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PHOTOGRAPHIC NOTES. III.

Having mounted our subject carefully, we are going to set the camera, expose the plate, develop, fix, wash and dry the negative. As we are taking our negatives mainly for slide reproduction, it will be better in most cases to arrange the lens distance for a negative that will serve for contact printing. Center the picture on the ground glass by means of the intersecting guide lines and bring it inside the three inch square. For most line work, a $3\frac{1}{4}$ x $4\frac{1}{4}$ plate will do; for "natural history" subjects, a 4 x 5 plate will leave more room for notes on the margin (in ordinary ink on the film side of the dried negative). We shall speak of the reduction of large negatives when treating of the actual slide making. Now for the development.

The beginner is apt to overexpose "time" pictures, and underexpose snapshots. Of the two faults, overexposure is the lesser, for with it one will surely have all that is wanted on the plate. Overexposure, however, tends to flatness, loss of contrast, and so a developer that leans towards contrast should be welcome.

The following is a good, easily kept, flexible, two-solution stock developer for negatives--plates or films, and for lantern slides,--not for paper prints.

SOLUTION A.	SOLUTION B.
Water (hot) 30 oz (fluid).	Water 30 oz.
Sodium Sulphite (dry) 2 oz.	Sodium Hydroxide (stick) 1 oz.
Conc. Sulphuric Acid 1 dram.	
Hydroquinone 360 grains.	
Potassium Bromide 30 grains.	

To make up A: Weigh out the dry materials and have the Sulphuric acid in a small graduate; take a 2 quart beaker containing 30 fl. oz. hot water, (ordinary tap water will answer); add the Sodium Sulphite but do not shake or stir; then carefully pour in the Sulphuric Acid (thin stream) and swirl the mixture. In this way the acid mingles with the water and reaches the sulphite at the bottom of the beaker, liberating some SO_2, which is prevented from escaping by the water above it and so the needed bisulphite is formed. Then add the hydroquinone and potassium Bromide, mixing well wihtout too much exposure to air and immediately pour into two 16 oz. glass stoppered bottles, filling one up to the bottom of the stopper, while the other, taking the rest of the solution, may not be quite full. This last should be used first; the first bottle with scarcely any air in it, will keep for a long time.

Solution B is easily made by placing 30 oz. of water (ordinary temperature) in a glass stoppered bottle and adding the ounce of Sodium Hydroxide.

The stopper of this bottle should be dried and vaselined. For normal developer take 1 oz. of A, 1 oz. of B and 4 oz. of water. This working solution, six ounces, will, in a 4 x 5 or 4 x 6 tray, develop six 4 x 5 plates very uniformly (if the operation is continuous); it may then be thrown away economically, as it costs only one cent, whilst a spoiled plate may cost five or ten times as much.

Do not wet the exposed plate before putting it in the tray and when pouring the developing solution, try to cover the whole plate practically at once, especially if it is a fast one. Rocking the tray promotes contrast and keeping the developing plate away from strong light (even red) will help to avoid fog; the plate, of course, is less sensitive to light when wet than when dry.

Do not take the appearance of the back of the plate as an index of completion; different emulsions vary in thickness. Examine the face of the plate occasionally, keeping it in the tray, and when the normally cream colored parts of the plate representing the dark lines or deep shadows of the subject, begin to veil over, the operation is done. Overdevelopment will produce fog, but a little fog will not prevent a negative from giving good results. If the normal developer does not give sufficient contrast with the plate used and an approximately correct exposure, add one or two drops of a 10% Potassium Bromide solution to every ounce of developer. If the negative is too harsh, add more water, up to fifty or one hundred percent.

It will be interesting and instructive to give the same exposure to two or three plates (same speed) on the same subject, varying the make-up of the developer as suggested. Allowing the solution to act quietly on the plate, without rocking, will also help to diminish contrast. As soon as the development is completed, put the plate immediately in running water to wash for 3 or 4 minutes. The washing lessens the chance of stains and accelerates the "fixing".

The "fixer", a solution of Sodium Thiosulphate, or Hypo in photographic parlance, removes all the unaltered silver halide, making the negative permanent or "fixing" it. Any of the standard formulas for fixing baths may be used, with or without "hardener" for plates and films. It has been the writer's good fortune for years to have a supply of cool spring water for developing fixing and washing, and so he has used only a plain fixing bath not weaker than 1 lb. Hypo to 2 quarts of water. Weaker solutions may form the Silver Thiosulphate, but not dissolve it.

A convenient and harmless hardener may be made by adding 1 oz. commercial formalin to 15 oz. of water; immersion of the negative for 5 minutes in this solution will remove all tendency of the gelatine to soften or frill; this solution may be used at any time during the developing or fixing. Nagatives made with a plain fixer are apt to last longer and lantern slides made with a hardening fixing bath are often difficult to color.

When the plate seems to be thoroughly fixed (all the silver salts removed), leave it in the Hypo 5 minutes longer: this may save time later on. Once the negative is fixed, place it in the washing water, running if possible, and leave it in the washing tray for half an hour; then remove it, set it upright on a rack in a dustless room to dry.

Quick drying without too much heat gives a slightly stronger negative; but if a negative is half dry, do not change conditions--the change will be recorded by the film. If one is in a hurry to dry a negative, let him place the drained plate in a tray of 95% alcohol for 5 minutes, rock well, remove to rack and it will dry quickly.

Father J. A. Brosnan S.J.

HISTORY OF THE MANILA OBSERVATORY, Part II.

Note: By an oversight the second installment of this interesting history was not included in the last number of the Bulletin. It appears in this issue instead. In our next we shall give an account of the equipment of the observatory. (Editor).

In 1891, the Municipal Corporation of Manila voted to construct a

Faura Barometer on a large scale and/ place it in a public square for the convenience of the people. Difficulties about payment arose when the barometer was finished and almost ready to be installed and a rich citizen, Mr. Angel Ortiz came to the rescue. However, just as it was ready to be set up and the most proper place to erect it was being discussed, the Revolution broke out and, with so much anti-catholic feeling in the country, its erection was postponed. Finally Mr. Ortiz, in virtue of his claim of ownership presented the barometer to the Observatory. It is a true aneroid barometer, not regulated by a small barometer and a relay system as one would expect when he first sees the instument. The dial is two meters in diameter, the indicator a trifle shorter and a thermometer, graduated from -20° to plus 50° Centigrade, made of a tube at least 1.5 cm. in diameter with a dark red liquid within, curves along the lower edge of the dial. All the letters and numbers are visible at a distance of fifty feet and the main divisions of the weather, "Nortes", "Baguio Intenso", etc. could easily be distinguished at a distance of 100 feet. After one knows the divisions, a glance from a distance of three or four hundred feet would show him what the indicator pointed to and thereby enable all who passed by the barometer to tell the weather of the coming day. The barometer is placed on the landing of the stairs leading to the offices of the Observatory and is the object of wonder to all who behold it.

When Father Faura returned from the Columbian Exposition, he was accompanied by Father Jose Algue, who soon became sub-director of the Observatory. In 1895, he published the first edition of "Baguios o Ciclones Filipinos", which, when revised and translated into English later on, became "Cyclones of the Far East".

Father Faura's health began to fail in 1896. He grew weaker and weaker from asthma and heart trouble. At that time, there were indications that the Observatory would be very close to the war zone, if not in the midst of it, for the Revolutionists were planning at attack on Manila, and there seemed little hope that his last hours would be peaceful. Consequently, he was removed to the Ateneo, inside the walled city, where he would be safer, and there he died on January 23, 1897, bemourned by everyone in the city. He had done his work well. His publications were eagerly sought for and his presence and advice required at international meetings of meteorologists. He was acknowledged to be the final authority of typhoons, so much so that, on one occasion, after a serious shipwreck with loss of life, his testimony freed the captain, who was accused and prosecuted for neglect of duty and ignorance, whereas, as Father Faura showed, he had done all that was humanly possible to do to save the ship. An accurate student and a talented scientist, Father Faura made the Observatory indispensable for the public welfare, with the result that, after the Archipelago was ceded to the United States, the new government allowed his work to continue as he had organized it.

Soon after the death of Father Faura, Father Algue was appointed director. He successfully guided the Observatory through this critical period of transition from the control of Spain to that of the United States, thereby assuring the future of the Observatory. From this time (1899), the third period of the history of the Observatory begins.

One of the early difficulties Father Algue had to contend with was an unfair complaint on the part of the director of the Hong Kong Observatory, Mr. Doberck..As soon as the Americans were in charge of Manila, Mr. Doberck wrote to the Secretary of Commerce at Washington, asking him to forbid the Manila Observatory to send out typhoon warnings. Without investigation, the order was at once sent to Father Algue, who thus unexpectedly found his activities curtailed. Finding out the cause of this peculiar order, he wrote to the authorities at the different ports, who had always depended upon the Observatory for typhoon warnings, explained the facts and asked them to give him their opinion of the past services of the Observatory. A storm of protest arose at once and the matter was even discussed in the newspapers. The Hong Kong

Chamber of Commerce, on their own initiative, took up the matter with the Colonial Secretary and asked whence Mr. Doberck obtained the authority for sending such a request to Washinton. The result of this and other protests was a letter from the Secretary of Commerce reinstating Father Algue with the permission to continue his work as before.

There are various stories regarding the citizenship of Father Algue and especially the manner in which he lost his Spanish citizenship. In the first place, he did not officially resign from his position when the Americans took over Manila. This naturally led to the loss of his citizenship, for the Spanish nation would not allow any of her official employees to be in the employ of another government. Father Algue could not obtain United States citizenship, for no one in the Islands can obtain that by residing in the Islands. What his citizenship really is, has not been decided, but there is no difficulty of obtaining his Spanish citizenship when he takes up a permanent residence in Spain. The same can be said of the other members of the staff. Typhoon warnings sent to Admiral Dewey were warnings for Hong Kong and other stations outside of Manila, because all cable messages had to be sent to the Olympia (Admiral Dewey's flagship) where the cable transmitting instruments were. There is no foundation in the story that Father Algue sent a typhoon warning to Admiral Dewey at Hong Kong for these two reasons. Father Algue had no idea where Admiral Dewey was, even if he wished to send a message to him. When Admiral Dewey was in Hong Kong, (April 1898) there were no typhoon warnings sent from the Observatory for the very good reason that there were no typhoons that month.

That the Observatory was respected by the new government may be shown from the fact that Father Algue attended the Paris Exposition in 1900 at government expense as the representative of the Philippine Islands in the Meteorological Congress and also as personal representative of Mr. Taft. A further testimonial of respect was the incorporation of the "Philippine Archipelago" into the report of the Schurman Commission, a commission sent to investigate conditions and to form a system of government for the Islands. "The Philippine Archipelago" is a complete and exhaustive treatment of the geographical, economic and climatic conditions of the Islands. It was written and compiled by the Jesuit Fathers of the Observatory staff, and the Ateneo Faculty and the normal school faculty. Father Algue directed and guided its preparation as well as contributing the part called the "Atlas of the Philippine Islands".

Since 1900, under the title "Phillipine Weather Bureau, Manila Observatory", there has been much progress. Father Algue had developed his famous barocyclonometer and, encouraged by American officials, exhibited it at the St. Louis Exposition of 1903. In 1904, he revised his book, translated it into English and published it under the name "Cyclones of the Far East". This book attracted much attention throughout the world, especially among navigators. It is a very exhaustive study of the nature and characteristics of typhoons, with complete analysis of typical typhoons. One part of the book is devoted to a description of and detailed instructions for using the barocycolnometer. The barocyclonometer is a double instrument, an aneroid barometer and a "wind disk". By means of the barometer, adapted from Father Faura's barometer, and with a movable rim for adjusting the instrument for latitude, one can tell how far he is from the center of the typhoon. This places him in "Zone A, B, C or D" of the typhoon. The "wind disk" is a small horizontal cross section of an ideal typhoon with concentric circles marking the different "zones" and with arrows, showing the directions of the wind in the various parts of the typhoon. By determining the prevailing direction of the wind at the place of observation and placing the end of the "needle" of the instrument so that it cuts the end of the proper arrow corresponding to the prevailing wind, the other end of the needle will give, with reference to the observer's position, the position of the center of the typhoon. Further settings with another needle on the face of the instrument, too involved to explain in this paper, will give the direction in which the typhoon center is moving. The center of the typhoon can be determined

when the observer is five hundred miles away. A detailed description of the barocyclonometer is given in the Woodstock Letters of October 1919 (p.322), where the use of the barocyclonometer in foretelling approaching hurricanes at the U. S. weather station in the West Indies is described.

The value of these products of Father Algue's labors can be measured by what other people think of them. Doctor Paul Bergholz, director of the Observatory of Bremen, asked Father Algue for permission to translate "Baguios o Ciclones Filipinos" into German, which permission was readily granted. However, instead of placing Father Algue's name on the title page as author and his own name as translator, Doctor Bergholz published it under his own name, only acknowledging his indebtedness to Father Algue in the introduction. That this is not a prejudiced statement is shown by the review of the book in the publication of the Potsdam Magnetic Observatory, August 25, 1902, where Mr. A. Nippoldt writes: "It is to be sincerely hoped that a new edition of Bergholz's book will, even from its outside appearance, show the character of the book to be a translation only". This German edition was translated into English, but at the expense of scientific accuracy. Father Algue has defined his position in the introduction of"Cyclones in the Far East", where he gives as one motive for translating the former edition into English, the fact that the above mentioned English translation is untrustworthy, and that he hopes that seafaring men will profit as much as possible from his work, whether the Spanish, German or the correct English edition is used. Doctor Bergholz also persuaded the manufacturers of the barocyclonometer to make similar ones for him, and with German wording and labeled "Bergholz Barocyclonometer". These have proved to be very valuable and have been in constant use. Father Algue had applied for a patent in Spain but his application was unfortunately lost and the loss was not known until he tried to obtain redress for Doctor Bergholz's actions.

Under American rule, new second class stations were established at points most suitable for obtaining early information about approaching typhoons. Time signals were sent from the Observatory to all the post-office stations in order to assure uniformity of time throughout the Islands. This service was later extended to wireless telegraphy when the Navy Station at Cavite was erected. Typhoon warnings are sent out even more promptly than before, and by means of the cable connection with the Observatory, Hong Kong and Shanghai are at once informed of the movements of the typhoons. In cases of necessity, observations can be obtained from all the stations of the Islands every hour of the day or night, and after each series is reported to the central office, a weather map is drawn and the position of the typhoon determined. A comparison of the maps shows the movement of the typhoon. During the typhoon season, it is not unusual to have a telegraph operator and three or four clerks keeping watch all night, ready to send warning to points of danger as the typhoon approaches.

In 1902, a station was established at Baguio to find the truth of various reports that the weather there was very cool, similar to the weather of the temperate zone. It was found out that these reports were based on a good foundation and the observation taken by the new station had an important part in the opening of Baguio as a vacation center. As Baguio is about one hundred and fifty miles from Manila, a cool climate there makes it very desirable for Americans, who can refresh themselves without taking a long journey to America. As soon as possible, a road was built and the district opened to the public. Since then, Baguio has become famous as a health resort and for its scenery. Father Algue established a branch of the Observatory there, with seismographs, and other equipment for his use when spending the summer there. The building also is a villa house for members of the Society.

One of the interesting sets of records kept in the Observatory are the seismograms of the eruption of Taal Volcano in January 1911. This eruption caused earthquakes that made the people of Manila think that some amunition in storage had exploded. These movements of the earth lasted for three days, the period of eruptions of the volcano, and caused much anxiety in Manila. A very

interesting and detailed account of the eruption, written by Dean C. Worcester and illustrated by magnificent photographs can be found in the National Geographic Magazine for April 1912.

Father Algue went to Rome in August 1924 to take charge of the exhibit sent by the Church in the Islands to the Foreign Mission Exhibition at the Vatican. After performing his tasks, he went to Spain and underwent an operation for cataract of the eye. He did not recover from the operation as he should have and the doctor had little hope for a complete healing of the wound. Father Algue, however, did not lose hope, and during the long hours after his operation, applied a medal to the afflicted organ. When he returned to the doctor and the bandages were taken off, the wound was almost healed to the astonishment of the doctor. It is not known yet if Father Algue will be able to return to the Observatory where he has spent the best part of his life.

The Observatory has an excellent opportunity for increasing its prestige and honor in the future. It has an excellent telescope for astronomical work in a region where there is no competition and where other observatories will be glad to have cooperation. The "Philippine Deep", near the coast of Mindanao, will have an effect on the Islands thus giving a fine chance for study of seismology. Besides these branches there is much to be known regarding magnetic disturbances and typhoons and future study of these phenomena will take place with the help and assistance of the Observatory records. It is evident that the future will find the Observatory ready to solve problems in these matters as promptly and as accurately as it has done in the past under the leadership of its two great directors, Father Faura and Father Algue.

Bernard F. Doucette, S.J.

CAN WE TELL FROM THE RECORD OF AN EARTHQUAKE WHETHER IT OCCURRED ON LAND OR SEA?

The question occurred to the writer as the result of a comparison of the earthquake records of July 6, and August 7, 1925. The particulars of the records are as follows:

	Distance (from Oxford)	Direction.	Epicentre
July 6	21° 6	S.E.	$36^{\circ}7$ N. 21° 0 E (50 mls. off S.W.Greece.
Aug. 7	26° 7	S.E.	$38^{\circ}0$ N. 30° 0 E.(Asia Minor).

The two quakes have the same general direction, and closely similar distances, yet their records are totally dissimilar. The first preliminary of the quake of July 6, consists of waves of quick period, considerable amplitude, and lasting energy; while by strange contrast the first prelimary of the quake of August 7 consists of a single impetus at the start, followed by an almost straight line. The second prelimaries of both records are equally prominent and violent. The P phase of the first record therefore seems to have three distinct features which are lacking in the second: a) energy lasting throughout the duration of P. b) unusually large amplitude, reaching a maximum shortly after the beginning of P. c) unusually quick period.

Why are the records of these two quakes so different? They agree roughly in direction, distance and intensity, yet their records are quite dissimilar. Is the dissimilarity due to the fact that the epicentre of the first quake is under the sea (at a sea depth of about 2000 metres), while the epicentre of the second quake is on terra firma?, i.e. do land and sea quakes yield distinctive records? The quake of April 30, 1919 with epicentre $21^{\circ}2$ S, $172^{\circ}5$ W at a sea depth of 15000 feet, and the quake of Sept. 20, 1920, epicentre $20^{\circ}6$ S,$168^{\circ}8$ E in the Aldrich Deep, both show the same peculiar characteristics noticed in the sea quake of July 6, 1925. Is the similarity of the records due to the suboceanic origin of the quakes?

The above records were shown to Doctor Turner, and he encouragingly suggested that the phenomenon be thoroughly investigated, since no such differentiation of land and sea quakes had so far been mentioned to his knowledge. Mr. Shaw, the designer of the present Milne-Shaw instrument, had noticed the peculiar type

of record exemplified in that of July 6, 1925, but had put the phenomenon down as an Antipodal phenomenon. The quake of July 6 however was far from being an Antipodal quake, since it was only 21° away.

Some thirty large quakes have been examined to find out how far the facts warrant such a differentiation of land and sea quakes. Of the thirty, twenty-four bear out this differentiation of land and sea quakes fairly well--nine of them being sea quakes with typical sea quake records. On the other hand, six quakes seemed to contradict such differentiation, though it was noteworthy that all save one of these, were sea quakes, whose records were of the land quake type. However, after further study, these exceptions would not seem to be serious ones, and can be explained in accordance with this differentiation supposition, without any fanciful hypothesis being introduced to dispose of them, since:

1. In two of the exceptions, shifting the epicentre a degree of two, shifts the scene of the quake from a land altitude to a sea depth, and it is not unreasonable at our present stage of uncertainty in epicentre determination, to avail oneself of a slight elasticity in the position of the epicentre, in order to test such a differentiation of land and sea quakes.

2. Sea charts at present available, leave it doubtful in other cases whether the epicentre in mid-ocean is not really a small island or a partly submerged one, hence other of the exceptions may prove to be epicentres on partly submerged land, and not really sea quakes.

The single exception of a land quake posing as a sea quake, was the large China quake of December 16, 1920. But since this was one of the largest quakes in the history of modern seismology, one would expect to find an unusually energetic P phase.

To guard against the phenomenon's being purely/local one at Oxford, some of the records of the Belgian Royal Observatory (Uccle) were examined. The instruments here are Wiechert and Galitzin. Both instruments show the phenomenon e.g. the records of July 6,1925 (Galitzin), September 20, 1920 (Wiechert 1000 kg.) and April 30, 1919 (Wiechert) are records of sea quakes and show the same general characteristics of sea quake records observed at Oxford. The record of August 7, 1925 (Galitzin) is a typical land quake record as it should be if there is anything in our supposition.

The investigation is being continued, and is merely mentioned here in embryo form, in the hope of obtaining helpful suggestions from the more active seismologists of the Province.

Mr. Joseph Lynch, Valkenburg, Holland.

THE FORDHAM SEISMIC STATION.

We have received the following brief but interesting account of the activities of the seismological station at Fordham. It finds a fitting place in the Bulletin and we are sure will prove of interest to our readers.

At the close of October 1925, the Fordham Seismological Station had been in operation continuously for one year, since its removal to new quarters, and the installation of partially new equipment.

During this time regular monthly Seismologic Bulletins were mailed to 68 stations throughout the world, giving the following information on all quakes, the preliminaries of which were sufficiently clear to permit of interpretation: Time of origin, time of all phases, Period of L and M waves, actual earth motion in microns due to surface waves, distance of epicentre from Fordham Station.

A method of contact printing, directly from the bromide record has been perfected so that exact reproductions, full size, of all grams may be made, and these are also sent to the principal Seismologic Centers, such as Strasbourg, Ottawa, U. S. Coast and Geodetic Survey and St. Louis.

In addition to the cable communication with Oxford University, England, cooperation with the U. S. Coast and Geodetic Survey has been established, and through the courtesy of Science Service, telegraph reports are transmitted to the Washington Offices immediately subsequent to the occurrence of a quake.

This enables a much more rapid determination of the epicenter, and in addition acts as a link between the Department of Seismology of the U. S. Government, and the newly established Central Station of the Jesuit Seismological Association at St. Louis, inasmuch as all Science Service reports are at once forwarded to the Jesuit Center.

The second component of the Milne-Shaw seismograph arrived at the University a few weeks ago, and is now installed and operating. This completes the equipment for recording the horizontal motion of the earth. Beginning January 1st. 1926 determination of the azimuth angle, after the method of Prince Galitzin, will be attempted: thus specifying not only distance but direction of the epicenter, with however a possible ambiguity of 180 degrees.

During the coming year the contemplated purchase of either a short period Wood-Anderson, or the Galitzin vertical, will enable the removal of this ambiguity in the case of well defined preliminaries. Thus we may with some confidence hope for the direct determination of epicenters.

THE KANSAS CITY MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND OF AFFILIATED SOCIETIES.

One of the most important events of the year is the Christmas meeting of the American Association for the Advancement of Science and its affiliated Societies. It brings together a large body of scientific men from different parts of the country and while most of the papers presented are quite technical and of interest only to specialists, from time to time some topic of general interest is discusses or data of special importance are presented. The 1925 meeting was held in Kansas City, Mo. Father E. C. Phillips, the director of the Georgetown Observatory sends us the following account of some of the proceedings. His reference to Professor D. C. Miller's paper on the results and significance of ether drift experiments is worthy of special note. The so called Michelson-Morley experiment devised to detect relative motion between the earth and the ether has had an important place in modern physics, not only on account of the problems to which it has given rise, but also because Einstein made use of it as one of the starting points of his theory of relativity. Hardly any experiment has been made with such great care or has involved so many observations. While all physicists and astronomers may not be ready to admit that Einstein's famous three predictions have been completely verified, at any rate, remarkable evidence has been obtained in their favor. This has led to renewed interest in the foundations of the theory. D. C. Miller who had worked with Morley decided to repeat the famous Michelson experiment under different conditions. All the early experiments had been made on the surface of the earth. The negative results were possibly due to the fact that the earth dragged the ether near its surface along with it so Miller inferred that a drift might be detected some distance from the surface. He accordingly set up his apparatus at the top of Mount Wilson some 6000 feet above sea level. An appreciable drift was detected. Miller's paper will doubtless soon appear in Science. He says that the observations made in 1925 involved over 100,000 separate readings and he knows of no other observations which are more trying or fatiguing. The most results of the experiments will be their bearing on the theory of relativity. We have seen no statement of Einstein except that quoted in the Scientific American for March 1926, namely: "If Dr. Miller's results should be confirmed then the special relativity theory with the general theory in its present form falls". This is a frank statement. Then we may ask, What about the close agreement of the deductions from the theory with fact? The whole question is a perplexing one.

Father Phillip's letter follows:

Dear Father Brock: P.C.

You requested me to send you some notes concerning the Annual Meeting of the A.A.A.S. which took place in Kansas City, Mo., during Christmas week. I am

a very poor reporter but the following points of interest may enable you to give the readers of the Bulletin some points of interest.

A fairly large number of Jesuits, mostly from St. Louis University, were present at the meeting: the following list, is I think, complete:

From St. Louis University, Fathers George A. Deglman, Francis J. Gerst, Raphael C. McCarthy, James B. Macelwane, Albert Muntsch, Alphonse M. Schwitalla and James I. Shannon. From Loyola University, Chicago, Father Paul Muehlemann. From St. Mary's College, St. Mary's, Kansas, Mr. Jerome O'Connor. The East had two representatives, Father Daniel P. Mahoney, from Holy Cross College, and Fr. Edward C. Phillips, from Georgetown University. The following papers were read by Jesuits at the Meetings of the various societies holding their sessions with the Association:

1. Are Important Earthquakes Ever Caused by Impact, by Fr. Macelwane.
2. Contribution of Seismology to Engineering Design, by Fr. Macelwane.
3. The Psychogalvanic Reflex as a Measure of Conation, by Fr. McCarthy.
4. Some Applications of Mathematics to Architecture, by Fr. Phillips.
5. Father Schwitalla was one of the speakers at the annual Dinner of the Zoologists.

Father Macelwane was elected as representative of the Seismological Society of America on the Section Committee of the Section of Geology and Geography and thus became a member of the Council of the Association and participated in its deliberations.

Most of the visiting Jesuits were guests of Rockhurst College, where they were generously entertained during their stay in Kansas City.

The question of the relations existing between science and religion came up for discussion several times, but not at any of the meetings at which I was present, hence my knowledge of the views expressed is derived from the press reports; and it may be noted in passing that the daily papers of Kansas City gave very extended notices of most of the proceedings. Professor R. W. Walcott, of the Department of Zoology of the University of Nebraska holds that "It is inconceivable that there can be any conflict between the truths that underlie all religion and the truths revealed by science. But there always has been, and always will be, a disagreement between formalized religion and a growing science; between creed and dogma on the one hand, and the laws and principles unfolded by scientific investigation on the other". The opinions expressed by Vernon L. Kellogg, permanent Secretary of the National Research Council, seem to be of a higher order as indicated by the following quotations reported in the press: "The majority of scientists are Christians and church-goers. They cannot explain (on scientific principles) the creation of the world, and they do not attempt to". "Evolutionists cannot explain love, charity, and altruism....Their religious faith rests on those endowments which place man so far above other animal life. Scientists are divided, just as others are, upon the divine origin of the Bible". They "have no quarrel with religion. They accept the Bible as a guide to high moral standards for individual and social life. They do not however accept it as a scientific textbook". The Kansas City Times thus reports editorially the gist of views of Dr. Michael Pupin, President of the Association for the year 1925: "The most valuable message embodied in his address of Wednesday night was the assurance that the pursuit of science exalts and refines character; that it makes for spirituality; that there is nothing in its revelations that conflicts with the religious instinct; that the more one knows the universe, the more exalted the respect for the supreme power that had co-ordinated its forces and directed its development. Even when man, with his finite powers, has succeeded in co-ordinating some of these forces and applying them for the betterment of the human race, he, more than anyone else, stands in awe of the wonders yet unexplained save through the recognition of a supreme being".

Akin to this same question of science and religion is the one treated by Dr. Frederick L. Hoffman, secretary of the section of social and economic science of the Association; his theme was the cure for modern lawlessness: "Perhaps the

greatest force, " he said, " in combating and reducing crime is to recreate a sense of answerability to God. That sense is becoming vague, shadowy. But it is the knowledge of God that makes one think twice before committing a criminal act, for religion, of all things, profoundly affects man's life and awakens a sense, an urge, toward the normal, the orderly." The editorial comment of the Kansas City Star on this paper approves his view and says: "The age may pride itself on its sophistication, that it has drawn out from under the clouds of superstition, that the world is more enlightened; but if this progress is achieved at the cost of the sense of answerability to God and the laws of man, it is a poor exchange....Yes, the sense of answerability must be keen and controlling if society is to be clean and stable".

I think that on the whole these expressions of the views of some of our great scientists show an encouraging trend of reaction against the materialistic and at times openly atheistic views expressed in former meetings by a number of scientists holding high places in the Association.

The most interesting general lecture which I attended was that of Professor Dayton C. Miller on the Results and Significance of the Ether Drift Experiments. He claims that his experiments show beyond doubt the existence of an ether drift, and that the commonly accepted "Negative" results of the Michelson-Morley experiment cannot be accepted as absolute: the total amount by which the velocity of light is changed by its motion parallel to the earth's motion as compared to its velocity perpendicular to this motion is relatively small being about five per cent. of what would be expected on the classical theory in the supposition of a motionless ether; but the change though small, undoubtedly exists and has now been measured with fair accuracy. This is in conflict with one of the fundamental suppositions of the Einstein Theory of Relativity. It is of interest to note that on the morning after Dr. Miller's lecture, St. John of Mount Wilson Observatory read a paper on the "Astronomical Evidences for the Gravitational Displacement of Spectrum Lines" in which he held that Einstein's third test has been verified. And a second point of interest is that the annual $1000 prize of the Association for the most important contribution presented during the meeting was awarded to Professor Miller.

(Signed) Father E. C. Phillips, Georgetown.

NOTES ON THE CONSTANCY OF THE WESTON STANDARD CELL.

It is well known that the Weston Cadmium cell which has taken the place of the Latimer Clark cell in the laboratory maintains its electromotive force quite constant for considerable periods of time. The secondary standard which is the form generally employed in practice differs from the normal cell in having its solution saturated only at 4° C. Its electromotive force is slightly different from that of the latter which at 20° is equal to 1.01830 international volts. The makers therefore supply a certificate with each cell. Laws (Electrical Measurements p. 300) states that the extreme variation among 145 secondary cells was found to be 0.0009 volt. The secondary cell had the advantage of great permanency with a temperature coefficient so much smaller than that of the normal cell as to be neglible for most ordinary measurements.

In May 1921 a Weston cell was purchased from the Weston Electrical Instrument Company for the physical laboratory of Woodstock College. According to the certificate furnished its electromotive force at 22° was 1.01869 volts, on April 20, 1921. The cell was used in the laboratory whenever needed and for considerable periods it sotted idle on the shelf. Last summer it was included in a shipment of apparatus to Fairview, Weston, Mass. On its way north it was thought worth while to leave it for a time with its makers for recalibration to determine whether it had changed to any extent since its acquisition. The new certificate dated September 26, 1925 gave its electromotive force as 1.01852 volts at 23°. There was a change therefore of only 0.00017 volts or 0.017% in about four years and a half. Whether this was due to some variation in the cell itself or to an

occasional slight polarization when in use would be hard to determine. At any rate the change was very slight.

It would be interesting to know how constant the Weston cell remains when used frequently in the laboratory by ordinary college students. If several are available this could be determined by reserving one as a standard and comparing the others with it occasionally. As the high grade cell is costly and easily injured, many professors prefer not to put it in the hands of the ordinary student. They use instead the cheaper form of Cadmium cell sold by the Eppley Laboratory of Newport R.I. This is made up in the same way but with less care and its electromotive force is not so carefully determined. Its price is therefore much lower. Several of these cells can be provided for the laboratory and their electromotive force can be checked up from time to time with a Weston cell of higher grade, which can now be purchased from several companies. For rough work the Daniell cell is available when made up according to specifications which are given for example in Ames and Bliss or in Duff and Ewell. It is cheap and cannot easily be injured. If the solutions are spoilt they can easily be replaced.

H. M. Brock, Weston, Mass.

CHEMICAL REFERENCES.

"A simple method for standardizing weights" by N.K. Harvey, in Chem.Eng. Mining Rev., 1925, xvii, 205; also Chem.Abstr.,1925,xix,3441. The method is based on the assumption that in an average box of weights some of the weights may be heavier and some lighter than the face calue, but that none will in reality be very far off. The rider should be nearly the same weight as the 0.01 gm. weights. Assume that the rider weighs exactly 0.01 gm. and then calculate the value of each weight by successively comparing the weights with one another and the 0.01 gm weights with the rider. Now calculate the actual weight of the rider by the formula $Ea/b = -e$, in which E is the calculated difference of the largest weight from its face value, a and b are the smallest and largest weights respectively, and e is the difference of the rider weight from its face value. Now calculate the actual value of the other weights.

"Ink for marking chemical porcelain". Ind. Eng. Chem. (News Edit)., Sept. 20, 1925, p.3. Coors Porcelain Company sent the following formula, on request. 18.8 gm. cobalt oxide (black commercial), 1.2 gm. bismuth subnitrate; grind these together thoroughly with 15 cc. turpentine and 15 drops Dresden thick oil. N.B. The last named item can be obtained from dealers in Artist's supplies, for it is used in certain high class artist's paints.

"Matter--Is there anything in it?". W.R.Whitney, In Ind. Eng. Chem., Sept. 1925, p.885. This is a very interesting, useful and quite simple lecture on the structure of matter. Physicists in particular will find it of great value, containing, as it does, a number of practical experiments.

"The twilight zone of matter". Alexander Findlay, in Ind. Eng. Chem., Sept. 1925, p.891. To all who are in any way interested in colloids this article is highly recommended. One does not need a thorough knowledge of chemistry to understand and enjoy it. Biologists especially should find it of interest because of the intimate connections between colloids and life processes. This is brought out very clearly in the article. Dr. Findlay concludes: "Although we must recognize the essential importance of colloidal matter in connection with the phenomena of life, and matter in the colloidal state is the vehicle of life; although, further, we may interpret much of the behaviour of living matter in terms of physics and chemistry, I am of the opinion that we cannot explain life itself in terms of physical science. There seems to be no continutity between inanimate colloidal matter and living matter, but there is a distinct and sharp break in the curve of relations. In other words, life is a new factor, a new set of potentialities, introduced into inanimate matter. Life is a new creation".

"Passage of boric acid through living skin." L. Kahlenberg, Jour.Biol. Chem. 1924, lxii, 149. Dr. Kahlenberg's experiments offered evidence that living skin and dead skin are chemically different, for they act differently osmotically. Likewise living skin and living mucous membrane act differently. Borates, e.g. sodium borate, as well as other salts, pass through dead skin and mucous membrane, but do not pass through living skin. Only free boric acid passes through living skin.

Mr. G.J.Shiple, S.J., Woodstock, Md.

NORDICS, SUPERMEN, RACE AND RECENT SCIENTIFIC LITERATURE.

Not so long ago, books and periodicals dealing with genetics, eugenics, and race spoke of physical and intellectual supermen as an ideal and possible goal, particularly for the United States. Restricted immigration, segregation and inhibition of undesirables, selective breeding and outbreeding based on intelligent mating between the more desirable parties were the means to the end. An echo of this idea is found in the following: "Now we have the pattern of sane progress, all points and lines intact: There must be limitation of births, there must be direction and control in the utilization of wealth.....Then there must be conscious selection to restore progress to the scheme" (Scient. Monthly-Feb.1925, p.162). Similarly, in the same publication, (pp.185 ff.) Abraham, John the Baptist and Our Lord are introduced as sponsors of eugenical and euthenical ideas. John the Baptist believed in the principle of the axe and the fan, and our Lord had no use for foolish people as shown in His parable on the foolish virgins. "By elimitaing every class of undesirable the race is rid of its heaviest handicaps and is able to progress on its upward road unburdened". The contributors of these two articles are both professors in non-Catholic Institutions. One can scarcely calculate the extent in damage of such loose thinking, especially when it is proferred to gullible and untrained intellects. The serious advocacy and the actual existance of state laws for the vasectomy and fallectomy of certain classes is a clear instance of the outcome of such talk.

Then there was a great deal of propaganda on the superiority of the Nordic race. Implicitly at least this was the most suitable material, supposedly, for raising the ideal stock and brend. Statistics of course were at hand to prove the theses and all the paraphernalia of necessary legislation, mooted outlined and recommended. Thus the World's Work for October 1922 spoke of the population of 1910 as "furnishing the desirable racial composition of the future United States. The great majority of that population came from the countries of Northwestern Europe". And Professor Robert Ward, writing in the Scientific Monthly for December of the same year, said: "If we want the American race to continue to be predominantly Anglo-Saxon-Germanic.....then the simplest way to accomplish this purpose is to base the percentage limitation upon an earlier census than that of 1910, i.e. before southern and eastern Europe had become the controlling element in our immigration".

There appears now to be a swing of the pendulum in the opposite direction. The Scientific American Monthly for February 1925 hits at the supposition that there is any such thing as a distinctly pure and superior race. And when Dr. Eliot lately in the Jewish Tribune opposed himself to amalgamation, Rabbi Schulman was prompt to see in this a subtle Ku Klux Klanism which quietly assumed that Anglo-Saxons are the only pure Americans. "America" from time to time was early in the lists against such propaganda. And finally Dr. Gregg writing in the Scientific Monthly for March 1925 has the following remarks: "One might have supposed that the World War would have put an end to the intellectual arrogance not only of Houston Stewart Chamberlain, but also of his disciples and the whole cult of "Nordic" self-laudation....As one reflects upon the really known evidence, the actual facts, it seems high time to throw overboard the whole notion of the general superiority or inferiority of any race" (p.249 ff).

Others have queried: "What about half the Saints of the Roman Breviary? What races gave to the world the Fathers of the Church, the greatest philosophers of all time, Western culture and law, an Aristotle, a Dante, Michel Angelo, Galvani, Pasteur, etc.?"

If one feels moreover the pulse of Jews, Negroes and Irish Roman Catholics as recorded in their various periodicals, the charge of a subtle Ku Klux Klanism, of unwarranted arrogance, and scientific pish-posh seems well founded. These representatives have all sensed the same thing and attacked it. Though the names they give it and the standpoints from which they assail it differ, they are all agreed that it is a handful thing, a nefarious bomb to prevent the explision of which is the concern of all true Americans.

Now that the non-Catholic periodicals are swinging into line on this point, one might well and earnestly wish that they would see the light on the underlying and still more dangerous eugenical ideas from which it was budded.

Mr. R.J.McWilliams, S.J., Woodstock.

RECENT BOOKS BY OURS.

"Estudios de la Quimica Contemporanea" (Studies in Contemporary Chemistry) by Fr. Edward Vitoria, S.J., Director of the Chemical Institute of Sarria. Tipgrafia Casala, Caspe, 108, Barcelone. 1925.

This latest work from the pen of Father Vitoria, the second published this year contains in finished form, with many illustrations, the seventeen lectures he delivered with so much applause two summers ago in the Universities of Buenos Aires and La Plata (Argentina). At the beginning of the book there is a facsimile of the diplima presented to him by the faculty of the University of Buenos Aires. This is followed by an introduction in which the author gives a very interesting picture of the cultural life in the Argentine, showing that that country is well to the fore along scientific lines. In the lectures proper, Father Vitoria takes up many important topics in the theory and practice of chemistry and discusses them with a clarity that only his deep knowledge and long experience can give. All in all the work is very instructive and is a further proof of the author's unremitting labor in the field of chemistry.

"La Vida y su Evolucion Filogenetica" (Life and Its Phylogenetic Evolution) by Father James Pujiula, S.J., Director of the Biological Laboratory of Sarria. Second Edition. Tipografia Casala, 1925.

This little book is perhaps the best that has come from the prolific pen of Fr. Pujuila. It contains the matter, somewhat revised and brought up to date, of six lectures delivered in the University of Valencia and dealing with several important phases of Biology. That they have been well and interestingly treated is shown by this call for a second edition. The volume is well illustrated.

"Jesuitas Portuguesas Astronomos na China", 1583-1805" (Portuguese Jesuit Astronomers in China) by Fr. Francisco Rodrigues, S.J., Tipografia Porto Medico, Porto (Portugal), 1925.

We have all heard about the wonderful work of Ricci and Schall at the imperial court of China, but we perhaps did not realize that they were only the beginners of a long line of Jesuit astronomers in the celestial empire. In this work Fr. Rodrigues, of the Portuguese Province, has given us an interesting account of the Portuguese Jesuits who were a part of this band. It is a most important contribution to the history of astronomy, to say nothing of its importance in the history of the Society, for Fr. Rodrigues has given us for the first time the results of his researches in the original documents dealing with this subject. In an appendix to the volume he has published several of these, the most noteworthy being six Latin letters which represent an important correspondence carried on between the Tribunal of Mathematics of Pekin and the Academy of Sciences of St. Petersburg.

Among the more famous men whose work is chronicled are: Duarte Sande, Manuel Dias, Gabriel de Magalhaes, Tomas and Andre Pereira, Domingos Pinheiro, Bishop Policarpo de Sousa and Felix da Rocha. Father Rodrigues is to be congratulated on his work, though it is well to observe that he had only scratched the surface of the abundant material that exists for similar works in the libraries of Portugal. Thus in the Library of Ajuda under the title of "Jesuits in Asia", there are sixty four volumes of manuscripts almost entirely untouched. Oh for a Ruben Gold Thwaites to work this rich mine of Jesuit history!

Mr. P. H. Yancey, S.J., Woodstock, Md.

To the above list we may add references to the following articles:

Fr. W.F.Rigge of Creighton University has an article entitled the Accuracy of Oppolzer's Eclipse Maps in Popular Astronomy for February 1926.

Mr. R. J. McWilliams has two articles on Anthropology in America for January 23, and January 30, 1926.

N O T E S.

FATHER ALGUE'S RESIGNATION.

On the occasion of Father Jose Algue's resignation, on account of advanced age, from the direction of the Meteorological Observatory of Manila, the "Journal of the American Chamber of Commerce" of Manila, paid a very high tribute to his work and that of the Jesuits in general both in the Phillipines and elsewhere. Among the achievements mentioned is "Velarde's Chart", the original plate of which was recently found and placed in the museum of the University. This was the first chart of the Phillipine archipelago, made by Father Velarde, S.J., in the sixteenth century, and used for many years. Father Selga, of the Aragon Province, is to take Father Algue's place.

Mr. P. H. Yancey, S.J., Woodstock, Md.

DELEGATES OF THE SCIENCE DEPARTMENTS OF OUR COLLEGES MEET IN NEW YORK.

An important meeting of representatives of the science departments of the colleges and universities of the Maryland-New York Province and the New England Vice Province met at St. Francis Xavier's New York on January 2nd to consider the proposed new schedule for our Bachelor of Science Course. Father F. Connell was chairman ex officio. Father G. Strohaver, President of our Association, presided. The schedule was discussed in detail and afterwards printed in revised form.. It has yet to receive official approval.

Among the lectures of the Fortnightly Forum of the Catholic Alumni Sodality of Philadelphia we note the following by several of our Science Professors:

Nov.15,1925. "What a Scientist-Theologian believes of Evolution" by Father M.J.Ahern of St. Joseph's College, Philadelphia.

Jan.24,1926. "India, the Land of Delights and Regrets" by Father J. Assmuth of Fordham University, New York.

Feb.21,1926. "Chemistry in Everyday Life" by Father G.L.Coyle of Georgetown University.

Father F. Tondorf of Georgetown University lectured before the Engineers' Club of Baltimore on Feb.17. He has also given talks at some of the High Schools of Washington. On February 7, Father H. Brock of Weston,Mass., addressed the Catholic Alumni Sodality of Boston on some current scientific theories and our attitude toward them.

SCIENCE CLUBS AT HOLY CROSS COLLEGE.

Holy Cross College, Worcester, has several active science clubs which supplement in an effective way the work of the class room and laboratory and while

arousing the interest of the students and developing their initiative, give them an opportunity to hear men of distinction in their professions and to present papers on scientific subjects themselves. According to the "Tomahawk" the Scientific Society, the oldest of these clubs had taken on new life under Father D. Mahoney. Its members are chiefly students of Physics and Mathematics. The Mendel Club for students of Biology keeps up its active work under Mr. A. MacCormack and we now note that Father G. Strohaver has organized a Chemist's Club for Senior and Junior students of Chemistry in good standing. Admission is to be by invitation and among the advantages are special privileges in the laboratories, an opportunity to meet and listen to specialists in various departments of chemistry and the right to attend the lectures of the Northeastern Section of the American Chemical Society.

While the Bulletin has no list of advertisers to swell its income it is willing to call attention to occasional sales of instruments or books which may be of some interest to its readers. It may be worth while therefore to mention a sale of used sextants by Kelvin and Wilfrid O White Co. of 112 State Street, Boston and 38 Water Street, New York. While at their Boston store recently we found they had already sold all but eight of a lot of one hundred and another lot was expected. These instruments were purchased from the government and evidently formed part of a large way order. Some are marked U.S.S.B. (United States Shipping Board). They were made in Scotland and were tested at the Kew Observatory London for accuracy. Each has a Kew "A" certificate. The vernier reads to 10 seconds. All have been used more or less but it may be presumed that they received ordinary care. Prices are $50.00 and $40.00 according to make. This would seem to be a good opportunity for a college needing a sextant. It would be well of course to examine the instrument carefully before purchasing.

A CORRECTION.

In our September-October number by an oversight we neglected to mention that Father Phillips' immediate predecessor as director of the Georgetown Observatory was Father J. Gipprich. He had been professor of Physics at Georgetown. He was preparing to begin a programme of work after having visited a number of observatories in Europe and gotten in touch with developments there when he was appointed to take up instuction in Physics as successor of the late Father W. Cullen.
