Communicative Accuracy

The events of the past few months have emphasized something we have known all along—that it is important for scientists to describe their activities to the public in such a way that they will be generally understandable and properly informative. This runs into the practical difficulty that some scientists, when they attempt a "popular" description of their labors and of their ideas, insist on achieving almost the same precision and completeness of statement which they would, quite properly, use in talking to their scientific colleagues. "You must not expect me to say that genes are distributed along a chromosome like different sizes and colors of beads along a string, for I have no satisfactory evidence that genes are as discrete as separate beads, and also I don't know about their sizes and shapes." Such scientists feel the urge to attach to each general statement of a popular exposition all the cautionary qualifications, all the modifying details, and all the scholarly footnotes that they would use in a technical report.

It may be helpful to suggest to such scientists that they consider the concept of "communicative accuracy." This concept rests upon the fact, not always recognized, that the effective accuracy of a written statement depends primarily upon the interpretation given to it by the reader. A statement may be said to have communicative accuracy, relative to a given audience of readers or hearers, if it fulfills two conditions. First, taking into account what the audience does and does not already know, it must take the audience closer to a correct understanding. The better an example of communicative accuracy it is, the more gain in understanding it will achieve—but the basic point is simply that it must gain ground in the right direction. Second, its inaccuracies (as judged at a more sophisticated level) must not mislead, must not be of a sort which will block subsequent and further progress toward the truth. Both of these criteria, moreover, are to be applied from the point of view of the audience, not from the more informed and properly more critical point of view of an expert.

Communicative accuracy is important to all of us all the time. Consider the illuminating example, recently offered by a newspaper reporter, of the two men coming home from work and greeting their wives. One says, "My dear, when I look into your face, time stands still." The other remarks, "My dear, your face would stop a clock."

Warren Weaver

Rockefeller Foundation, New York
Progress begins in the mind—in the perception and appreciation of new ideas. In the past the ideas that sparked progress too often had to wait on the random interest of genius. Today more and more new ideas come from men trained to an awareness of that which is yet to be accomplished.

At Bell Laboratories, communications science is entering upon its most challenging era in history. As never before, progress will depend upon men who have acquired the special training needed to think creatively in this exciting field.

Bell Laboratories provides the young college graduate with unique opportunities to develop his creative abilities. During his first two years, he spends two or three days a week as part of his job, taking postgraduate courses in basic mathematics, physics and electronics. This he does at a graduate study center which has been established at the Laboratories by New York University. As he gathers a broad fundamental knowledge which will enable him to tackle every type of communications problem, he also gathers credits toward advanced degrees. To round out his education, he spends a third year on special phases of communications technology.

By helping scientists and engineers to reach their top development, Bell Laboratories has helped to make your telephone system the world's best—and will keep it so.
NOW available from stock!

**MEVALONIC ACID C¹⁴**

As N, N¹ — Dibenzyl Ethylenediamine Salt
Exhibits Full Microbiological Activity

*(Method of Skeggs, et al.; J. Bact., Vol. 72, 519; 1956)*

**ALSO OTHER BIOCHEMICAL TRACERS**
- Amino Acids
- Purines
- Intermediates
- Krebs Cycle Compounds
- Steroids

*Labeled with H², H³, C¹⁴, D², I¹³¹, Etc.*

---

**Fast Accurate Weighing — Corrosion-Resistant — Economical**

**Welch TRIPLE-BEAM BALANCE**

*With Stainless Steel Beam And Pan*

**Capacity 111 grams**
(201 grams using auxiliary weight)

**SENSITIVE TO 0.01 grams or less**

- Hard, Cobalite Knife Edges
- Grooved Agate Bearings
- Patented One-Piece Beam
- Stainless Steel Pan with Retaining Rim
- Three Scales Easily Read at Eye-Level
- Extra Weights Nested in Base
- Silver-Gray Hammerloid Finish

**W. M. WELCH SCIENTIFIC COMPANY**
DIVISION OF W. M. WELCH MANUFACTURING COMPANY

ESTABLISHED 1880

1515 Sedgwick Street, Dept. E, Chicago 10, Illinois, U.S.A.
Manufacturers of Scientific Instruments and Laboratory Apparatus


**Chemistry at Interfaces**

Stephen Brunauer, chairman
Norman Hackerman, vice chairman


25 July. *General discussion.*

**High-Pressure Research**

J. M. Lupton, chairman


1 Aug. *Geochemistry*, J. R. Gold-
LOURDES is pleased to announce the following NEW PRODUCTS

* CONTINUOUS FLOW SUPER-SPEED CENTRIFUGE ROTORS (Pat. App'd For)

This new design double type super-speed centrifuge rotor offers continuous forces up to 35,000x gravity. The inside of the rotor is lined with angled walls sloping downward to accommodate a polyethylene bag of similar shape. A stainless steel cover screws onto the rotor for sealing purposes.

Materials to be centrifuged are introduced from a central inlet tube and the lighter media are continuously discharged into a surrounding stainless steel collector by means of a unique discharge cap which is attached to and turns with the rotor. Heavier particles are forced downward as they impinge on the angular wall. This same rotor may be used for batch separation by use of a threaded sealing plug in the cover.

By simply replacing the polyethylene bag liner the rotor is ready for a new run or for continuous operation. There is no need for rotor removal, rotor cleaning, or for handling of test tubes with polyethylene bag liners.

The considerable distance between the inlet tube and the ports of the outlet cap allows for faster and better separation. If inlet and outlet ports are close to each other, materials introduced would be discharged in almost the same form unless the rate of flow were very slow. Available in two sizes, these rotors offer high speed and force and greater capacity than any other super-speed continuous flow centrifuge.

* FULLY AUTOMATIC SUPER-SPEED CENTRIFUGES
  - FULLY AUTOMATIC ROTOR ACCELERATION/DECELLERATION
  - ROTOR UNBALANCE ELECTRICAL SAFETY TRIP
  - REMOVABLE PANEL FOR REMOTE CONTROL
  - ACCOMMODATES ALL LOURDES' ROTORS INCLUDING CONTINUOUS FLOW

* THREE LITER CAPACITY ROTOR—SUPER-SPEED

As a follow up to the popular VFA rotor (15,000 M.I. this new rotor machines from a radial gined drain tap in a forging has six compartments for 500 ml bottles. It is the first rotor of its type which will spin such large capacity at forces exceeding 10,000x gravity.

* LARGE CAPACITY HOMOGENIZER

Similar in design to the small Multi-Mixer but with a higher horsepower motor for homogenizing within larger containers.

These new products plus the new design Model LB refrigerated centrifuge (pat. applied for) and other LOURDES' products will be displayed this spring at many of the forthcoming society meetings. Further details will be promptly furnished upon request.

LOURDES instrument corp.
53rd Street & 1st Avenue, Brooklyn 32, New York

---

BALANCE REPAIRS

We can now offer the same service on BALANCE REPAIRS and maintenance that we have been doing on microscopes.

Prompt service (48 hrs.)
Guaranteed work by factory trained men.
Loan instruments.

MORONIE MICROSCOPE SERVICE
P.O. Box 656
Rochester 2, N.Y.

NEW SMALL SOURCE Ultra-Violet
pencil type lamp
3/8” in diameter, 4.6” in length
8 models, ideal for far U.V. examination of small areas.
High intensity, suitable for collimator use and laboratory instrumentation applications.
Also, complete line of near and far ultra-violet lamps 4-100 watts available in various sizes and models.
For specific information please write: dept. S-1
ULTRA-VIOLET PRODUCTS Inc.
San Gabriel, California

---

smith, chairman: G. C. Kennedy, Rustum Roy, “Application of high-pressure research to problems in geochemistry.”

Toxicology and Safety Evaluations
John A. Zapp, Jr., chairman
Don D. Irish, vice chairman


Chemistry and Physics of Metals
J. A. Krumhansl, chairman
E. I. Salkovitz and J. W. McClure, vice chairman


For Ultraviolet-Visible Spectrophotometry

The Cary Model 11 provides performance comparable to the finest; cost comparable to the cheapest.

Considering the purchase of a recording spectrophotometer? The following comments may help you get much more for your money.

Most spectrophotometer users regard the Cary Model 14, with its 1860 Å to 2.6 μm wavelength as the finest recording spectrophotometer available. We have been surprised to discover that quite a few people do not realize that the Model 14 has a companion instrument—the Cary Model 11—which gives the same high quality of the Model 14 at a cost comparable to the lowest-price recording spectrophotometer. The difference between the Model 11 and the Model 14 is in wavelength range. Of course, where the wider wavelength range is required, the Model 14 is the finest instrument available. However, for applications in the ultraviolet and visible ranges (2100 Å to 8000 Å) the Cary Model 11 provides the same high degree of accuracy, ruggedness, and dependability as the Model 14, as well as its convenience and flexibility, including linear wavelength recording, speed of scanning, accessories, etc. Important performance data on the Cary Model 11 are outlined below.

- **Bray Light**: Less than 0.0001% over most of the range.
- **Scanning Speeds**: 1.0 Å per second (ultraviolet region) to 125 Å per second (visible region).
- **Resolution**: 1.0 Å or better throughout most of the range.
- **Wavelength Accuracy**: Better than 5.0 Å in the ultraviolet region and better than 10.0 Å in the visible region.
- **Reproducibility**: Better than 0.5 Å in the ultraviolet and 3.0 Å in the visible region.
- **Photometric Reproducibility**: Reproducibility better than 0.004 in absorbance can be achieved with the Model 11.

**20,000 HOURS OF SERVICE WITHOUT MAJOR REPAIRS**

The first Cary Model 11 was produced in 1947, and since then nearly every leading analytical laboratory in the United States—and many abroad—has acquired one or more Model 11's. The performance, flexibility and reliability of the Model 11 have been proved in all kinds of research and control applications.

One of the first instruments to be manufactured—Serial No. 2—was recently overhauled at the factory after having been in use twelve hours per day for over six years without requiring any service other than routine maintenance. This instrument has now begun a second stint of reliable service which will undoubtedly run into additional thousands of hours.

**FREE BULLETIN**

If your spectrophotometer applications are in the visible or ultraviolet range, investigate the many advantages of the Cary Model 11. For complete information write to Applied Physics Corporation, 362 West Colorado Street, Pasadena 1, California, for Bulletin E338.
SCHAAR introduces...
the NEW
Lab-Asco-Vac 10

MECHANICAL
HIGH VACUUM PUMP

Free Air Displacement
50 Liters Per Minute
Guaranteed Absolute
Pressure 0.1 Micron

This high vacuum laboratory
pump presents a completely
unique concept of pumping
standards. Here are some of
the most desirable features:

Insulation and rubber mounting eliminate noise; radical vertical
design eliminates conventional, hazardous belt and pulley. Carrying
handle on the supermount provides easy portability. Supplementing
the low purchase price, this pump requires a much smaller volume
of oil charge, with maintenance and cleaning operations simplified.
The vertical design has made the pump leak-proof, and with the
visible oil level cup, oil spillage is confined to a minimum. In filling
the pump, oil is not introduced at the point of discharge, thereby
eliminating the need for pump disconnect. The Lab-Asco-Vac Pump
runs cooler and has a unique capillary gas ballast cleaner which
provides efficient operation for longer periods.

SPECIFICATIONS

Cat. No. SR-4492*
Model Two-Stage
Guaranteed Absolute Pressure 0.1 Micron
Pumping (displacement) Speed 50 liters/minute
Operating Speed 1140 rpm
Oil Charge Required 1 pint
Dimensions 12" diam. x 20½" H.
Weight 45 lbs.
Voltage 110/220
Cycles 50/60
PRICE 195.00

*Mounted on rubber-cushioned cast base and supplied complete with electrical cord, switch and plug, one quart of Lab-Asco-Vac pump oil, operating and maintenance bulletin.

Additional Literature Available on Request

Klett Manufacturing Co.
179 East 87 Street, New York, New York

GLASS ABSORPTION
CELLS made by KLETT

Makers of Complete Electrophoresis Apparatus

SCIENTIFIC APPARATUS

Klett-Summerson Photoelectric Colorimeters—
Colorimeters — Nephelometers — Fluorimeters—

L-9500—complete with Pyrex Brand Glass noz-
ze, vial shield and Tygon R-3603 delivery tubing
* PATENT PENDING

L-9500—complete with Pyrex Brand Glass noz-
ze, vial shield and Tygon R-3603 delivery tubing
* PATENT PENDING

PALO LABORATORY SUPPLIES, Inc.
81 Reade Street, New York 7, N. Y.


29 Aug. Summary discussion; overflow papers; business meeting.

W. George Parks
Department of Chemistry
University of Rhode Island
Kingston

Los Angeles 24, Calif.; treas., Albert L. Meder, Jr., New York, N.Y. The vice presidents are Garrett Birkhoff, Harvard University, and Salomon Bochner, Princeton University. The representative to the AAAS Council is W. L. Duren, University of Virginia.

Forthcoming Events

March

31-2. Utilization of Atomic Energy. College Station, Tex. (R. E. Wainerdi, A.&M. College of Texas, College Station, Tex.)

April

1. Microcirculatory Conf., 5th, Buffalo, N.Y. (S. R. M. Reynolds, Dept. of Anatomy, Univ. of Illinois College of Medicine, 1853 W. Polk St., Chicago 12.)

1-2. Alabama Acad. of Science, annual. Birmingham. (H. M. Kayler, Dept. of Physics, Birmingham-Southern College, Birmingham.)


1-3. Corrosion Control. 5th annual conf., Norman, Okla. (M. L. Powers, Extension Div., Univ. of Oklahoma, Norman.)
7-11. American Assoc. of Cereal Chemists, annual, Cincinnati, Ohio. (J. W. Pence, Western Utilization Research Laboratories, Albany, Calif.)

8-10. Electronic Waveguides Symp., New York. (J. Fox, Microwave Research Inst., Polytechnic Inst. of Brooklyn, 55 Johnson St, Brooklyn 1, N.Y.)

9-12. National Council of Teachers of Mathematics, Cleveland, Ohio. (M. H. Ahrendt, NCTM, 1201 16 St., NW, Washington 6.)


10-11. American Inst. of Chemists, annual, Los Angeles, Calif. (L. Van Doren, AIC, 60 E. 42 St., New York 17.)


10-12. Ohio Acad. of Science, annual, Akron, Ohio. (G. W. Burns, Dept. of Botany, Ohio Wesleyan Univ., Delaware, Ohio.)


11-12. Eastern Psychological Assoc., annual, Philadelphia, Pa. (G. Lane, Dept. of Psychology, University of Delaware, Newark.)

11-12. Montana Acad. of Sciences, annual, Missoula. (L. H. Harvey, Montana State Univ., Missoula.)

11-18. Horticultural Conf., 15th international, Nice, France. (Secrariat General, 84, rue de Grenelle, Paris 7th, France.)


14-18. American Assoc. of Immunologists, annual, Philadelphia, Pa. (F. S. Cheever, Graduate School of Public Health, Unv. of Pittsburgh, Pittsburgh 13, Pa.)


14-18. American Soc. of Biological Chemists, annual, Philadelphia, Pa. (P. Handler, Dept. of Biochemistry, Duke University School of Medicine, Durham, N.C.)


17-19. Association of Southeastern Biologists, annual, Tallahassee, Fla. (J. C. Dickinson, Jr., Dept. of Biology, Univ. of Florida, Gainesville.)


(See issue of 21 February for comprehensive list)
Since 1931, New York Laboratory Supply Co., Inc., has been serving industry with all their laboratory requirements. This has not been an easy job—it has been a challenge—a challenge we meet and conquer every day. Below is listed a few of the many instruments and apparatus we carry:

Balances & Weights
Incorporators
Baths
Metallographic Equipment
Calorimeters
Microscopes & Accessories
Centrifuges & Accessories
Nitrogen Determination Equip.
Chemicals, Laboratory
Ovens
Colorimeters
Petroleum Testing Equip.
Crushers & Mills
Calorimeters
Distilling Apparatus
Incubators
Filter Papers
Metallographic Equipment
Furnaces
Microscopes & Accessories
Gas Analysis Apparatus
Nitrogen Determination Equip.
Glassware
Ovens
Heaters & Hotplates
Porcelain Ware
Hydrogen-Ion Equipment
Powerstats
Hydrometers
Pumps
Distilling Apparatus
Refractometers
Petroleum Testing Equip.
Sieves
Crushers & Mills
Spectrophotometers
Distilling Apparatus
Stirrers—Mechanical & Magnetic
Hydrometers
Thermometers, etc.

Let us help you efficiently solve your laboratory instrument and apparatus problems. Call on us, we will be glad to help you.

NEW YORK Laboratory Supply COMPANY, INC.
76 Varick Street, New York 13, N.Y.
Telephone: Canal 6-6504

2 NEW MICRO TOMES
by JUNG

Famous for Precision
Microtomes Since 1872

UNIVERSAL QUICK-FREEZE

- For rapid sectioning of frozen or embedded tissues
- Automatic Object Feed—2 to 40 microns, in steps of 2 microns
- Instant transition from frozen to paraffin work by a mere change of object plate
- Integral two-way valve cool object as well as knife
- Tilting knife guards mounted for safe operation
- Ball Bearing Knife Action—free of play and vibration
- Streamlined design and compact, enclosed mechanism renders microtome dirt and dust proof
- Section control indicates thickness of specimen desired

ROTARY MICRO TOME 1120

- Automatic Feed—1 to 40 microns in steps of 1, 2 or 5 microns
- Freezing chamber quickly converts microtome for frozen tissues
- Unique tilting arrangement for portability
- Special knife holder for safe operation
- Completely vibration-free instrument
- Built-in section counter and specimen control
- Accessories include conveyor belt and specimen trimmer

We shall be pleased to send complete illustrated details

WILLIAM J. HACKER & CO. INC.
82 Beaver St., New York 5, N.Y.
BO. 9-8750
SLURRIES
WITHOUT CONTAMINATION OR CORROSION

Wavelike Motion of Steel Fingers Forces Material Through Tubing
Cap. 0.2 cc. per min. to 4.5 G.P.M.
Prices $60.00 to $550.00 depending on size and accessories

SIGMA-MOTOR, INC.
46 North Main St. Middleport, N.Y.

PHOTOMICROGRAPHY
Accurate determination of exposure time in black-and-white and color photomicrography
Write for Bulletin #810 to Price $105.00
PHOTOVOLT CORP.
95 Madison Ave. New York 16, N.Y.

NEW IMPROVED ALOE
ELECTRIC MICROTOME KNIFE SHARPENER
FOR A KEENER EDGE IN LESS TIME

Less effort, too, in getting the keen, uniform edge you want. This new improved sharpener has heavy duty "T" guide holder that supports knife over the full length up to 13 inches, greatly simplifying operation. Holder is adjustable for differences of bevel required by various knives.

Special alloy honing wheel is powered by unusually quiet split phase ½ h. p. motor. Entire mechanism is enclosed in attractive gray finish rubber-footed metal housing with aluminum platform. Overall dimensions: 13½" x 11" x 9". Operates on 115 volts A. C.

For additional information, request Bulletin 20-105.
Since our business might have bearing on yours, this is the first in a series of reports on work we're doing for a variety of clients, not only in the nuclear industry but in such diverse fields as chemicals, petroleum, pharmaceuticals, medicine, steel and coal.

Nuclear reactor developers and operators call us for such services as analysis of reactor fuels, decontamination studies, and the development of data relating to the production of atomic power.

Researchers and industrialists in all fields draw upon our specialized skills and equipment for applying the phenomena of radioactivity to improving processes and for highly complex studies which were not possible with "yesterday's" techniques.

So many people these days are curious about the possibilities of applied radioactivity, we thought you might be interested in reading about some of our current projects.

ENVIRONMENTAL RADIOACTIVITY SURVEYS

Since we started in business, one of our important activities has been conducting site surveys for operators of nuclear reactors. These studies are undertaken prior to start-up to determine the level of "background" radioactivity in the area surrounding the reactor.

This then provides a basis for measuring any increase in radioactivity after the reactor is in operation. Environmental radioactivity studies are required. Such studies should also be made on a continuing basis not only for safety's sake but to provide "third party" legal protection against lawsuits and insurance claims.

In conducting a site survey, NSEC takes samples from the surrounding area. These may be soil, ground water, plants, animals, fish, rainwater, dust, sewage or other materials. We consider carefully the nature of the facility, the terrain, direction of air movement, and surface and ground water flow. The samples are processed and analyzed in our labs. We are then able to establish the radioactivity level, the kinds of isotopes producing it, and the possible sources of these isotopes.

NSEC has conducted more site surveys of nuclear facilities than any other company in the United States. For information on environmental radioactivity surveys of your nuclear site, phone us at HOMestead 2-4000 in Pittsburgh. We can either conduct the survey for you, or train your personnel on proper procedures.

PREVENTING BEACH POLLUTION

Recently, in the largest radioactive tracer study ever conducted in the United States, NSEC successfully traced the dispersion of sewage effluent flowing into ocean waters. Our study helped the City of Los Angeles in planning expansion of its sewage system. First we injected the isotope scandium-46 into sewage about to be released into Santa Monica Bay. This is an effective way to measure the pattern of sewage diffusion and its dilution in sea water to one part in ten thousand.

Write for a copy of "Radioactive Tracer Study of Sewage Field in Santa Monica Bay" by Dr. Ralph L. Ely, Jr. (He's our Vice President and Technical Director.) Or ask about our forthcoming study for the Public of Venezuela, in which we will investigate littoral drift, using radioactive sand, to determine the feasibility of a certain harbor location.

RADIATION SICKNESS

It's common knowledge that excessive radiations produces harmful effects in human beings, ranging from mild nausea or skin burns to cancer and death. Recent experiments under the direction of Dr. A. Edelmann, Manager of our Department of Biology and Medicine, have indicated that radiation can also produce a toxic factor which appears in the blood. Analysis of the blood of rats subjected to X-rays under varying conditions not only indicates that a toxic element is produced but that it may be transferred by injection from one animal to another.

When and if this toxic substance is identified, it may be possible to devise an antitoxin to alleviate some of the effects of atomic radiation. Medical and pharmaceutical applications of controlled radioactivity open up entirely new means of studying existing problems. Contact Dr. Edelmann about your problem.

DETERMINATION OF BORON IN SILICON

A major problem plaguing the electronics industry is achieving ultra-pure silicon for transistors. Current methods are slow and costly, but effective. Nevertheless, boron still remains as a damaging impurity even in minute quantities of only a few parts per billion. Ordinary chemical methods cannot detect the presence of boron in such small concentrations.

However, NSEC scientists are now perfecting a process by which the boron is transmuted into radioactive carbon-11 and subsequently measured by its radioactivity. This new method of analysis will be helpful in the quality control of silicon during production. Once a routine method is established it will be offered on a commercial basis. Interested? Drop us a letter.

We'll be glad to furnish detailed information on any of these studies. And if you'd like to keep abreast of new developments in the field, just ask us to put you on the mailing list for our monthly publication "Radioactivity at Work."

Our technical staff is available for consultation on your specific requirements and will make proposals and quotations without obligation.

---

Nuclear Science and Engineering Corporation
DEPT. S-1, P. O. BOX 10901, PITTSBURGH 36, PENNSYLVANIA

---

Watson Davis's article on "Babel Resolved" [Science 126, 55 (1957)] made interesting reading, even if not everybody would agree with every point of it. However, he touched only one out of four aspects of this problem. For scientists, babel means difficulties (i) in reading foreign science abstracts; (ii) in reading foreign articles; (iii) in personal correspondence with foreign workers in the same field; and (iv) in oral discussions with foreigners at international conferences. International use of English has largely overcome some of these difficulties. We have, in Washington, services which translate abstracts directly into English without need for Interlingua. Most foreign scientists may not be expert in English but can at least write a decipherable letter in broken English. But at international conferences we keep meeting the Frenchman who does not understand your English question and who can answer it only in French after someone translates it for him, not to mention the American sci-
entist who feels ill at ease at a conference in Paris. Also, how many of us can read most of the foreign scientific literature easily enough to actually do so? Foreign articles and oral discussions in foreign languages are therefore our main problems.

Forrest F. Cleveland [Science 126, 64 (1957)] rightly says that translation of articles is not a satisfactory solution, if it is practicable at all. Where would we find all the translators it would require? A solution will be found only if and when we scientists all write originally in one and the same chosen language, and do the writing ourselves.

I agree with Watson Davis that if one knows enough other languages, then one can usually guess the meaning of a sentence in Interlingua or Esperanto after reading it two, three, or four times. The question of readability at sight, however, is rather irrelevant. Any language with an international vocabulary (there are several) is more or less easy to decipher. The main difficulty is not in the reading but in the writing, the speaking, the understanding of the spoken word. The greater regularity of Esperanto over Interlingua makes Esperanto greatly preferable. The confusion created by Interlingua's so-called "natural" accentuation of syllables (whatever that means) is sufficient to make a person understand why, at conferences, Interlingua (though admitted for written abstracts) has never found oral use even as a secondary language, contrary to the situation with respect to Esperanto, which is used every year by thousands at international congresses in which is is the only congressional language.

Esperantists don't claim that texts in Esperanto would be completely understandable to persons too lazy to learn even the simplest elements of the language (though, if you try it out for yourself, you may find Esperanto just as easy as Interlingua). But we do claim that it is some five times easier to learn it for active use than it is to learn any national language. I was able to translate into it, faultlessly, from the daily newspaper after 18 hours of pleasantly easy study. (Since I already knew a couple of other languages, learned in highschool, some may be a bit slower.) To learn to read Esperanto requires much less time.

I admit that if right now we could make Esperanto internationally a required subject for all sixth-grade school children, it would yet take many years before they would start using it generally for international communication. But at that time they would like to find abstracts of older papers published in Esperanto rather than in Interlingua.

There was a time when German was the international language for physics and for some other branches of science.
IN THIS ISSUE

SCIENCE ANNOUNCES
A NEW SERVICE
FOR ITS READERS

To provide a convenient and rapid means for obtaining further information about Equipment News and advertised products, SCIENCE has inaugurated a Readers' Information Service for its subscribers.

Every week in SCIENCE you will find a coupon listing all advertisers and new product announcements for that issue. Form the habit of using this handy self-mailer to continually keep abreast of the latest developments in instruments, equipment and materials.

SEE PAGE 550 OF THIS ISSUE

Since 1933, English has taken its place. In this world nothing lasts forever. The present position of English will last an even shorter time if no funds and no legislation are available to get high-school children interested in science, as might be achieved if instruction were given by people who, by acquiring an M.S. or Ph.D. degree in the subject they teach, had shown that they are interested themselves and have, as background, an understanding of the epoch-making progress in science that is being made, to a degree not likely on the basis of undergraduate courses alone. If it is utopian to expect this, then I keep my fingers crossed for our English-speaking descendants and hope that the next change of international language will be a switch to Esperanto rather than to German, Russian, or what else. To achieve this in time, however, the Esperanto movement needs solid support now.

F. J. BELINFANTE
Department of Physics, Purdue University, Lafayette, Indiana

Significantly, the "spread in the use of Interlingua" in scientific publications has been largely spontaneous. Many editors have felt a need for such a means of increasing the number of readers of their journals and of thus facilitating the advancement of their field of science. Upon seeing a sample of Interlingua, they have been impressed with its readability, have investigated its suitability for use in their journal, and have decided finally to use it for summaries or otherwise.

The contents of Spectroscopia Molecular have included not only "summaries" and "news notes" but also short technical articles and three technical monographs published in serial form before being collected into book form. Copies of the first monograph have been sold in 25 states of the United States and in 19 other countries, while the second has been sold in 15 states and in 9 other countries—despite the fact that the material was already available in the journal. It seems quite certain that this demand for the monographs, and for the quite technical issues of the journal, would not have existed unless the buyers had felt that Interlingua was a "precise, universal, and scientific" language.

Most persons, including scientists, will (and should) continue to have some knowledge of European languages as a part of their general educational and cultural background. The greater this knowledge the easier it will be to use Interlingua. But even if scientists must learn Interlingua from the very beginning, they will find that this requires less time than is needed to learn one of the national languages. Besides, it seems
quite improbable that any national language will approach universal usage. Much material is now published in English, but many cannot read English. For example, the recent UNESCO report [Scientific and Technical Translating and Other Aspects of the Language Problem, J. E. Holmstrom, Ed. (Columbia Univ. Press, New York, 1957), p. 13] says: "Nearly two-thirds of engineering literature appears in English, but more than two-thirds of the world's professional engineers cannot read English and a still larger proportion of English-reading engineers cannot read scientific literature in other languages. In other words, leaving qualitative differences aside, the greater part of what is published is inaccessible to most of those who could otherwise benefit from it."

The average scientist can probably read Interlingua at sight with 80 percent comprehension. Thus, material written in Interlingua is immediately useful to him, since much of his reading consists in scanning articles to see if they contain material of importance for his work. For articles which require 100 percent comprehension, or for writing in Interlingua, use of the dictionary and grammar will of course be necessary. (To test whether Esperanto would be equally readable and useful, the reader may compare the parallel texts in Interlingua and Esperanto in the American Journal of Physics [21, 471 (1953)] or in the UNESCO report (p. 200).)

To speak for myself, if a scientist who is by no means a linguist could first see a sample of Interlingua in February and begin editing and publishing a periodical the first issue of which appeared in May of the same year, despite a concurrent heavy schedule of teaching and research, it certainly cannot be too hard to learn to write in Interlingua.

The scientist is a busy person. If he has to take the time to study a new language, however simple, before it begins to be of use to him, he probably will not do it. But if there begins to appear literature of importance to him in a language he can largely comprehend at sight, he will probably scan it. And if by such scanning, and by use of the dictionary and grammar for careful reading of those articles that are of importance for his work, he is able gradually to perfect his comprehension while obtaining information that is of use to him, then it is possible that he may begin to appreciate the advantages of this common language. He may even finally begin to write and speak it in order to carry his ideas and results to a wider audience. Let us hope so. For if this were universally done, the gain to science would be substantial.

**Forrest F. Cleveland**
Department of Physics, Illinois Institute of Technology, Chicago

7 MARCH 1958
KENNAMETAL* components help valve a 646-mph flow!

Builders of chemical equipment must frequently find components with unusual service properties.

When the Manton-Gaulin Mfg. Co., Inc., of Everett, Mass., designed and built this Sub-Micron Disperser Valve, they encountered a problem.

The solid-fluid dispersion materials must move through the valve at almost supersonic speeds. Components in the path of the flow are exposed to severe erosion and abrasion...plus corrosive action in some applications.

The company found that Kennametal tungsten carbides provide the necessary properties to stand up against such destructive forces. Vulnerable parts are being made of Kennametal as they have proven to be the most economical solution to the service-maintenance problem.

If at any time you need materials with unusual resistance to erosion, abrasion, or corrosion...materials that can retain normal properties under prolonged exposures at 2200°F and above; materials with rigidity three times greater than the hardest steel, it will pay you to investigate the contribution Kennametal compositions are making in scores of varied applications. Just write: KENNAMETAL INC., Dept. SA, Latrobe, Pennsylvania.

*Trademark

KENNAMETAL...Partners in Progress

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).

- CRYSTAL LATTICE MODELS of German manufacture now include feldspar, alpha quartz I, alpha quartz II, beta quartz I, and beta quartz II. Models, consisting of wooden spheres fixed and joined by metal rods, are designed on the basis of x-ray- and electron-diffraction data. Linear magnification is 2.5 x 10⁸, so that 1 A is 25 mm. (Arthur S. LaPine & Co., Dept. S907)

- POWER-SUPPLY REGULATION ANALYZER measures applied d-c voltage, the percentage change in applied voltage, and the root-mean-square ripple of regulated and unregulated power sources. Voltage range is 1 to 3000 v; accuracy is ±0.1 percent. Percentage regulation is measured in four ranges of sensitivity from 0.005 percent to 5 percent each side of the null position. Ripple voltage is measured in 11 ranges to 100 v r.m.s. Provision is made for oscilloscope display and for external recording. (Kepco Laboratories Inc., Dept. S917)

- TRAVELING-WAVE OSCILLOSCOPE is designed to display transient and repetitive phenomena in the millisecond region. Frequencies as high as 2000 Mcy/sec and voltage levels of 40 to 50 mv can be detected. The total size of the display is 0.4 by 0.6 in., but the extremely small size of the cathode-ray beam spot, 0.002 in., permits resolution equivalent to that of a standard 5-in. cathode-ray tube. In terms of trace widths, sensitivity is 0.06 v per trace width. (Edgerton, Germeshausen & Greer, Inc., Dept. S925)

- DENSITY MEASURING SYSTEM consists of a probe and a power supply. The probe is coated to resist the action of liquids being observed. A standard model has a range of 0.60 to 1.45 g/cm³. Time response for a change of density of 0.01 g/cm³ is about 1 sec. Temperature range is 0° to 100° C. Output from the instrument can be used for recording density. (General Communication Co., Dept. S930)

- OSCILLOGRAPH allows simultaneous and directly visible recording of up to 16 processes. Recording is rectilinear. Frequency response is 100 to 165 cy/sec. Sensitivity is 5 mv, peak-to-peak, per millimeter, and each record is 20

MEASUREMENT...

- Extreme sensitivity — 5 mr for soft x and gamma rays; 10 mr for hard x and gamma rays

WIDE EXPOSURE RANGE — from 5/10 mr to 600R

Complete coverage — beta-gamma, x-ray, and neutron film packets are held in one badge

DESIGN...

- Tamper-proof — special unlocking device required to open badge

Combined film and security badge — has space for standard 1½" x 2" identification photo

Lightweight — sturdy, moulded plastic badge weighs less than 1 oz.

SERVICE...

Prompt weekly reports, supplemented by quarterly and annual cumulative report

For data on the newest advances in film-badge dosimetry write for Bulletin S-3

controls for radiation

130 ALEWIFE BROOK PKWY., CAMBRIDGE, MASS.