WHY WAIT?

(From Los Angeles Times)

Weary after a long life of usefulness and successful endeavor, approaching the last milestone on a journey filled with kind thoughts and generous deeds for his fellow-beings, seeing little hope of being any further benefit to the world his inventive genius had so greatly enriched, an aged man anticipated the certain and probably early end by his own act, leaving behind the laconic farewell message, "To my friends - My work is done. Why wait?"

So America parts from one of its famous citizens, George Eastman, whose gift to popular pleasure, knowledge and profit, the Kodak camera, has made his name known in every civilized nation. How much his famous device has done to brighten the lives of the millions who like himself must write "It is finished" at the close of their work on earth, let those who have sent or received its scattered feathers from the wings of memory answer for themselves.

Some friend or relative it may be, or one nearer and dearer still, a mother, a favorite child, comes back to us today through the snapshot taken years ago when a happy scene at a happy moment suggested the pure joy of the picture; children romping with a dog on a sunny lawn; a beach group under a gay-colored umbrella; granny taking a siesta on the south porch; the little woman as she plucked a rose in courted days for him who was to travel with her through life. And for these priceless treasures the whole world owes a debt to the man who has just passed behind the veil.

George Eastman spent his whole life, on the business and human side, in ministering to the needs of mankind and not the kindest remembrance in which he will be held is his gift of the Kodak camera made attainable for the poorest family. Without this, his many philanthropies and deeds of public and private generosity would still have endeared him to his countrymen.

His life was long and useful and at the end torn with physical suffering. As for his last question, "Why wait?" we can leave the answer of it to the loving Savior Who said to His weary disciples in the Garden of Gethsemane, "Sleep on now and take your rest; the spirit truly is ready but the flesh is weak."
Brick Church Life

May, 1932
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Obituary articles
Letter from the Pastor

DEAR FRIENDS OF THE BRICK CHURCH:

This last month has brought the usual change in our church activities. Our Wednesday night services, for instance, have been terminated for this season. For these services a very regular constituency has been built up and a steady attendance has been maintained with practically no effort in the direction of publicity and promotion. A number of our people have been interested also in the book review group which has been meeting at 8:15 following the lecture and discussion hour. We had two very interesting discussions in the book review group last month led by Professor T. Russell Wilkins of the University of Rochester and Mr. John A. Lowe, our new city librarian. The interest in this group has raised the question whether we ought not to promote other groups of this sort for adults in our church who would like to follow other lines of study. The issue of the church's responsibility in the entire field of adult education in our time is involved in this question.

Our April social at which those who had joined our church during the last year were our guests was a marked success. The entire seating capacity of our dining room was used at the dinner. The young people of our Sunday Evening Club acted as hosts and hostesses and also furnished extremely good entertainment in the play “Squaring It With the Boss.”

From May 8th to 11th I shall be away from Rochester attending the Biennial Convention of the Young Women’s Christian Association at Minneapolis. We are very happy that Dr. Taylor has consented to occupy the pulpit on May the eighth and we know that you will all be at church that Sunday to give him a genuine Brick Church welcome.

Dr. Gutelius has been elected a commissioner from the Presbytery to the General Assembly which will meet this year at Denver, Colorado. Dr. and Mrs. Gutelius will make the journey by automobile, and we shall all wish them a good vacation time for the trip out and back. I know that there will be no vacation for them at the General Assembly.

Hoping that these spring days may bring new courage and confidence to us all, I am

Your friend and pastor,

* 

BRICK CHURCH SPRING SOCIAL

A superlative success—nothing sadder could characterize our general church social which was held the evening of Friday, April 19th. The young people of the Sunday Evening Club were in full charge of every feature of the event. They received universal praise and compliments of the highest sort. This closing social of the season was, as is the case each year, in honor of the new members who had united with the church during the past year. All such were invited guests. Quite generally they were present. Each was designated by being given a fine pink carnation and a place of
BRICK CHURCH LIFE

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George Eastman Museum

Obituary articles

New Members

The following new members were received at our last Communion, the first Sunday in April. We give them all a very hearty welcome.

ON CONFESSION
Milton Allen Angle, 320 Hazelwood Ter.
Mrs. Katherine Poorman Babbitt, 554
South Goodman Street.

Eleanor Parker Davis, 128 Rosedale St.
Martha Elizabeth De Weese, 33 East
Parkway.

Barbara Edith Greeno, 7 Highland Park-
way.

John Rensselaer Holton, 137 Aldine St.
Harry Eugene Johnston, Jr., 109 Ambas-
dador Drive.

Allen Farley Johnston, 109 Ambassador
Drive.

Mary Motley Johnston, 109 Ambassador
Drive.

Lina Lou Kellogg, 54 Thorneale Terrace.

Jean Livingston, 290 Kenwood Avenue.

John Adams Lawn, Jr., 175 Croyten Rd.
James Morton McKinney, 100 Nunda
Boulevard.

Marjorie Rachel Parry, 11 Woodlade St.
Mrs. Ruby J. Rasy, 15 Catalpa Road.

Bradford P. Squire, 91 Avalon Drive.

Raymond D. L. Smith, 861 Arnett Blvd.

Virginia Brooks Stedman, 443 West Ave.

Russell Wray, 138 Leland Avenue.

BY LETTER
Wayne X. Babbitt, 554 South
Goodman St., from First Presbyterian
Church, Albion, N.Y.

Charles P. Bandel, Veness Avenue.
Greece, Charlotte Station, N.Y., from
Westminster Presbyterian Church, Roch-
ester, N.Y.

Mrs. Mary Gertrude Beascher, 3 Beech-
wood Street, from First Universalist
Church, Rochester, N.Y. (Formerly mem-
ber Brick Church.)

Alfred E. Brooks, 100 Hoover Road,
from First Methodist Episcopal Church,
Burlington, Vt.

Mrs. Mildred Stanbrook Brooks, 100
Hoover Road, from Calvary Baptist
Church, Rochester, N.Y.

Dr. Lawrence R. Burridge, State Hos-

honor at a supper table. The Club issued
a special Spring Social number of their
periodical, the S.E.C. BLANK, and
placed a copy in the hand of every at-
tendant. These were the opening words:
"WELCOME! To the members of Brick
Church; we covet this opportunity of be-
coming re-acquainted with you. To the
new members especially we extend a
cordial welcome to the fellowship of Brick
Church. To members old and new—the
Sunday Evening Club welcomes you and
hopes that you will enjoy the Spring
Social to the utmost."

At each table a young man and young
woman of the club acted as host and
hostess and made it a point to see that
all at the table became acquainted with
one another. The very large attendance
and the remarkable happiness and soci-
ability of the evening must have gratified
every member of the club and conveyed
assurance of appreciation.

Following the dinner a musical pro-
gram was given in the church auditorium.
Mr. Harold Gleeson at the organ. Miss
Florence Koome rendering greatly ap-
preciated violin selections, and Mrs.
Clifton L. Stowe, of our quartette, giving
several delightful contratelo solos. At the
same time movies were given for the
youngerst in the upper Sunday School
room. At 8:30 everybody went to the
Institute Assembly room, where members
of the club put on the one act comedy,
"Separating It With the Boss." The cast:
"Beth," Lil Kempster; "Jimmy," Ray-
mond Boyle; "Johnny," Charles Smith;
"Aunt Hortense," Gertrude Mason;
"Aunt Clarissa," Grace Harrison; "Mr.
Cornelius Dunne," William Harrison;
"Peterkins," a cat. The Director, to
whom much praise is due, was Mr.
Harold Scineks.

The immense and almost constant ap-
plause gave sufficient evidence that the
rendition was a remarkable success.

Following the play there were games
for the boys in the bowling alleys, in
charge of Fred Coots, and for the girls
in the lecture room in charge of Elizabeth
Bartholomew. For all others there was
dancing in the Institute Assembly room.
Joseph Farley

A long and fruitful life was brought to its earthly close by the death of Mr. Joseph Farley. This occurred on Saturday, April 9th, in his ninety-fourth year. During early manhood Mr. Farley was a member of the Brick Church. As a trained musician he was for a considerable time our church organist, as also in charge of the music at the week-night devotional services. When the Plymouth Congregational Church was organized he enlisted in the new enterprise as a devoted helper. When that church was discontinued, in 1901, he renewed his communicant connection with Brick Church. Very happy in the resumed relationship he manifested a deep interest in all the church's activities. Up to the closing days of his life he was almost never absent from the services.

Mr. Farley had led an active business life. He was first a miller and then a prominent shoe manufacturer. He was also a member of various institutional and financial boards, where his counsel was always sought and valued. He was always keenly interested in worthy civic enterprises, giving freely of his time and money for their advancement. He will long be remembered as a citizen of Christian fidelity and solid worth who did much for the progress of Rochester along desirable lines during many years in which he was active in business and civic affairs.

He is survived by one son, Mr. Joseph Allen Farley, who is Chairman of our Board of Trustees; by two daughters, Mrs. George Motley and Mrs. Harry E. Johnston; a sister, Miss Mary A. Farley, and by eight grandchildren and three great-grandchildren.

We extend our affectionate sympathy to the entire family circle.

Camp Pioneer, on Seneca Lake, will be open beginning July 4th, for six weeks. It is a Boy Scout camp, and a lot of our boys are going. It will pay parents of boys of the proper age to look up the advantages of this camp.
Letter from Dr. Taylor
316 Auburn Avenue,
Chesterhill, Pa.,
April 18th, 1922.

Dear Friends:
The high regard in which Mr. Eastman was held was in no way more convincingly shown than in the restraint with which the newspaper press, the public and his friends referred to the manner of his death.

He was a man to whom Reason and Action—Action guided and impelled by Reason—were the prime elements of a successful life. A logical conclusion, calling for action, became to him a mandate.

He was old, he was sick, he was tired, he was lonely—though he had devoted friends. He dreaded the progressive decline of his physical and mental powers. He had made his contribution to the life of the world, and a magnificent one it was. He felt that he could add nothing significant to it. If he lived he would only be a burden to himself and others. So, "why wait?"

He evidently had thought deeply and long about the right of a man to end his own life. But it was not in his nature to continue indefinitely in suspense on such a subject. Reason must have a conclusive answer to give. He must make up his mind. He did; and, as I believe most of us think, made it up wrong. He acted as his reason dictated. But there can be little doubt that illness, weakness and long and lonely brooding had disturbed the fine balance of his judgment and self-control—at least on this matter.

The death of such a man by his own hand, together with the alarming increase of suicide among business men in recent months, forces the whole question to the front for a fresh examination. We have no right to pronounce a judgment of condemnation in any particular case. No scales of ours are delicate enough to weigh the allowances that should be made. But it is our duty to look into
BRICK CHURCH LIFE

the moral character of such a catastrophic act as suicide, and, if it appears to be wrong, to condemn it.

* The ethical quality of suicide has been much discussed. Many of the finest minds, ancient and modern, have been concerned with it. The early Greeks regarded it as "unnatural and reprehensible," and unlawful. Socrates, in Plato's "Phaedo," expressed himself rather equivocally, but a fair inference is that he would justify it in highly exceptional cases. Plato and Aristotle were against it. "With the decay of national thought and character" the Greek Stoics argued for it. The Roman Stoics followed. Seneca contended for it. David Hume, English historian and philosopher, wrote an essay defending it, which, doubtless by the advice of friends, he suppressed, and it was not published until after his death. Though he was dying for more than a year, of a wasting disease, he did not exercise the right he claimed for himself and others; but, despite his lack of Christian faith, set a shining example of patience and cheerfulness. Rousseau and Goethe adopted "a less rigorous attitude"—presumably than the popular one. Schopenhauer and Nietzsche, philosophical pessimists, were, of course, advocates of it. But some of the greatest names in the history of German philosophy—like those of Spinoza, Kant and Fichte—must be listed in condemnation of it. Suicide in a most repulsive form, "harakiri" still holds its ancient place in Japan's code of honor.

These few quite random references will suffice to show that we have here a question far too serious to be decided in individual snap-judgments.

* Unless the Sixth Commandment, "Thou shalt not kill," be understood as applying to the killing of oneself, Scripture contains no explicit prohibition of suicide. The commandment may be so interpreted without doing violence to the language. But it is, at least, open to question whether suicide comes within its original scope. Suicide was exceedingly rare among the Hebrews. In the many centuries covered by Old Testament history, mirroring frankly, as it does, every phase of human life, we have only four instances of it. King Saul, defeated in battle and wounded, fell upon his own sword; his armor-bearer followed suit. Absalom, cornered by Absalom in his conspiracy against his father, King David, when he found that his advice was not taken "gat him home . . . put his household in order and hanged himself." Zimri, for seven days king of Judah, defeated in battle, went into his palace, set it afire and died in the holocaust. Perhaps Samson should be added.

In the New Testament we have but one case, that of Judas.

* Cold, practical Reason may defend the right of a man to terminate his life. But man does not live by reason alone, any more than he does by bread alone. There are values in life that Reason does not provide, or discover, or evaluate, and that it cannot satisfy. The great name of Pascal stands over these pregnant words: "The heart hath its reasons that Reason doth not know."

* Self-destruction causes a needless excess of pain to relatives and friends who survive. Natural death brings grief. If it be sudden there is shock. But self-inflicted death intensifies both grief and shock and adds an element of horror whose dark shadow never quite departs from the mind. It cannot be forgotten.

* We are suggestive beings. We follow example. Every suicide makes other suicides more easy and more certain. Perhaps we might become accustomed to it if it should become the common practice. But would our spirits be the finer for it? Would the level of life be as high?

* In his Easter sermon Dr. Nixon declared his faith—which is also ours—that "in every person there is a seal in the making which death will not destroy."
In this "making" of souls life's natural changes play an essential part. "Not change for change's sake, but change for life's sake." The change from youth to maturity, from school to business, from single life to married life, from health to sickness and back again to health, from success to failure and from failure to success—every change, leading to successive periods of life, presents an opportunity for the development of new spiritual forces. And how may one's growth in the spirit be measured? Not by any rule of reason; "rather by the intensity of one's deep convictions, the persistency of spiritual awareness, the capacity for spiritual wonder and surprise; by the things one outgrows and leaves behind; by the trophies he never ceases to seek to win; by the times he rises when he falls."

Who does not see that, of all the periods into which life naturally falls, old age is one of the richest in these possibilities? It is the natural ripening time for a life—the time for action to quiet down into reflection, the time for patience, submission, gentleness, sweetness, hope, faith and love all to come fully into their own. Who can tell how much he loses who refuses this period, and any of the preceding periods, and escapes through the door of suicide?

The writing of this letter has been a difficult and painful effort. It is necessarily so incomplete. There is so much more that needs to be said. It is in itself a painful subject. And I may be hurting somebody very much. But so many men and women are desperate these days, and so many are turning to suicide as the way out, that I have written what I have written in the hope that it may help to stay some uplifted hand, and steady the thought of all of us upon the moral and spiritual quality of the act.

We cannot think or speak of any one who has taken his own life with anything but the utmost compassion and charity. How great the unhappiness, how deep the spiritual darkness must have become before such an act is possible. But nothing that can be said can change the fact that suicide is an abhorrent thing, essentially pagan in its philosophy and opposed to the whole Christian ideal of life.

"Ye are not your own."

"None of us liveth to himself, and no man dieth to himself."

"We glory in tribulations also; knowing that tribulation worketh patience; and patience experience; and experience hope; and hope maketh not ashamed; because the love of God is shed abroad in our hearts by the Holy Spirit which is given unto us."

Faithfully yours,

William P. Taylor

P.S.—Word has just reached me of the death of Mr. Joseph Farley. Another dear friend and loyal supporter gone. Quick, nervous, intense, impulsive, he was yet shrewd, cautious and generally sound in his judgment. He was a thinker, independent, courageous, progressive, untrammeled by tradition and authority and never afraid to say what he thought. Many were the hours we talked together on themes about which we differed widely. It was indicative of his breadth of mind that he was willing to listen regularly to a preacher whose views were, on so many points, opposed to his. His friendliness, his reliability, his generous gifts and his unfailing sense of humor will be greatly missed. Altogether, he was a good representative of the sturdy New England stock from which he sprang—the stock that, in these days, we can least afford to spare. But we could not expect to keep him longer. He was in his ninety-fourth year, and had earned his discharge.

Don't forget that I am to preach for you on Sunday morning, May 8th. If you need not hurry away after service please give me the pleasure of taking your hand. It is for that I come, quite as much as for the preaching.—W.R.T.
DOINGS AND SAYINGS

Our next Communion and reception of new members will occur on Sunday morning, June 5th.

Miss M. Gertrude Mason has returned from a much enjoyed visit in New York City.

Miss Elizabeth Bartholomew will spend the month of June and July in a vacation trip to Europe.

Save Wednesday, June 29th, for the general Brick Church Picnic at Corbett's Glen. We'll all be there.

We are glad to welcome back Elder and Mrs. William R. Hardy. They spent the entire winter in the South.

Scout Troops 8 and 15 and Cub Pack 3 had a Parents Night Party on Friday evening, April 29th. Supper was served at 6:30, after which games, stunts and Scout Court of Honor were conducted.

Styles For the Well Dressed Home

In the shadow of the Sibley Clock Tower there is a beehive of activity, folks busily engaged in the pleasant task of furnishing homes . . .

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BRICK CHURCH LIFE.

The Mothers Club held a much-enjoyed meeting on Tuesday, April 30th, at the home of Mrs. Dwight C. DeWeese, on East Parkway.

Mrs. Milton E. Gibbs and Miss Florence M. Brown sailed on April 30th for study and recreation in Spain and on the north coast of Africa.

Edmund H. Plant won the Dewey Prize Oratorical Contest for Sophomores at the U. of R. He is Assistant Scoutmaster of our Troop No. 15, Boy Scouts.

The engagement is announced of Ormond Ford Bullis and Miss Katherine May Bishop. Mr. Bullis is son of Mrs. Adelyn F. Bullis and the late Dr. William H. Bullis. Miss Bishop is daughter of Mr. and Mrs. Ora O. Bishop, of Hollywood Avenue.

Our next Communion and reception of new members will occur on Sunday morning, June 4th. We trust there will be a large number to unite with the church at that time. With others, we will welcome any who may have given their names but were prevented by illness from being publicly received on the first Sunday of April.

Hearty congratulations to two members of our church, Miss Mildred B. Clare, daughter of Mrs. A. F. Clare, and Mr. Donald Ross, son of Mr. and Mrs. Donald Ross, of Avoca, Ross-Shire, Scotland, who were married on Saturday morning, April 2nd, at the home of the bride's mother. Dr. Ballock performed the ceremony. The young couple are to reside at 99 Maryland Street.

Our friend and Brick Church missionary, Rev. Dr. Dirk Lay, of Sacaton, Arizona, well-known friend of the Pima Indians and representative of the Board of National Missions, has been nominated by San Francisco Presbytery for the Moderatorship of the 1882 General Assembly. The Presbytery spontaneously and without the knowledge of Dr. Lay, passed a resolution expressing its judgment that he possesses high qualifications for the office. It is claimed that his election would serve to call attention to the widespread and effective work of the Board of National Missions.

Have you noticed the date? We mean the date of the general church picnic. It is to be held at Corbett's Glen on Wednesday, June 29th. It is to be a full-depression picnic, an all-day frolic and play picnic, and it is to be for all the Brick Church people, big, little, and hobbledehoy. The whole glee will be ours for the whole day. Come and have a glorious, friendly, play-time and forget old man depression. Maybe he will not show up at all after that day.

We have worried about the depression long enough. The time has come to play. That is what the Men's Class of our Sunday School says. So the Executive Committee of the class has engaged Corbett's Glen for a picnic, which will be held on Wednesday, June 29th. The class is going to underwrite the expense and invite the whole church, men, women, children, all. Put that date down, and join the crowd for a whole day of frolic. Fuller notice later.

Bequest to Brick Church.

We much appreciate the thoughtful affection of the late Mr. Morrison H. McMath for the Brick Church. In many ways he manifested this during his life, but extended it beyond the present by a generous bequest in his will. His death occurred on February 20th, closing a long and honorable career as a Rochester attorney. As we write so soon after his death, the estate has not yet been administered, but we understand Mr. McMath's bequest to be for one thousand dollars.

Mr. McMath belonged to a long succession in Brick Church membership. His mother, Mrs. Robert McMath, was a life-long member and active in our church work. His brother, Mr. Edwin A. McMath, uniting in 1875, was teacher of a large Sunday school class of men, among his pupils are recalled Col. S. S.
Eddy and Mr. Alexander M. Lindsay. His sister, Miss Alma I. McMath, long a teacher in our public schools, is an esteemed member of Central Church. Besides his wife, Mrs. Eliza S. Rapulje McMath, he leaves a son, John N. McMath, a daughter, Mrs. Ralph M. Cole, the sister mentioned, Miss Alma, one brother, Albert O. McMath, and two grandchildren.

Besides his busy life as an attorney, with many notable clients, and membership in the Rochester, the State, and the American Bar Associations, and in various civic organizations, he found time for an avocation, which was music. He had a fine bass voice, and long sang in the choir of St. Peter's Presbyterian Church. Afterward he had charge of the choir of the Second Baptist Church, and still later was choirmaster of the First Methodist Episcopal Church.

We extend our sincere sympathy on account of his death to Mrs. McMath, the members of his own family, and the entire circle of his relatives.

The Brick Church Guild

On Tuesday evening, April 5th, our society met in the Mary Runey Shaw room of the Institute, the attendance being forty-four. Mrs. Crawford Mcchesney, our President, presided. Mrs. Hugh McNair led the devotional services. Mrs. Arthur Dagen reported on the work done at the sewing meetings held during the Lenten season. Many layettes and dozens of towels were made and sent to Hengchow Hospital, China.

The following officers were elected to serve for two years: Mrs. Harold Leary, President; Mrs. Ralph Tchenor, Vice-President; Mrs. Clinton Evarts, Treasurer; Mrs. Philip Burrill, Recording Secretary; Mrs. Dwight Van de Vate, Corresponding Secretary.

Miss Florence Bradley pleaded us very much with several solos delightfully rendered.

The speaker of the evening was Rabbi Philip Bernstein, who spoke on “Russia.” Having travelled extensively in Russia.
and made careful study of conditions, and being a most interesting speaker, he was able to give us a both wise and graphic picture of conditions in and problems confronting that country.

Mrs. Myron White, Mrs. Dwight Van de Vate and Mrs. Paul Meacham served delightful refreshments.

Our next meeting will be held at the home of Mrs. Justin W. Nixon, Brighton Heights, the evening of May 11th. Dr. Nixon will speak to us on, “The Future of the American Farmer.” All our members, with their friends, are invited.

+ New Era Missionary Society

The society met on Monday evening, April 11th, at the Brick Church Institute. The gathering was in the Mary Romsey Shaw room. Dean William E. Weld, of the University of Rochester, was the speaker. His theme was, “Understanding India.” The whole evening was one of much profit and pleasure.

Our next meeting will be at the home of Mrs. Frederick L. Higgins on Trevor Court Road, Monday, May 9th, at 2:30 in the afternoon. This will be a Tea and Reception to new members who have united with us during the past year. Dr. Stanley F. Gutenius will be the speaker, and his topic will be, “Our Changing World and the Missionary Spirit.” Mrs. John W. Singleton will lead the devotions. Mrs. Sidney Wilson will be our guest-soloist. The arrangements are in charge of Mrs. Eugene Weller, Chairman, and the ladies whose names begin with the letters S to Z, inclusive.

Don’t forget the Membership Campaign!

+ Ladies Missionary Society

The Fifty-Eighth Annual Meeting of the society was held in the upper dining room of the Institute on Friday, April 1st, with banquet dinner. Guests of honor were Mrs. John J. Lawrence, Acting President of the Rochester Presbyterian Society, and Mrs. Justin Wroe Nixon, the speaker for the day. Miss Gale Moundrup, accompanied by Miss Hartford, was the soloist, and sang several selections in a very pleasing way. Dr. Hallock led the devotional exercises.

Mrs. G. B. E. Hallock, the President, presided, and reports were given by the officers. The first report was by Mrs. Edward D. Chapin, the Recording Secretary. Mrs. Fred M. Warren, the Treasurer, read her report for the year. Mrs. Myron H. Dockstader, Corresponding Secretary, gave an account of the letters sent to and received from the Brick Church missionaries. Mrs. Albert F. Benson, Secretary for Literature, reported the number of magazines and year-books of prayer subscribed for by our ladies during the year. Mrs. Christopher F. Schmink,
BRICK CHURCH LIFE

Secretary of Box Work, reported the number of boxes sent—infants clothing to Dr. Lay’s mission among the Indians, used clothing to Kingston, Arkansas, also to the drought sufferers in South Dakota. The appeal for these latter came from a Presbyterian pastor and a former pupil of Dr. Nixon’s. Used clothing was also sent to the Gospel Tabernacle on Main Street West, in response to special need.

The address by Mrs. Nixon was exceedingly interesting. Her subject was, “The Everyday Life of a Missionary in China.” Mrs. Nixon was a missionary for six years in China, and gave a very graphic account of manners and customs of the people and of the day by day duties and opportunities of a missionary among them.

The Nominating Committee, Mrs. E. A. Webster, Chairman, made their report. The following were nominated as officers for the coming year and were unanimously elected—Honorary President, Miss Mary R. Shaw; President, Mrs. G. B. F. Hallock; Vice-President, Mrs. Justin W. Nixon, Mrs. E. A. Webster, Mrs. A. D. F. McIntosh, Mrs. Frank Ritter, Mrs. E. B. Leary, Mrs. E. F. Crouch, Mrs. C. F. Haupt; Recording Secretary, Mrs. E. D. Chipin; Assistant Recording Secretary, Mrs. Frank A. Weed; Treasurer, Mrs. F. M. Warren; Corresponding Secretary, Mrs. M. H. Dockstader; Secretary of Literature, Mrs. A. F. Benson; Secretary of Box Work, Mrs. C. F. Schmitke.

The gathering was brought to a close with happy remarks of appreciation and encouragement by Dr. Gutelius.

* * *

Brick Church Men’s Class

The Brick Church Men’s Brotherhood has been enjoying large attendance and enthusiastic spirit during the past few weeks. We mean especially so, for in both respects the gatherings have been notably successful throughout the winter. Dr. Gutelius has announced a fine series of subjects for the months of April and May, as follows: April 3—“He Gave Himself!” 10—“Has Science Discovered God?” 17—“A Square Deal for Prohibition.” 24—“Challenge of Christian Science.” May 1—“How Does God Help Us?” 8—“The Spirit of Motherhood.” 15—“Living Without Fear.” 22—“Is the Soul a Myth?” 29—“The Patriotism of Jesus.”

Besides enthusiastic singing and other features in the programmes the class enjoys good instrumental music, vocal selections, and constant good-fellowship.

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gathenings are such that no Brick Church man can afford to miss them. You will enjoy what these men enjoy.

+ Fifty-Eighth Annual Report of the Ladies Missionary Society

Receipts
Balance in Bank $62.02
From Church Budget $1,272.12
Interest from Bank 5.63
Interest, Memorial Fund 3.13
Gift, Mrs. Bowman to Mrs. Secord 25.00
Gift, Shoe Class to Kingston 12.00
China, Family from Mrs. Shaw 5.00
Interest, Mill Estate 62.52
Coffee, Quilts, etc 36.09
Total $4,248.31

Disbursements
Foreign Missions $1,109.90
National Missions $1,091.99
Freight on Buses 26.02
Memorial Interest 17.93
Microscope Repairing 1.93
Work Material 26.39
Total $2,436.01
Balance on Hand $1,112.30

JUBILEE MEMORIAL FUND

Mrs. James B. Shaw Memorial

Receipts
Balance, March 1, 1934 $252.49
Bank Interest 11.68
Interest on Investment 355.86
Legacy, Mrs. Mary H. Judson 1,006.00
Legacy, Mrs. Rebecca Relyea 300.00
Gift, Mrs. Philip Dyonis 5.00
Total $2,395.00

Disbursements
To Trustees for Investment $1,500.00
To Nurse's Salary, Kingston $300.00
Total $1,800.00
Balance in Bank $595.00

Total Invested, March 1, 1933 $3,500.00
Given Trustees for Investment $1,500.00
Total Invested $5,000.00

April 1, 1932 CORA L. WARREN, Treas.

+ Hartstown Class Activities

The Hartstown Class surely has been busy during the past two months. Besides their regular meetings on Sunday mornings, which have been unusually well attended, they report as follows: On Wednesday, March 23rd, a Food Sale, with Mrs. Eugene Weller as chairman. The Monthly Supper, on Tuesday, March 26th, when Mrs. Anna Best was chairman. Later a visit to Pidgeon's

+ J. B. KELLER SONS

FLOWERS, FLORAL DESIGNS
PLANTS, DECORATIONS
25 CLINTON AVE. NORTH

Shoe Store helped to swell the amount in the Treasury. A Luncheon and Sewing Meeting was held at the home of Mrs. C. P. Bandle, on Vanessa Avenue, on Thursday, April 14th, Mrs. Eugene Weller, chairman. A Bring-and-Buy Party was held at the Institute on Monday, April 18th, Mrs. Marshall P. Howard being chairman. Then on Monday and Tuesday, April 25 and 26, came the big Brumage Sale. Mrs. Lloyd Smoother was the efficient chairman for this event.

+ Married

RUSSELL CLARE—On Sunday, April 2, 1933, at Holy Trinity Episcopal Church, in the presence of the bride's mother, Mrs. Alfred Clare, by Rev. Marshall, the Rev. Alfred H. Clare and Donald Ross.

SYDNEY FROLING—On Thursday, April 2, 1933, by Rev. E. A. F. Hardie, D.D., at his residence, 10 Fairview Ave., Clinton, Miss. William and Miss Greta Helford, both of this city.

Died


FARLEY—On Saturday, April 1, 1933, in this city, Joseph Farley, in his 66th year. Burial in his residence, 116 Archdale Drive, in memory of his family in Mt. Hope Cemetery, Rochester. Member Brick Church, 1910.

Born


KINSELLA—To James Edward and Mabel Mary Kinsella, a daughter, 116 Archdale Drive, on February 12, 1933, a son, James Edward, Jr.

TUCKER—To William H. and Ruth Tucker, a daughter, 116 Archdale Drive, on March 15, 1933, a daughter, Isabel Tucker, 116 Archdale Drive.

CROOKWELL—To Richard Edge and Harriet Brooks Crookwell, a son, 116 Archdale Drive, on February 6, 1933, a son, David Grant Crookwell.

Baptized


Obituary articles
McCundy's

VALUE-GIVING

is the foundation upon which this store gains firm friends every day in the year.

McCundy and Company, Inc.

FAHY MARKET
ESTABLISHED 1862
Dealer in
BEEF, MUTTON, VEAL, PORK, PROVISIONS AND POULTRY
Special Rates to Churches. Both Phones
36 to 55 ANDREWS STREET

Personal Property Floater
Cover your baggage, golf and sports' equipment and other personal property against practically ALL RISKS ANYWHERE.
R. S. PAVIOUR & SON, Inc.
1007 COMMERCE BLDG.

Watts Dry Cleaning Co., Inc.
EXPERT DRY CLEANING SERVICE
FOR LADIES AND GENTLEMEN'S CLOTHING
Phone Gansevoet 614
Auto Delivery
Rochester, N.Y.

James Johnston
INSURANCE
201 GRANITE BUILDING

Mr. and Mrs. Albert B. Eastwood,
262 Culver Rd.,
Rochester, N.Y.
KODAK WORKS BULLETIN

Edited and Published by the Employees of Kodak Ltd., England

Vol. 13  Wealdstone, Middlesex, April, 1932  No. 12

In Memoriam

George Eastman

Born July 12th, 1854
Died March 14th, 1932

Obituary articles
Memoirs of Mr. George Eastman

George Eastman died March 14th, 1932. He came and founded our companies over here almost at the same time that he started Kodak in the United States. He turned our beginnings and directed our growth. He lived to see Kodak in every country of the world become an important unit of the one great international family.

Those who have visited or worked in many or all of our factories and offices scattered over the world, soon become aware that a common spirit prevails everywhere. We call this the Kodak spirit. Whether of English, American, French or of any other nationality, a Kodak employee soon absorbs this atmosphere and thinks and works for the good of the family.

Mr. Eastman, as father of this great family, created this spirit by the force and the integrity of his character. Each employee knew that Mr. Eastman’s every act was based on absolute justice and fair dealing. The whole world recognized his genius, his benevolence and that absolute honesty which governed his whole life.

It was under such a leader that this Kodak company grew. Who could be disloyal to the Company led by such a man? And our long history shows that there have been only few disloyal ones.

Now that Mr. Eastman has gone, we realize our great loss, but we must not forget that before he died he had carefully planned that his Company should go on and on. He left the leadership of it in the hands of men of his own choice, and he was confident that we Kodak employees would try our best to keep our Company the kind of company of which he would have continued to be proud.

W.G. BENT

Mr. George Eastman, whose death by his own hand took place in Rochester, U.S.A., on March 14th, left a note addressed to his friends, saying: “My work is done, why wait!”

Of Mr. Eastman it may be truly said that he was able in his lifetime to see the idea which he set himself to accomplish carried out to a completion, which is denied to many. He was born at Waterville, in New York State, on July 12th, 1854, and became an enthusiastic amateur photographer while earning his living as a bank clerk; and later, seeing the possibilities of photography as a business, succeeded in producing a photographic dry plate in 1880, and also devised one of the earliest plate coating machines.

He very early foresaw that if photography was to become the hobby of the public, the whole process must be simplified, and this was the ideal he set out to accomplish. His first step was the production of a flexible photographic surface, first on paper, then on transparent collodion base. Apparatus to use this then followed, and the earliest Kodak was produced in 1888. Since then he spent all his energies in developing still further improvements, always bearing in mind the well-known slogan which he originated: “You press the button and we do the rest,” culminating in the beautiful instruments of the present day.

During this time, with Edison, he had applied his transparent film to Cinematography, and from this collaboration has resulted the pre-eminent use of Kodak film in the production of motion picture photography and the development of sub-standard cine photographs for home use. The photographer of the present day knows little of the work and trials of the pioneer of simplified photography.

Mr. Eastman used his wealth for higher education and in the cause of charity, and as an employer he approached the ideal, the welfare of his employees always having first place in his thoughts, as can be exemplified by the Wage Dividend, and later, his great generosity in giving to all his employees shares in proportion to their length of
KODAK WORKS BULLETIN 247

service, and still later the very generous Pension Scheme.

We older servants of the Company, who knew Mr. Eastman personally, will ever regret his passing, and feel that a gap has been made in our lives which cannot be filled.

E.A.E.

My personal acquaintance with Mr. Eastman was very limited. I met him once in the Board Room, once in his private office, and on two occasions as his guest. On the other hand I have had for over twenty years the privilege of sharing the friendship of friends of his of long standing, and from them I have learned much about him. These friends belonged not to one strata of life. Some occupied positions of eminence, others had more humble parts, but the outstanding feature in their conversation which always struck me was the respect that all had for "G.E.", an enduring respect which appreciated the intrinsic value of the man.

To myself, George Eastman appears great not so much by reason of his early struggle, but rather because he remained master of himself. His simplicity of life and tenacity of purpose, his keen sense of justice and dislike of ostentation, seems to permit a suggestion that somewhere in his ancestry a Quaker infiltration may have occurred. His sternness of character is plainly shown by the negligent effect that wealth made. The possession of great wealth, a wealth, to most of us, beyond comprehension, never induced him to alter his life. George Eastman remained George Eastman, accepted the added responsibilities it entailed and carried on.

Kodak Company's Tribute

Doctor Rhoads read the following resolution on the death of Mr. Eastman adopted by Eastman Kodak Company directors.

His work is done. His career has ended, but in the hearts and minds of men his work is still a throbbing, living thing.

George Eastman was more than a business genius and public benefactor. He was a founder with vision, who felt the responsibility of giving and founding wisely. Others there have been who gave of their wealth. He gave of his; gave by far the greater part of it; but, more than this, he gave of himself—all
of himself, to the end that his gifts might not be merely generous but wise.

The world at large knew him as a great philanthropist. We, his associates in the company he founded, were witnesses to his giving more than money. We saw him devote to his benefactions that same keen, unflinching, intelligent interest that he had imparted to the business in the days before his means enabled him to make his helpfulness world-wide. We knew his courage in the days of stress; his ability to be helpful to others in days of their distress; his quiet, confident optimism; his belief in the fundamental soundness of mankind.

As a boy he knew real poverty. It taught him to be just and wise and—when the opportunity came—to be generous. His first thought was for his mother; his first generosities were for her happiness and comfort. For her there was a loyalty that touched the heart of those intimates who were so fortunate to witness it.

But, there was an equally fine loyalty to his friends, to his co-workers, to his community and to his convictions. Quietly, without publicity, he signalled an early financial success by a personal gift to all employees. For years he kept the story of one of his greatest benefactions from the world, and numberless small deeds will never be known—all typical of the modesty of the man, typical of his passion for being helpful, quietly and always wisely.

Throughout his nearly three score years of active business life, he inspired respect—for his devotedness to high ideals; respect for big resourcefulness; his integrity; his intelligent generosity and, above all, respect for his character.

This, then, is more than a memorial to his family and to his immediate associates. It is a memorial to a world that has lost a worth while friend.

Yet the world will continue to profit, for his work is still a throbbing, living thing.

Times Union, America.

Mr. George Eastman

The tributes to the late Mr. George Eastman have been written by those who knew him well, and we cannot refrain from adding, on behalf of the less intimate employees, the deep and sincere regret we all feel in his tragic and untimely death. The great loss has personally affected every employee, and it is impossible to adequately express our feelings, for we all have felt the bond of that noble, sympathetic and generous gentleman who spent his life in seeking ways to ease the burdens and trials of others, and was a model to all his employees, his thoughts being ever with those who worked with him and for him. May his character be our guiding star through future years.

A photograph of Mr. George Eastman has been inserted in this issue.

Congratulations

Mr. C. S. Richeno has found it necessary to retire from the Fire Brigade owing to the distance of his residence from the Factory preventing his being at the latter after business hours. He joined the Brigade in 1903 under Chief Officer Lewis, and was appointed Second Officer in 1916 under Mr. Thorp. Mr. Richeno rendered valuable services and zealously carried out his duties, amongst which were the attendances at all air raids during the War which the Kodak Fire Brigade attended in London.

A gold watch chain was presented by the members of the brigade as a token of esteem, and regrets expressed at Mr. Richeno's retirement.

Thanks

J. B. Clark (General Store), wishes to express, through the Bulletin, his thanks for cigarettes and books kindly sent him by his Kodak friends during his sojourn in hospital.
George Eastman

His work was for the people and the world, rather than himself.

George Eastman was one of the great industrial figures in this great industrial age and this great industrial country.

His work was known all over the world and gave enjoyment and benefit to millions.

His life was simple and he cared nothing for the vast wealth he accumulated, except for the benefactions it enabled him to bestow.

In fact, this simplicity of life, this disregard of luxury, this indifference to money, except as a measure of success and a means for public service, are distinguishing characteristics of the great Americans of our age.

But the service these constructive geniuses render the public is not merely in the benefactions their wealth enables them to bestow.

It is mainly in the benefits their creative work supplies. It lies in the usefulness of their creations, the service to civilization, the added impetus to human progress, the increased measure of human happiness and achievement.

George Eastman has gone, but the work which he has done will never end. It is a basis upon which further progress will be built, an influence which has had its effect upon human character, and will be perpetuated in the thoughts of men long after this age shall be past and be forgotten.

It is so with all good thoughts and all good works, and that is the real recompense for labor.

William Randolph Hearst
Chicago Evening American
March 16, 1932
The secret of the popularity and the operating convenience of the new B&L Microscope GS is the advanced design of the new stand. The heavy V-shaped base and rugged arm provide a rigid stability found heretofore only on research models. The instrument retains its inherent balance when tilted at any angle.

Here, certainly, is a combination of structural and operating precision that recommends the GS to every microscopist who demands convenience, and enjoys the satisfaction of using a fine instrument in his work.

SEND THE COUPON FOR COMPLETE INFORMATION

BAUSCH & LOMB OPTICAL COMPANY
642 St. Paul Street Rochester, N.Y.

Send me at once complete information on the Microscope GS.

Name Address
City State

Entered as second-class matter July 20, 1932, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.
NEW! "PINCH-TYPE" SWITCH

THE laboratory worker may use this new pinch-type switch either as an ordinary double pole, double throw switch, or as a reversing switch. For reversing, the jaws are simply cross-wired. The cross-wiring may, if desired, be almost entirely hidden in the hollow base of the switch. This makes a very neat-looking device, especially for set-ups that are to be used for semi-public demonstrations.

Operation of the switch is very rapid because the handle moves through only 60 degrees and until purposely moved, is held open by a click device. The switch need not be fastened to the table top. Insulation resistance is about 2500 megohms.

3294 PINCH-TYPE D.P.D.T. SWITCH . . . . . . . . . . . $2.50

LEEDS & NORTHRUP COMPANY
4931 GERMANTOWN AVENUE
PHILADELPHIA, PA.

LEEDS & NORTHRUP

ELECTRICAL MEASURING INSTRUMENTS
HIGH AND LOW-HEAT INDUCTIVE FURNACES
POTENTIOMETERS, THERMOCOUPLES
AUTOMATIC STARTER CONTROLLERS
PROVIDES ULTRA-ILLUMINATION AND INCREASED DEFINITION FOR OPAQUE OBJECTS AT ALL MAGNIFICATIONS, INCLUDING OIL IMMERSIONS.

ULTROPAK permits observation of specimens under conditions which were thought impossible to achieve, it reveals details hitherto undetectable by ordinary means. The equipment consists of these major parts: a special illuminating arrangement, a series of special objectives (including dry, wet and oil immersion objectives) and a series of seven specially constructed condensers which are adapted for study under a great variety of magnifications.

The ULTROPAK is so arranged that the illuminating rays pass entirely outside the tube of the microscope, thereby forming a perfect microscope image, free from any glare and haze.

OUTSTANDING FEATURES:

No preparation of specimens required. Characteristics of specimens revealed which could never be detected hitherto except: Deep seated layers below the surface of the specimen may be observed; Use of full numerical aperture of the objectives yields increased definition; Manipulation is exceedingly simple.

SPECIAL PILLAR STANDS FOR ULTROPAK—Since the ULTROPAK permits the examination of specimens without limitation to size, the conventional type of microscope would not allow for the most far-reaching means of utility and for this reason special pillar stands have been constructed, permitting the use of the ULTROPAK under all existing conditions, without placing any limitations upon the size or form of the specimens. Three different pillar stands have been provided and for use with these three different mounting brackets. One of these is of simple design and the other sets a mechanical control on the microscope tube in a similar manner as a mechanical stage finds similarity to a microslide. Molecular or Holograph Microscope Tubes may be used on either model of pillar stands in an interchangeable manner.

IMMERSION ATTACHMENTS FOR ULTROPAK DRY OBJECTIVES—While the ULTROPAK Dry Objectives are primarily recommended for use in connection with dry objects, immersion Attachments have been constructed which pass through the objective and form contact with the specimen. The Attachments also lead the object a horizontally plane surface by pressing them down slightly upon the specimen. The Attachments act as immersion devices for dry objectives in the observation of the internal life in water and other objects which require observation in their immersed state.

SPECIAL ULTROPAK OBJECTIVES—Two new objectives have been added which are especially constructed for tissue examination in wet state.

IMMERSION CAPS FOR ULTROPAK IMMERSION OBJECTIVES—Special caps have been provided to permit immersion objectives to be dipped into solutions without any moisture reaching the condenser or objective, respectively, and thus distorting reflections are completely avoided.

DIAPHRAGMS FOR ULTROPAK OBJECTIVES—Inserting these diaphragms into objectives, whenever required, will greatly increase the depth of field and permit satisfactory observation and photography of specimens having exceedingly uneven surfaces.

FLUORESCENCE LAMP—Using this lamp with the ULTROPAK renders the latter available for the study and photography of specimens UNDER ULTRA-VIOLET LIGHT.

Write for ULTROPAK Literature

E. LEITZ, Inc., Dept. 95, 60 East 10th Street, New York
April 10, 1902

Science—Advertisements

Culture Dishes

Of Resistance Glass

No. 3597

In the purchase of culture dishes, consideration must be given to two characteristics. These are the stability of the glass during sterilization and the perfection of manufacture of the dish.

These glasses that withstand repeated exposure to heat, moisture and oxygen of the air are of the higher melting point type with higher silica content and smaller quantities of heavy metals in their composition. Corrosion resisting glass requires greater care in production and is more difficult to fabricate into the finished article. The finished product, therefore, costs more, but this increased cost, as compared with dishes made of less resistant glasses, is usually more than offset by the longer period of use that is obtained. The lower priced dishes of ordinary lime glass are often purchased for student use and are given a satisfactory period of service where cost is considered in drying before sterilization, followed by sterilization in hot air only. The corrosion resisting glasses will not become soaked during 15 minute exposure to steam sterilization at 15 lb. of steam pressure. An additional advantage in the resistance glasses lies in their lower free silica content, which does not appreciably change the pH value of the culture media in contact with the glass during the incubation period.

The second consideration, the perfection of manufacture, covers the manufacturers’ design, thoroughness of annealing to remove strain and thoroughness of inspection to remove those dishes carrying such consequences imperfections as scratches, flaws, bubbles, etc.

The molded dishes listed below are perfectly regular in shape and size, are of excellent finish, have well-rounded edges and flat bottoms of a planeness approaching that of a polished surface. The square dishes with rounded corners are an innovation for conservation of space. The same surface area of the 100 mm round Petri dish is provided by a square dish measuring 90 by 90 mm.

3597. Culture Dishes, Petri, Square, Resistance Glass, manufactured by a new patented process, which produces a highly perfected, practically flawless Petri dish, with surfaces plane to a degree closely approaching that of a polished surface.

The square shape, with rounded corners, permits the same surface area in a dish measuring 90 by 90 mm, so that of the 100 mm round dish. The square shape has some real advantages in that they use easier to handle and they waste no space in the autoclave, sterilizer or incubator.

Dimensions, outside: Bottom, 95 by 95 by 15 mm deep; top, 100 mm; number in original package, 75.

Per pair 6.50 Per dozen 6.75 Per gross 27.50

3596. Culture Dishes, Petri, Round, “Pyrex” Glass, a combination of the excellent qualities of the mechanically strong, best-resisting, alkali-free “Pyrex” glass with precision manufacture producing Petri dishes of an improved design to meet the most stringent requirements of the research worker.

In the design, a bead is provided along the edge of the two parts of the Petri dish. This bead reinforces the edges to reduce chipping and breakage. The bead on the bottom part also serves to prevent the loss parts including the tendency for condensed moisture to be drawn up the sides by capillary attraction.

Dimensions, outside: Bottom, 95 by 15 mm deep; top, 100 mm; number in original package, 75.

Per pair .50

10% discount on original package lots.

Central Scientific Company

Laboratory Glass Supplies

Apparatus and Chemicals

New York—Boston—Chicago—Toronto—Los Angeles

Obituary articles
EUTOPOTROPISM:—SENSE TO FIND THE FIT PLACE

By Professor ALFRED C. LANE

UTIUS COLLEGE

My subject is Eutropotropism. I imagine some of my professor listeners will be inclined to say, "What in hell is eutropotropism?" To which I would reply, "It is not in hell." Others more literary may ask, "In what dictionary is it?"

To which I would reply: "It is not in any dictionary. I made it up." I made it up to shock you so that you will remember the idea, for although the word is new, the idea is not.

Eutropotropism is the tendency or sense to know where you are well off and go there, the sense to find the fit place. It is the opposite of the trait exemplified by the June-bug who will "buzz and butt his head against a wall" or the moth that "shrieks in the fire."

I have no ax to grind, and my action is not determined by the past, but is determined by the future. I will call it by a word that you never heard before, that I invent for this occasion, eutropotropism. It means turning to the place where you are well off. The capacity to be eutropotropist is a sign of intelligence. For evolution by natural selection to work there must be three things—a variation, an environment where that variation fits, and, third, a disposition to occupy that environment. It is in this third factor that I call eutropotropism. An extra coat of hair fitting an elephant to be a mammoth and live in the Northern part of Asia would not tend to a race of mammoths unless the extra hair went a disposition toward a northern climate. It is this sense...
enough to know when you are well off and go there
that I call entopetropism.
Such behavior leads us to infer intelligence, whenever
we can more easily infer it from aunts in the future
than from animals in the past.

The derivation is obvious to one familiar with
English science or Greek roots. "Heliocyte" is the
flower that turns toward the sun. At the Tropic of
Cancer the sun turns backward in the heavens. The
biologists have a string of terms ending in "tropil" and
"tropism." A "tropil" is a turning, or an
inherent tendency of a living organism to turn in
response to an external stimulus.

J. Lock, in his book on "Forced Movements, Tropi-
isms and Animal Couplings," has a long list—of helio-
grotic ct-lrme (thermo- and zoeto-complexes)
—but he does not mention our entopetropism, because
he is not strong on intelligence, perhaps?

Entopia I spell with an R to distinguish it from the
Utopia of Sir Thomas More and other visionaries.
His Utopia was supposed to be the kind where every-
thing was well, and as there is no such place, the
name was derived from the two Greek words φι ρη,
not, and ρις, place. The word "tropil," which we have
in the word "topography," is also a root in ento-
petropism. But the first syllable is from the Greek ϝ,
well, which we have in numerous other English words,

This entopetropism is the sense or tendency to turn
the place for which the organism is well fitted, to
which it is predisposed. This may be—indeed,
it certainly will be—less fitted to other organisms. It
is not a general Utopia, but it is a logical next step to
the theory of preadaption, as developed by Ogburn
and Davenport, to consider for what the organism is
predisposed and what it will do.

Then pointed out that when an individual varies
from its forebears, it will often do so in a way that
makes it better off and more able to survive in some
particular set of surroundings before it is in them.
If it comes to be in that particular set of surround-
ings, it will there thrive. But will they have home enough to go there or stay
if they find themselves there?

I use the term sense, because, literally speaking,
we regard behavior that takes you where you are well
off and to the place for which you are fit as sensible,
and the opposite tendency to kick against the pricks
and to butt your head against a stone wall as unintel-
ligent, or senseless. Perhaps others may prefer a
longer word. Do not miss the idea, whatever you prefer.

I have chosen this subject as of interest not merely
to us as geologists but to all of us as individuals
and as members of the body politic. For we were men
before we were geologists, and as we are composed
of cells, in whose harmonious and fit cooperation is
our bodily health, so are we but units in that
greater organism of society called the United States
of America. It is well that we should find our fit
place in it and that the whole nation should find its
fit place in the family of nations.

But, granted that the subject is one of interest and
importance, why is it fitting that I should select it on
this occasion, which perhaps is the greatest oppor-
tunity of my lifetime to reach a wide, an intelligent
and an influential audience. What has geology to do
with it? Let me explain how I came to select it.

I trust you have not honored me with this high
office simply because I have lived long enough to
have arrived at years of discretion, nor because
you think I will not bore you with too long an address
and think that I have learned that brevity is the soul
of wit, but because you also think that I have con-
tributed somewhat to the science to which we are
devoted.

If I had some great epoch-making geological dis-
cover of my own to announce, it would be well to
throw the limelight of this brilliant occasion upon it.

But Oker has suggested that now ideas do not come
after sixty, and others have put the date as early as
thirty. Failing such a discovery, it is natural to look
over one's life and see which work of value seems to
have been least appreciated.

I remember that old teacher Shaler at about this
time of year, the time of the January mark-down
sales, said to me: "Lars, I find at the end of the year
I have a job lot of hypotheses that I would sell very
cheap?.

So toward the end of life it is natural to look over
ideas to see which have been sold and which, though
still weird, you consider valuable—not cheap, but
such as you would commend to the attention of a
discriminating audience.

Six years ago I coined the word entopetropism in
the heat of a verbal talk to students. Thirty years
ago I discussed the early surrounding of life and
their evolution and the way life has adapted itself to
the changes and before that I had discussed the im-
portance of individual choice in evolution. In

Indeed, I might go farther back. It is well-nigh
forty years since I first addressed this society on the
role of the earth's originally absorbed gases. In
some respects the conception of the role of the earth's

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Obituary articles
originally absorbed gases these defended doesn’t need to be brought up again. It is old!

That volcanic magma contain gases and yield waters which do not come from the surface of the earth is now generally accepted, though, as late as 1865 my old teacher Shaler said of outbreaks of volatiles:

This action appears to be due to the inclusion of water in the crystallized rocks at the time they are laid down on the sea floor; this volatilized water becomes heated as the rocks become deeply buried, and by the central heat is brought to an exploding strain.

This possible source of some volcanic activity, illustrated in the flower pieces of Lyell’s geology, is now almost entirely ignored. The works of Day, Allen, Fenner, Shephard, Zies and their coworkers of the Geophysical Laboratory have thrown much light on the magmatic gases.

It is, however, a fair question on which we need more light which I commend to your consideration. What does become of the connate waters or petroleum when a sandstone is converted to a quartzite or a clay to a shale? I am in the process of compilation, where and when and how do they go?

The rôle of magmatic gases and of juvenile waters is so well understood and so widely accepted now that I hope you only for a few moments to recount the evidence on one particular line of activity before I take up my main and more interesting theme, which is their effect on life.

These gases have a rôle in the crystallization of igneous rocks affecting not only the coarseness of grain of the igneous rocks and the minerals of the igneous rocks, which form from a rock magma as easily from syrup, but also affecting a wet and dry differentiation. Hornblende and mica replace pyroxene and olivine, and the foliation formation is prolonged as the magma gets wetter, with a consequent shifting of the eutectic or eutectic troughs and of the chemical character of the residual magma available for differentiation. Much has been learned since 1895, and the recent president of the Association of Petroleum Geologists, Sidney Powers, has helped me to contribute thereto.

Yet any treatment of rock crystallization and differentiation that would satisfy me and the severe and competent critics that would be in this audience would need mathematics and figures and diagrams, if it is to go beyond some such simple statement as above made, or a statement that the hotter the initial temperature of an igneous rock and its country rock are, and the more the mineralizer, the less pronounced will be the marginal belt of finer grains, while the general effect of the retention of these mineralizer gases is very much as though the temperature of crystallization was shifted toward that of the country rock and away from that of the original melt rock.

I remember that Professor Linggren has complimented me as a “refined mathematician.” I must not backslide. So I put aside another subject. Geologic time, for instance, has much interested me and it would not be disagreeable to explore on my own and against the time by radio. Dr. A. Holmes will treat it in his forthcoming Lowell lectures. Knopf’s Bulletin 80 of the National Research Council has just been published. The abstract says that I have handled the forty odd methods of estimating geologic time that I have studied in a fashion to suit me:

Returning to this evolution of gases from the interior, I would ask: If there has been a continuous supply of gases from within added to the ocean of air and of water and also a precipitation from the ocean either directly or by deposits due to organic life, would it be a very striking and remarkable balance if there had not been some change in the oceans of air and water and an inorganic evolution in the sediments formed in them as well?

The more active of these gases will be combined and largely precipitated. For instance, the carbon dioxide so common in volcanic gases will be the food of plants, and the chloride and sulphate will combine with bases.

But the more inert nitrogen and the rare gases will accumulate. Therefore, we are not surprised to find that they form a large part of our atmosphere.

If we find signs of glaciation and a more rigorous climate in early times, one factor may be that there was less atmosphere then. A rise of 300 feet in the atmosphere means a drop in average temperature of something like a degree. Thus the climate in the past must have varied with the amount of atmosphere. Taking away three thousand feet of atmosphere might well bring on another ice age if it means in Scientific American, Feb., 1909; Scientific Monthly, Apr., 1931.
lowering the snow-line 3,000 feet. This may have counterbalanced any possible greater heat on the sun. The diameter of the sun was very likely greater and that would tend to equalize the temperature at different latitudes. The brightness or amount of heat would tend to equalize the temperature at different latitudes. The brightness or amount of heat per unit of its area is likely also to have varied. Possibly for the former reason, but very likely more from a different distribution of land and water, climatic some seem not to have been as marked in the remote past as at present.

If the crust of the earth was ever hot enough to vaporize all the water in the ocean and the ocean was anything like its present ocean, the temperature at the base of this very heavy atmosphere might be far above 100° C. and near the critical temperature of water, 374°. The water would remain gas until cooled down to that temperature. Thereafter from that point the rock surface temperature would slowly drop, a process ignored by Lord Kelvin.

I do not, however, personally believe that the early ocean, either of water or air, had the volume of the present. If Poquet was right in estimating that one of the principal faults of a coastal area 2,500,000 cubic meters of water, in 100 years, it would discharge a cubic mile. Thus only a hundred such vents would suffice to discharge all the 200 million cubic miles of seas water in the 1,850 million years or so in which it seems likely we have had plenty of time to have discharged the ocean.

Of volcanic gases the vast bulk is water.15 Some of the water gas might be absorbed in hydration of the rocks. But the crust of the earth, ever near enough to the surface to be hydrated, must be much less than 10 km and must be less than 5 per cent. By weight of the 10 km can be water. This would be about 2 per cent. By volumes, so that the water absorbed in the crust must be less than 200 meters, no great addition to the volume in the ocean.16 Most of the water exhaled from the interior must still be in the ocean, whose volume is continually increased by volcanic emissions. I know no signs that the earth is absorbing the oceans or that they were ever deeper than now—quite the contrary.

The next most abundant gas is carbon dioxide. This can be and is precipitated directly as calcium magnesium, ferrous and other carbonates. As soon as plants were available, it would be decomposed by them into vegetable fiber and oxygen.

To be sure, vegetable fiber may be eaten and oxygen breathed by animals and reunited. Yet insofar as we find carbonaceous matter of organic origin in the crust of the earth, petroleum, coal, peat, natural gas, etc., we may reasonably look for the oxygen which went with it, when the carbonaceous matter was reduced by plants from CO₂. Some of it goes into oxidation of the red rocks, as C. H. Smyth17 has estimated. But this will not account for all. For the balance we may look to the amount of oxygen in the air, some four pounds per square inch, though, as we really know nothing as to how much carbon there is beneath the three quarters of the earth's crust covered by the oceans, an estimate might well be characterized as three hopes of hypothesis, a skip of computation and a jump to a conclusion!

Nitrogen of the volcanic gases must also accumulate, mainly in the atmosphere, for the amount in the rocks and waters is much less than the carbon dioxide. Here again it may be possible to compute whether the nitrogen in the air is to the water of the ocean and the oxygen of the air as the analysis of volcanic gases would lead us to expect. The sulphur may be represented in the sulphate of the ocean, the sulphydrate and gypsum of the land and in the widely-spread sulphides. The chlorine is partly represented in the salt domes and the salt water of the strain and the chlorine of the oceans. When first delivered, whether as HCl or Cl₂, it would naturally attack the bases in the order of their abundance and ease of attack. Calcium and iron chlorides would be more abundant than sodium chlorides. But when it comes to precipitation, calcium, magnesium and iron are surely deposited from the ocean more than the sodium. It will be a rare drilled well in which there is not more salt than soda in the cuttings. Therefore, there will accumulate in the ocean an increasing proportion of sodium, while in the early ocean there was a relatively larger proportion of early chlorinity.

While we can not say forlorn that the ocean would be growing saltier, since that would depend on the relative supply of water or base exchange, the precipitation effect of organisms and other factors, it seems almost certain that there has been an increase in the proportions of sodium to chlorinity. Moreover, all lakes without outlets tend to grow saltier. Why should that great salt lake called the ocean be an exception? The very old and very salt waters that are sometimes encountered one would have to explain on the residue after the hydration of volcanic glass and the formation of chlorites.18

But all this is a deduction from the general idea of evolutions from the interior. Are there any facts

13 Shephard, Rev. Hawaiian Volcano Obs., vi, 3, 1920, p. 2, other papers of this observatory and various papers of the Smithsonian Laboratory.
15 M. H. Fuller and others cited in Clarke, ibid., p. 35, make it perhaps 1 per cent. of the ocean.
to substantiate this idea. I think that critical study of analyses of waters, and other facts support it.

The question how we can distinguish between the waters circulating down into the rocks now or from past land surfaces, the connate waters originally laid down in the rocks, and those juvenile waters which have emanated from below in invasions of igneous magma—has been on my mind. It might well be the subject of a course of lectures. But it involves a detailed consideration of analyses of the waters. Many of you perhaps, like myself, can not very well understand figures by hearing them. I have to see them to understand. Perhaps none of you hate figures, anyway. Moreover, there are men here who have vastly more material at their disposal than I, who will take it up and by careful study of water analyses will be able to distinguish buried land surfaces which have been leached and filled with a water quite different from that which originally filled the beds. So I shall not go into the matter in detail on this occasion, though I should be glad to take it up with them individually. I look to a time when, with widespread use of accurate analytic methods, we shall find the rarer ingredients also significant, since perhaps rarer in the older rocks. We might, in the age of the surrounding strata, find a reason for the low condition and prevalence of gull around Lake Superior. The distribution of Sr may also be significant, and the constituent grases dolomites.

I expect to see old land surfaces and discontinuities recognized by the associated waters. I suspect that, as in the Red Rocks of Canada, they will be marked by a lower concentration and an increase in other and less relative to chloride, and in sodium as well. Perhaps also, as W. L. Ginter suggests, organisms coming in from these old land surfaces may be traced by their bioclastic reactions. Again, while I do not propose to bore you with detailed discussion, are there not signs that in the earliest rocks, the Keweenah, or “greenstone schists,” as they are allotted to be called, we have a formation which does differ significantly from the later rocks? There are less signs of contemporary oxidation. The abundant limestone lacks the reddened top of later limestones. Sedimentary carbonate beds are rare or absent. So seem to be red beds of any kind and red dolomite or shales, or hematites that might be considered interstrat.

We do not find beds of salt or gypsum or metamorphic equivalents of those in the Thecmuckian. I think the ferruginous carbonates are more common in the Keweenah, which would be natural if this early atmosphere was not so oxidizing.

In this early period when there was little or no oxygen in the air, air-breathing animal life would be 11 Ried. Can. Mining Inst., Nov. 1902.

relatively absent. If we may carry ever into geology the distinction made in college catalogues between biology and zoology, we might say that there was an early Ance but not an Acanthus Era. In the early Precambrian Keewatin rocks signs of animal life, at any rate, are rare.

I am convinced that the Precambrian limestones are akin to the so-called “shell marls” which my lamented friend, Charles A. Davis, studied for me and showed were mainly the product of lime-depositing plants. We agreed that the same origin might apply to Precambian.

It seems to me probable as a “canard” that, while life began in a rather peculiar and individual environment, which the chemist and biologist after much experimenting have not yet been able to reproduce, it has gradually varied to fit varying environments and found a profit in new reactions, chemical and otherwise.

For instance, it seems as though in the later Precambrian, at a rather definite time in the earth’s history, not the very beginning, the algae began to throw out lime carbonates, as the stromatolite (cambrian) do now in our nasal lakes. It was somewhat later that the organisms studied by W. C. Harder, 19 the iron-predicating bacteria, learned to find a profit in the precipitation of iron oxides and initiated a worldwide age of iron deposits, and it was later yet before the conditions were so favorable that they abandoned, as did the potato bags about 1850, when I saw a window three inches high along high road and as far as the eye could see along the Atlantic coast.

Still later, as Daly has pointed out, 20 came fish, and a scavenger system was developed with a change in the quality of limestone. F. W. Clarke has also pointed out the effect of temperature in changing the proportions of lime and magnesia included in the shells of sandy animals.

As we have said, volcanic waters are generally acid and the steam water is女朋友 neutral. The rivers are high in sodium, lime, etc., combined with sulphate and CO₂ mainly, but a small amount of SiO₂. On reaching the ocean, the lime carbonate may largely be precipitated as limecarbonate (directly or more likely indirectly), but the sodium carbonate or silicate may be thought of as converted into sodium chlorides, while the silica is converted into the silt of the siliceous and the CO₂ is used by life in one way and another.

In the ocean the tendency to an increase of the ratio of sodium to chlorine was probably not uniform, for rainy climates and large land areas would furnish

19 U. S. Geological Survey, Prof. Paper 125. See also
21 Jour. Geol., 1906, pp. 103-176.

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sodium more rapidly, while a large precipitation of salt would leave a residue in which the earthy chlorides were more abundant.

R. B. Neavecombe tells me that a well at Mtshegwe, Motlhogoa, 4,715 feet deep down to the St. Peter sandstone, has 50,700 c.f. of Na and 10,000 c.f. of Cl, a ratio of 5.05, while wells higher geologically (in the Devonian), but just as deep, have a higher ratio of Na to Cl. For instance, in a well near Milford, practically as deep down as the Sylvan sandstone just below the Devonian (4,097-4,700 feet), the ratio had risen to 0.4, and in the present ocean the ratio is 0.65.

In estuarine waters of the latter Paleozoic, the ratio is usually from 0.14 to 0.53, as found by Roven.22 We must, however, remember that there and other buried waters struck by the oil wells have generally been more or less altered by diagenetic changes, by bacteria buried with them, or introduced later by circulation since burial of the strata, not by any means necessarily by circulation from the present surface, but by circulation from some ancient land surfaces which in leaching the limestone left it full of pores and cavities and underground water channels in which later petroleum could collect, ready to grab out when trapped. Such changes from old land surfaces in most cases seem to raise the proportion of sodium and of acid radicles other than chlorine, even though water is absorbed. For instance, the St. Peter's sandstone now shows a fresh water 3,000 feet down. I have no doubt the normal oceanic Na:Cl ratio of St. Peter's time is less than 0.35 and nearer that of the Keweenawan, which seems to be near 0.49—the ratio of the time when hard parts and land animals may have developed, as we shall see.

But what about the life that has existed in this changing physical environment of the ocean? While the single-celled forms multiplied in the water which brought them their food, those which showed they had a capacity to cooperate to help the circulation of sea water around through the mass had an advantage which led to the purifiers or sponges which have a circulatory system which ultimately led to that of the blood of our veins.

Even though there was life even in the hot waters of the geysers, the chances are that somewhat cooler and somewhat less acid waters would on the whole be better for the activity of the precursors. While in the beginning there would be no limey shells in the acid or soft waters, and no tendency to produce them and if produced they would have been promptly dissolved, the time would come when the concentration passed the physiological optimum which dissolved us in about eight parts per thousand. Then what? Some of the organisms would secrete some of the extra salts. If they were secreted internally, they might serve as a skeleton support. If they were secreted around the outside, they might serve as a shell-like protection. A leathery or shell-like protection might serve to protect from evaporation as well as attack. They could stand exposure to the air. Some of them might find themselves better off in streams where the water was somewhat too fresh, than in the ocean where the water became too salt. Others would find the reverse. So we find forms diverging, fitting themselves for different stations.

Thus we find in fresh-water forms various concentrations below, in salt-water forms, concentrations above, and in land forms the concentrations just about eight parts per thousand.

While Günther, who first emphasized these facts,23 considered that concentration the original composition of the ocean, I maintained that it is more likely to be that of the ocean at the close of the Precambrian, i.e., 3,000 million years ago, but only some 500,000,000. We find the urge to secrete hard parts appears in the same geological period with a simultaneity in various lines of life that points to some changing factor in their common environment as the cause.

The Keweenawan, however, whether Cambrian, as I believe, or Precambrian—the current work of Dr. Urry on the helium, radium, thorium ratio of its traps may have settled the question—was at any rate laid down under an existing atmosphere, so that its red sandstones and weathered traps are much like those of later days. It is very different from the Keweenawan, and the normal ratio of Na:Cl seems to be not far from this critical value.

When the ocean passed the physiological optimum, some forms were carried passively with it. Others, as has just been said, resisted by secreting shells, by development of a special circulatory fluid and by getting out on land. With the modification of environment came the command, "Modify to match, or migrate, or go to the margins and moribund." The ammonites and the clam were fitted to stay in the mud, and they stayed. My ancestors "were fitted for higher things," and they migrated to find them.25 Various modifications fitted them for various stations in life. But the modification often came first,
as assured by the theory of predaptation of Davenport and Coolidge. If so, it is altogether likely that some organisms did not go to or find the place which they filled. Only those who had the sense to go to it, or if they were there accidentally, to stay in it would profit by their fitness and variation advantage. If their children inherited their variation and their sense, they would in turn profit by it. Thus a nerve reaction or variation, an intelligence correlative to the other variation was needed.

Some forms would be fitted for land life, could emerge from streams with a circulation cut off from the sea, yet retaining traces of its composition at the time they emerged, and a skin to prevent its evaporation too fast—just enough to keep them cool on hot days. In the new surroundings, which they alone fitted, they would find less competition. If they were eutropopots, they would stay there and mate with others like-minded.

But once on land, there is a wide variety of climates—from that of a tropical jungle or of a tropical desert to that of a Siberian desert or to that of the Antarctic continent. Yet almost everywhere we find forms of life, fitted so that they can survive and thrive in those surroundings. Sometimes they have to seek other surroundings to breed.

Now, this we notice, that whether or not they fit into their surroundings, the higher life which is mobile does not have to stay there. Indeed, like the migrating bird, it often journeys far. Among the most wonderful journeys are those of the sable, from the center of the Atlantic to the fresh-water streams and back, and the salmon, from the fresh-water streams to the ocean and back.

In other words, with fitting the environment goes finding the environment that fits. Let us illustrate again.24

Before the Himalayas were nearly as high as at present, elephants roamed Asia. Some had less hair and were better fitted for the climate of India. Others had more and were better fitted for the climate of Siberia. But there was nothing to prevent the hairy ones going south. No doubt some did and got too hot and caught cold and died.

Little by little, however, there was a gradual segregation of the hairy to the north, the hairless to the south.

We will agree that there have been great changes of climate. Through these Nature commanded, "Modify or migrate." Some animals, preadapted, could obey the first alternative, others, sensibly eutropopots, obeyed the second. Those without variability or intelligence perished.


This finding the place for which the organism is fit we call intelligence, or especially when it is hard for us to imagine that in the animal mind the movement is toward a clearly conscious goal, instinct. But in general, the higher animals seem to have instinct replaced more and more by conscious intelligence. Behavior which seems to be controlled by the future, by an aim or goal, we call intelligence, whereas motion which we can predict from the past we call mechanism.

"Westward, the star of empire takes its way" describes in poetic language the spread of the race of man over the world after the last ice invasion. It is in part perhaps instinctive. It has culminated in my lifetime in the attainment of the North and South Poles, the battle of Manila, the entrance of Japan into the list of great powers, and the formation of the League of Nations after a world-wide war. But the settlement of America was partly that of intelligent purpose. My Puritan forebears came with a definite aim, to construct a commonwealth (note the word "common") which should be secure what they thought God wanted, a purer form of government in church and state.

Carl Schurr and the "Lathnasie Bauern" came to get a greater freedom and a more democratic government than they existed in their fatherland. Many before and since have come to America from many lands, the cream of their respective communities, because they were the more discontented and restless, who sought, like Abraham of old, a better land, or as the Pilgrim said, enlargement. These restless energetic souls, even though they may be classed themselves as dangerous radicals, may make fine sires. Many people who would think of Congressman Lindbergh as a dangerous radical would agree that he was a success as a parent, and that the United States should not have been improved by keeping him out.

My Uncle Daniel went from New England to Kansas in the days of bleeding Kansas. So his son enlisted in the days of the Spanish War and now finds himself in Honolulu.

In the development of the United States, in the shaking back of the frontier, in the development of the oil business, there has often been little conscious planning for the good of the whole, any more than there was in that wild stampede of individualists which opened the magnificent state of Oklahoma. It was partly "each for himself and the devil take the hindmost" and partly "there is plenty for all, help yourself. Uncle Sam can give every man a farm." Twenty-odd years ago, called upon to speak at a banquet in Saginaw, about one o'clock in the morning, after a long evening of speeches, I told the Saginaw business men that when they ran out of other fuel,
they would strike gas! I also told them I hoped they would not strike it before they had changed the state law to prevent overdrilling. They found it where I said, but they had not changed the state law as much as it should be changed, and even since I started writing this, a horrible tragedy of burning, involving some of my friends, has occurred, and may be due partly to overcrowded wells. Overcrowding is emphasized in this year’s Michigan Engineer.

But, as when the ocean grew too salt, survival was for those who could find a fit place in new conditions, so it is now. Conditions in America have changed. Our early towns grew hollow-skeletons. Now we have city-planning boards and the systopetropus man, if he fits that kind of thing, will seek a decent, a beautiful and a well-laid-out town. No doubt, too, there will be a good while hollow towns, and peoples who find themselves most at home there will turn that way.

The era of expansion of the human race approaches its close. The era of organization, of cooperation draws. Not only in the petroleum business, but in world affairs the question is who has enough sense, enough intelligence to find his place, the place where he fits, and our Nation fits, to find its place in these new conditions.

The old order changeeth, yielding place to new
And God fulfill himself in many ways.
Lost sea good custom should corrupt the world.

We have been absorbing the gold of the world. We have more than half of it. We were gathering in the rest at a rate that would surely tax it. This has not been deliberately and intelligently done, but the result has been one factor in business depression. As we cornered gold, the price of everything else measured in gold went down. If continued, sooner or later debts payable in gold can no longer be paid.

Shall we have intelligence to see this and arrange for some way in which the debts due us from Europe shall be paid in some work for world welfare, but not in gold? Shall we have sense enough to fit the new conditions and learn from Him who said, “He that would be greatest among you, let him be the servant of all.” Or shall we, bearing some seeds of isolation and independence and separation of politics and economics, continue to butt our head against the wall, kick against the pricks and squeal when we are hurt?

Years ago I was geologizing down South, and one noon we unhitched the mules from the hickory and left them to eat their rations of corn from its rear while we sought a cooler spot under the shade of a tree a little out of sight.

After a little the moonshine stillness was pierced by a tremendous washcourseness, unquestionably arising from one of the razzle-dazzles. I said to my driver:
would not inevitably and mathematically lead to a larger and longer preponderance of colored with more or less white blood, whether our milestone toward the Indians (which has led to persons like Mrs. Woodrow Wilson, Calvin Coolidge, Vice-President Curtis, and others) was winer.

The American people are cramped by legislation and by a respect for tradition in the legal profession, which is not without advantage in retaining what is good from the past, and geologists are evolutionists rather than revolutionists. But it hinders greatly that adaptation to changing conditions which are found in the frontiersmen.

It made it very hard to change the laws suited for the wet climate and rural conditions of England and the Emerald Isle regarding water rights so as to have a code suited to a hand which is worthless without irrigation, or to handle the problems when great cities spend tens of millions and reach out tens of miles to remote waterheds crossing state lines for their water.

The great works of the present, like the Chicago drainage canal, affect men from Georgian Bay on the north side of Lake Huron to New Orleans. They are not state matters.

So again the flood of oil, due to the way in which your petroleum geologists have so successfully, too successfully, applied your science to the development of national resources, can not be handled by individual state action any more than can a Mississippi flood.

In these days of automobiles, to say nothing of airplanes, when in our smaller New England states a man can be in five states in an afternoon, is talk about shutting the central of the liquor traffic back into the hands of the states the banning of the Junebug?

Again, facing the problem of unemployment, modified as it is by the enormously increased powers of production, is it not necessary that some planning be done as to what and how much shall be produced? If some new invention puts whole communities out of business through no fault of their own, as the invention of rayon silk has crippled the making of cotton stockings, would it be too much to demand part of the investment royalties to rehabilitate and to teach those thrown out of work some new and useful work?

Should any one out of work be helped until he had been examined for the work to which he is pre-adapted? Possibly he may be out of work because he is too good at the job into which he drifted. Should a prerequisite for a dole be four hours a day of study?

All these are questions which require sound sense, a spirit prepared for progress, but guided by the experience of the past.

Fifty years ago Dr. Peirce and I were in Harvard together. Little did I dream that I should succeed him as president of the Geological Society of America, or that he would leave the society the magnificent endowment that will be a monument to his memory, more enduring than any erected in a cemetery. In the first place, there was no such society. In the second place, he was a freshman when I was a sophomore, and got his bachelor’s degree a year later than I, though he received the degree of doctor of philosophy from Harvard two years before me, leaving the practically unique distinction of obtaining it at Harvard in two years after the A.B.

Now the large endowment brings to the Geological Society new conditions. Shall it be adaptable or autotropical? While I do not forget that word of our Saviour, “Where the cares are there are the hazzards gathered together,” I have faith to believe that we have sense enough to be autotropical, and will find in these larger conditions room for worthy expansion, that the new conditions may be to us as the expanding shell to Holmes’ chambered nautilus;

Build thee more stately mansions
Oh, say, axil,
As the swift seasons roll.
Let not new temple, nobler than the last,
Shut thee from heaven with a dome more vast.

Environment, heredity—there are not all the factors in evolution. We must add our individuality as human beings. Some of you have doubtless seen a yachting race. As a son of the Old Bay State, let me close with the following sonnet, dedicated, with his permission, to probably the most skillful human in the United States, Charles Francis Adams—a sonnet which gives a picture of the three factors in evolution. Besides heredity and environment we have individuality—autotropism—sense enough to steer a skillful course, sense enough to find the fastest track.

The Race
Oh, see the ships with sails that flash out bright
Against the ruffled sea and gray sky
Along the horizon, when the sun is set
Strike fair on the main sails towering high.
They vanish as they come about to tack—
First one and then another, as for each
The helmsman pilots his individual track,
Knowing his own boat’s sails and there and reach.
So, striving wind and wave and cap and tide,
Toward the desired haven they beat in.
He bears adverse or light, yet on they glide,
The skipper’s wit counts much the race to win.
Our forehearts give the best, but we must steer
Across life’s seas, though weather foul or fair.
George Eastman

The press and the public seemed instinctively to realize that Mr. Eastman's last message, "My work is done; why wait!" and his dramatic termination of his career formed a fitting end to a remarkably consistent life. Certainly it is true that his close friends and associates view this ending as the final triumph of a man who all through life made his own way, made his own decisions and courageously followed the line of his convictions. Consider for a moment the full significance of his last words. He had invented the modern photographic plate; he had invented the photographic film; he had made the Kodak a household object throughout the entire world; he had created a great business; he had established a great research laboratory which had strikingly fulfilled his faith in it; he had selected certain fields of education, health, and art to which he had devoted his fortune for the benefit of the entire world; he had satisfied his insatiable desire for the excitement of exploration and big game hunting; he had no close relatives; the intimacies of old age had come upon him and were about to master him. He who had always been his own master remained so to the last.

George Eastman was born in Waterville, Onondaga County, New York, on July 12, 1854, and lived there until he was six years of age, when his parents, Mr. and Mrs. George W. Eastman, went to Rochester, New York, to live, where in 1842 his father had founded Eastman's Commercial College. The father died two years later, leaving Mrs. Eastman without funds and with the eight-year old boy. By dint of hard work and self-denial Mrs. Eastman kept the boy in school until he was 14, when he became an office boy for Coradina Waydall, a Rochester insurance agent. He stayed with the firm two years and then went with Broeck and Brewster, afterwards Bostell and Hayden, insurance agents. He studied at home in the evenings and later became a bookkeeper in the Rochester Savings Bank. It was while he was employed there that he began in his leisure hours experimenting with these photographic developments which were the foundation on which was built the Eastman Kodak Company.

In the very beginning period of Mr. Eastman's experiments, there were opposition with his mother a Colonel and Mrs. Henry A. Strong. Mr. Strong was a well-to-do partner in a whip manufacturing firm. He became interested in Eastman's experiments and his careful calculation as to what might lie ahead in the photographic industry, and in 1881, he made an investment of $1,800 in Mr. Eastman's business, following it shortly afterward with an additional $8,000.

For some years Mr. Eastman and Colonel Strong were business associates and together went through some of the early trials and tribulations of the business, for the story of the growth of the Eastman Kodak Company was not without its trials and tribulations, as the following illustration will show.

Late in 1883 or early in the following year, the output of the Eastman plant had risen to about $6,000 worth of plates a month, all of which were shipped to wholesale dealers, who allowed the unsold plates to accumulate throughout the winter. Suddenly it was found that the Eastman plates had lost their sensitiveness, and complaints began to pour in on the young manufacturer. At first he called in and replaced all the defective plates.

Shortly after this episode another calamity came upon the company, for the art of making plates seemed to have been lost. The plates fogged easily and lacked sensitivity. During this period Mr. Eastman sifted in the laboratory and carried out 300 experiments, all of them failures, in an endeavor to localize the cause of the trouble. During this time he became so nervous that he could not sleep, and lay awake at night reading cowboy and detective stories in order to rest his mind. Finally, after having been carried into debt, it was discovered that the difficulty was due to a defect in some of the constituents which had been purchased in a large order. Therefore Mr. Eastman always made careful experiments in order to test new lots of material ordered for his firm.

An eager and active research man himself, Mr. Eastman was always on the lookout for new ideas or developments from other sources, and gradually added to his staff young men from all over the United States and England who had shown the ability to contribute new ideas and developments to the photographic art.

In this connection, he established his research laboratory, and his vision is shown by the fact that he stated that he did not expect results from it for ten years. His faith, however, has been amply justified by the development of new photographic products. In fact, only a few months ago Mr. Eastman expressed to the director of his research laboratory, Dr. Mees, his feeling of satisfaction in the fundamental strength of the company. He said that never before had such a fine lot of new products been put out and never before had the organization of the company been in such a satisfactory condition. He felt that the future success of the company was assured.

In the recent biography of George Eastman by Carl Ackerman it is stated that by the winter of 1879-1880 Mr. Eastman had established four fundamental business principles upon which he was to build his own
company. First, production in large quantities by machinery; second, low prices to increase the massiveness of his product; third, foreign as well as domestic distribution; fourth, extensive advertising as well as selling by demonstration. It was fundamental in his business policy that service should be given to the public. This is illustrated in the watchword in the early days of the kodak: "You press the button; we do the rest." It is illustrated now by the service on film and by the sale of lookads which, after all, are simply a service and a means to increase the film industry since it is the film and plate industry which is, and always has been, the backbone of the business.

Mr. Eastman has been one of the world's greatest philanthropists. His benefactions during his lifetime exceeded $100,000,000, with $12,000,000 more added in his will. His first contribution to education was made in 1857 when he sent fifty dollars to the Mechanics Institute in Rochester. It was a modest sum, but it was the pretense of his giving. His salary as treasurer of the company was at that time under sixty dollars a week. Even at this early period in his career, he had strong convictions in regard to the relationship of the individual to the community.

By far the largest of Mr. Eastman's contributions have been to the Massachusetts Institute of Technology and to the University of Rochester. He also made important contributions to the Tuskegee and Hampton Institutes for education of the Negroes. He felt a pride in, and a responsibility for, the city of Rochester, and made notable contributions for the benefit of that community, chief of which are the Eastman School of Music and contributions to the medical center of the University of Rochester and the dental clinic. In recent years he had also established dental clinics in several foreign countries. It is said that his interest in doing was due in part to his desire to make some contribution for the benefit of people in those countries in which the business of the Eastman Kodak Company had prospered in its foreign contacts.

It is very certain that Mr. Eastman's philanthropies were never the result of emotionalism or sudden fancy. They were carefully thought out and calculated. They were generally preceded by a long study of the situation on his part before the recipient had any idea of what was in his mind. They generally came not as the result of a request to Mr. Eastman for assistance, but as the result of Mr. Eastman's own independent study of situations in which he felt that his wealth would be of benefit to the public.

At least a part of the story of what caused Mr. Eastman to change his mind on this point and to become one of the greatest of all benefactors of higher education is given in the history of his growing interest in the Massachusetts Institute of Technology.

In 1891 Mr. Eastman asked Professor Thomas M. Brown, of the Massachusetts Institute of Technology, to "select a young chemist from the graduating class who can devote some attention from now until graduation to photographic chemistry. I do not want anyone who is not painstaking, thorough and thoroughly reliable. Harvard or Amherst youths are not of any account in this business. I have a great deal of confidence in the material you turn out of your institution."

During the next few years Eastman engaged several graduates of the Massachusetts Institute of Technology and his enthusiasm for this "material" increased to such an extent that he began to read the annual reports of President Richard G. Macalvain and to study the system of technical education. He continued it for nearly twenty years to observe the value of technically trained men and posted himself in the history of this institution.

Finally, in 1913, Mr. Eastman expressed a desire to meet the president of the institute, and a meeting was arranged at the Hotel Belmont in New York City. As a result of that meeting Mr. Eastman wrote to the president that he was prepared to give the institute as a building fund the sum of two and one half million dollars, asking that his gift be anonymous, as he wished to avoid all fuss, his one object being to see a good thing done and not to have people talk about it. In referring to his interview with Mr. Eastman in New York, Dr. Macalvain wrote: "I could not fail to be impressed with his capacity to go to the heart of a problem quickly and to see immediately what the main points were and to keep to them in later discussions—an impression reinforced by later intercourse." Later, in 1913, Mr. Eastman increased his subscription to the building fund by five hundred thousand dollars, making his total initial gift three million dollars.

For eight years after the initial gift, the name of the donor remained simply "The Mysterious Mr. Smith," and it is possible that it would never have been divulged had not a later gift in 1919, which necessitated the transfer of a large amount of his own Eastman Kodak Company stock, made it inevitable that his connection with the gift would be discovered. Particularly throughout the construction and equipment period of the new technology, but also clear up to the end, Mr. Eastman maintained his very keen interest in the progress of the institution. Yet with all this interest, so far as I know, Mr. Eastman has never visited the institute, except on two or possibly three
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of the various reasons given by Mr. Eastman for his gift to Technology, three stand out in special prominence:

1. His appreciation of the needs of technical education of the highest type. He had seen this in his own business and observed it in others and believed that this need would be far greater in the future than in the past.

2. His belief in the value of scientific training for executives. He knew, of course, that a good executive, like a good poet, is born and not made, but he believed that his training can contribute largely to his effectiveness, and his experience with men that he had employed demonstrated to him that men with a scientific training, and of course the right qualities of temperament and character, make first-class executives.

3. His recognition of the duty of a man whose business is national to support national institutions and not only local ones.

President Rush Rhees, of the University of Rochester, to which Mr. Eastman's gifts exceed even those to the Massachusetts Institute of Technology, has kindly given me his estimate of outstanding characteristics of Mr. Eastman's philanthropy, based upon close personal relations with Mr. Eastman for a period of more than thirty years. The following paragraphs are quoted from President Rhees's letter:

"The first outstanding characteristic feature of Mr. Eastman's philanthropy, in my opinion, was his accessibility. I believe that beyond any other generous man of wealth, he saw every appeal that came to his office. He maintained no barrier of subordinates through whom alone he could be reached. By this I do not mean that you could walk up to his office and go in. Of course his secretaries protected him, and written appeals would very frequently be routed speedily to a scrap heap, but I believe that all appeals came under his eyes.

"The second characteristic that has impressed me was his independence in reaching decisions on philanthropic projects. Here in Rochester it has for many years been a commonplace remark that if he said with reference to any proposal 'I am not interested,' then that answer was final, nine times out of ten. His independence of mind showed itself, however, in the tenth case, in which, having studied the matter further, he changed his mind, and having changed his mind, would be likely to act with extraordinary breadth of vision. In my first interview with Mr. Eastman, thirty years ago, the remark with which he opened the conversation was 'You know, Mr. Rhees, I am not interested in higher education.' To this, as well as Rochester, has had very examining evidence
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that in that particular he changed his mind, and also, having changed his mind, he proceeded to think of higher education on a scale that fairly astounded its advocates.

"I had another experience of the same sort in 1919 after he had made his initial gift for the School of Music. At that time we undertook to raise a fund of one million dollars to enable us to cancel debts accumulated during the war period. I went to Mr. Eastman, among others. His first reaction, as firm as it was courteous, was I don't expect to give any more money to the University of Rochester. To which I replied, I do not blame you at all; you have done marvelously as it is! Then we talked over the problem a little further, and he answered, Of course I'll chip in, and gave me one hundred thousand dollars.

"Third: I have referred to the broad scope of his conception of institutions in which he was interested. I remember his telling me with a great deal of pride, on that occasion when he remarked that he did not expect to give Rochester another dollar, that he regarded the Institute of Technology as the greatest educational institution in the world. You know better than anyone else how much he had then done and he since done to insure the realization of that conception.

"Fourth: When he made his great distribution of property in 1934 to you, Hampton, Tuskegee, and to us, I remarked to Mr. Hart, who was in Rochester for the execution of the agreement, Did you ever know anyone who "bent his chin" like Mr. Eastman? and Hart agreed that he never had.

"This might constitute a fourth characteristic. He did distribute his philanthropies widely, particularly here in Rochester. But he apparently preferred to concentrate his larger interests in a very few places. Relatively speaking, his gifts to Hampton and Tuskegee were phenomenal. I believe that they were due to the confidence inspired in him by Booker Washington, to which confidence Morris succeeded on Washington's death.

"In explaining his very large allocation of the 1934 funds to the University of Rochester he expressed the conviction that Rochester was all set to become one of the best, though not necessarily one of the largest, universities in the country.

"Fifth: If you have read Ackerman's life of Eastman you must have been impressed with the very early conception of his business enterprise in international terms. I think that he carried over that natural attitude of mind in determining his chief gifts for education.

"Sixth: I would like to supplement what I said above concerning his independence in forming his own decisions by confessing that I take unalloyed delight in a statement which Mr. Eastman made, after the 1934 distribution of his wealth, to a reporter who was interviewing him and asking why he did so much for the University of Rochester. His answer was, Mr. Rhees never asked me for a dollar! I cherish this with delight because it is not strictly true. I did ask him for money at that first interview when he told me he was not interested in higher education. I also asked him for help at that later time when he told me he never expected to give any more money for Rochester. But these are the only two occasions. The first resulted in a gift of seventy-five thousand dollars; the second, as I have stated, in a gift of one hundred thousand dollars. But, in paraphrasing the words of the parable, What are these among so many other millions which have come to our hands?"

"Mr. Eastman's feeling of pleasure and satisfaction over his philanthropies is indicated by the following sentence from a letter in which he refers to another educational benefactor: "I think that both he and I have good reason to feel that the money we distributed will produce more important results than if spent in almost any other way."

"Mr. Eastman lived quietly alone in the big house on East Avenue, just outside the city proper. It is interesting and pleasant to know, in recalling the self-denial and hardships of his mother during the early years of her son's life, that she also resided in his beautiful home before her death. In fact, he built and furnished the house as a home for his mother. Since 1905 most of his activities radiated from there. Throughout the house are paintings by Millet, Whistler, Homer, Corot and others, and for many years his home was open to musicians, artists and performers. In the museum on the third floor are his trophies from Africa, Alaska and other sections. In the spacious conservatory palms and flowers in endless profusion give color and variety to the scene. Here his guests listened to the organ and other music that he provided for the entertainment of his friends, while well-trained performing a musical menu."

"Here his body lay in state preceding the final funeral services. His death came on March 14, 1932, in the East Avenue mansion. He died as he had lived—thoughtfully, purposefully and with careful attention to details. The world will always hold his memory in warm and admiring regard, and continues to honor the name of George Eastman.

Karl T. Compton, President

Massachusetts Institute of Technology
THE COPYRIGHT BILL.

The Copyright Bill introduced in the Senate by Senator Hoadley, of Rhode Island (S. 176) is substantially the same as the Vesta Bill of 1929-31, which was passed by the House at the last session and was being considered by the Senate in the closing days of the session.

The Copyright Bill favorably reported by the House Committee on Patents, April 5, and referred to the Committee of the Whole House on the state of the Union, was introduced on March 29, 1929, as H. R. 16001 and later in amended form as H. R. 17749 and H. R. 16793, by Representative William L. Silviovelo, of New York, who, with the shift in control of the House, succeeded the late Mr. Vesta as chairman of the Committee on Patents.

Of the two the House Bill is the better bill. It was drawn from the standpoint of author and artist rather than from that of book and music publisher and distributor; is simpler, more direct, and a better piece of drafting. It makes no reference to the International Copyright Union, but the adoption of the bill would, in the opinion of the State Department, clear the way for ratification of the Rome Convention by the United States, if the Senate were favorable to such action.

It outlaws piracy, recognizes property right as dating automatically from creation of the work or from first public presentation, does not make registration compulsory but encourages registration by restricting the damages that can be secured for infringement of copyright if the work has not been registered; gives the author the right to sell different aspects of his copyright to different parties so that he can dispose separately of publishing rights, dramatic rights, motion picture rights, radio and television rights, etc.

The term of copyright is fixed at fifty-six years from the date of first public presentation.

American authors are still required to have their works printed in America as a condition of copyright.

The bill still favors the corporation over the individual in the vague and doubtful provision that "in the absence of agreement to the contrary where any copyrightable work is created by an employee within the scope of his employment, the employer shall be considered the author of the work." Whether the writing of a book on physics by a university professor of physics would be 'within the scope of his employment' would be for the courts to determine.

The provision is inserted from preceding bills known as the "book prohibition clauses," which in the present bill is cannibalized under a section entitled "Impounding." In the effort to put the purchasing power of the American market into copper-riveted marketable form, so that it can be the subject of contract between American publishers and English authors or publishers, and under the mistaken assumption that additional opportunity for labor is thereby provided for the American workman, the bill prohibits the individual American citizen from ordering a single copy, for his own use and not for sale, direct from London or Edinburgh, Toronto or Sydney, of a book published in English by an author in his own country (even though the American citizen is willing to pay at his own cost the duty imposed on such importation by his own laws), if an American publisher has secured the right to publish an American edition when he is ready to do so, under penalty of impounding at port of entry and eventual confiscation.

As a result of the continued opposition to this provision the授esing committee has been printed that the citizen may exercise his right, provided he has first made application to the holder of the right of American reprint and the American publisher declines, or in ten days fails to signify his willingness, to procure the desired book for the citizen at a time not specified, with no penalty for delay, at a price equivalent to the foreign retail price plus transportation charges and customs duties.

Not 18 per cent. of books in English published abroad are reprinted in this country. The number of individuals who buy books without seeing them and without solicitation, on their own initiative, is relatively small. Yet to put a stop to this negligible trickle of foreign trade would not result in a fundamental change in the markets of the world, so far as reprinted English books are concerned, a restriction on individual liberty for which there is no parallel in the legislation of any country; and for the negligible and doubtful good, thereby to be attained, to subject all legitimate foreign book trade to intolerable red tape and delay. The representative of the Publishers' Association at the public hearing stubbornly opposed the proposal to give the individual scholar the same right that has been finally conceded to libraries and to the United States Government itself, in the case of books for its own use, and the author of the bill at the public hearing, upon conclusion of the reading of a memorandum by Dr. M. Llewellyn Rose against the provision, submitted in writing on behalf of the American Association for the Advancement of Science, made the statement that the

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The constructional work on the institute's new building is said to be proceeding satisfactorily; it is thought that this edifice will be completed and ready for occupancy in the summer of 1933.

PRINCETON CHAPTER OF SIGMA XI

The sixty-first Chapter of Sigma Xi was installed at Princeton on March 10, 1932, and includes faculty members and students of Princeton University and staff members of the Princeton branch of the Rockefeller Institute for Medical Research. Dr. L. B. Wilson, national president, and Professor Edward Ellis, national secretary, were present to conduct the ceremonies. The installation took place in the historic faculty room in Nassau Hall, after which followed a banquet in Procter Hall of the Graduate College.

Twenty-six members of the faculty were initiated to full membership. Fourteen others were elected to membership, but were absent at the time of the installation. Forty-two Sigma Xi members from other chapters, who are now on the Princeton faculty, affiliated themselves as charter members of the new chapter.

The officers elected for the first year were:

President — G. H. Shull
Vice-President — K. N. Harvey
Secretary — Paul MacCratek
Treasurer — R. H. Coyle
Committee, 2 years — A. M. Greene, Jr.
Committee, 2 years — R. W. Unger
Committee, 1 year — A. P. Bickford

The presidential address by Dr. L. B. Wilson was "The Cultural Implications of Research in the Sciences."

Eight visiting delegates were present as follows:

Chapter Delegate
Brown — Leonard Curnichael
Columbia — J. W. Barker
Lehigh — Gilbert Dunn
New York University — H. Austin Taylor
Pennsylvania — Clarence W. Burr
 Rutgers — M. A. Cather
Swarthmore — Edward H. Cox
Yale — J. L. Wilson

THE OHIO ACADEMY OF SCIENCE

The Ohio Academy of Science will hold its forty-second annual meeting at the Ohio Wesleyan University, Delaware, on April 29 and 30, under the presidency of Dr. Alphonus W. Smith, of the Ohio State University. The program of the meeting, as now being formed, will follow in a general way those of other years, which is to say, a short business session of the academy will be held early Friday morning followed by a general scientific session to be ad-
dressed by distinguished scientists on topics of general interest; the afternoon will be devoted to sectional meetings, seven in all, and Friday evening will be given over to the annual dinner following which the presidential address will be given and possibly other interesting features, including a social acquaintance hour. Saturday will be devoted mainly to an adjourned business session and the completion of the sectional programs and for such diversions, social and otherwise, as may be provided by the local committee, including a trip to the famous Perkins Observatory.

The preparation of the sectional programs is in the hands of the several vice-presidents, as follows:

- **Zoology**: Dr. M. Delong, the Ohio State University, Columbus.
- **Botany**: Dr. T. H. Knew, Miami University, Oxford.
- **Geology**: Dr. M. Spitzer, the Ohio State University, Columbus.
- **Medical Science**: Dr. E. T. Schier, University of Cincinnati, Cincinnati.
- **Psychology**: Dr. E. B. English, the Ohio State University, Columbus.
- **Physical Science**: Dr. R. B. Oechler, Oberlin College, Oberlin.
- **Geography**: Dr. Van Cleef, the Ohio State University, Columbus.

It is worthy of note that the last mentioned section, “Geography,” is a new section and meeting for the first time with the academy. As the “baby” of the academy it is attracting considerable attention to itself.

The early arrivals on Thursday will find ample provision for their comfort and pleasure in the way of excursions about the city in the afternoon and possibly an informal talk or lecture by some well-known member of the academy or invited guests, followed by a social hour. The local arrangements are in the hands of the following committee: Claude E. O'Neal, chairman; Allen G. Coggeshall; Charles C. Edwards, C. W. Jervis, Edward T. Hues, William E. Ruesch, Levin A. Thompson, Dr. B. Watkins and Louis G. Westgate.

**WILLIAM H. ALKENBERG**

**Secretary**

**SOCIETIES AND SECTIONS MEETING AT THE SYRACUSE MEETING OF THE AMERICAN ASSOCIATION**

Plans are rapidly shaping together for the sectional meetings and those of associated societies for the summer meeting of the American Association for the Advancement of Science to be held in Syracuse from June 29 to 25.

Thus far seventeen organizations have signified their intention of cooperating to make this meeting a successful one. Section A (Mathematics) has plans for at least two sessions. It is expected that each invited speaker will have an hour for discussion on a selected topic. Professor W. A. Harriott, of Cornell, and Professor H. N. Gehman, of Buffalo, have accepted invitations to speak.

The American Chemical Society will hold a regional meeting in connection with Section C. A symposium on “The Effect of X-Rays on Biological Life” is planned for Friday morning, June 24. Members of Section D (Physics), Section F (Zoological Science) and Section N (Medical Science) will undoubtedly participate in this symposium. Friday afternoon and Saturday morning will be devoted to selected papers. The papers on Saturday morning probably will be of greater interest to industrial chemists.

Section E (Geology and Geography) is planning several interesting field trips. It is expected that competent guides will lead these trips and deliver short talks at points of geological interest. The Ecological Society of America will meet with Section F (Zoological Science). The zoologists expect to hold programs on Tuesday, Wednesday and Thursday.

Several field trips are planned. The section of New York around Syracuse offers exceptional facilities for excursions and field trips for zoologists, botanists and geologists.

Several societies are joining their support to Section G (Botanical Science) and their field trips with round table discussions promise to be most interesting. Leaders have been selected for each field trip. Each of these is now busy in working up the discussion material for his meeting. Among the modus operandi and organizations which have thus far promised cooperation in making this an exceptional summer meeting for Section G are: The Botanical Society of America, American Fern Society, Torrey Botanical Club, Syracuse Botanical Club, Geneva Experiment Station, Brooklyn Botanic Garden and the Botanical Department of the New York State College of Agriculture at Cornell.

The psychologists of upper New York will meet with Section I (Psychology) for a two-day program. One symposium will be devoted to industrial psychology and another to mental hygiene. Professor Edward Lee Thorndike will give one of the association's general evening lectures.

Plans have been made for holding at least two symposia in connection with Section K (Social and Economic Science); one on “Statistics in Relation to Social Science.” The title for the second symposium has not been announced as yet. An excursion to the statistical laboratory of Professor P. A. Pearson and Professor G. F. Warren at Cornell will be a feature of the meeting. The affiliated Economic Society, an international society for the advancement of economic
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The sixty-eighth annual meeting of the National Academy of Sciences will be held in Washington on April 23, 24 and 27, 1932.

The general meeting of the American Philosophical Society, Philadelphia, will be held on April 21, 22 and 23.

The president of the fourteenth International Congress of Physiology writes that no change has taken place regarding the date fixed for the congress: August 29 to September 3, 1932, in Rome. In the near future members who have already completed and returned their registration cards will receive a second circular giving the latest information regarding the congress, membership cards, reduced rate rail tickets and program.

Dr. Benjamin Kendall Emerson, for forty-seven years professor of geology at Amherst College, died on April 7 at the age of eighty-eight years. Dr. Emerson became professor emeritus in 1917.

Dr. William Gushwa, long professor of physical chemistry at Lehigh, died on April 4 at the age of seventy-eight years.

At the special convocation of the University of Durham in June next the degree of D.C.L. will be conferred on Sir Frederick Gowland Hopkins, professor of biochemistry in the University of Cambridge and president of the Royal Society.

Dr. William H. Welch celebrated his eighty-second birthday on April 8.

Dr. Waldemar Lindroth, professor of geology in the Massachusetts Institute of Technology, was recently elected a foreign corresponding member of the Royal Swedish Academy of Sciences and of the Swedish Academy of Engineering Sciences, both of Stockholm.

The northeastern section of the American Society of Agronomy is meeting for two days, one at Geneva and one at Cornell. This, in connection with the symposium on “Land Use” to be held at Syracuse will make a very attractive program for Section O (Agriculture).

Several symposia are under way for Section Q (Education). Definite announcements will be made regarding further activities of these sections in the immediate future.

CHARLES F. ROECK, Permanent Secretary

SCIENTIFIC NOTES AND NEWS

DR. PROKOP C. LEVY, of the Rockefeller Institute for Medical Research, New York, has been elected a corresponding member of the Bavarian Academy of Sciences.

DR. ALFRED P. HESS, professor of clinical pediatrics in the University and Bellevue Hospital Medical College, New York, has been elected a member of the Deutshe Akademie der Naturforscher.

The medal of honor for 1932 of the Institute of Radio Engineers, at its twelfth anniversary convention in Pittsburgh, was presented on April 8 to Past-president Arthur E. Kennelly, professor emeritus of electrical engineering of Harvard University and the Massachusetts Institute of Technology. The citation states that the medal is awarded to Dr. Kennelly "for his studies of radio propagation phenomena and his contributions to the theory and measurement methods in the alternating-current field which now have extensive radio applications."

The editorial board of The American Journal of Cancer gave a dinner at the New York Athletic Club on April 5 in honor of Dr. Joseph C. Bloodgood, professor of surgical pathology at the Johns Hopkins University and president of the American Association of Cancer Research, on the evening before his departure for a lecture tour in Europe.

DR. ALEXANDER OLIVER RANKINE, professor of physics in the Imperial College of Science and Technology, was elected president of the Physical Society, London, on March 19, at the annual meeting of the society. He succeeds Sir Arthur Eddington, his name was added to the list of ex-presidential vice-presidents. Mr. T. Smith was elected a vice-president in place of Professor Rankine; the secretaries, foreign secretaries, treasurer and librarian were re-elected,
and Professors J. A. Crother, E. R. Robinson and G. F. J. Temple were new members elected to the council.

The coordination of scientific terminology has been considered by a committee which meets recently at the International Institute of Intellectual Cooperation, Paris. The committee consisted of Professor Cabrera (Madrid), chairman; Professor Cotton (Paris), representing the International Union of Physics; Professor Willstatter (Munich); Professor Lowry (Cambridge), representing the International Union of Chemistry; Professor Noyes-Longchamps and Dr. Ledoux (Brussels), representing the International Union of Biological Sciences, and Professor Lombardi (Rome), representing the International Union of Electrochemistry.

Dr. R. W. Trask, president of the Massachusetts State College at Amherst, has resigned owing to ill health, his resignation to take effect next September. After he has had the opportunity for rest he will become, early in 1923, research professor in the experiment station.

Dr. E. K. Marshall, professor of physiology in the School of Medicine of the Johns Hopkins University, has been appointed professor of pharmacology and experimental therapeutics to fill the chair made vacant by the retirement of Dr. John J. Abel.

Due to ill health, Dr. Jacob Diner has retired as the active dean of the College of Pharmacy, Fordham University, but will remain as dean emeritus. Dr. James H. Kildare has been appointed dean.

Dr. Harry B. Van Dyke, professor of pharmacology, University of Chicago, has been appointed professor and head of the department of pharmacology at Peking Union Medical College, Peking, China, effective about August 1. Dr. van Dyke has been a member of the faculty of the University of Chicago since 1920.

Dr. J. T. Hutton, director of the British Non-Ferrous Metals Research Association, has been appointed the first (Honorary) professor of metallurgy at the University of Cambridge.

Mr. A. C. Carlson has been appointed curator of geology and the mineral industries of the Museum of Science and Industry of Chicago.

Dr. Helen C. Doane, of the department of physiology of the New York Homoeopathic Medical College, has received a grant of $375 from the Committee on Scientific Research of the American Medical Association for the study of blood changes in experimental epilepsy.

Dr. Wendell C. Bennett, assistant curator of an
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The tenth William Thompson Seaborg Memorial Lecture was given at the Massachusetts Institute of Technology on April 8 by Dr. William G. Savage, county medical officer of health, Somerset, England, on “Some Problems of Salmonella Food Poisoning.”

The first series of the Thomas W. Salmon Memorial Lectures, established in January, 1931, is being given by Dr. Adolf Meyer, Baltimore, on April 8, 15 and 22, at the New York Academy of Medicine, on the general subject “Psychiogy.” The Salmon Lectures were established in memory of Dr. Thomas W. Salmon, professor of psychiatry at Columbia University College of Physicians and Surgeons and first medical director of the National Committee for Mental Hygiene, who died on August 13, 1927. A fund of $4,000 was subscribed to be administered by the New York Academy of Medicine.

The Federation of American Societies for Experimental Biology will meet at the University of Pennsylvania, Philadelphia, from April 27 to 30 with headquarters at the Hotel Pennsylvania. On April 27 the members are invited to visit the laboratories of Jefferson Medical School, Hahnemann Medical College, Temple University School of Medicine and Women’s Medical College of Pennsylvania. There will also be meetings of the executive committee of the Federation and of the councils of the societies. On Thursday, April 28, at 10 a.m. there will be a joint session of the federation, followed by scientific and business sessions of the societies. On Friday, April 29, in addition to the scientific and business sessions of the societies there will be joint demonstrations and at 3:30 p.m. a general meeting of the American Society of Biological Chemists. At 7 p.m. the annual banquet of the federation will be held at the Hotel Pennsylvania. On Saturday, April 30, there will be scientific sessions and a joint session of the federation. Meetings of the following societies will be held, at which members of the federation who wish to attend will be welcome: The American Association of Pathologists and Bacteriologists, the American Association of Immunologists, the American Association for Cancer Research and the International Association of Medical Museums. The meetings of the American Association of Pathologists and Bacteriologists will continue through Thursday and Friday.

The twenty-fifth annual meeting of the Illinois State Academy of Science will be held on Friday and Saturday, May 6 and 7, at the University of Chicago. The two-day session will comprise both general and sectional meetings as well as special inspection trips to the New Oriental Museum at the University of Chicago, the Field Museum of Natural History, the Adler Planetarium and the Shedd Aquarium. The address of the retiring president, Dr. Fay-Coxen Cole, of the University of Chicago, on “The Coming of Man,” will be delivered at 7:45 a.m. on Friday, May 6, immediately following the annual dinner of the society, which will take place at the Shedd Hotel, near the university campus. The meeting will officially begin at 9:45 a.m. on May 6, when Dr. Robert Maynard Hutchins, president of the University of Chicago, will deliver the address of welcome, opening the general session at Mandell Hall, to which the public will be admitted. Dr. Cole will respond and will be followed by Dr. M. L. Leighton, chief of the State Geological Survey, who will speak on “Twenty-five Years of the Academy of Science.” Other speakers on the general program will be Dr. J. Harloe Brotz, of the University of Chicago, whose address will be on “The Glacial History of the Chicago Region,” and Dr. J. R. Swager, extension entomist, of the State Natural History Survey, who will speak on “The National Forest Movement in Illinois.”

The tenth annual meeting of the West Virginia Academy of Science will be held at Concord State Teachers College, Athens, West Virginia, on April 29 and 30. A general session will be held on the morning of April 29, while the afternoon will be devoted to sectional meetings. In the evening an illustrated lecture will be given by the visiting speaker, Professor H. P. Robertson, of Princeton University. Saturday morning, following a brief business meeting, excursions will be made to points of interest in the vicinity of Athens.

The Louisiana Academy of Sciences held its fifth annual meeting at Centenary College, Shreveport, on April 1 and 2. At the meeting of the academy last year it was voted that a gold medal be awarded for the best paper read before the academy at its annual meetings. This is the first year the medal has been awarded. Professor Hamilton Johnson, of the Louisiana State University, received the award for his paper on “A New Cycle of Operation for Internal Combustion Engines.” The meeting of the academy will be held at the Louisiana Polytechnic Institute at Ruston in the spring of 1933.

The first and final accounting in the estate of Dr. Richard A. P. Ferraro, who died last July, shows a balance for distribution of $9,099.457. The account, filed in the Register of Wills’ office, lists disbursements aggregating $1,229,877, of which inheritance taxes paid to the Commonwealth of Pennsylvania amount to $403,909. Dr. Ferraro’s will, after giving $85,000 to his secretary, $85,000 in specific charitable bequests and making other small bequests, left the residue to be divided equally between the American Philosophical Society and the Geological Society of America. Each will receive approximately $4,990,000.

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THE FIFTH FLORIDA WHALE SHARK—1932

Since the capture of the fourth whale shark at Marathon, Florida, in June, 1926, reports have been coming in of others seen in the Keys and in the Gulf Stream between Miami and the Bahamas. However, all efforts to get definite information about these have been in vain. Recently an 18-foot specimen was taken off Miami and the facts have been gathered to make a new faunal record, the fifth for Florida waters and the seventh for that general locality—the Straits of Florida.

The first news of this fish that reached the American Museum was a telegram which simply read: "Huge shark captured here. Do you want it?" From my personal knowledge of Florida sharks, I judged this shark to be first a great hammerhead (Sphyrina zygocephala), secondly a huge tiger (Galeocerdo tigrinus) and lastly and most improbably a whale shark. Hence I was not very much excited, and when the identity of the shark was ascertained twenty-four hours had passed and it was too late to do anything. However, as will be seen the skin has been preserved and will be mounted.*

On January 15, 1932, Captain Thomas Gifford took a party of anglers in his boat out in the Gulf Stream off Miami for a day's fishing. About 2 p.m., while about 30 miles south of the entrance to Miami Harbor, the mate, James O'Neill, saw a large fish, and the vessel's course was set to intercept that of the shark. When the huge fish crossed the vessel's bow it was thought from its color to be a huge leopard or tiger shark (Galeocerdo tigrinus). But when Captain Gifford went out to the harpooning "pulpit" on the bowsprit he saw that it was a whale shark (Rhincodon typus) with which he and other Florida sailors are somewhat acquainted by reason of various captures of late years in the Florida Keys.

In the excitement over its great size (great in comparison with that of other Florida sharks) and the unusual coloring (vertical rows of large yellowish spots), the first throw went wide. The second, however, struck the whale shark in its most vulnerable part—the gill region. The harpoon—one made for striking sashfish—though bent, held, and the fish towed the boat a considerable distance out into the Gulf Stream. Promisedly, however, it began to work from head of blood and to work toward shore. As it grew weaker, it was drawn up to the boat, lashed fast, and with much resistance was towed into the yacht basin at Miami. Later by means of block and tackle it was swung up clear of the water and photographs were made of it hanging clear.

The fish was harpooned in water about 25 feet deep in the edge of the Gulf Stream, but the capture was made near Beazer 0, between Cape Florida and Sand Key, in water between five and ten feet deep. Like other Florida specimens this fish put up no fight other than to tow the boat around in trying to escape. Being of relatively smaller size (18 feet over all) and because of less blood by reason of being harpooned in the gills, it offered less resistance than larger specimens harpooned in the head, and was lashed to the boat for towling about three hours' effort to escape. Three hours more were required to tow it into the yacht basin at Miami, some 26 miles distant.

Mr. Pfueger made a plaster cast of the fish while it was fresh and secured the skin. As noted there were excellent photographs made of the fish swung up by the tail. With the help of these things Mr. Pfueger plans to mount the skin in fashion as near to nature as possible.

The length is variously given as 17 feet, 8 inches, to 35 feet, 6 inches. Various estimates have been made of the weight of the fish, the liver and the heart; but, as they are all merely estimates, they will be disregarded. Mr. Pfueger opened the stomach but found therein nothing but unswallowed and a great quantity of partly digested and hence unrecognizable food material.

This is the fifth Florida whale shark and the seventh for this general region—the Straits of Florida. The first specimen (15 feet long) came ashore on Ormond Beach on January 25, 1922. The second (32 feet long) was taken near Knight's Key in May, 1922.
April 15, 1928

The third was 31 feet over all and was captured in the Bay of Florida in June, 1919. The fourth (33 feet in length) was harpooned at Marathon in June, 1925. This, the fifth specimen, was taken on January 18, 1926. In addition, two specimens have been captured off Havana Harbor. The first (32 feet long) was taken west of the mouth of the harbor in 1927; the second (about 34 feet in length) was caught east of the harbor mouth in March, 1930. All these fish, save the first, I have put on record but only after the receipt of photographic evidence. Such data have come for this specimen, and since one photograph is the best ever made, I hope here to publish it and others and thus make them available for the use of ichthyologists.

These seven captures in the region of the Straits of Florida indicate that there is a breeding ground somewhere in the southwest from which the fish drift northeast with the Gulf Stream. From various data coming to me over a period of years, I am convinced that this is somewhere in the Yucatan region. The reasons for this are set out in a recent paper of mine, to which the attention of those interested in this particular matter is called.

H. W. Gudgeon
American Museum of Natural History

THE WHALE SHARK ON THE COAST OF BORNEO

Darwin Bay is a large indentation on the southeast coast of British North Borneo. In the jungles behind its flat sandy shore live deer, wild boar, tambulu or baya wild ox, elephant and chimpanzee.

Last summer I discovered that the waters of the bay held monsters even greater than anything on its shores. As the Philippine revenue cutter Minaro, entered Darwin Bay from the Sulu Sea on August 4, 1931, my friend, the Spanish engineer of the boat, spoke to me of the great "chamos" and its mate which were always seen whenever the Minaro passed that way. To my surprise, while we were talking about it, a great whale shark broke water and swam about on the surface, perhaps a little more than two hundred yards away. It was a typical specimen of Lamnidae with the white spots and longitudinal ridges being more distinct than I had ever seen them before. We estimated the length of the "chamos" to be between 22 and 25 meters.

Our boat was running parallel with the flat sandy coast, and we soon left the great shark behind, as it was merely circling about. Perhaps a quarter of a mile farther on another whale shark broke water but


DID not emerge sufficiently to show its spots. Only its gigantic size, equal to that of the one seen first, told what it was.

The Minaro frequented these waters during several months each year, while watching for these, and the anchors were never far from the place where we saw the sharks. The engineer told me that he had seen these two sharks almost every time the ship had passed the point during the past fifteen years.

ALBERT W. HEUSER,
Curator

Zoological Museum,
Stanford University

DETERMINISM AND THE WEATHER

In commenting on Professor Compton's remarks on the uncertainty principle and free will, Professor Noyes has contributed to clarify of thought and discussion by pointing out the important distinction between events which are indeterminable and those which are indeterminist. The illustration he has chosen, however, seems to imply a view of causation which calls for a certain amount of comment. He says: "I think no scientific man would claim that because the weather is indeterminable it is indeterminist—that the weather to-morrow will not depend, inevitably, on conditions which exist to-day." On the contrary—he is said for whatever measure of philosophical comfort Kwartler may derive therewith—"I think that a considerable number of scientific men would decline to commit themselves to any such statement, for excellent reasons which Hume pointed out nearly two centuries ago. Sequence of events, however often repeated, affords no proof of causal connection. The best that can be said, from the strictly critical standpoint, is that the weather to-morrow is related to the weather to-morrow through a chain of intermediate unknown events which, if we were able to find them out, we should be likely to qualify regard as establishing a causal connection.

If it be objected that this strikes at the root of all scientific method, it may reasonably be replied that the scientist should himself be the most eager to examine critically the basis of his own procedure. Such an examination is inevitable when the boundary between physical science and metaphysics becomes as indistinct as it is at the present time.

It may be admitted that there are excellent pragmatic reasons for assuming a causal connection between events or series of events characterized by a high degree of statistical correlation (the relation of the weather on two successive days is not the best example of this), but it should be pointed out that this assumption does not justify the ordinary idea

J. J. E. Compton, SCIENCE, 74: 175, 1931.
that the event which precedes in time is the cause, while that which follows is the effect. We are quite as justified in saying that the weather-tomorrow is the cause of that to-day as in saying the opposite. Any one to whom the logic of this is not self-evident is invited to revolve “Alice in Wonderland, or Through the Looking-Glass.” When we say that two events are causally related, all that we can mean from either the philosophical or scientific standpoint is that there is a high degree of probability that one will not occur without the other.

It is a commonplace of probability theory that empirically determined laws are liable to violation. When the probability of such violation is slight, we are prone to disregard it, but on very much the same basis that we disregard the probability of being killed by stepping in the bath tub. This admittedly may happen, but we continue to take baths and hope for the best.

The "collapse of causality" alleged to result from the uncertainties of quantum theory has been variously received by different segments of the scientific world— with alarm and consternation, with resignation or despair, or with an enthusiasm born of the hope that it offers new arguments for human freedom. It is difficult to see how any of these points of view is justified. The principle of causation is just as valid as ever for practical purposes, while from the philosophical standpoint it never had any validity. Therefore it would seem that matters remain as they were.

If quantum theory has silenced any service to the cause of free will, it is primarily that of showing that some of the reasons for believing in determinism are not as good as was formerly supposed. At present each hypothesis seems to rest on the somewhat precarious ground that the other cannot be shown to be true. Without discounting his own prejudices in the matter, the present writer holds to the view that determinism labors under the disadvantage of requiring a greater number of assumptions in regard to the behavior of unknowns. In other words, the conservative attitude is to emphasize that events which are indeterminable are indeterminate as far as we know. It requires an extraordinary extension of the scientific method to assert what would be true if we knew all the facts in the case.

ROBERT C. MILLER

UNIVERSITY OF WASHINGTON

ON "ACADEMIC FREEDOM IN ITALY"

In Science for March 25 Dr. A. J. Carlson, head of the department of physiology, University of Chicago, asks American biologists not to attend the next International Congress of Physiology, which is scheduled to meet in Rome next August, "unless the brutal and defiant attack on academic freedom as an outgrowth of the Italian government is repressed." The "attack" is the oath of loyalty required by the government from the professors of the Royal universities. I wish to make, in this connection, some statements of facts, which are perhaps not well known, or have often been overlooked in the discussion on the subject.

The Italian universities are classified in three categories, namely, universities entirely supported by the state; universities largely supported by the state and partially by private contributions; and private universities, which do not receive any financial help from the state. The oath is demanded only from the professors (including associates, assistants, etc.) teaching in universities belonging to the first category, i.e., from the official instructors maintained by the state. The professors of private universities are, of course, entirely free from such an obligation; a large number of them, however, offered spontaneously to take the oath. As it has been published, twelve out of a total number of 1,225 professors, refused to take it. Does Dr. Carlson think that the remaining 1,213 took the oath against their conscience? Did he realize that the attitude that he suggested implies an insult toward the very men he seems so anxious to defend?

An oath of loyalty and allegiance to the King, the fatherland and the laws of the state has been required since the time of the constitution of the Kingdom of Italy from every person taking any office in direct dependence on the state. After the advent of the Fascist régime, which represents now the Italian State, the phrase "... and to the Fascist régime" was added to the prior formula. The formalism is essentially the same for every category of officials, but may vary somewhat, according to the specific functions which shall be exercised. For the university professors, the sentence concerning their functions is the following: "... and (I swear) to exercise the teaching function and to fulfill all academic duties with the purposes of serving active, honest and devoted to the fatherland and to the Fascist régime." The entire formula has already been published in Science (Jan. 15, p. 70), but evidently in the translation the meaning of the Italian word "patria" (i.e., home) has been confused with "propria" (i.e., bold).

The statement of a group of Harvard professors (Science, ibid.), namely, "This decree imposes upon all university professors of the Kingdom of Italy—and among all state officials of the Department of Education it is applicable to university professors alone—the obligation to take an oath which implies complete adherence without reservation or discussion to a particular system of political ideas," is thus somewhat misleading, since all state officials are ob-
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led to take the oath, and not all the university professors.

The Fascist regime, as far as the theory is concerned, undoubtedly is to be considered "a particular system of political ideas," as every other regime in the world. Actually, however, it represents the Italian state as recognised by far the greatest majority of citizens.

The state requests its officials, who are supposed to apply its laws and to make the citizens respect them, to take an oath of allegiance, as a means of prevention against the danger of maintaining in dependence on it men whose activity is contrary to the safety of the state itself. This is, I believe, the general procedure in every country. In the United States, for instance, an oath of "true faith and allegiance" to the Constitution, implying the condition to "support and defend the same against all enemies, foreign and domestic," and to be taken "without any mental reservation or purpose of evading" is required from "any person elected or appointed to any office of honor or profit in either the civil, military or naval service," and, apparently, whatever his personal political ideas may be.

Furthermore, examples of states directly defending themselves against professors who are supposed to exercise dangerous political propaganda are very common everywhere, and are well known.

There is not in Italy any limitation whatsoever to discussion and research work in any particular or general biological theory or field, nor any restriction from either the civil or ecclesiastical authorities, and this is not the case in every country. Therefore, there is no reason whatever for supposing that a scientific discussion in the field of biology could not enjoy the utmost freedom. A refusal to attend the physiological meeting would only result in a boycott, on the part of American biologists, of the hospitality that the Italian scientists (whose own conscience has always made them take the oath) are preparing for their colleagues of the world.

GIOVANNI MONTECATINI
ASSISTANT PROFESSOR,
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RESEARCH FELLOW FOR 1931-32,
UNIVERSITY OF OXFORD

ACADEMIC FREEDOM IN SPAIN

Dr. Carrillo's protest against the International Physiological Congress and his participation in the League of Nations because of the attack on academic freedom in Italy suggests that similar action be taken by American educators in protest of the more brutal attack on this right by the Spanish government in regard to the Jewish Order. For, whether one agrees with the aims of this teaching body or not, the principle at stake is the same, namely, academic freedom, which has suffered a serious blow not only by the law forbidding members of the Society of Jesus to teach in Spain but also by the outright confiscation of their twenty-six colleges serving 14,099 students. Among these institutions were many which were doing notable work in science, especially the Chemical and Biological Institutes of Sarriá (Barcelona) and the Engineering Institute in Madrid.

Particularly obstructive was the proposal of the government to Father Rodó, director of the Observatory of the Ebro, one of the world's few stations for the study of terrestrial magnetism, to continue his work until they could prepare a staff to replace him and his assistants.

Those who have found fault with Spain because of its backwardness in things scientific will resent this further handicap to progress in science and will add a protest against it to the one against the attack of the Fascist regime on academic freedom in Italy.

SPRING HILL COLLEGE
P. H. YARBOROUGH, S.J.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A METHOD FOR WASHING CORPUSCLES IN SUSPENSION

The original fluid may be replaced and corpuscles washed while still in suspension during centrifugation. This is accomplished by placing the suspension in a conical chamber (A). During centrifugation, the replacement fluid is introduced at the outer and narrow end of the chamber while the replaced fluid is forced out at the inner and wider end. The chamber is so designed that, when properly operated, the rate of flow at the narrow end is too rapid to permit the settling and packing of the corpuscles, while at the wide end it is too slow to carry them out with the replaced fluid. The corpuscles, therefore, remain suspended in the middle of the chamber.

TECHNIQUE

The conical chambers (A) are filled and inserted in the centrifuge head. These are so designed that all connections are made automatically as they are placed in their guide. An injection tube (F) from an inverted flask (I) containing the replacement solution is clamped in position in the center of the intake chamber (B). The position of the mouth of this tube regulates the height of fluid in the intake chamber. A clamp on the rubber connection (H) permitted control of the rate of fluid in the intake chamber.

When only one conical chamber is used or when accurate distribution is not essential, the jet (J) may be replaced by a fine glass tube and the rate of flow of replacement fluid regulated by a jet or valve before it is introduced into the intake chamber.
to the flask (1) prevents the fluid from flowing out. The centrifuge is started and run at full operating speed long enough to permit the corpuscles to settle away from the outlet of the chamber (A). The clamp on the flask connection is then removed and the replacement fluid permitted to flow into the intake chamber. The rate of flow to each central chamber is regulated by the size of the jets (F) leading to them. The overflow is carried to a collector pan below the centrifuge head. When the desired washing or dilution has been obtained, the flow of replacement fluid is shut off and the centrifuge stopped by applying the brake. The central chambers are removed from their guides and the suspension of corpuscles may be poured out through the vent tube (C). The corpuscles come in contact with glass only. All vessels and tubes which come in contact with the replacement fluid are glass and their connections rubber.

The rate of replacement and washing depends upon it is convenient to keep the mouth of the injector tube close to the top of the intake chamber. When one of the central chambers is not in use the jet is replaced with a closed tube and the chamber filled with fluid of proper density to maintain balance. The suspension to be washed and the centrifugal force used. In a first test, a 90 cc solution containing corpuscles in suspension and 62 per cent. phenol red was centrifuged at approximately 650 times gravity at the maximum cross section of the central chamber. After one minute, the replacement fluid was permitted to flow through the chamber at the rate of 90 cc per minute. At the end of fifteen minutes, the dilution of the indicator showed that only a fraction of 1 per cent. of the original fluid still remained.

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MEDICAL RESEARCH

A MODIFICATION OF THE BUCHNER METHOD OF CULTIVATING ANAEROBIC BACTERIA

This apparatus illustrated in the accompanying diagram has been tested thoroughly in connection with our work and has been found very effective for the cultivation of microaerophilic bacteria, at the same time eliminating several of the difficulties involved in using the usual Buchner tube.
PHOSPHATE, NITRATE AND NITRITE IN THE SEA-WATER OF REGIONS ADJACENT TO CAPE COD

The first objective in the planned program undertaken at the Woods Hole Oceanographic Institution, during the summer of 1931, was a general survey of the waters of the Woods Hole region with respect to their phosphates and nitrogen content, and especially a comparison of the inshore or neritic waters with the oceanic water found at or near the Continental Shelf. The broad shelf to the south of Martha's Vineyard and Nantucket offered a particularly favorable opportunity to study this latter point.

For this purpose two series of stations were established in this area, one, Series D, extending seventy miles to the south of Block Island to the edge of the Continental Shelf, and another Series A, to the south of Martha's Vineyard in a similar manner. Water samples were taken from the surface, bottom and intermediate depths at stations of varying distances from shore. Phosphates, nitrate and nitrite were determined by standard analytical methods.

The samples from Series D were taken on a single trip, covering a total time of less than two days. The results are shown in Fig. 1, correlating the phosphate and nitrate content, both surface and bottom, with the depth of water and distance offshore. The most significant feature is the increase in phosphate, and more particularly nitrate, found at the bottom as the Continental Shelf is approached. The distinction between “oceanic” and inshore water, not only in this series of stations but in others as well, is to be found in the concentrations of phosphate, and more especially nitrate, at the bottom.
The thirteen stations in Series A were visited at various times during the summer, and consequently the results do not represent a continuous profile. They indicate that water movements of a very fundamental sort take place. This is especially noticeable in the vicinity of the ships, where the influence of oceanic water varies over many miles, extending considerably further inshore at some times than at others.

Phosphate and nitrate concentrations at inshore stations, not only in these two seas but in others in Vineyard Sound and Buzzards Bay, were found to be variable, even over comparatively short periods of time. This is to be expected from the continuous movements of water due to tidal currents, etc., and is in accord with similar results obtained by the author in the northeasterly waters of the Gulf of Maine. It is evident that inshore waters cannot be distinguished or characterized in terms of their phosphate or nitrate content.

The interpretation of the variations in nitrite is a problem in itself. With a few significant exceptions the following general principles seem to be true: Nitrite is seldom, if ever, found at the surface, and almost always found at the bottom, although there is usually not a very high concentration at the bottom of oceanic stations. It is exceedingly variable from time to time. It is apparently used up by some process at or near the bottom. This last conclusion is supported by the fact that nitrite-free sea-water inoculated with nitrite-free bottom mud develops nitrite on standing.

There were a few cases of exceptionally high nitrite values for which no good reason was apparent, although it may be significant that these came from stations visited earlier in the season than any others.

A METHOD OF IMMUNIZATION WITH CARBOHYDRATE HAPTOASSOCIATED ON COLLOIDION PARTICLES

To ascertain whether colloidion particles combined with haptens induce antibody formation, i.e., whether haptens can be made antigenic by adsorption on non-protein inert particles, a description of this work was published in 1930, with colloidion particles treated with purified type-specific substances of pneumococcal type 1. The results were negative. In May, 1931, I started similar experiments with a carbohydrate solution prepared from the anthrax bacillus. Before the immunization experiments were begun I demonstrated that the hapten was adsorbed by colloidion particles and that the hapten adsorbed on colloidion could not be removed by washing, and was able to react in vitro with its antibody. 0.5 per cent solution of the hapten was mixed with colloidion particles, which, after washing four times, were agglutinated by antibody-immune serum in dilutions from 1:5 to 1:50. This agglutination was observed in hanging-drop preparations.

In immunization experiments it was found that when colloidion particles are injected into the ears of rabbits the Knopf cells contain colloidion particles demonstrable with Ziehl-Neelsen method. These results made it highly probable that carbohydrate hapten adsorbed on colloidion particles would induce antibody formation in vivo.

Subsequently and after personal communication Dr. Zazzya reproduced my results. Then we immunized rabbits with the combination of colloidion and haptens. Later the work was continued independently.

In one of three rabbits injected with colloidion coated with anthrax-carbohydrate the serum gave a faintly positive precipitin reaction with the solution of anthrax-carbohydrate. Rabbits injected with colloidion particles coated with the specific substance from pneumococcal type II did not produce agglutinins or precipitins. Work with other haptens and adjuvants is in progress.

Henry Phipps Institute,
University of Pennsylvania

BOOKS RECEIVED


1 The hapten preparation was given to me at my request by Dr. J. Zazzya, of the H. K. Melford Co.


7 The hapten preparation was obtained through the kindness of Drs. Avery and Geobeil.
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THE PNEUMONIA GERM

A new understanding of the pneumonia germ was presented by Dr. Oswald T. Avery, of the Rockefeller Institute for Medical Research, at the convention on April 2 at the American College of Physicians in San Francisco. A new germ, which plays a leading part in the germ's disease-producing activities, it appears from the research, Dr. Avery described.

The pneumonia, or pneumonic germ, is surrounded by an envelope of material known as the cell capsule, he explained. Without this capsule the germ has no power to invade the body or to cause disease and it is easily taken up and destroyed by the plague-carrying or scavenging cells of the body. This important capsule is probably composed largely of a soluble sugar-like substance which is made by the pneumococci. Each of the different types of pneumococci produces its own specific sugar-like substance.

The sugar of the pneumococcal germ is probably not a poison like the poison produced by the diptheria germ, but it does seem indirectly to hinder recovery from the disease. This is because the sugar tends to bind certain protective substances in the blood and thus to prevent their reaching areas of infection in the body, where they could fight the disease.

Dr. Avery and associates found that the body does not produce any enzyme which can break down the complex sugar of the pneumococcal germ's capsule, but a microorganism found in so-called "pudding" does produce such an enzyme. When this enzyme was injected into mice and rabbits suffering from pneumonia, the animals recovered. Likewise, they found that a preparation of this enzyme protected more than a million times the number of virulent germs which invariably caused death in the unprotected animals.

The enzyme breaks up the complex sugar of the germ's capsule, the unprotected germ is easily prey for the scavenging cells of the body. Thus recovery depends both on the presence of the enzyme and on the body's ability to produce scavenging cells to destroy the unprotected pneumococcal germ.

Dr. Avery also told how, in the course of his research, an important skin test was developed of the sugar of the pneumococci. When a little of this sugar is introduced into the skin of patients recovering from pneumonia, a reddened spot will develop in the center of it appears. The capacity of the skin to sequester in this way with the germ's sugar is closely connected with recovery from the infection. The results indicate that this skin test may be significant in forecasting the outcome of the disease, and may also be of value in determining the dosage of antistreptococcal serum to be given in treatment.

ENCEPHALOMYELITIS

Two cases, one of them fatal, in which men have apparently been affected with a newly-discovered brain disease of horses and mules were reported by Dr. Karl F. Meyer, of the George Washington Hospital Foundation for Medical Research, University of California, at the meeting of the American College of Physicians on April 4.

In view of his findings, Dr. Meyer urged the assembled physicians to examine the brain and spinal cord of every fatal human case of encephalitis which was not typical in symptoms and course.

The two cases in which Dr. Meyer described occurred in cattlemen who had been caring for horses afflicted with the equine form of the disease. He could not prove conclusively that they had suffered from the same disease because he was unable to examine the brains of the men who died. But in the absence of other facts of their close contact with the sick horses, he felt sure they had contracted the disease from the animals.

The equine disease, called encephalomyelitis, first appeared in California during the summer of 1924. It started with the onset of hot weather in June or July and with the onset of cooler weather in October, disappeared. The same thing occurred again in 1925. During these two seasons, about 6,000 horses died. Dr. Meyer expects the disease to occur in epidemic form again this season when the warm weather returns, as several cases have been reported from the San Joaquin Valley during the past two weeks.

The encephaly is caused by the type of germ known as a virus, which attacks the brain and spinal cord of the animal. It is apparently identical with the so-called "encephalitis-equine meningitis" which has been reported in various parts of the United States during the past 70 years. The disease caused heavy losses in the West Central States about 1912 under the name "Kansa-Nebrode horse plague."

Horses and mules are the only animals known to be affected under farm conditions, although the studies of Dr. Meyer and associates showed that the virus found in the brain and spinal cord of sick horses can produce the disease in horses, mules, rabbits, guinea-pigs, rats and mice when injected into the brain. Two types of the disease occur: the sleep type in which the animals are drowsy until disturbed, then they may have convulsions, and the walking type in which the animal paces around and around the field.

An attack of the disease, even so slight as to escape notice, seems to give the animal immunity, that is, to protect it from subsequent infection in the majority of cases. Investigations at the Hospital are being made with the hope of producing a serum that may be used in treating the animals or a preparation that will confer immunity on them. Encouraging results have been had in a small number of cases and Dr. Meyer and associates expect an opportunity to determine the real value of their preparations during the anticipated epidemic.

MAGNETIC POLES

The idea that there can exist in nature a magnetic pole free from the influence of a magnetic pole of oppo-
April 15, 1882

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Nine. Only, the "soup-kettle" does its boiling in terms of millennia rather than minutes, and is thousands of times as stiff as glass, so that its movements are naturally slow. This is, in rough outline, the picture sketched by Professor Arthur Holmes, of the University of Rochester, England, to account for the rate at which the earth is losing its heat. He spoke at a meeting of the Washington Academy of Sciences.

The first effort to calculate the age of the earth from the known rate of heat radiation was made by the famous English physicist, Lord Kelvin. He assumed an originally molten globe, with no energy resources beyond the original dowry it brought with it from the sun. The maximum age allowed by Lord Kelvin, forty million years, was pretentious by geologists and geochronologists as altogether too short to allow for all the events they knew had happened.

This picture between geophysics and geology stood until the discovery of radium and other radioactive elements in practically all the rocks of the earth's crust. This gave the planet its necessary supply of energy, which permitted a much longer time for its cooling down to its present state, and incidentally allowed the geologists all the time they wanted.

As a matter of fact, the first calculations of granite rocks for radioactive elements yielded an embarrassment of riches in energy. There was too much of it to account for the earth's radiation, if all the rocks were equally endowed. But it was soon learned that this was not the case. Granitic rocks from near the surface contain far more radium and allied elements than the basalt from deeper in the crust, and the basalt in turn are very much more radioactive than the still deeper rocks, called peridotites, that are assumed to make up the bulk of the stony material of the globe, filling all the space between the surface crust and the rigid central core of nickel-iron that seems about to spin off the third of the earth's diameter.

But even with the bulk of the earth's radium thus concentrated in the crust—about sixty miles of the outer rocks—there still remains the problem of the transfer of the interior heat to the surface; else part of the earth's interior would be too hot for our ultimate comfort, and the rest too stiff.

Two theories have been prepared to account for this. One is supported by Professor John Joly, of the University of Dublin. He thinks in terms of "waves" of thermal energy starting from the interior and working outward toward the surface, through a semi-fluid mass. As each wave travels outward, it liquifies the zone through which it is moving, and as it passes leaves it solid again. Naturally such a wave would move very slowly, but it would carry with it a great increase in energy, so that it would well give rise to revolutionary geological events as it arrived at the surface.

Professor Heaviside's "soup-kettle" hypothesis visualizes events in the interior as consisting of waves of energy passing outward through a stationary mass, but as a movement in the mass itself, carrying the energy with it. The deep, periodic, stony waves, he thinks, may be sufficiently fluid to move with slow revolution

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George Eastman Museum

SCIENCE—SUPPLEMENT
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Congressional Investigation of Inventions

The claim of an invention of a deadly weapon of destruction giving the nation possessing it command of world military affairs, which the Congress is now considering, is viewed with skepticism in scientific circles. Extreme secrecy and broad claims do not inspire the confidence of authorities in the world of science.

If the resolution introduced to give exceptional consideration to this claimed invention of Lester P. Barlow, of Stamford, Connecticut, should be passed, the Congress would not be following the path of recognized scientific endeavor or that of the patent system provided for the protection of inventions and of the public.

Scientists recall that several years ago the Congress appointed a committee to investigate an invention said to extract free available power from the atmosphere. But the inventor, Gerhard Z. Girgensons, failed to submit his apparatus to the committee.

Similarly, another resolution concerning an invention of Mr. Girgensons has been introduced into the House during the present session of Congress.

Another proposal for getting quantities of power cheaply, which failed to meet tests, is that of Lester J. Hendrickson. It was widely reported in newspapers in the early part of 1928. Inventor Hendrickson intended to get power from the electricity of the atmosphere.

An apparatus which received widespread publicity about 30 years ago was the Keeson motor. It developed that the machine was a failure, power to run the motor being supplied as compressed air through a hollow tube concealed in the leg of a table on which the machine rested.

Recognized scientists always welcome the consideration of new proposals, but they insist that full details be given and that claims be made only that which has been accomplished in actual experiments. As a rule, inventions announced with the secrecy and broad claims of the Barlow invention of war seldom become important.

Mr. Barlow's claims for the new invention link it with an invention of a flying torpedo that he submitted to the Navy Department in 1917. It is said that the device now being considered will destroy cities and forces of men a thousand or more miles from its operators. The 1917 suggestion was examined by the Navy and declined.

Mr. Barlow is also said to have submitted ideas for a submarine escape device. In reply to an inquiry, the Navy could not find record of contact with the inventor.

The name Lester P. Barlow is not in the latest membership lists of the American Association for the Advancement of Science, the American Society of Chemical Engineers or the Society of American Military Engineers. Neither is he recorded by the most recent Who's Who in America or by American Men of Science.

ITEMS

Hercules comet, presently to the heavens, has been photographed at the National Observatory of Argentina at Cordoba, by Astronomer Robin. This comet was discovered on April 8 at the Cape of Good Hope Royal Observatory. It is moving northward, but is still much magnitude too faint to be seen without telescopic aid and is visible only from the southern hemisphere. Harvard College Observatory has notified American astronomers of the Cordoba observation.

The Hydrographic Office of the U. S. Navy reports that a 2000-mile voyage across the Pacific just north of the equator has been performed by a drifting bottle. The bottle was picked up among the Philippine Islands. The paper it contained recorded that it had been thrown overboard off the coast of Mexico by Second Officer J. C. Johnson of the American cruiser George W. Brown, on July 2, 1929.

Among a warning odor and taste to McKeebied of mercury tablets would help to reduce the number of accidental poisonings by these deadly tablets, suggests Dr. B. E. Rose, Director of the chemical laboratory of R. F. du Pont de Nemours and Co., in a note to Industrial and Engineering Chemistry. Attention has recently been drawn to the importance of making those tablets a distinctive color and shape. Specifically, Dr. Rose suggests a drop of the lighter fractions of synthetic alcohols for giving a warning odor that is both characteristic and not so dangerous for use in the sink room, and a small quantity of a very bitter substance such as the salt of quinine to give a characteristic warning taste.

A current for packing more power into ultra-short wave radio waves, the forms of transmission which is now the subject of intensive research throughout the world, was reported to the Institute of Radio Engineers meeting in Pittsburgh by Mr. H. H. Kanaunok, of the Westinghouse Electric and Manufacturing Co. Many radio engineers interpret Mr. Hannahok's achievement as a step toward single-trans and full-time radio. Because ultra-short waves travel in a straight line and can be focused, it has been predicted that they will largely overcome those two drawbacks of the larger waves now used for broadcasting. One of their great advantages has been the limited power with which they could be used. The new development, however, makes possible an output of at least five watts from a 60-centimeter wave-length transmitter while, according to published standards, the energy available in this range has been used only a fraction of a watt.
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