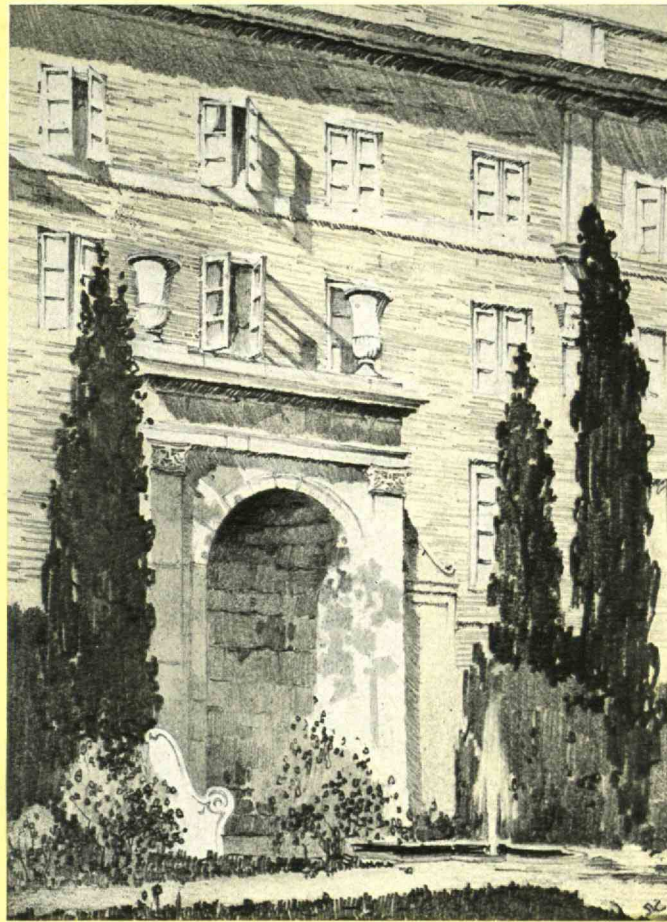


THE TECHNOLOGY REVIEW



MAY
1926

RELATING TO THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



"The Song of the Shirt"

WITH FINGERS weary and worn,
With eyelids heavy and red,
A woman sat, in unwomanly rags,
Plying her needle and thread.
Stitch—stitch—stitch!
In poverty, hunger, and dirt;
And still with a voice of dolorous pitch
She sang the Song of the Shirt.

"O men with sisters dear!
O men with mothers and wives!
It is not linen you're wearing out,
But human creatures' lives!
Stitch—stitch—stitch!
In poverty, hunger, and dirt—
Sewing at once, with a double thread
A shroud as well as a shirt!"

—Thomas Hood.



ELECTRICITY

—the great emancipator



More than half of the homes of the nation are now able to enjoy the comfort and convenience of electricity. But hardly any home is yet allowing this cheapest servant to do *all* that it *should* do. Wherever electricity is generated or used you will find electrical products bearing the initials G-E—make them your guide.

TOM HOOD'S poem swept over the world. It was one of the first influences that made lawmakers and humanitarians and scientists see that women's lives are too precious to be wasted in the daily toil of routine tasks.

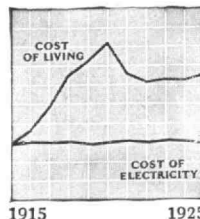
Wise laws already have limited women's working hours. But another kind of force than law has also been at work. The great emancipator is electricity.

No wise manager of a factory now asks any woman to do by hand a task that an electric motor can do.

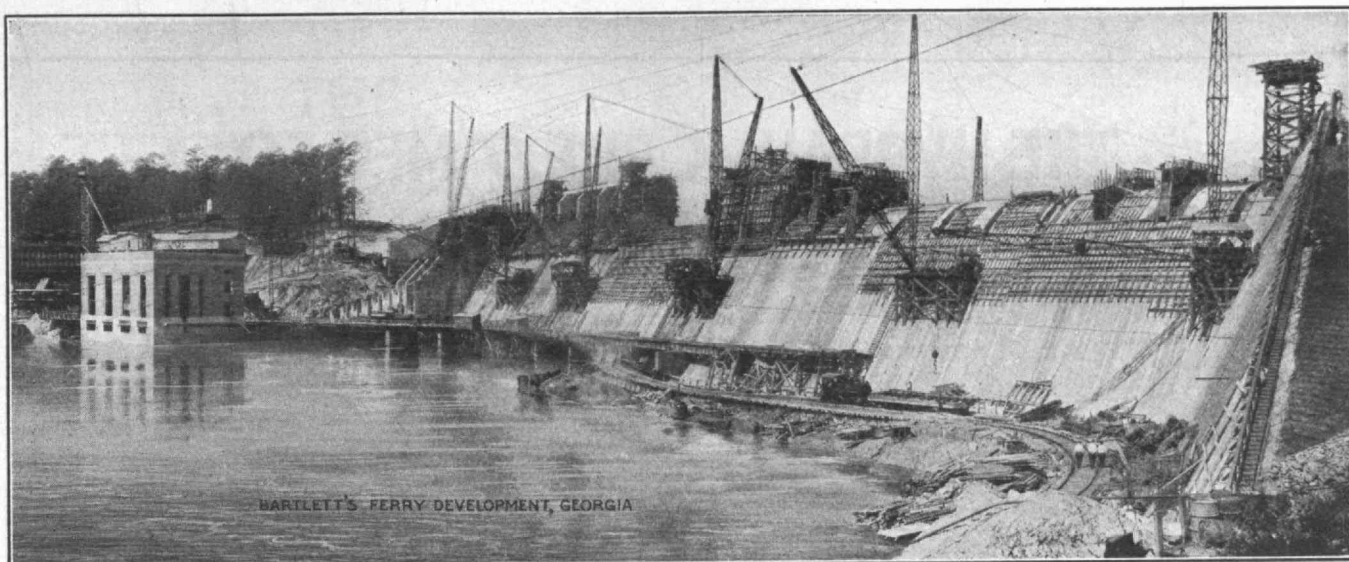
No wise husband allows his wife to do by hand the old, heavy tasks of washing, and sweeping, and pumping, and sewing.

With cheap electricity, and with electric light and power lines reaching far out into the countryside, we have learned that it is bad sense and poor economy for *any* woman to do *any* work which electricity can do for a few cents an hour.

What hard task is there in your home that electricity could do just as well and at little cost?



GENERAL ELECTRIC



New Water Power Construction

NEW water power construction by Stone & Webster includes a variety of plants providing power for both public utilities and isolated industrial establishments. The work is widely distributed, the southernmost development being in Georgia on the Chattahoochee River, the northernmost in Michigan on the Menominee River, the most easterly in New Hampshire on the Merrimack River, the most westerly in Washington on the Baker River. Old plants have been reconstructed securing maximum power from existing stream flow, and new plants have been built, some high head and some low head with dams including both concrete and earthfill construction; there has been tunnel work.

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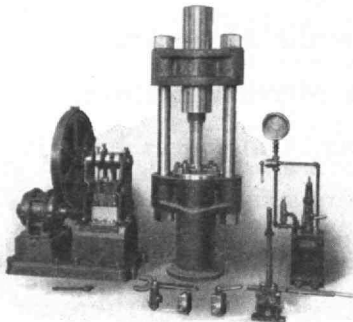
FACTORY
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OHIO.
U.S.A.
SINCE
1877

Mount Gilead, Ohio.
May 1st, 1926.

Dear Alumni:-

I have told Reg. Smithwick to count me in on our five year class reunion this June. I hope to see a lot of you twenty-one'rs "back to Tech".

However, this is intended to be an "All-Technology" letter. Getting down to business - I am going to be with you on this page each month to talk "HIGH PRESSURE", (not that I am a high pressure salesman in the usual sense). I am doing this, believing that many M.I.T. men are in work that touches on the various applications of high pressure hydraulic power. Designing and building machinery for this service is the field of our company.

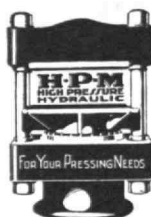


This month as the first example of H-P-M High Pressure apparatus, I call your attention to the Hydro-Static testing outfit which we placed in Professor Hayward's Testing Materials Laboratory a few years ago. The attached small photo shows the principal items, i.e. - a 2-1/2 horse power motor driven H-P-M Pump with a pressure capacity of 5500 pounds per square inch, an H-P-M Intensifier to develop 16,000, (thou-

sands, mind you), pounds per square inch, and H-P-M Valves and Fittings which stand this gaff..

Whenever you desire data on high pressure hydraulic machinery - presses, pumps, valves, etc. - please write me. Be sure to call my attention to your Technology connections.

I will hope to hear from many of you.



Yours for Tech.

Howard J. McMillin
Second Vice-President II-21.
THE HYDRAULIC PRESS MFG. CO.

THE TECHNOLOGY REVIEW

RELATING TO THE MASSACHUSETTS
INSTITUTE OF TECHNOLOGY

PUBLISHED MONTHLY, FROM NOVEMBER
TO MAY INCLUSIVE, AND IN JULY
AT CONCORD, N. H.

EDITORIAL OFFICE, ROOM 3-205, MASSACHUSETTS
INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

Vol. XXVIII

No. 7

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PUBLISHED AT THE RUMFORD PRESS, 10 FERRY ST.,
CONCORD, N. H., FOR THE ALUMNI ASSOCIATION

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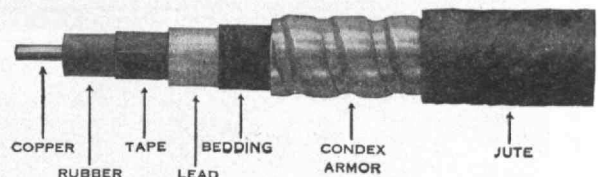
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Entered as Second Class Mail Matter at the Post Office at
Concord, New Hampshire

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TERMS:—\$3.50 a year, in advance; a single copy, 50 cents. To under-
graduates of the Massachusetts Institute of Technology, \$2.50 per year,
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The TECHNOLOGY REVIEW

RELATING TO THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOLUME XXVIII

MAY, 1926

NUMBER 7

The Past Month

GEODETTIC and seismic investigations by which it is hoped to add to the store of knowledge on the problems of earthquakes and readjustments in the earth's crust, will be started by the Institute this summer. It is planned to make a modest beginning and add to the equipment in instruments as the importance of the work develops in the future.

Camp Technology, near East Machias, Maine, where field work in surveying is given during the summer, has been decided upon as an excellent location for such investigations. The rocky foundation of the country and its isolation well adapt it for the purpose and, as it will be the only station in the extreme northeastern part of the country, it will not duplicate the observations of others.

The station is established not only for the object of seeking new knowledge toward solution of geodetic problems but to develop experts in this branch of science. George L. Hosmer, '97, Professor of Geodesy, who will be in active charge of the field work, expects to establish a base line from which geodetic surveys can be started this year. The task requires instruments of great precision and a special theodolite has been built for the purpose.

It is known that relatively large changes have taken place in the latitude and longitude of certain established points on the earth's surface. Some of these are caused by systematic variations, and earthquakes cause other changes. But there are certain movements of the earth's crust that cannot be attributed to any known cause. Within recent years, for example, scientists have been puzzled by a tilting of the land toward the sea. These changes, which have

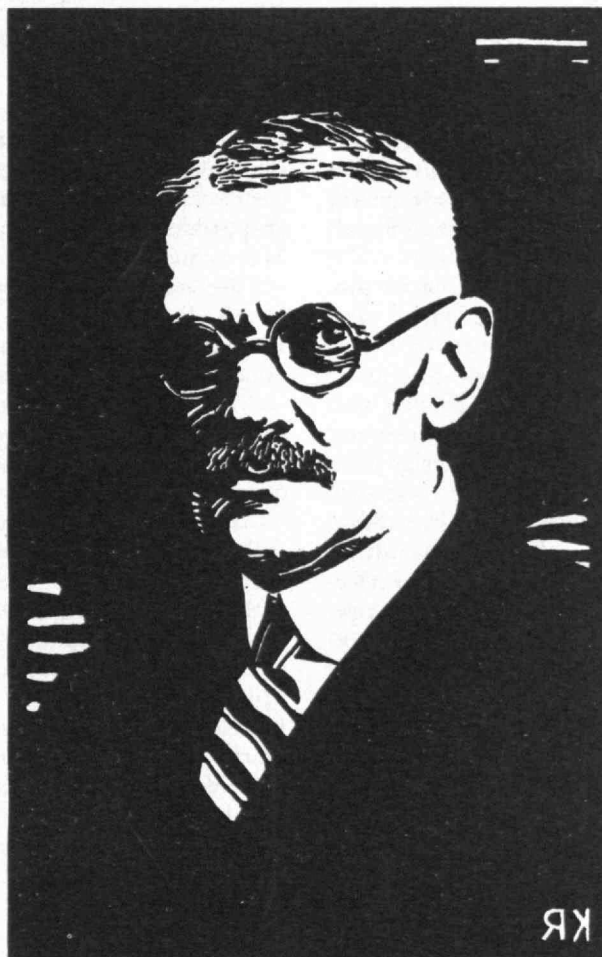
been detected in the leveling work of the Coast and Geodetic Survey, cannot be wholly accounted for by any known tidal action or rise and fall in the land.

It is expected that the seismograph which will later be installed at the station for the measurement of earthquake waves will be one recently developed by Dr. Harry O. Wood and J. A. Anderson of the Mount Wilson Observatory in California, of which George E. Hale, '90, is Honorary Director. The new instrument differs radically from the older forms of the seismograph. It has the advantage of a short vibration period, which is important in measuring the waves of earth shocks, and is highly accurate. No installation date is yet set.

It will record photographically instead of mechanically as the older instruments do, and because of its light weight will be less subject to mechanical difficulties due to friction and to variations of temperature. A Mendenhall invariable half-second pendulum will be used in gravity studies and the astronomical observatory already established on the site will be part of the station.

In addition to beginning work on the base line this year, measurement of the angles in triangulation surveys will involve erection of several towers about fifty feet high to allow unobstructed observation above the tree tops. A line of precise levels will also be started.

FOR its 119th meeting held in the Faculty Room of Walker Memorial on March 29, the Alumni Council spent most of its time in a discussion upon the then forthcoming and (as we go to press) nearly accomplished meeting of the Technology Clubs



From a woodcut by Kenneth Reid, '18

HENRY F. BRYANT, '87

Distinguished civil engineer, and this year sole nominee for Vice-President of the Alumni Association for 1926-1927

Associated in Cincinnati on April 23 and 24. A series of hair-tearing telegrams from out of Cincinnati raised vividly before the Council the question of whether or no the meeting was to be held. Several difficulties in program temporarily disheartened the out-of-Boston alumni contingent as represented by the Cincinnati Club, and after considerable debate, which concerned not only the immediate problem of the April meeting, but likewise the broader question of what place in world affairs the Technology Clubs Associated ought really to hold, the Council voted to request the managers of the Convention to proceed along previous lines. Heartened by this demonstration, Cincinnati had the Convention although the results cannot be included in this issue of The Review.

As further business the Council listened to two reports: one by Mr. Denison, then just returned from his discovery of the Far West, and another by Allan Winter Rowe, '01, upon the subject of the standardization of the Technology colors, the cardinal and gray. Mr. Denison gave facts, figures and anecdotes, was heckled and made retorts, explained the Mystery of the Missing Briefcase, and, in general, was his accustomed self.

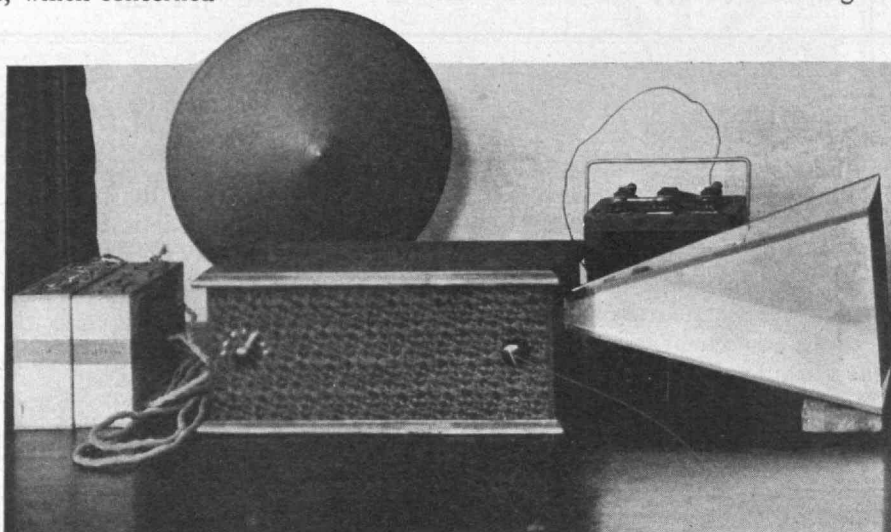
Dr. Rowe exhibited considerable concern over the decay of the color sense among Technology men. Through his courtesy The Review excerpts the official version of his presentation:

"From time to time the question arises as to the exact colors which constitute the so-called official cardinal and gray of the Massachusetts Institute of Technology. Some years ago the question again arose as it was deemed advisable to standardize these shades, the immediate necessity being uniformity in the insignia worn by our athletes. As cardinal red was designated as the dominant color, an attempt was made to secure samples of materials so designated. . . . Ultimately,

through the initial courtesy of the Reverend George L. Coyle, S.J., a well-known expert on textile colors, I was enabled to secure a piece of silk forming a portion of a vestment of William Cardinal O'Connell, to whose courteous coöperation I wish to record my sincere indebtedness.

" . . . Realizing that the silk in

question might not retain its shade, I conferred with Dr. S. P. Mulliken ['87] of the Institute to enlist his interest in the matter and utilize his high degree of expert knowledge concerning the dyes producing this color. . . . Feeling the matter to be both important and emergent, I desire to place the matter before the Alumni Council with the following rec-



WE LISTEN IN ON LIGHT RAYS

The receiver of the apparatus recently designed by Donald C. Stockbarger, '19, of the Department of Physics. Across the page you will see the transmitting end

ommendations for action at the discretion of that body:

"First, that the President of the Alumni Association shall appoint a Committee to decide upon and standardize two colors, one a cardinal red, the other a silver gray, which shall be accepted as the official colors of the Massachusetts Institute of Technology.

"Second, that this Committee shall consist in part of Dr. S. P. Mulliken, as Chairman; and Mr. Charles Bittinger as a constituent member; with such other individuals as the President may select.

"Third, that with the adoption of the respective colors the absorption spectra shall be determined and that these reproducible standards shall fix the colors in question.

"Fourth, that with the designation of the colors, as defined by the absorption spectra, experimental work shall be carried out to determine the dye or dyes together with their methods of application, which will reproduce these standard colors on the different fabrics of silk, woolen, cotton, and mixtures of the same. . . ." Much impressed, the Council unanimously voted Dr. Rowe's resolutions into the record. The personnel of the Alumni Dormitory Fund Committee was announced as a concluding feature of the evening. The members are H. F. Bryant, '87, H. A. Morss, '93, T. B. Booth, '95, Gorton James, '10, and H. B. Richmond, '14.



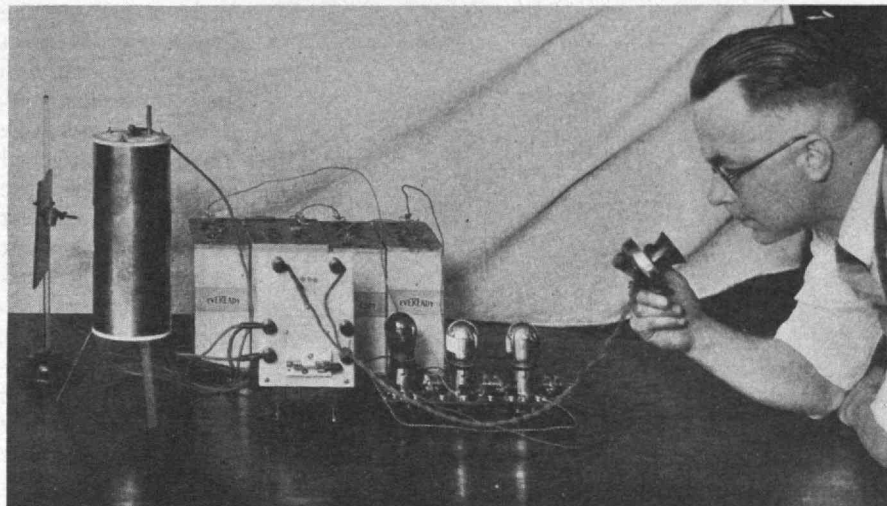
OBVERSE

The new and striking medal in memory of George Swartz, '24. Sculptor John Wilson is the designer

SOMEBODY told it to a newspaper; told only part of it, and part of what they told was wrong. Verification was overlooked in the rush of press time. Hence a "scoop", inaccurate, misleading — embarrassing to the innocent individual and Technology.

Donald C. Stockbarger, '19, instructor in the Department of Physics, has prepared a paper for publication in a forthcoming number of a technical journal describing his researches in "directional radio" by the transmission of the spoken word on a beam of light, and now the true story can be told for the first time.

The genesis of Mr. Stockbarger's discovery lay in a



WE TALK ON LIGHT RAYS

Here is Mr. Stockbarger talking into his beam of light. For description of the apparatus and process see the story on this page

quartz mercury vapor arc the current through which and the light from which is modulated by the voltage impressed upon it from a radio receiving set. Although the appearance of the arc remains entirely unchanged so far as the eye is concerned, the minute fluctuations, if received upon a potassium hydride photo-electric cell, may be amplified into a current which with perfect fidelity reproduces the message.

Not only has he developed an apparatus which will transmit his voice, music or other sounds on a beam of light to a receiving device which will make them again audible, but his apparatus possesses two important features: (1) It is perfectly directed and by it one could signal from a boat to an airplane or vice versa without the use of special code or fear of eavesdropping, for no one outside the path of the light ray would receive the message; (2) the entire operation of transmission can be concealed: in his laboratory, Mr. Stockbarger has already sent signals successfully, using only invisible ultra-violet radiations. These invisible radiations he can produce and control as successfully as ordinary light.

Thus far the transmission of sound by light has not been developed to the point where great distances may be covered nor is it to be expected that this method of communication will ever compete with the present-day radio methods, since light is easily absorbed by smoke, fog and other atmospheric conditions.

Mr. Stockbarger substitutes a small quartz mercury vapor arc lamp for the oscillator tube in an ordinary small radio transmitting set, operated on direct current so regulated as to take normally a current of one ampere. "It is coupled," says his description of the procedure, "to an ordinary radio receiving set

where customarily a loud speaker would be attached, with a high ratio step-down between it and the output terminals of the set. Fairly loud signals, after amplification in the set, produce an alternating current in the arc which may be as large as one-tenth of an ampere. The total current in the arc, being the algebraic sum of the direct current and the alternating

current, changes in value at a frequency equal to the frequency of the alternating current. Since the latter flows forward during one-half of a cycle and then backward during the next half cycle and so on, it follows that the current through the arc is greater than one ampere during one half-cycle and less during the next half-cycle. The intensity of the light from the arc increases and decreases just as fast as the current does, and by an amount proportional to the amount of current change and therefore to the magnitude of the alternating current. The stronger the signal, whether it be from a violin note, or any other sound, the greater is the alternating current and the greater is the resulting flicker in the light. The higher the pitch of

the sound producing the radio signal, the more rapidly the light flickers."

Having once translated his collection of sounds into flickers, he proceeds to make it audible at the reception point by means of an ordinary radio set in which no radio frequency amplifier is employed, but the crystal or vacuum tube detector is replaced by a photo-electric cell. The flickering light passes through a small window in the silvered photo-electric cell bulb and thereby causes a pulsating current to flow. The loud speaker does the rest.

In imagination, Mr. Stockbarger can establish a sending apparatus on the steps in front of the main entrance to the Institute building and talk to his Department Head, Professor C. L. Norton, '93, in the window of his office on the eastern wing of the building. And no one can listen in unless he gets in the light path. Then, Mr. Stockbarger can swing around and say something to Professor E. F. Miller, '86, who will conveniently place himself just outside the door near his office in the western wing. What he tells Professor



REVERSE

The George Swartz medal will be given every year hereafter for excellence in athletic managership

Miller, he can keep secret from Professor Norton, and furthermore, if he uses ultra-violet radiations, neither will know when he is talking to the other.

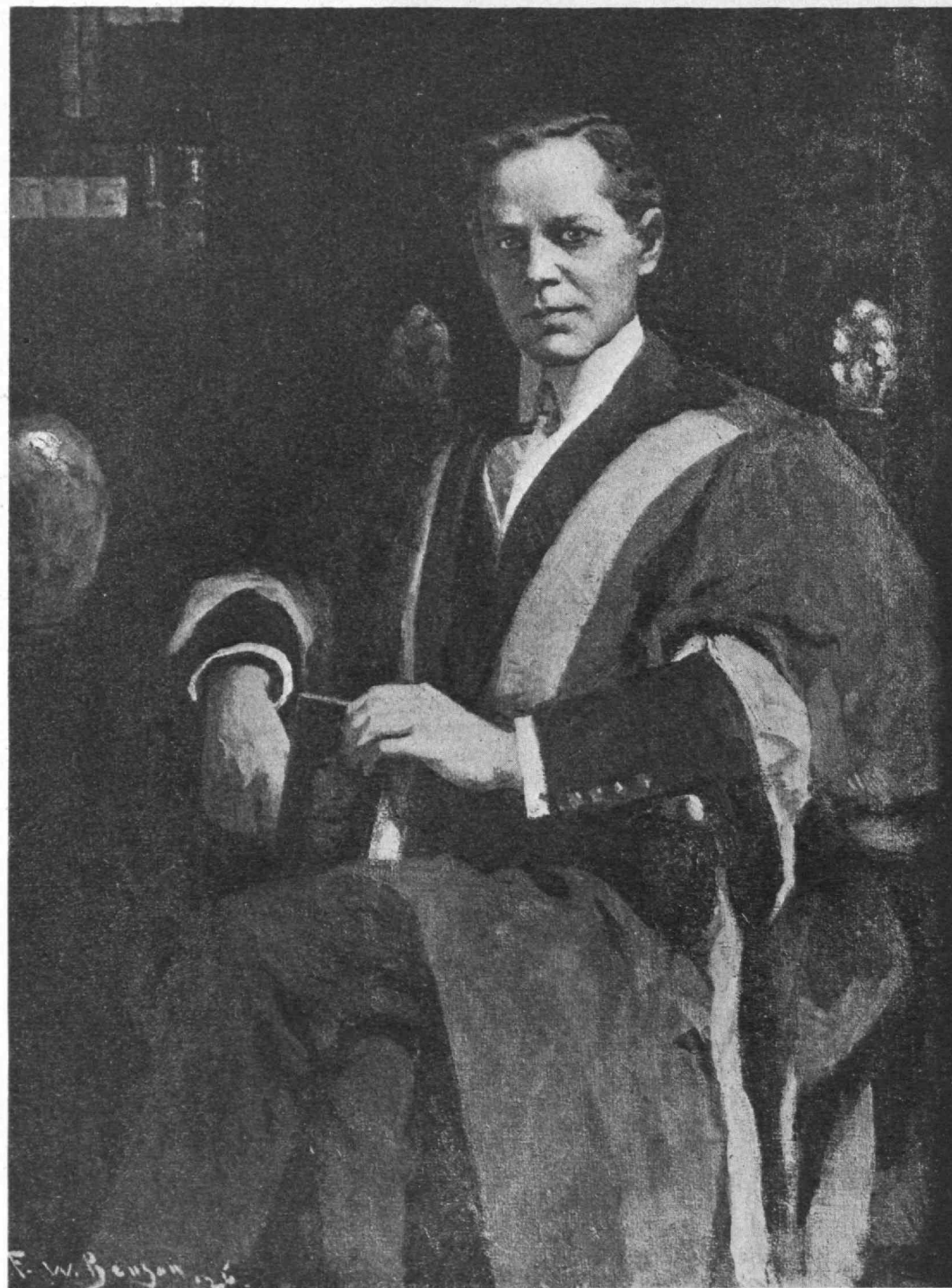
COMMUNICATION electrically by means of light is not in itself new. Before the days of radio other methods were tried and since then the subject has had much consideration.

Alexander Graham Bell on August 27, 1880, at a meeting of the American Association for the Advance-

ment of Science, delivered a lecture on the production of sound by light. He described a device, which he termed the "photophone," by means of which he and his co-worker, Sumner Tainter, had been able to transmit sounds with a beam of light. He varied the intensity of the beam through the use of a delicate mirror which vibrated when sound waves struck it. At the receiving end the varying light fell upon a selenium cell whose electrical resistance decreased and increased as the light increased and decreased, and so permitted a

variable current to flow through a battery and telephone receiver connected in series with the cell. Bell stated that this variable current reproduced the original sounds in the receiver, and that he had been able to receive spoken words at a distance of over 200 meters from the vibrating mirror. Since the apparatus which he had at his command was crude compared to modern equipment, it is probable that the quality of reproduction obtained was far from satisfactory. At any rate the idea appears not to have been developed.

M. Luckiesh in his book "Ultraviolet Radiation" published in 1922, refers to the work on signaling by ultra-violet radiation during the World War which "was accomplished by directing the invisible beam upon luminescent substances. . . . One of the problems in such a case is to conserve the ultra-violet energy. It can be directed by a parabolic mirror and caught by another at a distance. In the first case the source of the radiation is at the focus of the mirror and in the second case the 'lumines-



RICHARD COCKBURN MACLAURIN

At a reception given on April 15 by the Corporation this portrait by F. W. Benson was placed on public view for the first time. It will hang in the main lobby