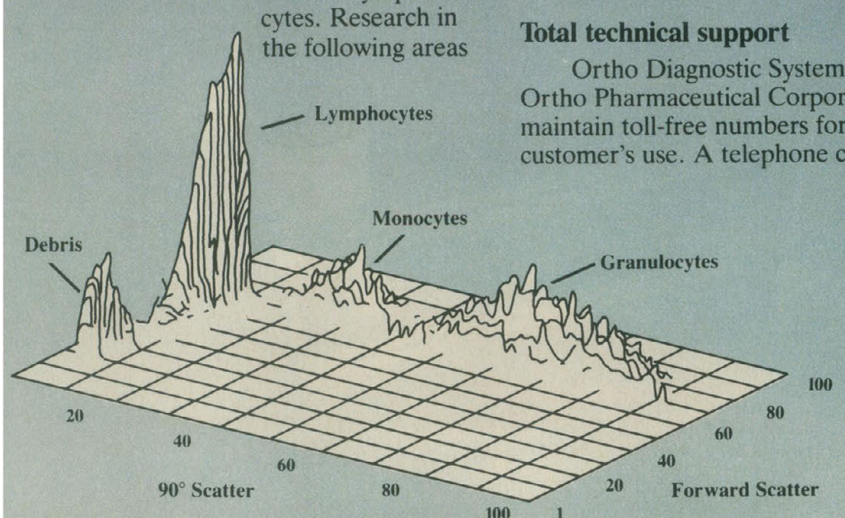


OKT8 Identification of the human suppressor/cytotoxic T lymphocyte subclass

OKM*1 Identification of human monocytes

New avenues of research become practical

Utilizing this panel it will be possible—for the first time—to recognize distinct antigenic determinants on the surface of human T lymphocytes. Research in the following areas may be facilitated: immunodeficiency states, autoimmune diseases, malignancies, assessment of immunoregulatory status in certain disease states (rheumatoid arthritis for example).



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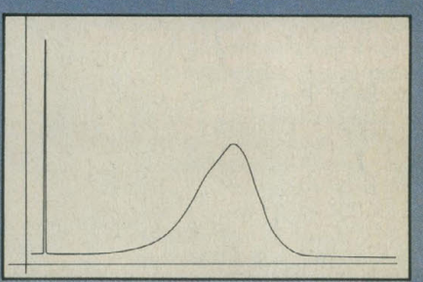

Ortho—total capability

With advanced instrumentation, a continuing program in immunobiology and significant technical expertise, Ortho Diagnostic Systems can provide invaluable assistance in your research efforts. Contact Ortho Diagnostic Systems for information regarding the integration of instrumentation and reagents for your research program. Contact Ortho Pharmaceutical Corporation for information regarding the Orthoclone reagents.

Protocols

Protocols Number 31 "Detection and Enumeration of Peripheral Human T Lymphocyte Subsets Utilizing Monoclonal Antibodies" is now available. Contact Ortho Diagnostic Systems, Research Instruments Division, 410 University Avenue, Westwood, MA 02090 (617) 329-6100, for copies.

Note: These reagents are intended for research purposes only and are not to be used in diagnostic procedures.

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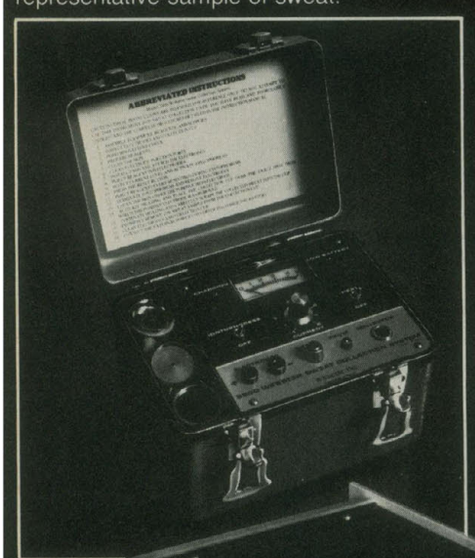

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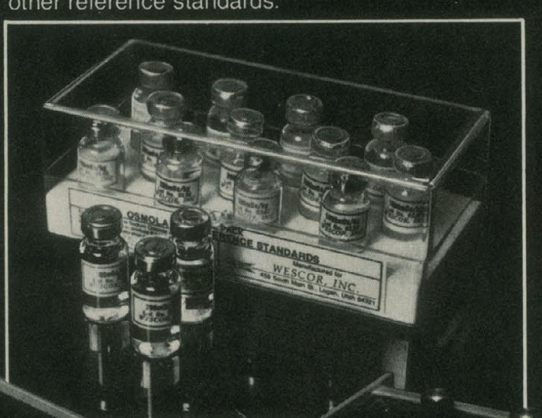

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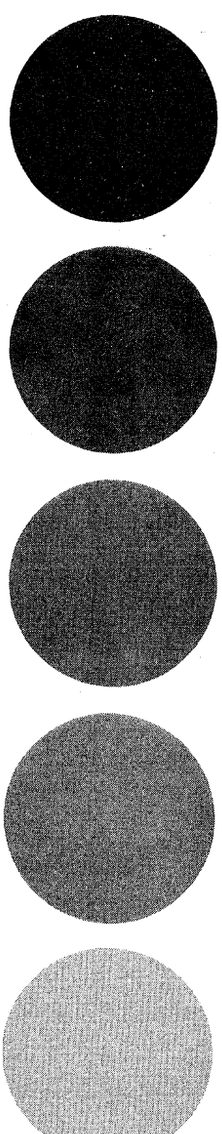

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PHILLIPS 66

25 September 1981, Volume 213, Number 4515 **SCIENCE**

Industrial Recruiting on Campus

Engineers and some scientists are in short supply, and their recruitment by industry has been intense. This has led to large differentials in the salaries offered to graduating seniors in the various disciplines and to departures from campus of graduate students and professors. The demand is likely to continue throughout this decade. The current shortage is especially acute for chemical, electrical, mechanical, and petroleum engineers. It also affects computer scientists, solid state physicists, geologists and geophysicists, and chemists. An imbalance between supply and demand came about as the result of a number of factors. For nearly a decade centered around the early 1970's, the number of engineers produced was at a cyclical low. Daniel Drucker, dean of engineering at the University of Illinois, attributes part of the low to attitudes induced in precollege students by the Vietnam war. These effects have worn off and many top students are opting for engineering, but a substantial deficit in graduates remains at a time when many new positions are being created.

Today, much of the capital stock of this country is obsolete. It is energy inefficient or does not utilize advances in electronics and computers. Although there is now a petroleum glut, the excess supply is temporary. Great synthetic fuels complexes will be created. Replacements for present petrochemical processes will be devised and built. Computers will have a vastly expanded role in design and manufacturing. This will contribute to better quality control—a function that will itself absorb a large force of engineers. Applications of computers and electronics will become ubiquitous and will require the talents of many engineers.

Through conversations with people on campuses and in industry, much anecdotal evidence can be obtained about the extent and nature of the unsatisfied demand for engineers and scientists. One can encounter talk of some companies being able to fill less than one-fifth of their openings. However, one of the best kinds of semiquantitative evidence is the salary survey report issued by the College Placement Council.* The most recent report covers the period 1 September 1980 to 12 June 1981, and includes 62,835 bachelor's offers submitted by the 184 placement officers at the 161 participating institutions. Engineers, who constituted about 8 percent of the graduating class, received 65 percent of the bids. In contrast, graduates in the humanities and social sciences, although more numerous than the engineers, received only 4 percent of the total. Examples of average monthly salary offers to bachelor's degree candidates in July 1981 are: petroleum engineers, $2221; chemical engineers, $2030; electrical engineers, $1882; computer scientists, $1726; chemists, $1637; and humanists, $1204. Offers to the most desired new baccalaureate engineers amounted to $2500 a month or more. In many instances, these salaries have been larger than those of some of their professors. Assistant professors at leading universities typically receive $20,000 to $22,000 for 9 months; only about half of them manage to obtain an additional 2 months' salary from other sources. Industrial salaries for new Ph.D.'s are in the vicinity of $35,000 a year and above. Professors are also being recruited at large salaries and occasionally extra benefits in the form of equity participation. Some 2000 faculty positions are unfilled in engineering schools. They will not be readily filled without distortion of campus salaries.

The current efforts to recruit engineering talent are not a short-term phenomenon. The time constant of the educational system is more than 4 years. Shortages are now being partially met by hiring chemists, geologists, and physicists for positions formerly filled by engineers. This is increasing their salaries and causing many to forgo graduate school. Professors complain about the lack of quality of the comparatively few U.S. citizens who now choose to go on for higher degrees. We are only witnessing the beginning of a complex set of problems and interrelationships for which no quick cure will avail.—PHILIP H. ABELSON

**CPC Salary Survey*, College Placement Council, Bethlehem, Pennsylvania, July 1981.

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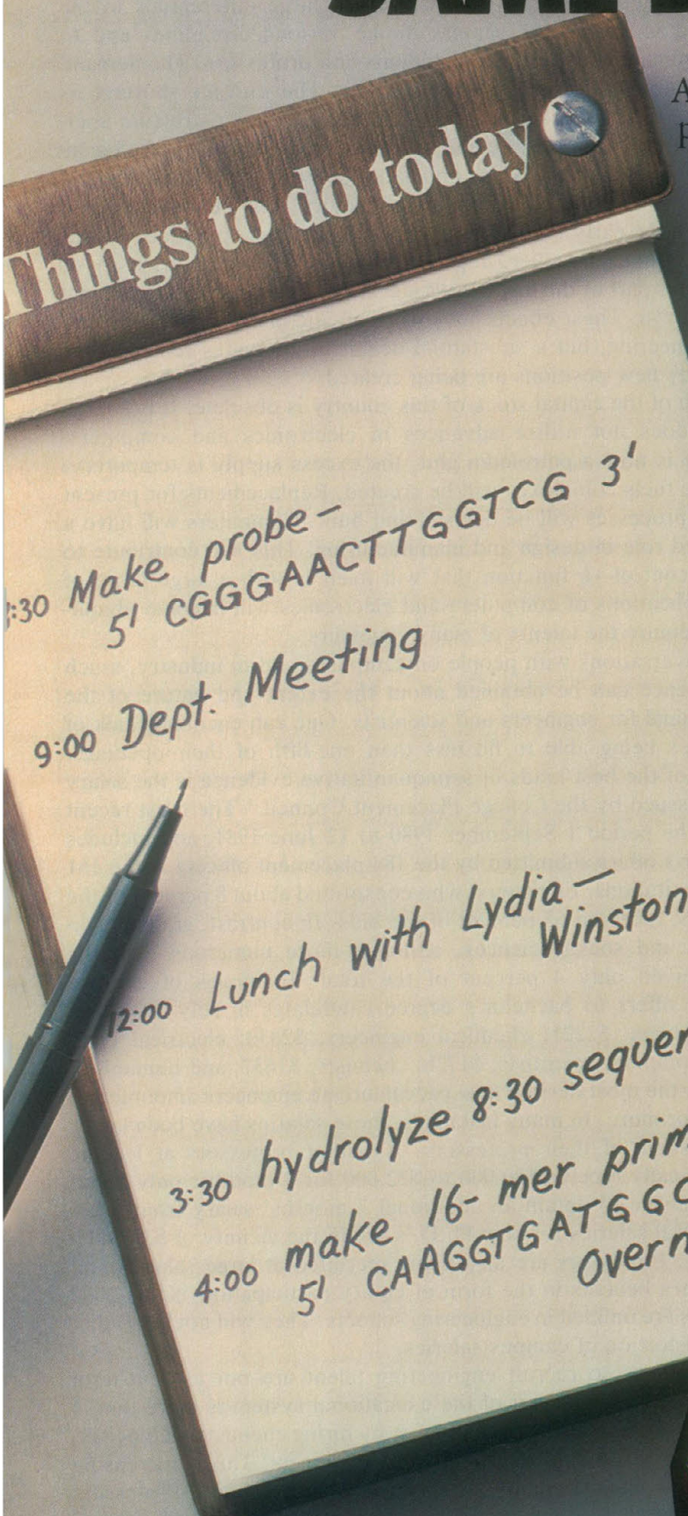

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