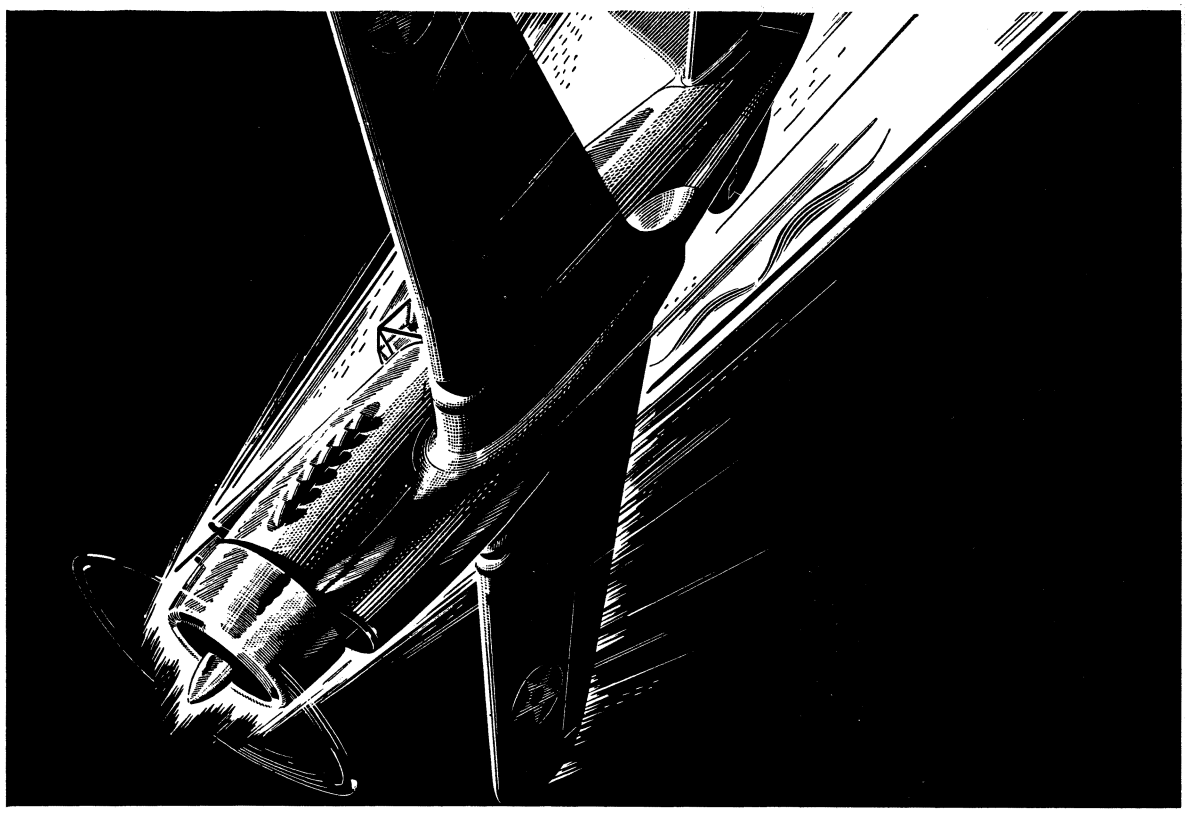
SCIENCE

NEW SERIES
VOL. 93, No. 2415

FRIDAY, APRIL 11, 1941

SUBSCRIPTION, $6.00
SINGLE COPIES, .15

Science: published weekly by The Science Press, Lancaster, Pa.
Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.



MORE PLANE PARTS PER DAY

Because Westinghouse Developed a Furnace

Normally when steel is heat-treated it undergoes a form of surface deterioration called "decarburization." Correcting this defect takes time . . . slows down production.

Westinghouse solved this production problem with a new type of furnace . . . a furnace with an "Endogas" atmosphere that delivers heat-treated parts with bright, clean surfaces . . . parts that need a minimum of finishing . . . in many cases none at all.

This development has made possible the production of more airplane engine parts per day.

The furnace itself requires no expensive accessories . . . is simple to operate . . . easy to install. The newly developed "Endogas" atmosphere, which is produced from ordinary city fuel gas, can be used for the treatment of all SAE steels. Proof of results is found in reports like this:—"In one shift we hardened 20,000 small alloy bolts. This would have taken a week in our old furnace, with the added cost and delay of pickling."

Your production problem may not be that of hardening steel. But remember, Westinghouse maintains a corps of engineers whose entire time is devoted to solving production problems for industry. Their job is to help you. Use their services freely.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Westinghouse

Time-Saver For American Industry

ELECTRICAL POWER SPEEDS PRODUCTION

No American manufacturer can afford to overlook the modern methods and equipment offered by the electrical industry for speeding up production. A phone call will bring a Westinghouse representative to your office to discuss your problems.

Future advertisements on this page will describe how Westinghouse is helping in the mining . . . steel . . . metal-working . . . textile . . . marine . . . and other industries. Watch for these stories.

J-94419

NEW L&N GLASS-ELECTRODE pH INDICATOR—$160

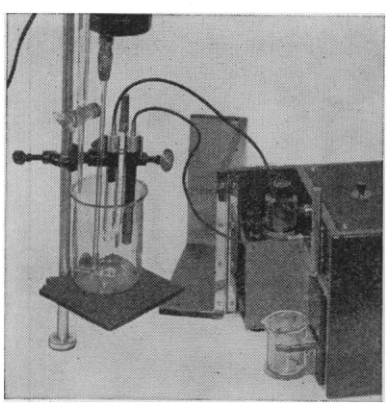
Sets New Standards Of Speed And Convenience

Although simplified and stripped to essentials for low cost and easy operation, L&N's new Glass-Electrode pH Indicator measures within a limit of error of ±0.1 pH. It includes everything necessary for measuring pH, and is also adaptable to titrations.

Speed and convenience are inherent in its simple construction. Adjustments take but a moment, and measurements are made simply by pouring the sample into the beaker and reading pH directly from the meter scale.

Outstanding advantages include:

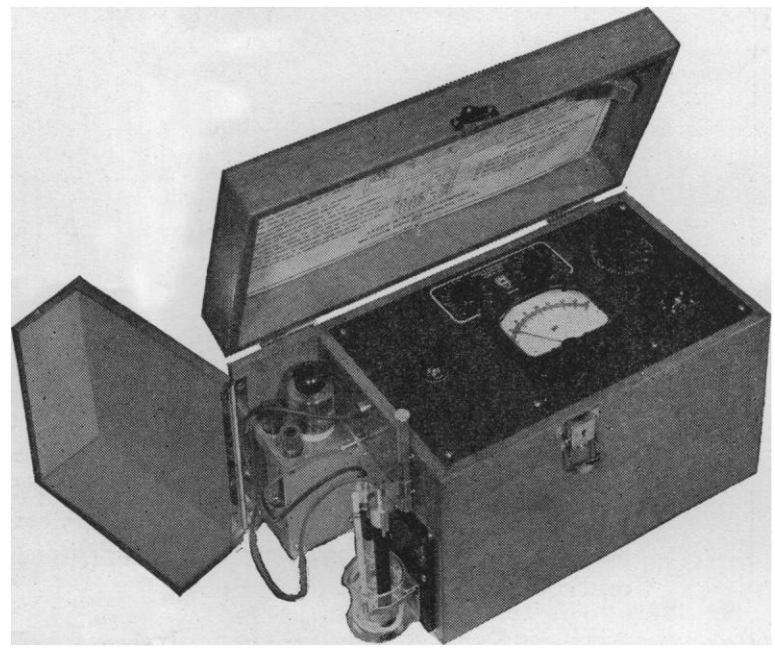
1. Full accuracy in atmospheres of 95% relative humidity up to 85 F.
2. Manual temperature compensator eliminates computations, saving time and preventing errors.
3. Instrument is adequately shielded from electrical disturbances.



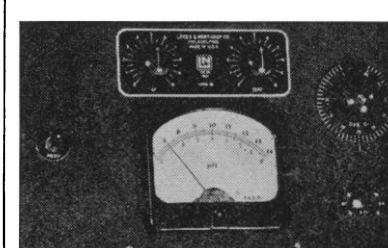
Titrations are made outside the electrode compartment, with the electrodes furnished.

4. The double range, covering 0-8 and 6-14 pH, provides a convenient overlap of 2 pH . . . a desirable feature for titrations.
5. The calibrated scale is longer than in any comparable pH indicator.
6. The mahogany case is built to stand up under severe use. Wood and finish are unaffected by high humidity.

A catalog is in preparation describing and illustrating the Glass-Electrode pH Indicator in detail. We'll be glad to put your name on the list to receive a copy.



7. Batteries are separated from the electrical circuits to avoid corrosion from spent batteries.
8. A whole end of the box swings out, leaving the electrodes and sample holder easily accessible.
9. Glass electrode is adequately shielded against electrical effects.
10. Factory sealed and filled electrodes are highly stable.
11. The sample cup is a standard 50 ml. beaker.
12. Fifteen-inch shielded leads permit electrodes to be used external to the case, for titration as well as pH.
13. Light, well-balanced, and easily portable, the instrument case carries everything necessary for measurements.
14. Only 3 simple preliminary adjustments are necessary. Each is independent of the other.
15. Maintenance is negligible, consisting of adding KCl to the reference electrode salt bridge every 6 or 8 weeks, cleaning the electrodes occasionally, and replacing batteries at infrequent intervals.



Clearly marked, the well arranged top plate reflects the instrument's simplicity and ease of operation.

These instruments are in stock, ready for immediate delivery. The price, including everything necessary for pH measurements, is $160.00.

7662-A1 GLASS-ELECTRODE pH INDICATOR ASSEMBLY

Ranges .....0 to 8 pH, and 6 to 14 pH
Limit of Error. ± 0.1 pH, exclusive of any error in the buffer solution.
Temperature Compensator. Range, 0 to 50 C
Size .....16¾″ x 8⅛″ x 9⅛″
Weight .....23 lbs

Jrl Ad E(16)

LEEDS & NORTHRUP COMPANY, 4926 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

Measuring Instruments • Telemeters • Automatic Controls • Heat Treating Furnaces

SCIENCE

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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

Lancaster, Pa. Garrison, N. Y.

New York City: Grand Central Terminal

Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary in the Smithsonian Institution Building, Washington, D. C.

PROCESSES OF ORGANIC EVOLUTION[1]

By Professor R. RUGGLES GATES

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OMITTING the Greek philosophers and the adumbrations of the early naturalists, the first thorough-going theory of evolution may be said to be that of Lamarck. In his time, however, even the elements of physical and chemical science were in a rudimentary state, so that the nature of organic structure and functioning was but little understood. His theory of the direct impress of adaptive modifications on the organism and their transmission by inheritance to future generations failed to convince the world at large of the fact of evolution and has since failed of acceptance by critical students of evolutionary processes. Darwin partly accepted this principle of the inheritance of acquired characters, which was only natural, considering the very sketchy and inadequate knowledge of the nature of reproductive processes in plants and animals in the middle of the nineteenth century, when the "Origin of Species" was written. It may even yet find support in some subtler serological form.

Darwin, however, stressed his principle of natural selection as the main force causing evolutionary adaptation. This theory was derived in turn from an extension of Malthus's law of human populations, and still stands as an almost universally accepted process in the modification and replacement of species. But evolutionists still differ widely in the emphasis they would lay on natural selection in comparison with other evolutionary processes. Darwin relied upon the selection of variations of all kinds occurring in large numbers in the species, but in his time very little was known either of the nature of these variations or the manner of their inheritance. Had Mendel's paper on

[1] Substance of a lecture at the University of California, Berkeley, November 27, 1940.

where he can easily reach the switches and controls (all located on the front panel of the rack) and then can look through the large eye pieces at the magnified image of the specimen under observation. At the twist of a knob, he can adjust the brightness of the image, bring it into sharp focus or vary the magnification over a wide range. He can turn another knob and adjust the position of the specimen until the most interesting portion of the field comes into view. This latter control, by the way, affords an extremely fine vernier motion by means of which the image position can be set to within a sixteenth of an inch even when the image magnification is 30,000 times. This means that the actual position of the specimen can be set to within two one-millionths of an inch!

Exposures of the image can be made on a photographic plate by simply twisting a control on the side of the instrument. The average exposure time used is about twenty seconds.

A special interlocking valve system enables specimens and photographic plates to be changed without breaking the vacuum in the entire system, thus greatly speeding up operations. Only about one minute is required for changing specimens, and approximately three minutes suffice for introducing a fresh photographic plate.

The plates are of the standard glass type used in ordinary photographic work and are ten inches long so that several exposures can be made on each plate. A control on the side of the microscope column varies the width of the electron image so that exposures of several sizes can be made.

The facility of operation of this microscope is such that as high as one hundred and fifty pictures can be taken in a single day, provided the specimens have been prepared in advance or are of such a nature as to lend themselves to ready preparation.

The power supply contains the most important improvements of all, however. No bulky transformers or filter packs are used even though a voltage of 60,000 volts is produced. Unique circuits are employed to generate this voltage and, incidentally, regulate it to better than one part in 50,000. The low voltage supplies which produce current for the condenser, objective and projection lenses are also regulated to the same degree. This stability assures good results under a wide variety of working conditions.

H. E. RHEA

RCA MANUFACTURING COMPANY, INCORPORATED

A SENSITIVE COLOR REACTION FOR 2-METHYL-1-4-NAPHTHOQUINONE AND RELATED COMPOUNDS

THE color reaction of Dam and coworkers,[1] while lacking in specificity,[2] has been useful in the investigation of vitamin K concentrates and in studies relating to its distribution, etc. Unfortunately, it is not suitable for a quantitative test because of the changing color.

We have found that the sensitivity and stability of the reaction is greatly increased when it is not based directly on the quinone, but on 2-4-dinitro-phenyl-hydrazine. This reaction can be employed for a quantitative test.

To 1 or 2 drops of a methanol or ethanol solution, containing not over 0.1 mg of 2-methyl-1-4-naphthoquinone, or related compounds, add 3 drops of a 1 per cent. solution of 2-4-dinitro-phenyl-hydrazine in 2N hydrochloric acid. Warm gently for a few seconds, cool, add 3 drops of ammonia solution (D: 0.910), shake, and then add 1 cc of amyl alcohol. A green color appears. On the addition of water the color is separated in the amyl alcohol phase. Its depth is proportional to the quinone present, and it is stable. Instead of ammonia, sodium methylate (0.5 cc of a 5 per cent. solution in methanol) can be used. In this case the color is bluish green, and it is not necessary to add amyl alcohol for its development; however, it is also soluble in this substance.

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[1] Dam *et al.*, *Helv. Chim. Acta*, 22: 310, 1939.

[2] Fernholz, Ansbacher and Moore, *Jour. Am. Chem. Soc.*, 61: 1613, 1939.

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