

# THE SPEX SPEAKER

Vol. IV—No. 4—December, 1959

Published by  
SPEX INDUSTRIES, INC.  
P. O. Box 98  
Scotch Plains, N. J.



WILLIAM F. MEGGERS

Having officially retired after 44 years on the staff of the National Bureau of Standards, William F. Meggers simply continues to work in his laboratory methodically taking advantage of the inspired mind which some 200 scientific papers have amply demonstrated. "Waging" peace, not just hoping for it, is an additional endeavor. The article presented here is abridged from an invited address before the Eastern Analytical Symposium banquet in New York on November 5th, 1959.

After teaching physics for two years at Carnegie Institute of Technology, Dr. Meggers joined the National Bureau of Standards in 1914, rising to Chief of the Spectroscopy Section in 1920. One of his earliest achievements was to build a large Wadsworth mount spectrograph, the forerunner of many commercial instruments built decades later. In 1922, he co-authored a basic paper, "Quantitative Spectroscopic Analysis of Materials," which helped spark the development of this science-art in which around 3000 laboratories are presently engaged. As co-editor of the "Index to the Literature on Spectrochemical Analysis," Part IV of which has just been released, his devotion to the field is once more illustrated.

Apart from the chemical analysis aspect of spectroscopy, Dr. Meggers has contributed a wealth of knowledge to the field of spectral measurements. Extensive tables of atmospheric refraction and secondary wavelength standards owe their existence to his painstaking work. In 1947, when gold was transmuted to mercury-198, he introduced for consideration the green line of the latter as the primary standard of length to replace the red cadmium line, use of which dates back to 1894. He is presently working on precision measurements and term analysis of ytterbium spectra.

Honors for his work have been numerous. The Optical Society, which recently made him an honorary member, awarded Dr. Meggers the Ives Medal in 1947. The National Academy of Science elected him to membership in 1954. The Franklin Institute gave him the Elliot Cresson Medal and the New York Section of The Society for Applied Spectroscopy made the first award of its annual medal to him. The U. S. Department of Commerce awarded him the Exceptional Service Gold Medal in 1948.

---

## P E A C E

WILLIAM F. MEGGERS

Last summer when I suggested "Peace" as the title of this talk, I did so with some trepidation because this word had long been suppressed in favor of "cold war" in this country. I was aware of the Attorney General's list of subversive organizations in the U. S. A. — twenty of them contain the word "peace". Although I have never belonged to any subversive organizations, there was real danger that I might be accused of disloyalty if peace were advocated or discussed in public. However, after contemplating all the evil effects of the cold war on our democracy, on dignity of the individual and on personal freedom, I decided that it was my patriotic duty to speak in favor of peace.

Since World War II, we have "enjoyed" a truce of terror and a war economy. But can we continue forever with ever-increasing taxes and national debts, preparing for World War III which nobody wants and which nearly everybody agrees would spell disaster for the human race? Because future war is universal suicide, why don't we wage peace instead of war?

"The Russians, like the weather, are here to stay—moreover here to stay as extremely serious competitors. Perhaps the two most important things to say are (a) they are strong, not weak; (b) they do not want war. Whether we like it or not, it is our duty as a people presumably more secure and adult.

as well as free, to try to understand not merely their vagaries but the essentials of their position—to know the full nature of our adversaries, comprehend their massive power, and, if possible, live side by side with them peacefully even if difficulties largely of Russian making appear to be insuperable. This is strictly to American self-interest.” (John Gunther, *Inside Russia Today*, p. 505, Harper & Brothers, New York, 1958.)

Fortunately, since last September, there has been a hopeful revival of rationalism and humanitarianism; the world’s leading politicians and militarists are now all talking “peace.” They have stolen my thunder but I am relieved and happy because I can now quote the world’s leaders—as follows chronologically—without fear of disloyalty charges against me.

“The time has come for the efforts of the United Nations in strengthening peace to be supplemented by the efforts of heads of governments of all states, by the efforts of broad masses of the people who support peace and security for the nations. Everything indicates that the time has come to usher in a period of international negotiations, conferences, and meetings of statesmen in order that one after the other of the pressing international problems should find their solution. . . . Never have so many states, so many people, been drawn into military preparations as at present. If we consider, in addition to the military, the number of people directly or indirectly connected with the production of arms and involved in various military research, we will find that over 100 million people have been taken away from their peaceful labors—the most vigorous and able-bodied people, men of science and technology. A priceless fund of human energy, knowledge, ingenuity and skill is thrown as into a bottomless pit, squandered on growing armaments. The annual military expenditures of all states today total approximately \$100 billion. Is it not time to call a halt to this senseless waste of the people’s means and energy for the preparation of war and destruction? . . . All peoples need peace.” (Premier Khrushchev to United Nations General Assembly, 18 September 1959.)

“Have you ever pondered over this question: If we are not planning to fight, whatever for do you and we need all these armaments? I am told that your country every year spends an average of over \$40 billion on armaments. As for us, I won’t conceal that we spend about \$25 billion a year for the same purpose. Surely a better use for the people’s money can be found.” (Premier Khrushchev, farewell to U. S. A., 27 September 1959.)

“All outstanding international questions should be settled, not by application of force, but by peaceful means through negotiation.” (Eisenhower-Khrushchev agreement, Camp David, 27 September 1959.) It is regrettable that the word “should” in that agreement was used instead of “must.”

“No other aspiration dominates my own being so much as this: That the nations of East and West will find dependable,

self-guaranteeing methods to reduce the vast and essentially wasteful expenditures for armaments, so that much of the savings may be used in a comprehensive and effective effort for world improvement. . . . The world must learn to work together—or finally it will not work at all.” (President Eisenhower, Abilene, Kansas, 13 October 1959.)

“History teaches quite clearly that it is an illusion to believe that peace can be won and supported by instruments of war. We know that ultimately these weapons, accumulated with a desire to avoid war, will threaten peace and then irreparably shatter it. . . . Peace is and must be possible—simply because we cannot do without it.” (President Lopez Mateos, to United Nations General Assembly, 14 October 1959.)

As an example of true Un-Americanism, let me quote part of a column by a nationally known and read news analyst and reporter, Westbrook Pegler:

“Now we have been hearing fables about the great technical achievements of the Russians. The truth is, as their housing projects in Moscow plainly show, that they can’t even mix cement, lay brick, or hang a window or a door. They are the most incompetent slobs on earth. They can’t even ring a doorbell much less install one. As for physics, that stuff is all in the books. Our students are as smart as theirs. If they have any scientific bulge they got it from German double-domes whom they captured when Truman and Ike surrendered the victory in 1945 and from Klaus Fuchs and the Monmouth traitors whom Joe McCarthy tried to expose. I will discourse further on my observations in Russia, with emphasis on their yearning to be free and their inability to feed Moscow any better vegetables than pale cucumbers, nubbin tomatoes and grass in mid-summer. Dogs have more spirit and better sense.” (Milwaukee *Sentinel*, 21 August 1959.)

On October 11th, the Advisory Committee on Science and Technology of the Democratic Advisory Council held an all-day meeting in Washington to discuss the problems of science and technology in relation to United States foreign and military policy, and proposals on science and technology for the 1960 Democratic campaign platform. This Committee, consisting of seventeen outstanding American scientists, proposed the establishment of a Government laboratory for active study in a scientific manner of methods for maintaining peace. The proposed laboratory should be an independent agency, launched with a \$50 million budget, and staffed by top-level scientists whose first work would be to make realistic suggestions for meeting the technical problems of disarmament. Eventually we should wage peace with the same efficiency that we wage war. (*Science* 130, p. 966, 16 October 1959.)

“Now is the time for all good men to come to the aid of their country” and promote “peace on earth, good will toward men.”

---

## WANTED: SPECTROGRAPHERS

Time: January 13, 1960

8:00 p.m.

Place: Reception Room, Pius XII Library, St. Louis University, Lindell Blvd. entrance

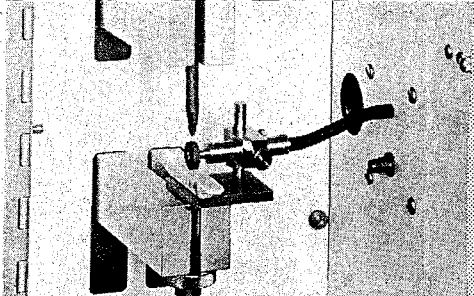
Chairman: Dr. A. G. Rouse

Subject: Reorganization of St. Louis Spectroscopy Society

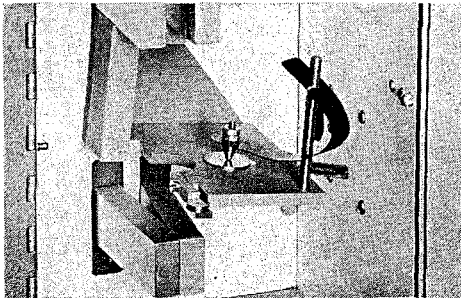
Modernize your Spectrograph with the

# SPEX 9010 ARC/SPARK STAND

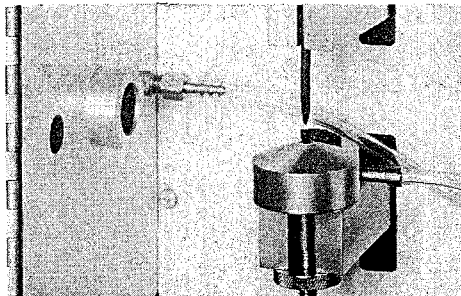
## VERSATILE



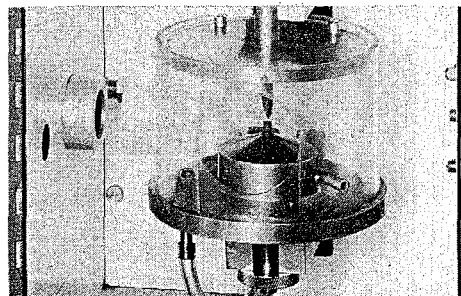
ROTATING DISC and PLATFORM



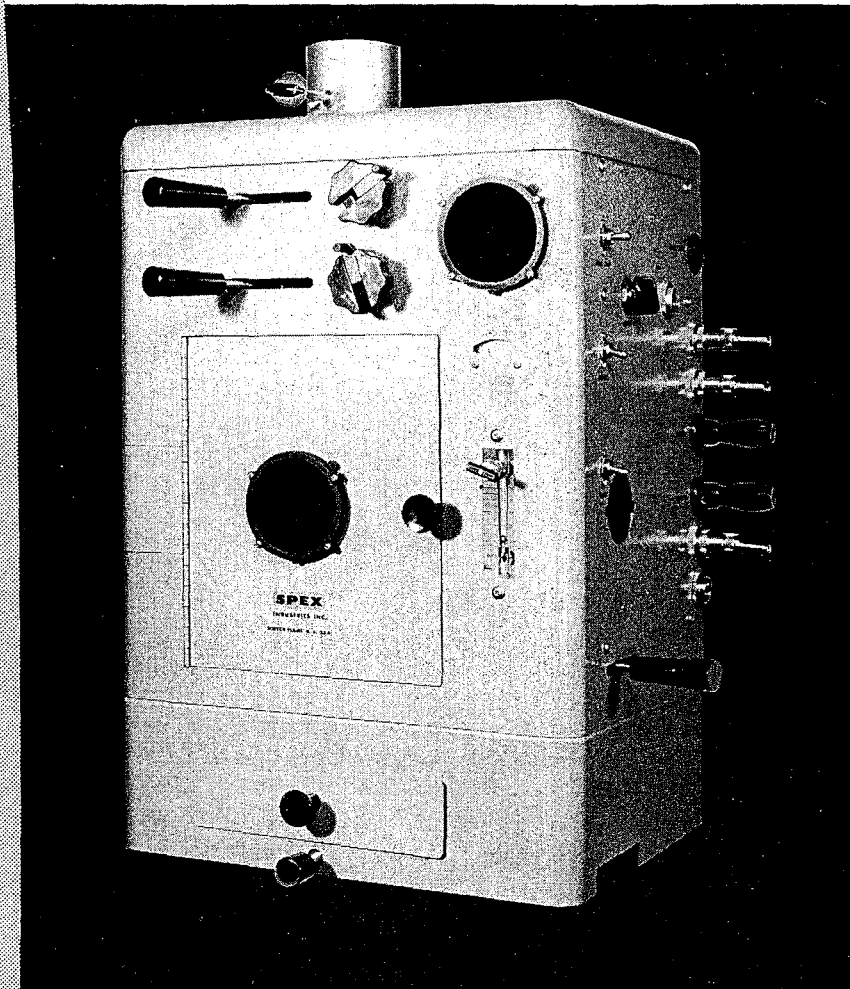
PETREY STAND with motorized turntable and viewing mirror



STALLWOOD JET FOR ARC STABILITY



ENCLOSED ARC CHAMBER FOR HIGH SENSITIVITY



## DESIGNED FOR YOUR SAFETY AND CONVENIENCE

- Built-in gauges for water-cooling and air draft.
- 2 built-in motors for rotating samples.
- Bi-lateral, water-cooled electrode clamps.
- 2 variable Polaroid viewing mirrors.
- Erect 4X optical alignment system.
- Filter for exhausting poisonous or radioactive fumes.

## RUGGED

- Acid-proof plastic wash-down interior.
- Stainless steel and nylon hardware.
- Rhodium-plated electrode clamps.

•• ADAPTED TO MOST SPECTROGRAPHS ••

**SPEX**

INDUSTRIES INC. SCOTCH PLAINS, NEW JERSEY

## TAMING YOUR MIXER/MILL

The major complaint against our Mixer/Mill—the high-speed impact grinder and mixer—has been its noise and vibration. While it is not possible to quiet the instrument altogether, a high degree of reduction can be achieved with internal shock mounts. All recent instruments have been shipped so equipped.

If yours is an earlier model, you can easily add shock mounts to it in about half an hour by purchasing one of our shock mount kits. Shipped pre-assembled with all necessary hardware and instructions, the kit may be ordered by specifying:

**8000K Mixer/Mill Shock Mount Kit .....\$ 26.00**

## FLOW METER FOR STALLWOOD JET AND ENCLOSED ARC CHAMBER

First announced as accessories with our 9010 Arc/Spark Stand, the Stallwood Jet and Enclosed Arc Chamber have been purchased by a large number of laboratories, many of which have already corroborated our results in terms of improvements in precision and sensitivity. One problem is rigging up a regulator and flow meter from the cylinder containing the mixed gases (recommended: 30% oxygen, 70% argon). A compact package is that offered by Hoke Incorporated, Cresskill, N. J., at about \$50.00. Comprising a regulator, flow meter and needle valve, it is specified as follows:

Model 982 valve with 2103 tube (O-9LPM oxygen) and Hoke Style N (CGA 580) tank connection for argon.

Incidentally, we have modified our Stallwood Jet so that deep-cratered electrodes can be advanced with respect to the Jet as the electrode burns away. The final design of the Enclosed Arc Chamber uses Pyrex telescoping cylinders instead of Lucite.

**9014 Stallwood Jet**, for stabilizing arc by surrounding it with a blanket of air or other gas. Designed to be used either separately or inside the Enclosed Arc Chamber 9015. Overall diameter 2"; o.d. of stem which fits in lower electrode clamp 1/2"; constructed of rhodium-plated brass; interchangeable for 3/16" (0.180") d. or 1/4" (0.242") d. electrodes.....\$ 60.00

**9015 Enclosed Arc Chamber**, for bathing sample in special atmospheres, especially those free of nitrogen to remove cyanogen bands. May be used alone or with 9014 Stallwood Jet. Designed for ease in loading and aligning electrodes with transparent, rotating and telescoping Pyrex housing; Suprasil quartz window transmits below 1700A; stems which fit in electrode clamps are 1/2" d.; overall diameter of Chamber 4-1/2" .....\$198.00

## USED EQUIPMENT AVAILABLE

1. L&N Recording Microphotometer, in routine operation until a few months ago.
2. Grating spectrograph built by Harry S. Read, employs 35-mm film, dispersion about 5A/mm in the first order.
3. B&L Quartz Cornu Spectrograph, ca. 1948.

## NOBLE METAL STANDARDS

We are pleased to announce noble metal standards supplementing those already available for the common and rare earth elements. With analogous names to the others, the new ones are called Noble Metal Spex Mix (NMSM), Noble Metal Qual Mix (NMQM) and Noble Metal G (NMG) Standards. In turn, these are used for the semi-quantitative analysis of "pure" materials; the qualitative identification of noble metal elements; the semi-quantitative analysis of substances containing appreciable concentrations of the noble metals.

All of the standards contain the following elements:

Gold, Gallium, Hafnium, Indium, Iridium, Palladium, Platinum, Rhenium, Rhodium, Ruthenium.

Although not all noble metals, several of the above are added here in order to cover as many elements as possible and still not clutter the spectrum with overlapping or confusing lines. Osmium, one of the most toxic elements, especially when arced, has not been included. We shall, however, be glad to tell you where it can be purchased and how to handle it safely.

Altogether, the Spex scheme of semi-quantitative analysis now covers 68 elements. Not only is an accuracy of plus or minus 30% and better possible using suggested techniques but the spectrographer is enabled to report directly the limit of sensitivity of the particular technique, e.g.,

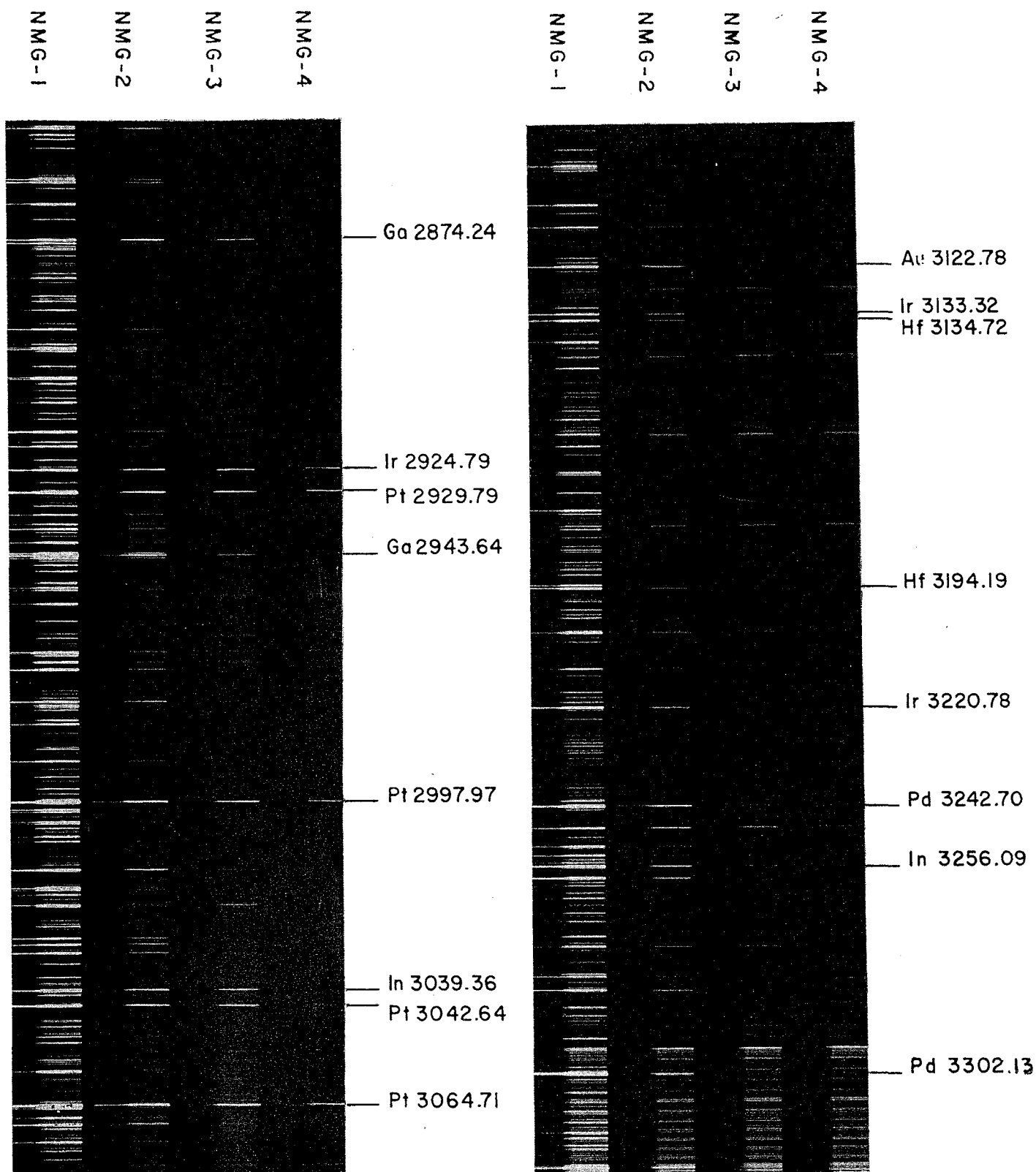
Palladium—not detected, less than 0.0005%.

- 1040 Noble Metal Element Kit.** Contains small quantities of the following elements, some in solution, others as salts or powdered metals: Au, Ga, Hf, In, Ir, Pd, Pt, Re, Rh and Ru. Boxed in attractive, permanent plastic container.  
**Per Kit .....\$ 50.00**
- 1041 Noble Metal Spex Mix.** Contains the same elements as 1040, all at exactly 9.32% concentration. For the analysis of "pure" unknowns.  
**Per 2 grams .....\$ 38.00**
- 1042 Noble Metal G Standards.** Semi-quantitative standards for determining the same elements as in 1040 in unknowns that are relatively impure. One standard contains 0.50%, the others 0.050%, 0.0050%, 0.00050% of each of the 10 elements.  
**Per set of 4 standards, 2 grams each.....\$ 48.00**
- 1043 Noble Metal Qual Mix,** preparation for the qualitative determination of the same elements as in 1040.  
**Per 2 grams .....\$ 20.00**

## NEW ASTM BIBLIOGRAPHY NOW AVAILABLE

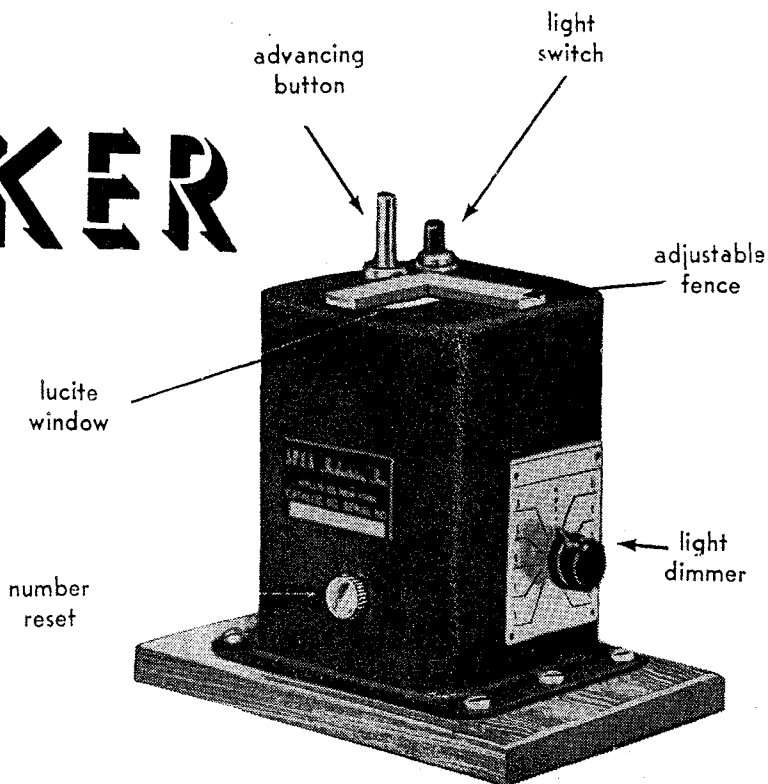
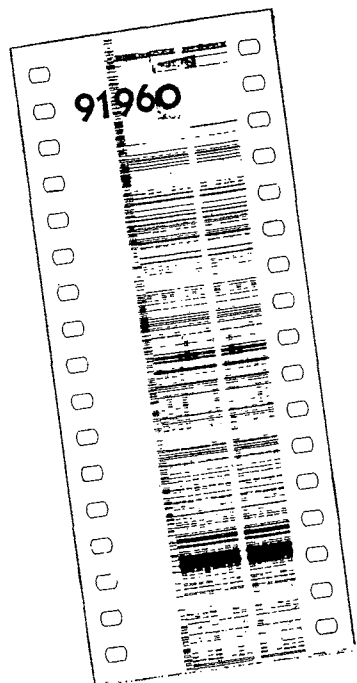
Part IV, covering the years 1951-1955 "Index to the Literature on Spectrochemical Analysis" may now be purchased to bring your bibliography up to date. Consisting of 1879 references abstracted and alphabetized both by subject and author headings, the Index supplements the previous three parts which covered the years 1920-1950. Part IV may be purchased directly from ASTM, 1916 Race Street, Philadelphia 3, Penna., as its Special Technical Publication No. 41-D. It is priced at \$5.20 to ASTM members, \$6.50 to non-members.

SPECTRA OF NOBLE METAL G STANDARDS



As illustrated on the above sections of spectrograms taken on our home-built, 3.4 meter, Ebert-mount spectrograph, lines of the elements in the Noble Metal Standards are readily identifiable. About half of the elements are detected at the 5 ppm level (NMG-4) while the remaining ones with the exception of Ru, are detected down to 50 ppm. Although these exposures were taken using an open dc arc, sensitivity may be improved about five-fold for all elements but gold using the Stallwood Jet. With it the major sensitivity gain is in the region above 3300A where band spectra of air and cyanogen obscure atomic lines. The use of argon-oxygen in the Stallwood Jet enhances the sensitivity of ruthenium from 0.05% down to about 0.002%.

# SERIAL MARKER



for | **SPECTROSCOPY, X-RAY DIFFRACTION,  
ELECTRON DIFFRACTION  
METALLOGRAPHY, NUCLEAR PHYSICS,  
MICROSCOPY AND PHOTOGRAPHY**

The Opto-Mechanism Serial Marker photographically assigns a 5-digit number to any light sensitive emulsion. In the dark-room, before development, the film or plate—of any size—is held against a Lucite window through which a number is projected by pressing a switch. The number is advanced by pressing a second button. Resetting, if necessary, is accomplished by rotating the side knob.

Two models of the SERIAL MARKER are now available. No. 3701 prints a 5-digit number; 3702 has a built in attenuator for controlling the exposure, and is particularly useful in those laboratories where several emulsions, differing in speed, are used. The instrument is first calibrated for each emulsion. This is done by determining the proper position of the attenuator for the emulsion with, say, a 2-second exposure. Once calibrated, the SERIAL MARKER will consistently print a correctly exposed number on any emulsion.

Both models are equipped with an adjustable gate so that the identifying number may be printed in the same relative place on each film or plate.

The housing is of steel, finished in black crinkle which will resist attack by photographic chemicals. The base is finished mahogany. A household "nite-lite" supplies the illumination and is readily replaced.

- 3701 Serial Marker**, prints a 5-digit number approx. 3/16" x 3/4"; complete with 6-watt, 115-v, ac or dc, candelabra-base bulb.  
 Each ..... \$60.00
- 3702 Serial Marker**, same as 3701 but with built-in attenuator for controlling light intensity.  
 Each ..... \$68.00

# NOTHING TO EQUAL IT —

## SAUTER *Ultramatic*

### PRECISION MICRO-BALANCE



Extremely Rapid  
& Repetitive  
Weighing of  
Minute Masses

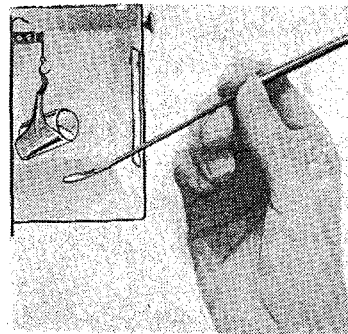
#### COMPLETELY FRICTION-FREE

All knife edges, pivots and bearing surfaces are eliminated by the Sauter patented suspension system... reduces inertia to an infinitesimal point.

#### SPECIALLY ADAPTED

for use with the

#### WIG-L-BUG

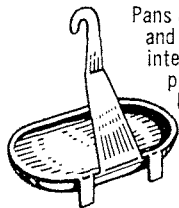


Although the Ultra-Matic Balance is available in various capacities ranging from 1 mg to 12.5 grams, the optimum instrument for the spectrographer is the 500 mg model with range extension permitting up to five times the normal weighing range. This allows taring of the vial and direct reading to 0.5 mg, equal to one-half of one scale division.

7001 SAUTER BALANCE: 500 mg model, with range extension to 2500 mg capacity. Includes special weighing pan designed to hold 1/2" dia. x 1" long plastic vial (3111) .....\$275.00

#### EXCLUSIVE

Pans are uniform in shape and weight...completely interchangeable, readily preloaded outside the balance. Unique construction makes loading round bottom pans easy... pan can't roll over.



NO COUNTERWEIGHTS

The Sauter #180 series provides unmatched convenience and accuracy in weighing any type minute mass: fibres, filaments, threads, tissues, powders, liquids, pellets, and countless other sub-miniature objects. It is widely used in scientific research, as well as product control in many industries including paint, pharmaceutical, medical, cigarette, paper, etc. This balance requires no weights. It is air damped, shock-resistant, and unaffected by even the most sudden changes in temperature.

Capacities — 1 mg. to 12½ grams. Calibrated for direct reading from 1 microgram up. Anti-parallax device. 11" wide, 8" deep, 14" high. Weight: 10 lbs.

# SPEX

## INDUSTRIES INC.

P. O. Box 98  
Scotch Plains, N. J.

S e a s o n s  
G r e e t i n g s

