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THE EARTHQUAKE.

After having been privileged to witness the rare spectacle of a total eclipse of the sun, the northeastern part of the United States was visited by an earthquake on the evening of Feb. 28, 1925. The shocks were quite marked in New England especially in the region north of Boston. Church bells were rung, clokks were stopped and people fled from theatres almost in panic. Apart from the press reports we have not received any accounts of the effects felt in different parts of the Province. The newspapers gave considerable prominence to the reports of Father Tondorf and Mr. J.S. O'Conor, Directors of the Seismological Observatories at Georgetown and Fordham and of Father F. Odenbach, Director of the Observatory at John Carroll University at Cleveland, Ohio. It was stated that at Fordham the shock was sufficient to break the needle of the lever of the seismograph. Here at Weston the shocks were not severe and were passed unnoticed by many. The editorial offices of the Bulletin situated in the White House on Sudbury Road received a distinct though not an alarming shake-up. This was at 9:22 P.M. The tables and chairs shook and the window panes rattled. There was no wind. Father Tondorf our veteran seismologist writes us that the center of the earthquake has been definitely located in the region about Lake St. Lawrence. The cause was due to the Logan Fault. This recalls the famous earthquake of Feb. 5, 1663, whose effects were so strongly felt in southeastern Canada and in New England. Our best descriptions are due to French Jesuit Missionaries who were on the spot in Canada. With true scientific instinct they recorded everything and included their observations in reports sent to their Superiors. These observations may be found in the Jesuit Relations. Their seismological successors can now detect earthquakes thousands of miles away. We may add that AMERICA for March 28, 1925, calls attention to the services rendered to the science of seismology by the Observatories attached to our Catholic Colleges and Universities.

PHYSICS TEACHERS MEET AT BOSTON COLLEGE.

The Eastern Association of Physics Teachers held its hundredth meeting at Boston College, Newton, Mass., on Sat., March 28, 1925. The Association usually meets at some school or college in New England, and this was the first time in its history that it met at a Catholic institution of learning. The magnificent new Science Building which was made possible by the recent college drive and which was opened for class insturction last fall was placed at the disposal of the visitors. The business meeting was held in the large chemistry lecture room at about 10:00 A.M. with the President of the Association

Mr. F.E. Mason of the Bosyon High School of Commerce, in the chair. Father William Devlin, President of the College, addressed the members welcoming them to the Heights and telling them that Boston College was theirs for the day. He assured them furthermore that they would always be welcome in its halls and laboratories. The remainder of the session was held in the Physics lecture room. Father H.M. Brock of Fairview, Weston, Mass., gave a lecture on "Some Properties of the Thermionic Vacuum Tube", with experimental illustrations. He was followed by Mr. D.R. Hill, of the Kelvinator Company of Boston, who described and showed the refrigerating unit placed on the market by his company for home refrigeration. A luncheon was served by the College to all the guests in the Assembly Hall. Inspection of the Science Building followed. Professor F.A. Saunders opened the afternoon session with an address on "The Use of Electrons in Teaching". He laid stress on the usefulness of the electron theory in explaining electrical phenomena and showed how he used it in his own courses in General Physics. He mentioned the confudion caused by the difference in the direction of flow of the electrons and the conventional direction of the current. He said that he hoped that some brave soul would come along who would ignore the latter completely. The main difficulty in the way is the way in which our electrical instruments are labeled and of course also the common text books. The annual address of the Vice-President, Mr. Ralph H. Hauser, of the Mander Hall School, Cambridge, Mass., was given on "Some Observations on the Teaching of Physics". Father D.J. Lynch, Professor of Physics at Boston College, had charge of the arrangements at the College and saw to it that every thing went off well. Mrs. V.P. Roberts, President of the Philomatheia Club, was on hand to look after the interests of the ladies. The members of the Association were very favorably impressed by the new Science Building and greatly appreciated the cordial hospitality of the College.

PROPOSED NEW INSTITUTE AT GEORGETOWN.

Father G.L. Coyle of Georgetown recently sent us a pamphlet, evidently gotten out under his direction, showing the need of fundamental chemical research in solving medical problems and describing the plans of the proposed new Institute of Chemo-Medical Research to be founded at Georgetown. An endowment of 3,080,000.00 is estimated as necessary in order to begin the work. Plans are being made and a campaign organized under father Coyle's direction. He writes that responses from those who have been approached so far are encouraging. In the pamphlet mention is made of our present health rate and of the economic loss to the country on account of sickness to say nothing of our annual drug bill of 800,000,000.00 much of which is spent for patent medicines. Some of the triumphs of research in conquoring disease are described. Pastuer's work is to serve as a model. We wish Georgetown all success in organizing the new Institute and in acquiring an adequate endowment. It will give our oldest Catholic University a high standing in the world of science.

THE EINSTEIN SHIFT -- CONFLICTING EVIDENCE.

The Annual Reports of the leading Observatories of the United States and Canada have just been published in POPULAR ASTRONOMY for January and February, 1925. The two following extracts are interesting and indicate the great difficulty of arriving at certitude on the matter in question.

"Excellent progress has been made by Mr. Burns in the program of precise solar wave-length determination. ..... As a by product of this extensive program, in which an accuracy of one part in five million is easily secured, Mr. Burns has obtained data as to the shift of the solar lines ~~which appear~~ to the red which appear to negative the prediction made from the theory of Relativity. Einstein predicted a shift of the solar lines to the red amounting to 0.009 A, the same for all lines in any given spectral region. Burns finds a regular progression in shift to the red, varying with the line intensity.....it seems impossible to reconcile this progressive shift with the simple Einstein prediction through any consideration of high or low levels, or any velocity factors depending upon ascending or descending currents." From Director H.D. Curtis' Report of Allegheny Observatory. POPULAR ASTRONOMY for Jan. 1925, pp. 18-19.

From Mount Wilson we have the following: "Two results of first importance have characterized the solar investigations of the year.....Second, the confirmation by St. John of the gravitational shift of the lines in the solar spectrum seems to afford final evidence for the validity for the theory of general Relativity. St. John's results, based on over 330 iron lines, show in a simple and convincing way the effect of the combination of the relativity displacement with that due to convection currents in the solar atmosphere and explain many of the difficulties encountered by observers in this field.....Grouped according to line intensity, the differences (between the sun and arc spectrum, i.e. the shift) increase progressively with the intensity. Line intensity, on the average, however, is an indication of the level in the solar atmosphere at which the lines originate. Downward convection currents at high levels, and upward currents at low levels with maximum velocities of the order of 0.2 or 0.5 km./sec. would remove the progression in the differences (i.e. in the shift of the lines). That such currents exist in the case of certain elements at least, is well known". From the Report of Director Walter S. Adams of the Mount Wilson Observatory. POPULAR ASTRONOMY, Feb. 1925. Father E.C. Phillips S.J.

THE TEMPERATURE OF MARS.

Those interested in the question of the possibility and probability of the inhabitability of planets other than the earth and particularly the inhabitability of Mars will recall the figures of Poynting, indicating the very low temperature of -20 deg. C. at the equatorial surface of Mars and an average temperature of -38 deg. C. over the entire surface of this planet. We will also recall that Poynting looked on this low temperature as an argument against Lowell's theory of a Martian people.

In 1921 attempts were made at a redetermination of planetary temperatures at the Lowell Observatory, Flagstaff, Arizona. The method used was to separate the radiation into spectral components by means of transmission screens, and measuring the energy by means of stellar thermo-couples. In view of the optimum conditions for working on the planet Mars at the recent opposition these researches were repeated and the following temperatures are now offered. The temperature about the equator is now believed to be from 10 deg. to 20 deg. C. Radiometric measurements made on twenty nights under a wide range of instrumental and meteorological conditions indicate that the bright regions of Mars are cooler than the dark and that the sun-rise side of the planet is at a lower temperature than the side exposed to the after noon sun, and that the polar region is intensely cold.

Dr. Coblentz says that his measurements show that the noon-day temperature of the equatorial surface of Mars at perihelion is no unlike that of a cool bright day on the Earth, with the temperatures ranging from five to fifteen degrees C.

Father F.A. Tondorf S.J.

SAMPLE OF A LABORATORY MANUAL IN ZOOLOGY.

Mr. A.J. MacCormack S.J., Professor of Biology at Holy Cross College, Worcester, Mass., sends us a sample sheet of a laboratory manual prepared for the course in zoology there. He would like some criticism of it by other teachers of biology. He writes, "The manual is divided into six parts. The first part deals with the classification of the animal in question, giving the derivation of the names. The second part deals with the terms and words used both in the lectures and in the laboratory. Therefore in lecturing it is not necessary to stop and define or explain any term. They are all on the sheet before the students' eyes. He is supposed to read the part concerning which the lecture will be given beforehand. The same is required before going into the laboratory. In order to make sure that he does this, evry now and then we hold an unexpected quiz before a lecture or laboratory class. The third part gives a short account of the animal so that the student may as it were orient himself and know what type of animal he is dealing with. The fourth part deals with the dissection proper. It is divided into exercises. When the student comes into the laboratory he knows he has to do such and such an exercise. All the directions of what and how to cut are given, he is told where to be careful, etc. The fifth part gives a list of questions usually not covered in the lectures. He is required to find the answers to these and be ready to give them when asked. The sixth part gives the bibliography, with all the well known books covering the particular thing, together with the page and chapter".

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GRASSHOPPER

1. CLASSIFICATION.

PHYLUM.	Arthropoda.	(G. arthron, joint; pous, foot).
CLASS.	Insecta.	(L. insectus, cut off).
ORDER.	Orthroptera.	(G. orthos, straight; pteron, wing).
FAMILY.	Acrididae.	(G. akris, locust).

etc.

2. GLOSSARY.

ABDOMEN-	part of the body posterior to the thorax. (L. abdomen, belly).
ANTENNAE-	jointed, thread-like feelers on the head. (L. antenna, a sail-yard).
CERCI-	pair of jointed projections on the tenth somite. (G. kerkos, tail).
CHITIN-	hard, calcareous substance forming exoskeleton. (G. chiton, tunic).

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--- Father F.A. Tondorf S.J.

SKETCH OF A LABORATORY MANUAL IN ZOOLOGY.

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ABDOMEN- part of the body posterior to the thorax. (L. abdomen, belly).

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CHITIN- hard, calcareous substance forming exoskeleton. (G. chiton, tunic).

CLYPEUS- plate connecting the epicranium and labrum. (L. clypeus, shield).
COLON- second part of intestine, posterior to the ileum. (G. kolon, member).

etc.

3. Description.

Grasshoppers are very common in the fields, great numbers jumping out in front of one as he walks throughthe meadows and open spaces in the country. Some of them are winged, others are much smaller and wingless. All are more or less protectively colored since their color closely resembles that of the grass. Their food.....etc.

4. PROCEDURE.

Place grasshopper in dissecting pan, anterior end at your left. Remove with the scissors the nearest wings.

A. EXTERNAL ANATOMY.

EXERCISE I.

Identify head, thorax, abdomen. Note chitinous substance covering the body.

HEAD.
Locate thread-like antennae, compound eyes, ocelli.

THORAX.
Note thoracic appendages, the legs, the place and mode of their attachment, different segments of which they are composed, etc.

B. INTERNAL ANATOMY.

EXERCISE IV.

With scissors make a slit from posterior to anterior end of the dorsal region, a little to one side of the mid-dorsal line. As the organs lie very close to the abdominal wall, this incision must be carefully done. Remove with scissors the entire dorsal wall. Immediately under the mid-dorsal region is a narrow transparent tube, the HEART. Note the ALIMENTARY TRACT,.....etc.

DRAW the organs "in situ". Label the parts.

5. QUESTIONS.

What is the economic importance of the grasshopper?

Give the most striking differences between the grasshopper and the type previously studied. etc.

6. BIBLIOGRAPHY.

PRATT, Invertebrate Zoology, pp. 9-20.

MENGE, General and Professional Biology, pp.332-35?

etc.

Mr. A.J. MacCormack S.J.,
Holy Cross College,
Worcester, Mass.

THE LAWS OF MOTION (continued)

In the Einstein mechanics it is easilt shown that a body acted upon by a constant force does not travel with uniformly accelaerted motion, but instead has a motion such that its trace has a constant curvature. The ratio of the force to the curvature is a quantity that is invariant and addative, and consequently a true measure of the amount of substance in the object. If units are chosen so that the velocity of light comes out unity, this quantity is the same as the stationary mass, or mass of the object when at rest. The term mass should have been reserved for this concept, and the other idea could be conveyed by the word inertia.

It may be of interest to exhibit the integration of the expression for the kinetic energy:

$$f = ma = m_0 \Big/ \left(\sqrt{1-v^2/c^2}\right)^3 . \, dv/dt$$

$$E = \int_0^V fds = \int_0^V m_0 \Big/ \left(\sqrt{1-v^2/c^2}\right)^3 . \, ds \, . \, dv/dt = \int_0^V m_0 \Big/ \sqrt{1-v^2/c^2} . dv.ds/dt$$

$$= \int_0^V m_0 v.dv \Big/ \left(\sqrt{1-v^2/c^2}\right)^3 = m_0 c^2 \Big/ \sqrt{1-v^2/c^2} \Big]_0^V = (m_0 c^2 \Big/ \sqrt{1-v^2/c^2}) - m_0 c^2 = (m-m_0)c^2$$

It will be seen that the factor m_0 should not be omitted. It should be remarked in passing that the prevalent philosophy not admitting a distinction between substance and accident connot understand the difference between matter and that disposition of matter which permits it to act. The formal cause of action is force, and energy which is merely a conditio sine qua non, is too easily thrown in as a material cause of action and subsequently may be identified with the matter itself.

In his general theory of gravitation Einstein proceeds to generalize the principle of inertia which states that every body tends to remain at rest, or to pursue uniform motion in a straight line, unless constrained by impressed force to change that state. We have seen that rest and uniform motion in a straight line are both represented by straight traces, i.e. traces that are the shortest distances between two points. A general name for such a shortest path is a geodesic; so we may re-word the principle of inertia:

Every body tends to pursue a geodesic of the time-space continuum unless constrained by impressed force to change that state.

Einstein now argues that gravitating forces are inferred from accelerations, that is from traces curved in the time-space continuum. In a non-euclidean geometry geodesics may be curves. If the time-space continuum is not homogeneous, the geodesics may be curved more in one region than in another. The general theory of relativity claims

that it can assign proper values to these geodesics so as to account for the observed phenomena of gravitating bodies, the inference being that gravtiation and inertia are not essentially different, and that forces of gravitation therefore need not be postulated.

Before we examine this explanation of gravitation we should first make sure of the objective validity of our concept of force, for it is this concept that is really at stake; so let us shift the scene from the first law of motion to the third:- For every action there is an equal and opposite reaction. So stated the law begs the question. But we can state it this way:-

Curvatures of traces in the time-space continuum occur in pairs symmetrical in direction with magnitudes inversely proportional to their stationary masses.

As long as traces are straight they do not implicate one another. As soon as they are curved a mutual quantitative implication occurs. This mutual quantitative implication occurring invariably in the case of curved traces, enables us to argue that bodies whose traces are curved must somehow be different from bodies whose traces are straight. A body whose trace begins to curve is really changed. There was no mutual quantitative implication when the trace was straight and there begins to be one now. This is a real change. A real change is produced by a real action -- and the name we give to a real action is force. Hence the third law of motion demands the concept of force.

Bearing this in mind, let us turn to the general theory of relativity and see if the force of gravitation has really been eliminated. There are two hypotheses to be investigated. Ther interval between the gravitating bodies is either a substance which for want of a better name we may call the ether, or it is nothing.

Taking the first hypothesis we have a dilemma. The peculiar curvature of the geodesic concommitant with the presence of the gravitating object is either the effect of the same object -- an effect continuously sustained and hence implying a continuous action of the body on the ether -- or the body is the formal effect of the distortion of the geodesics in this particular vicinity. (The idea is similar to the vortex atom theory.) In the latter case the geodesics whose formal effect is one body are modified in the presence of the geodesics whose effect is the other body, and hence we must recognize an influence or action of the diversification of geodesics in one locality on the diversification of geodesics in another. In both cases we have action.

On the supposition that the intervals of the time-space continuum are nothing, the geodesics are nothing but the mathematical formulation of a latent quality (in scholastic language it would be called a nisus) in the gravitating object. As the geodesics are different when the bodies are near, the latent qualities must be different, the bodies are changed, and change supposes action. Hence every alternative postulates action. But action is force. Hence relativity doesnot do away with a force of gravitation. The geodesics give us but the picture of the action. The picture of an action is really a result of the action, but besides seeing the picture we must also know how the picture came to be. The curved geodesics are the picture. The action which modifies geodesics under certain circumstances and leaves them unchanged under others we call force.

An attribute is said to be relative if it is based on an entity extrinsic to the subject. An attribute is said to be absolute

if allthe entities on which it is based are wholly within the subject Quantities may be relative or absolute as the case may be, but the magnitude of a quantity is relative because it is determined by a unit and the unit is surely outside. Position, rest, and translation we freely admit to be relative. Length measured at rest, rotation because it cannot be effected without an accelaration which is a real change, and some orientation of the time-space continuum we hold to be certainly absolute. The Einstein theory cannot be made the stepping-stone to philosophical relativity for its fundamental postulate calls for something absolute, an absolute velocity of light.

While the Einstein theory does not help relativism in the philosophical sense, it does accidentally help that school of philosophy that has been styled "descriptive dynamism", for by the spatialization of time ~~/~~action is reduced to a concomitance of curvature, the imagination is enchanted by seeing the flux of events portrayed as an intricate interlace of continuous traces to be described, admired, but not explained. The spell is instantly broken, however, if gazing at the picture we ask, why?

Mr. F.W. Sohon S.J.,
Valkenburg, Holland.

We are glad to welcome a new contributor to the Bulletin,- Father M. Vittrant, Professor of Physics at the Aurora University conducted by the Province of France at Shanghai, China. Most students and teachers of science are quite convinced of the advantage of the metric system. Very many would like to see it adopted in this country. In fact there is an association in this country whose main purpose is to further the adoption of the system in the United States. The metric system comes to us from France and it may seem strange that a Frenchman should propose other units. Father Vittrant, though French spent his scholastic years under the British flag having made his philosophy at St. Helier on the Island of Jersey, and his theology at Hastings in England. Most of his years as a Priest have been spent in China, so he has been able to broaden his vision. We hope his article may start some discussion.

A NOTE ON THE UNIFICATION OF THE UNITS OF MEASUREMENTS IN THE UNITED STATES, THE BRITISH EMPIRE AND IN CHINA.

The metric system is at present the best and most widely known system of units. It has been adopted by most nations. However it is not used in some of the largest countriesas, for example, the British Empire, China and the United States, which comprise in all some 900,000,000 inhabitants. We can say therefore, that half of the human race does not use this system. In view of this fact it is reasonable to ask if it is worth while to extend and develope its use. It would appear that this question should be ahswered in the negative. There is first of all an a priori reason. Unification is only to be desired if it means progress that cannot be exceeded. Everything human, however, is capable of improvement. To seek unification at any cost would only hinder progress. Besides, the metric system has many defects which are well known to those who have occasion to make measu surements and computations in the various applications of science. As a result various systems have been formed which are derived from the meter, and it is impossible to get along with one of them alone. Thus we have:-

Original System: meter, kilogram(weight), horse power,....
Principal " meter, kilogram(mass), joule, watt,.....
M. T. S. " meter, ton, kilowatt,.....
C. G. S. " centimeter, gram, second--and including two electric systems.
Practical Electrical System: volt, ohm, ampere, etc.

Besides, the division of time is not according to a decimal system, nor does it fit in with the division of the circle.

A nation should therefore only adopt the metric system if its own units cannot be improved in such a way as to constitute a system more perfect than the metric system. There are fewer disadvantages in improving something which is already in existence than in replacing it by something altogether different. Now if we study the old units closely we find that they can form a system which is preferable to any other. This is not surprising since the C.G.S. units are in general too small, and the M.T.S. units are too large, while the foot, the ounce, the pound, and the bushel are quite well suited to ordinary human needs. In China there are units similar to the latter, which however do not have the same value everywhere. They have the advantage of possessing decimal multiples and sub-multiples. Time formerly had decimal divisions. There were twelve hours in the day; the hours had eight or ten parts and these parts were subdivided into 10,ØØØ 100 and 1,000 parts. The division of the day into twelve hours is still used to some extent in ordinary language and the Eupopean hour is called a little hour.

The system whose values are given herewith has been built up from the following principles. a) Depart as little from the old units. b) Keep the ordinary electrical units, or at least their decimal multiples, for the watt, the ohm, the volt and the ampere are really international units. c) Introduce the decimal division in the measurement of time without interfering toomuch with popular usage. The following units therefore have been adopted:

1) Unit of power equal to 10 watts;
2) Unit of density equal to the maximum density of water;
3) Unit of time equal to one hour divided by 50 x 100, i.e. 0.72 seconds.

The day is still divided into 24 hours, the hour is divided into 50 minutes instead of 60, and the new minute is divided into 100 seconds. This corresponds to the 12 Chinese hours, each of which is divided into 100 x 100 parts. Upon computing the unit of length which satisfied these three conditions we find it is equal to 32.68902 cms. This is somewhere between the English foot and the Chinese foot. The principal geometrical and mechanical units have calculated in the classical way. As for the electrical units one tenth ohm has been adopted as the unit of resistance. Thus the volt and the C.G.S. unit of current (10 amperes) have been retained. The magnetic units have been deduced from the electrical units by means of electro-magnetic induction, the quantity Q of electricity induced in a circuit or resistance being proportional to the magnetic flux Ø which disappears: Ø = QR. This method seems more rational and practical than that followed in the C.G.S. system. The values of the other units can easily be computed.

Some observations on the values obtained will show that they can readily be substituted for our present units

Unit of length: Its value is about 12 7/8 inches, or 103/8 inches. One hundredth of this is quite closely 1/8 inch. In China the decimal

multiples and sub-multiples of the foot have been in use for more than 20 centuries.

The following are the names of some of the principal units:

1 chang --- 10 Chinese feet
1 tsun ---- 1/10 Chinese foot
1 fen ----- 1/100 " "
1 li ------ 1/1000 " "

There are also very small sub-multiples.

Unit of mass: This is equal to about 1232 avoirdupois ounces = 1123 troy ounces = 940 Chinese ounces = 93.5 troy pounds. This unit could be called a kilounce, and its thousandth part a decimal ounce. The avoirdupois pound is sensibly equal to 13 decimal ounces, and the troy pound is sensibly equal to 10.7 decimal ounces. A decimal pound could be adopted equalling 10 decimal ounces.

Unit of time: This is equal to the period of a simple pendulum whose length is equal to about 515 millimeters or 20 1/4 inches. Decimal clocks could easily be constructed and they would possess many advantages. There would be 24 hours of 50 minutes, each minute containing 100 seconds.

Unit of angular measure: Graduated circles could be divided into 12 x 100 x 100 parts. This division would be more convenient than any now in use and would resemble the division of time, since 24 x 50 = 12 x 100.

Unit of volume: This equals very nearly a bushel, or 9 U.S.A. gal., or 1/100 of a cord (128 cu. ft.)

Unit of velocity: It is nearly a mile an hour.

Unit of force: It is about the weight of 5 avoirdupois pounds.

Unit of work: It is about 5 foot-pounds.

Unit of power: 10 watts = 1 decawatt = 1/100 kilowatt.

Unit of pressure: This is about 2 millibars or 21 mm. of water or 1.54 mm. of mercury. Atmospheric pressure is equal to about 492 units.

It can be seen that it is easy to establish a system of units superior to all existing systems without changing too much the long fixed habits of 900,000,000 people.

PRINCIPAL UNITS OF THE AMERICAN-BRITISH-CHINESE DECIMAL SYSTEM.
(A. B. C. System)

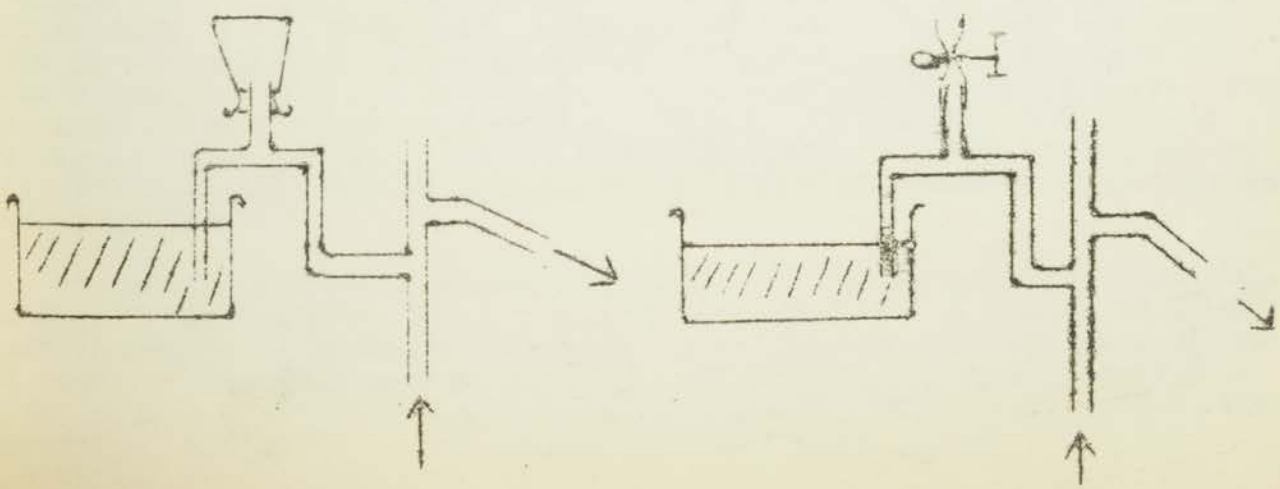
	equation of definition	name of unit	value of unit	approximate value
Length	L	decimal foot	32.68902 cm.	12 7/8 in.
Mass	M	kilounce	34.929 kg.	1232 avoir. ounces
Time	T	decimal sec.	0.72 sec.	
Surface	$S=L^2$	" sq.ft.	10.68572 dm^2.	1.17 sq. ft.
Volume	$V=L^3$	" bushel	34.93056 dm^3.	0.991 U.S. bushel
Velocity	v=L/T	" ft./sec.	45.4014cm/sc.	1.015 mi/hr.
Acceleration	a=v/T		63.0575 "	
Force	F=Ma		2.20257 x 10^6 dynes	4.95 av. lbs.
Work	W=FL		7.2 joules	5.3 ft. lbs.
Power	P=W/T	decawatt	10 watts	

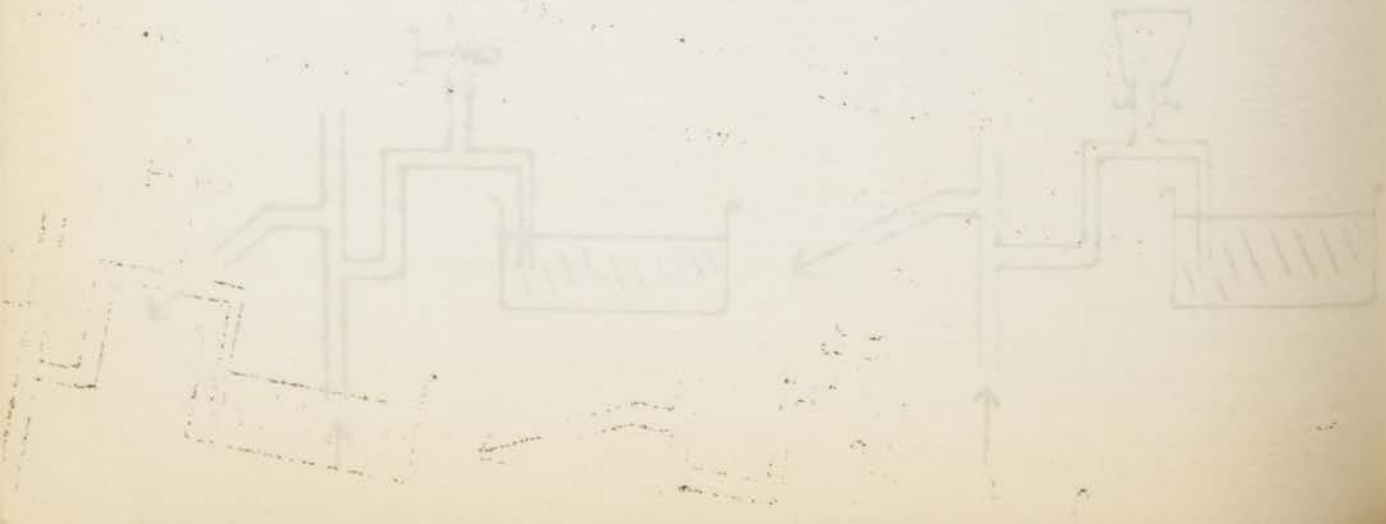
Pressure	p=F/S		20e1.23 dyn./cm^2.	2.06 millibars
Resistance	R	deci-ohm	0.1 ohm	10 C.G.S. units
Current	I^2=P/R	deca-amp.	10 amperes	C.G.S. unit
Electromotive Force	E=RI	volt	1 volt	10 C.G.S. Units
Quantity	Q=IT		7.2 coulombs	0.72 "
Capacitance	C=Q/E		7.2 farads	
Magnetic Flux	Ø=QR		72 x 10^6 maxwells	
Magnetic Field	B=Ø/S		67379.7 gauss	

Father M. Vittrant,
Aurora University,
Shanghai, China.

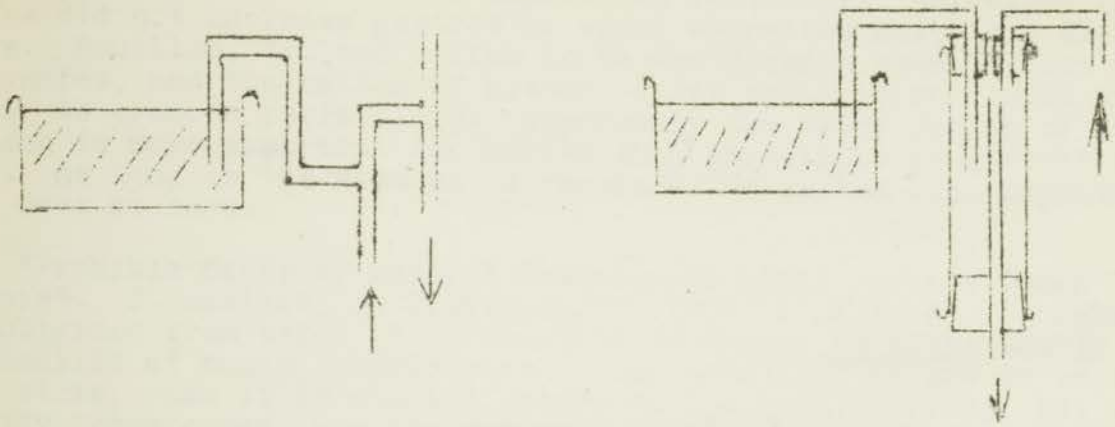
"A New Covering for Laboratory Table Tops". JOURNAL OF CHEMICAL EDUCATION, 1924, i, 209. The material is a plastic sold under the trade name of "resilite". It contains a mixture of five inert bitumens of which the chief is mineral caoutchouc. Gilsonite manjack, petroleum asphalt and other materials are mixed together and heated until the mass becomes uniform. On cooling, a volatile oil and a large percentage of asbestos fibre are added and the mixture is then churned until a rubber-like uniform paste is produced. Resilite is easily moulded into any form and may be worked around pipes and spread upon a floor or table top, when it hardens giving a resilient and permanent coating. It is shipped in barrels and may be kept indefinitely. It is obtainable in natural black, or tinted red, brown, etc. It is fine for stopping leaks in pipes and sinks, and for covering the H_2S storage tank. However, it tends to shrink and as it hardens it is apt to develope long cracks; long heating will soften it. But the cracks are easily mended. It is unsuited for organic laboratories since certain organic solvents dissolve it. If it is applied by one's own help and only a thin layer is used the cost is about 5 cts. per sq. ft. Resilite Mfg. Co., Peoples Gas Bldg., 122 S. Michigan Ave., Chicago, Ill.

"Constant Water-Level Devices". J. INDUST. AND ENG. CHEM., 1924, xvi, 1230. (Two diagrams).





"Constant Water-Level Devices". J. INDUST. AND ENG. CHEM., 1924, xvi, 904. (Two diagrams).



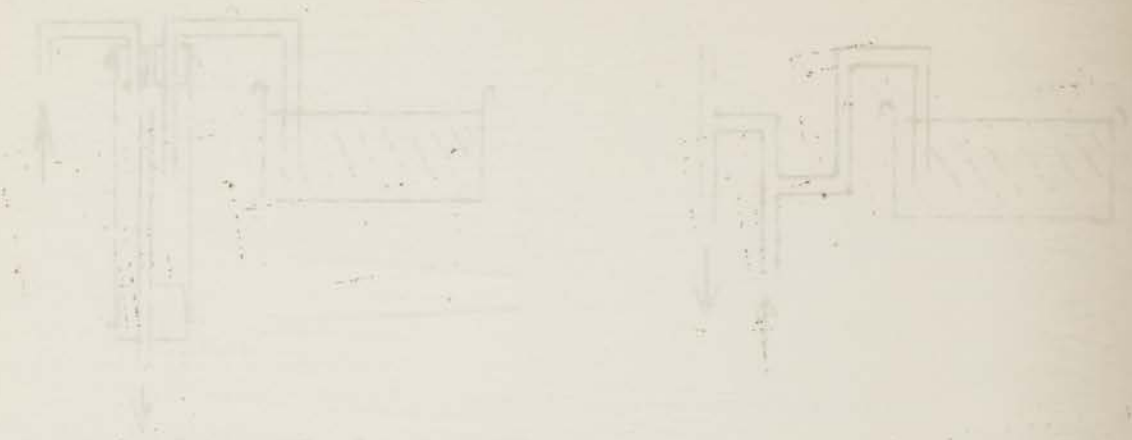
"A New Determination of Avagadro's Number". Pierre Lecomte du Nouy, in PHILOSOPHICAL MAGAZINE, 1924, xlviii, 684; also CHEMICAL ABSTRACTS, 1925, xix, 423. The mass of a single molecule of Na oleate is calculated to be 507 x 10^{-24} gm., which divided into the molecular weight 305.84 gives the Avagadro number as 6.003 x 10^{23} which is in close agreement with Millikan's value of 6.068 x 10^{23}.

"Organic Ring Systems". A.B. Patterson, in J. AM. CHEM. SOC., 1925, xlvii, 545. The main purpose of the article is to offer certain rules for the numbering of the atoms in organic ring compounds. It will be very valuable therefore both to teachers of organic chemistry as well as to writers. Moreover, it contains the skeletons of the rings of more than one hundred different organic ring compounds, both carbocyclic and heterocyclic, thus providing a very helpful chart of comparison.

"Carbon Monoxide -- A Product of Electrolysis". A.F.O. Germann, in SCIENCE, 1925, lxi, 70. Phosgene is a weakly ionizing solvent, and when a solution of $AlCl_3$ in phosgene is electrolyzed, carbon monoxide and chlorine are evolved. The production of CO by an electrolytical method is unique as it has not been obtained by electrolysis heretofore.

"Some Favorable Effects from the Alimentary Administration of Insulin". J.A. Gurlin, C.C. Sutter, H.B. Allen and H.A. Piper, in ENDOCRINOLOGY, 1924, viii, 681. Insulin in one per cent HCl solution when placed directly in the duodenum of diabetic patients caused in some cases an increased tolerance for and utilization of glucose. Its administration in enteric capsules together with malic, tartaric or citric acids or NaH_2PO_4 (these acids were used to delay the action of trypsin) resulted in its absorption and increased glucose tolerance in some patients.

"Gastric Secretion in the Healthy". A.C. Reneborg, in J. AM. MED. ASSOC., 1924, lxxxiii, 726. Tests on two healthy men showed that psychic secretion of gastric juice does not continue for more than 30 min. at most and accounts for scarcely 30 per cent of the total secretion after a meal. Anything taken into the stomach, even water, causes some secretion, but is not proportional to the amount ingested and hence can hardly be explained by mechanical factors. Xanthine or purine



bases were found responsible for the chemical secretion. The amount required is not large, and there is less gastric secretion and less diuresis when this optimum amount is surpassed. Large amounts of coffee in particular showed this depressing influence. Caffeine-free coffee did not increase gastric or renal secretion more than did water alone. Bouillon, tea and coffee leave the stomach soon, within 60 to 90 minutes, and the action of bitter tonics seems to be almost exclusively to promote peristalsis. Apparently the motor action of the stomach is more important for health than conditions of gastric secretion. As long as the stomach is regularly evacuated even hypersecretion does no harm.

"Probable Cause of Natural Immunity of Birds Against Human Tuberculosis". J. Auclair, in COMPT. REND., 1924, clxxix, 85. A substance was obtained from birds which was able to digest in vitro and in vivo the bacilli of human tuberculosis. This substance occurs in an inactive state, when it is without action on the Koch Bacillus, but it is readily transformed into the active condition. In either state it prevents the development of tuberculosis when injected into guinea pigs inoculated with the Kock Bacillus. The immunity of birds to tuberculosis is attributed to the presence of this bacillus-digesting substance.

Mr. G.J. Shiple S.J.

BIOLOGICAL ABSTRACTS AND REFERENCES.

"History of a Double Organism". JOUR. EXP. ZOOLOGY, vol. 41, no. 2, Jan. 5, 1925. An account of Uroleptus mobilis, one of the Infusoria. A pair of conjugating individuals of this species failed to separate, underwent reorganization, and finally fused to form two mouths, two peristomes, two contracting vacuoles and two sets of macronuclei. The double organism lived 405 days and underwent division 567 times.

"Quantitative Study of Reactions to Light in Amoeba". JOUR. EXP. ZOOLOGY, vol. 41, no. 3, Feb. 5, 1925. Amoeba responds to sudden increase in luminous intensity by a cessation of protoplasmic flow. The reaction time varies inversely with the intensity of the light.

"Conjugation of Paramoecium multimicronucleata". JOUR. MORPH. AND PHYSIOL., vol. 40, no. 1, Mar. 5, 1925.

"Growth of Human Eyeball and Optic Nerve". JOUR. COMP. NEUR., vol. 38, no. 2, Feb. 15, 1925. The weight of the eye is a little more than doubled in post-natal life, most of this growthbeing made in the first five years. The growth in length and breadth of the optic nerve in the fetus is directly proportional to the growth in the total body length. The nerve increases about 60 per cent in length, 14 per cent in diameter, and 115 per cent in volume after birth.

"Types of Man in the Yellow-Brown Race". AMER. JOUR. ANAT., vol. 35, no. 1, Mar. 15, 1925.

"Structure, Function and Regeneration of Seminal Vesicles in the Guinea Pig". JOUR. EXP. ZOOLOGY, vol. 41, no. 2, Jan. 5, 1925. Spermatazoa were found in very small numbers at the base of the vesicle. Ligation of the seminal vesicles of the adult resulted in atro-

phy, and almost complete reduction of libido and fertility followed extensive removal (not complete) of the organs.

"Artificial Parthenogenesis". JOUR. EXP. ZOOLOGY, vol. 41, no. 3, Feb. 5, 1925. Temperatures which produce parthenogenesis, caused in the eggs of Arbacia, Nereis and Cumingia, a coagulation within the cytoplasm of the egg. This warmth and coagulation appears to be a requisite for artificial development.

"Effects of Thyroid Gland Substances on Protoplasm in General". BIOLOGICAL BULLETIN, vol. 48, no. 2, Feb. 1925. From experiments and literature on the subject, the suggestion is made that these substances cause hastened development and differentiation in animal and plant protoplasm.

"The Refractive Granule Red Blood Corpuscle". ANAT. REC., vol. 29, no. 4, Feb. 25, 1925. The final stage in the maturation of the red corpuscle in man, dog, rabbit and mouse is recognized in fresh stained blood by the presence of a single, bright, refractive granule, one half micron in diameter. In health and while at rest from 0.3 to 0.7 per cent of the reds in the peripheral circulation of man are in this stage. These cells are the first to increase in the circulation when an increased production of corpuscles is stimulated.

"Study of Parathyroid Glands of the Cat". AMER. JOUR. ANAT., vol. 34, no. 3, Jan. 15, 1925. Number [illegible] four, not invariable; size and location also variable. Complete parathyroidectomy results fatally within a few days. Tetany and depression follow removal almost immediately. If thyroidectomy is performed, and all but one of the parathyroids removed, death usually does not ensue. It is concluded that the parathyroids are essential to life.

Laboratory Suggestions: ANAT. REC., vol. 29, no. 4, Feb. 25, 1925. "Apparatus and Methods for Embryological and Cytological Work". "An Improved Table for Gross Anatomy". "Method for Sectioning the Whole Human Brain".

Mr. R.J. McWilliams S.J.

PUBLICATIONS.

Father F.A. Tondorf has an article in the March-April issue of the MILITARY ENGINEER, entitled "Destructive Forces inConcrete Pavements". The BOSTON PILOT for April 4, 1925, quotes him at considerable length on the North American Earthquake of Feb. 5, 1663. The article contains extracts from accounts of some of the Jesuit Missionaries.

TYCOS-ROCHESTER for April, 1925, publishes pictures of Father Tondorf beside his new Gallitzin Vertical seismograph and of Father J. Ricard of Santa Clara, California, "The Padre of the Rains", working with his telescope. The caption states that he is studying Mars and the planets, but as he is in full sunlight and has a screen attached to the eye end of the telescope he is evidently making a study of the sun's surface.

The JOURNAL OF CHEMICAL EDUCATION for March 1925, has the following note on the National Committee on Chemical Laboratories;- The National Research Council has appointed a committee on the construction and equipment of chemical laboratories. The personnel of this committee is:-

George L. Coyle S.J., Chairman, Georgetown University, Washington, D.C.
C... Hover, Wesleyan University, Middletown, Conn.
Louis ... Pattern, McKinley Technical High School, Washington, D.C.
J.M. Mathews, Wisconsin University, Madison, Wis.
John G. Swan, University of Mississippi, University, Miss.

The Committee will be glad to receive builders' plans, specifications, blue prints of laboratories for both high school and college, recently erected or in the course of construction, new ideas with regard to systems of ventilation, of drainage, types of laboratory furniture and new efficient laboratory apparatus.

Father E.C. Phillips and Mr. F.... Colon have articles entitled "Mathematical Mystifications" in the April number of the MATHEMATICAL BULLETIN of the Missouri Province.

POPULAR ASTRONOMY for April, 1925, has an account by Father E.C. Phillips of Woodstock, of the observations made at the Woodstock Observatory during the solar eclipse of Jan. 25, 1925. Father R.K. Brock of Weston also has an article in the same number describing the eclipse as it was observed at Fairview, Weston, Mass.

We received not long ago a copy of the PROCEEDINGS of the Jesuit Educational Association of the Missouri Province. It is scholarly and interesting.

Father Tondorf sends us the following references to publications of interest to geologists:-

Isostasie und die Ursaechliche Einheit von Gebirgsbildung und Vulkanismus; Dr. C.G.S. Sandberg. Publ., Gebrueder Borntraeger, Berlin, Germany.

Aufbau des Erdballs; Gottlob Linck. Publ., Gustav Fischer, Jena, Germany.

Die Seismische Bodenunruhe; Dr. B. Gutenberg. Publ., Gebrueder Borntraeger, Berlin, Germany.

QUERY.

We have received the following query from a former Professor of Physics who is now studying theology. We should be glad to have some replies to the question, especially from those who have taught Physics according to the old and new schedules.

Question: How do they do it now?

Since our return to the benches, report has it that the number of semester hours in the Physics Course has been curtailed, and that Mechanics and Physics are now covered in one year. Will some obliging Professor in his "spare" time tell us how this can be accomplished? Methinks we found less than enough time for Physics in one year. To add Mechanics seems to be adding the last straw.

Temporis Acti.

A JESUIT INTERNATIONAL SEISMOLOGICAL ASSOCIATION.

Mr. J.J. Lynch S.J., of Valkenburg, sends us the following suggestion of interest to our seismologists.

"Your reference in the last Bulletin to the Geophysical Meet-

ing in Spain, and the work of Ours commended thereat, bids me unbosom an idea that has long been rankling--a Jesuit International Seismological Association, with an international bulletin for the same.

We have a belt of seismic stations in ideal geographical situations-- N. and S. Americas, various parts of Europe, Australia, China, The Philippine Islands, etc. And that these stations are not idle is readily seen from the published work of Ours done thereat during the past year or so. Spain reads of the work of Father Navarro-Neuman in the pages of IBERICA, China has published Father Gerzi's excellent work on Micros, the AMERICAN SEISMOLOGICAL BULLETIN has kept us in touch with the revolutionary work that is being done by Father Macelwane, etc. An International Bulletin would assemble this, to a certain extent, isolated work, and afford a regular report of the work being done by Curs, thus making for cooperation and even better work. In seismology we have a field to ourselves, owing to our peculiarly advantageous geographical distribution--but it is not my purpose to waste your space by repeating what is known to all. The idea of linking up our stations is not a new one, but the success of the Missouri and our own Provincial SCIENCE BULLETINS seems to warrant a reconsideration of the question. Does the discussion of such a propcsition come within the scope of your paper?

To start the ball rolling at home, may we not ask to be kept more in touch with our own Provincial Activity in seismology? Canisius, Georgetown, Fordham, Holy Cross and the Philippines have an excellent medium of cooperation in the Bulletin. Could not Father Tondorf's idea of a central bureau be put into effect in our Province? Photographic reductions (post card size) could easily be exchanged for the comparative analysis he suggests. Such reductions admit of accurate reading with a magnifying glass. They adoid the greater expense of the necessarily large contacts prints, and the possible loss of original records through postal transition.

Lest the last remarks be at all misconstrued, let me hasten to add that their tone is not at all one of adverse criticism. On the contrary, it is the brilliant notice our Province stations have been receiving here in Europe of late, that prompts the suggestion of cooperation through the valuable medium at hand in the Bulletin. The result cannot fail to be greater encouragement, greater progress and greater success.

To take the recent quake of Feb. 24 as an example of cooperative work: the epicentre of 59 deg. N. and 149 deg. W. was suggested. (Oxford University very kindly sent us the Fordham Readings along with their own.) Such an epicentre occurred on Nov. 29, 1920. Has any one compared the records of 1920 and 1925? Are there any special similarities or differences to be noted? "

Mr. J.J. Lynch S.J.

INFORMATION WANTED.

One of our readers in the Near East, Father J. Blampois of the Province of Lyons, writes to tell us how interesting he finds the Bulletin. He is Professor at the Ecole Francaise d'Ingenieurs at Beyrouth in Syria. Like so many others of his brethren he served in the French Army during the War, being part of the time an instructor in radio and radio engineering in an army school for American Officers. In connection with Father Deppermann's article on Permalloy he asks for information on the use of this material for the cores of high frequency

transformers. Perhaps someone can enlighten him. Through the good offices of Professor Ames of Johns Hopkins, Father Deppermann was able to obtain some samples of Permalloy for Father Blampois from the Bell Laboratories. Apparently it is not in the market yet.

Mr. Joseph Lynch S.J. of Valkenburg asks for information about film lantern slides. He wishes to know where they can be procured, what their efficiency is and if there is any special technique to be followed in making and handling them.

The following has also been submitted for the consideration of our Astronomers: "Another thing I am puzzled about is the shortening of the day. In the paper, the time of sunrise and sunset are given. During September, for a period of six or seven days at a time, the sunrise time remains the same but the sunset time changes a minute earlier each day. Then the sunrise time changes a minute or two later and the procedure goes on as before. These are the Geodetic Survey figures (whether U.S.G.S. or Philippine G.S. I do not know)".

Mr. P.H. Yancey S.J., now a theologian at Ona, Spain, sent us the following note, which however did not find place in our last issue: "Father Jose Labura, Professor of Biology and Experimental Psychology here, who attended the Cosmology Conference in Rome, is going to Venezuela in February to give a series of lectures on the subject of his recent research,-- the influence of physiological factors on animal behaviour. He has given these lectures with great applause before the principal medical faculties in Spain."

Dr. J.F. Norris, Professor of Chemistry at Massachusetts Institute of Technology and President of the American Chemical Society was recently a guest of the Faculty of Holy Cross College and gave a talk to the students of the Department of Chemistry.

JUST SOME REMINDERS.

The Editor solicits not articles of general interest for the Bulletin, but also accounts of scientific activities in our Colleges and High Schools, and references to publications by or concerning Curs. There is an old saying which expresses a cardinal principle of modern advertising, namely: He who blows not his own horn shall not have the same blown for him. While it may not become us to blow such horns for the sake of the music or noise they produce, an occasional gentle blast for the good cause may interest and inspire subscribers to the Bulletin.

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Keep next summer's Meeting in mind and look up some subject for a paper or for discussion.

L. D. S.