When Is Development Not Development?

The largest single source of funds in this country for scientific work is the Defense Department, but government officials and private citizens alike can easily fail to appreciate just how large this source is. In the President's fiscal 1958 budget, the $1.7 billion request for research and development does not include the expensive late development stage, which is financed instead by funds from the procurement and production appropriation. For example, it is largely this second category that covers the ballistic missile program, which is now spending money considerably faster than did the atomic bomb project during World War II. Assistant Secretary of Defense (Comptroller) W. J. McNeil estimates that the funds from procurement and production plus the amount budgeted directly to research and development plus certain other items, such as salaries for military personnel, may equal $5.3 billion.

Several questions come to mind. Is the Defense Department's present accounting system the best one from the viewpoint of administering the funds? If not, does it serve some special purpose?

Granted, the task of categorizing even the simplest of items can be made difficult by unusual circumstances. In *Through the Looking-Glass*, Alice was unable to decide whether the handsome article encircling Humpty Dumpty's ample form was a cravat or a belt. "If I only knew,' she thought to herself, 'which was neck and which was waist.' In the same way, the late development stage can be grouped with procurement and production, because a limited number of prototype weapons systems must be purchased for testing and evaluation. But the late development stage can also be grouped with research and development, because the mere acquisition of prototypes is not procurement and production in the basic sense of obtaining inventory quantities of the wherewithal to fight a war.

The present riddle, however, is something more than an exercise in logic. On the one hand, with the early and late development stages in separate appropriations, there is evidence that some officials in the Defense Department have difficulty in determining in detail how the three military departments are actually spending money. To this extent, the Defense Department cannot fulfill its function of assuring that our scientific resources are being used to best advantage.

On the other hand, there is the argument that the late development stage should remain under procurement and production because it is easier to get funds for that category. In illustration, the following exchange took place, during the House Military Appropriations hearings, between Chairman George H. Mahon (D Tex.) and Deputy Secretary of Defense Donald A. Quarles. Mahon: "... from a psychological or strategic point of view, [do] you think it would be more difficult for the Defense Department to get the Congress and Congress to get acquiescence from the public for such a vast sum as $6 billion for research and development?" Quarles: "I would think so. That is my sense of the situation, for what it is worth." Mahon: "I agree."

Is the latter argument to be taken as overriding? Is development not development when it is a question of seeking appropriations from Congress? Or is it possible that public acceptance of the place of science in our welfare and security has been underestimated?—J. T.
ALL-NEW EASE, SPEED, ACCURACY

Bausch & Lomb RESEARCH Microscopes

NOW! RIGHT LIGHT...AUTOMATICALLY! New Variable Focus Achromatic Condenser instantly and automatically adjusts light from B&L Professional Illuminator PR-27 to match any objective...for critical resolution of any object on the stage. Ends need of swing-in auxiliary condenser for low-power objectives. Standard equipment on 8 of the 14 new microscope models; optional on all others.

NEW EASE! Exclusive B&L Dynoptic design combines low-position controls, for hand-at-rest operation, with effortless ball-and-roller-bearing glide motion focusing. Inclined eyepieces permit comfortable position during prolonged examination.

NEW SPEED! Instant settings for critical resolution with any objective. Quick orientation, rapid repeat settings with graduated, rotatable circular stage. (Square stage available.) Ready for observation more quickly than any other research microscope!

NEW ACCURACY! Maximum resolution for critical study of "difficult" materials and structures...visual or photomicrographic...by bright field, dark field, polarized light, or phase contrast. Balcoathed apochromatic objectives, compensating eyepieces, and automatic Variable Focus Achromatic Condenser assure sharpest contrast, finest detail.

PLUS...many other exclusive advantages, important to you and your work.
Walton Kymograph

This is our standard large size kymograph, in which we have embodied many improvements suggested by Dr. Walton. It is substantially built and may be relied upon to give long service.

The characteristics required in research or classroom demonstrations are featured in this kymograph. A combination of five gear shifts and a variable transformer Universal series motor makes available speed ranges of nine thousand to one. The approximate maximum speed is 400 cm. per minute and the minimum .045 per minute. Any speed within this range may be selected.

The drum is made of laminated bakelite tubing and is 64 cm. in circumference, 30.5 cm. high.

A support arm for mounting instrument support rods is provided. This arm pivots on and may be raised and lowered along a column which is coaxial with the drum shaft. As many as four support arms may be mounted on this column. (One arm is normally included with each kymograph.)

Paper belt lengths up to approximately 275 cm. may be used.

Price—The complete Kymograph as illustrated and described for 115 volts, 60 cycles A.C. . . . . $625.00 each

PHIPPS & BIRD, INC.
Manufacturers & Distributors of Scientific Equipment
6th & Byrd Streets - Richmond, Va.
SAVE 15% with new PYREX brand ACCU-RED PIPETTES

...get faster

sight line readings, too

You can save up to $5.18 every time you order a package of 18 Accu-red measuring (Mohr type) or serological pipettes.

Oddly enough, it's the fact that these pipettes are so accurate that makes them cost you less. We've found a way of making fine bore tubing with such uniform inner diameters that we can calibrate and mark these pipettes much faster. Accu-red pipettes cost us less to make, so they cost you less to buy.

You get sight lines, too. You'll notice on the back of Accu-red pipettes short lines which level perfectly with the major graduations. Use them—like gunsights—to get faster, more accurate readings.

Both graduations and sight lines are in permanent LIFETIME RED. Actually part of the glass itself.

Plus the PYREX trademark. Because Accu-red pipettes are made of chemically resistant PYREX brand glass No. 7740, they will not alter antigens, or biological or chemical solutions. Nor are they affected by most cleaning solutions. And, PYREX brand pipettes withstand sterilizations.

Like all pipettes bearing the PYREX trademark, Accu-red pipettes have extra strength built-in—double-bevelled tips, ground satin-smooth, reduce snag-induced tip breakage; uniform walls, unmarrred by etched graduations, produce a stronger pipette from mouthpiece to tip.

Cat. No. S82702 Pipettes, Measuring (Mohr Type) Accu-red

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/10</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.03</td>
<td>$16.69</td>
<td>$15.85</td>
<td>$15.02 $14.18</td>
</tr>
<tr>
<td>1/100</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.14</td>
<td>$18.47</td>
<td>$17.64</td>
<td>$16.82 $15.97</td>
</tr>
<tr>
<td>1/1000</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.16</td>
<td>$18.79</td>
<td>$17.95</td>
<td>$17.11 $16.26</td>
</tr>
<tr>
<td>10/10</td>
<td>± 0.06</td>
<td>18</td>
<td>$1.81</td>
<td>$29.32</td>
<td>$27.86</td>
<td>$26.39 $24.92</td>
</tr>
</tbody>
</table>

Cat. No. S82762 Pipettes, Serological, Accu-red

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/10</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.08</td>
<td>$17.50</td>
<td>$16.62</td>
<td>$15.75 $14.87</td>
</tr>
<tr>
<td>1/100</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.25</td>
<td>$19.93</td>
<td>$19.05</td>
<td>$18.17 $17.30</td>
</tr>
<tr>
<td>1/1000</td>
<td>± 0.02</td>
<td>18</td>
<td>$1.26</td>
<td>$20.41</td>
<td>$19.53</td>
<td>$18.65 $17.79</td>
</tr>
<tr>
<td>10/10</td>
<td>± 0.06</td>
<td>18</td>
<td>$1.49</td>
<td>$24.14</td>
<td>$22.62</td>
<td>$21.12 $20.22</td>
</tr>
</tbody>
</table>
RADIOCHEMICALS?

They're in Stock
Their purity is guaranteed
AT
RESEARCH SPECIALTIES CO.

Our expanded facilities and our established reputation assure you of the best service in C¹⁴ and H³ labeled compounds.

Revised list of radiochemicals and current prices available upon request.

For unusual requirements, please write for quotation. State quantity and desired specific activity.

---

SCHOTT

Narrow Band Interference Filters

Transmission up to 45%... Half-band width down to 5 mÉ... Peak wave-length region: from 400 to 1,000 mÉ... Size of filters: 2½ x 2½... Regular quality IL: Tolerance at peak wave length ± 1%... Precision quality PIL: Tolerance at peak wave length ± 0.5%.

Ask for Bulletin NBF-339

FS Multi-Layer Interference Films

Part of the spectrum is strongly reflected and the balance strongly transmitted, according to requirements. Absorption is negligible. Transmission or reflection peaks as high as 85 to 90% but the spectral bands are relatively broad.

Ask for Bulletin MI-318

SCHOTT-JENA Raw Optical Glass
produced in West Germany, Now Available

FISH-SCHURMAN CORPORATION
74 Portman Road
New Rochelle, N.Y.

Fish-Schurman

Tomorrow's TECHNIQUES Today
GAS-LIQUID CHROMATOGRAPHY

ANALYZE: Volatile materials from gases to C-24-metyl esters. Column temperature: 25°-240° C.

CONTROL: Standardization of raw materials and processes is rapid and accurate.

SEPARATE: Components of mixtures can usually be separated by using one of various packings available in easily interchangeable columns.

COLLECT: Purified compounds are readily collected.

PURIFY: Samples are separated by many hundred theoretical plates and are well resolved.

WRITE FOR DESCRIPTIVE FOLDER OR SEND VOLATILE SAMPLE FOR ANALYSIS.

WILKENS INSTRUMENT & RESEARCH, INC.
ACHESON BUILDING • BERKELEY, CALIFORNIA
September
1–6. Laurentian Hormone Conf., AAS, Mont Tremblant, Quebec, Canada. (G. Pincus, LHC, 222 Maple Ave., Shrewsbury, Mass.)
1–7. Psychiatry, 2nd world cong., Zurich, Switzerland. (J. Wrasch, Tottikon, Stans, Nidwald, Switzerland.)
2–5. Passivity, internatl. symp., Darmstadt, Germany. (German Bunsen Gesellschaft, Postfach 11, Duisburg, Germany.)
3–4. Meteoritical Soc., 20th annual, Los Angeles, Calif. (J. A. Russell, 3518 University Ave., Los Angeles 7.)
4–6. Latency and Masking in Viral and Rickettsial Infections, symp., Madison, Wis. (A. S. Evans, Div. of Preventive Medicine, Univ. of Wisconsin Medical School, Madison 6.)
5–12. Medicine and Social Hygiene, internatl. symp., Trieste. (M. Lovenia, via Cavanna 18, Trieste.)
7–14. Odontostomatolog, 12th internatl. cong., Rome, Italy. (G. Corradi, 16 via Boezio, Rome.)
8–12. International College of Surgeons, 22nd annual, Chicago, Ill. (K. A. B.)

**RONALD Books . . .**

Essentials of Quantitative Analysis
A. A. BENEDETTI-PICHLER.
Queens College. Valuable laboratory manual and reference work for both organic and inorganic analysis. Book includes specific numerical data on the degree of precision of many unit operations, and supplies equations by which limits of error can be calculated for almost any quantitative operation. "Impressive . . . thorough, and firmly based on valuable practical detail."—The Chemical Age. 138 ills., tables pp. $15

The Evolution of Chemistry
EDUARD FARBER. This challenging, absorbing story of the origin and history of chemistry provides a fuller understanding of the concepts and methods of chemistry by integrating its evolution with progress made in other sciences and philosophies. Contains biographical sketches, writings and lectures of the world's outstanding chemists. " . . . a well-written, well-documented, ever-engrossing narrative."—The Science Councillor. 30 ills., 349 pp. $6

A Short History of Medicine
ERWIN H. ACKERNECHT, M.D., The University of Wisconsin Medical School. Based on the author's extensive study of original sources, this survey presents the major trends in the history of medicine, interprets their application for modern practice, and brings out their significance in terms of scientific, sociological, and economic developments. "I can recommend this book without reservation to everyone working in any area of human biology."—Joseph T. Velardo in The Scientific Monthly. 28 ills., 258 pp. $4.50

Guide to Medical Writing
HENRY A. DAVIDSON, M.D., Editor, Journal of the Medical Society of New Jersey. Expert guidance on basic writing techniques for physicians, dentists, nurses, pharmacists, and all who work in the health fields. Shows how to pin down ideas, organize and put subject matter into readable form without sacrificing accuracy. Advice on research methods, marketing, etc. "Dr. Davidson is a born journalist and his book is a superb piece of concise exposition."—The Lancet. 27 ills., 338 pp. $5

Biogeography
PIERRE DANSEREAU, University of Montreal. A new synthesis of the environmental relationships of living organisms, with emphasis on the higher plants. Using material drawn from the author's field work in many parts of the world, this book analyzes the components of the biogeographic community in terms of historical sedimentation, their climatic tolerance, their adjustment to habitat and to one another, and their genetic makeup. 183 ills., tables; 394 pp. $7.50

Order your books from:

**THE RONALD PRESS CO.** 15 East 24th St., New York 10

America's Largest Publisher-Distributor of Laboratory Appliances and Reagent Chemicals
Meyer, ICS, 1516 Lake Shore Dr., Chicago 10.)


8-15. International Cong. of Crop Protection, 4th, Hamburg, Germany. (Bundesanstalt für Land- und Forstwirtschaft, Messeweg 11-12, Braunschweig, Germany.)


9-11. Quantitative Methods of Mammalian Cell Culture, 2nd annual, Denver, Colo. (Office of Graduate and Postgraduate Education, Univ. of Colorado Medical Center, Denver 20.)


9-15. Macromolecular Chemistry, internatl. symp., IUPAC, Prague, Czechoslovakia. (Secretariat, ISMC, 5, Technicka, Prague 6.)


14-15. Minnesota Acad. of Science, Cedar Creek Forest. (M. R. Boudrye, 51 University Ave., St. Paul 3, Minn.)


17-24. Industrial Chemistry, 30th internatl. cong., Athens, Greece. (Committee of Organization, 30th internatl. Cong. of Industrial Chemistry, Rue Kanigatos 10, Athens.)

Two superb microscopes

WILD M 20

Meets the very highest requirements for research and scientific exploration, and provides unmatched versatility in many fields of microscopy.

Features include sextuple revolving nosepiece if desired * 20 Watt built-in illumination * beam splitting phototube for binocular focusing for photomicrography * phase contrast plus a complete line of attachments for every observation method.

WILD M 11

A highly precise instrument, ideal for the laboratory and many research applications.

Lightweight, easily portable and self-protected by the sturdy steel hood, the Wild M 11 offers a degree of versatility and precision far beyond its price and size. Outstanding optics, low-placed fine adjustment, easily interchangeable accessories and many other features make this a most noteworthy instrument for hospitals, expeditions and educational institutions.

DETAILED DESCRIPTIONS AND TECHNICAL DATA ARE GIVEN IN BOOKLETS M 20 AND M 11. WRITE FOR YOUR COPIES TODAY!

WILD HEERBRUGG INSTRUMENTS, inc.
Main at Covent Streets - Port Washington, N.Y. Port Washington 7-4843
SALES • FULL FACTORY SERVICES
EQUIPMENT NEWS

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Science does not assume responsibility for the accuracy of the information. All inquiries concerning items listed should be addressed to Science, Room 740, 11 W. 42 St., New York 36, N.Y. Include the name(s) of the manufacturer(s) and the department number(s).

- **SURFACE-TEMPERATURE TRANSDUCER** is said to be accurate between −320° and 950°F. The transducer consists of a woven grid of fine platinum wire. A resistance change of 100 ohms or more can be obtained for a temperature span of as little as 100°F. Response time is 0.5 sec. A special cement is used to attach the transducer to the surface to be measured. (Charles Engelhard Inc., Dept. S425)

- **REPEAT-CYCLE TIMER** uses resistance-capacitance networks for timing. Each timing cycle initiates the next. On-time is adjustable from 0.2 to 200 sec, off-time from 0.1 to 60 sec. The intervals are interchangeable. (G. C. Wilson and Co., Dept. S296)

- **ELECTROLYTIC HYGROMETER** automatically and continuously measures water concentration in vapor samples with 5 percent accuracy in the 0- to 1000-ppm range. The measurement is made by passing the sample-gas stream through an analytic element that absorbs and electrolyzes water present in the stream. The electrolysis current is a measure of the rate of absorption of water. The instrument will measure samples at temperatures up to 100°C. An incorporated alarm system can be set at any point in the instrument’s range. Output will operate a 10 or 50 mv recorder. (Beckman Instruments, Inc., Dept. S434)

- **PRESSURE PICKUP** may be installed in the body of a standard spark plug. It permits retention of the original thermal, ignition, and physical characteristics of the spark plug, and provides a tool for research on internal combustion engines. A pressure-sensitive diaphragm in the electrode cavity of the spark plug is linked with an unbound strain gage contained in the outer plug body to provide an electric signal. Pressure range is 0 to 1000 lb/in². Full-scale output with 22-v excitation is 20 to 30 mv. (Dynamic Instruments Co., Inc., Dept. S435)

- **PORTABLE POTENTIOMETER** covers the range of 0 to 100 mv with a single turn dial. Sensitivity is 0.05 mv and accuracy is given as ±0.1 mv. The galvanometer is of the torque suspension type and does not require locking in transit. Its low resistance makes the instrument suitable for use with thermocouples. (Williamson Development Co., Inc., Dept. S426)

- **RADAR RESTITUTER** automatically computes the errors that give rise to the distortions present in radar photography and produces a new photograph on which ground objects are accurately located. The chief distortions eliminated arise from the observation of slant distance rather than ground distance and from the motion of the radar. The corrected photographs are suitable for compilation of maps. (Fairchild Camera and Instrument Corp., Dept. S427)

- **MAGNETIC DRUM MEMORY** stores more than 12,000 bits and associated clock and reference information in 14 channels. Each channel is 0.070 in. wide and has a capacity of 1024 bits. The drum is 3.5 in. in diameter, and the case is 6 in. in diameter and 3.25 in. wide. The drum is belt-driven at speeds up to 15,000 rev/min. Access time is approximately 1.25 msec. Other models with up to 36 channels will be produced. (Borg-Warner Corp., Dept. S436)

- **TENSION METER** has a range of 1 to 20 lb, with greatest resolution at the low tension end. During operation, the material under test—for example, a wire—runs between two rollers and a third roller. The rollers deflect the material from a straight line and the meter measures the force required. Readings are made while the material moves at production speeds. (Tensitron, Inc., Dept. S429)

- **COUNTER** with a range of 100,000 counts is battery operated. A self-contained battery charger permits the instrument to be kept in readiness for field use. Five glow-tube decades perform the counting, with push-button reset and a spring-wound timer providing a predetermined time counting range from 0.25 to 6 min. A stop switch is also provided. (Nuclear-Chicago Corp., Dept. S440)

- **SINGLE CRYSTALS** as well as large-grain polycrystals are offered in most metals. A broad range of metal purity, crystal orientation, and overall size is available. The crystals may be obtained with the surface etched or electropolished, or with the surface unchanged from its condition at the end of growth. (Flow Corporation, Dept. S445)

Joshua Stern
National Bureau of Standards

dependable NALGON...

...flexible plastic tubing

NALGON TUBING* is saving time and money in plants and laboratories everywhere. Perfect flexibility, high chemical resistance, absolute safety, true transparency and excellent dimensional stability prove efficient in use... and it's economical too! The ¼” ID with ⅛” wall sells for less than 15c per foot. You'll find NALGON easy to handle and available in all sizes from ⅛” ID through 2” ID. Ask your dealer for catalog E-556

*A VOPLOV PRODUCT

the NALGE CO. INC.

Rochester 2, New York

World's largest producer of Plastic Laboratory Ware