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ural aids and counsellors, and the burden has fallen too heavily upon a devoted minority of a board, the majority of which had no especial competence in matters artistic. As a result, deplorable but natural, those who should have been most loyal to the Metropolitan have too often been its distant and not very friendly critics.

Happily, the time is ripe for a change. One may count upon Mr. Morgan for such liberal and enlightened conduct of his trust as to win the confidence of his fellows in the love of art. But much might be done by a proper organization of the friends of the Museum. At present some of them, far too few, are annual subscribers. Such members receive certain courtesies and privileges in the way of free entrance, etc., but they have no way of being heard in the management. In other countries, auxiliary societies have been formed which bring together the connoisseurs and amateurs of a nation in aid of its galleries. On this matter Mr. Hermann Paull writes interestingly in the November *Fortnightly Review*. The first auxiliary, it appears, was founded at Amsterdam in 1883, in order to keep the De Vos collection in Holland. But the organization was continued, and the society has subsequently added many notable objects to the Rijks Museum. About six years ago the Société des Amis du Louvre paid the greater part of the price of an extraordinary Baldovinetti, and has made other important gifts. The Berlin Society, of more recent date, has had even more striking success. Through its advice and with its aid pictures by Jean Fouquet, Van Eyck, Memling, Rembrandt, Holbein, and Guardi have been acquired for the already rich gallery on the Spree. Last of all, in England, the National Art-Collections Fund has been started under distinguished auspices. Such societies generally exact a very modest annual contribution of their members, and, practically, they are the intermediary between wealthy givers and the museums.

Probably few sympathetic tears are shed over the pathetic case of open-handed but uninstructed millionairism; yet it is easy to see that where a somewhat haphazard liberality is common, an authoritative body that will indicate possible gifts and guarantee their value and their welcome is not without its uses. An important element in the work of such a society is coöperation with the Museum authorities. It does not press donations ill-advisedly, but by consultation learns the needs of the situation. Ordinarily, indeed, the auxiliary society buys in conjunction with the Museum, eking out its funds where they are inadequate. This introduces a very welcome flexibility, for it allows the curators to take advantage of such exceptional opportunities as may occur, and it enables a single department to make timely purchases, such as even a prosperous department cannot ordinarily afford without deranging the general budget.

A very valuable feature of such coöperation is the effect upon the Museum staff of a body of keen yet friendly criticism. This makes against the deadening bureaucratic tendency that so frequently overcomes directors and curators. To such officials it is a very wholesome stimulus to know that their work is scrutinized closely by experts, and such surveillance loses its sting when it is exercised by those who do it by right of helpfulness in the past and desire to aid in the future. It would be short-sighted, then, to measure the usefulness of an auxiliary society simply by the objects of art it is instrumental in securing. Quite as valuable to a museum must be the constant interchange of suggestions, and the sense that organized and influential opinion applauds every improvement. Such volunteer organizations have even shamed the parsimony of governments, as when the Berlin "Kunstfreunde" paid £30,000 for the two Van Dycks in the Peel collection—knowing the opportunity was unique—and were afterwards reimbursed by a special vote of the Reichstag.

It might be said that the Metropolitan Museum, with more than $200,000 annual income for acquisitions, is beyond the need of such assistance. But, first, no museum can be so rich as that, and, next, the directive value of such a fund would be out of all proportion to the money contribution made. For directors, and even trustees, have their idiosyncrasies. It was understood, for example, that the late General Cesnola, an enthusiast for classical antiquity, fairly grudged all money spent for objects of the Christian era. However that be, outsiders frequently see the gaps in a collection better than its curators. At present, for example, it is amazing and most unfortunate that the Metropolitan Museum has but a handful of good examples of the Italian school of painting. Its agents should to-day be scouring Europe to bring together at least a few representative panels before it be too late. A society which could give not only good advice, but a money contribution, to this cause would hardly fail to get a respectful hearing. In fact, there are a hundred and one ways in which the art lovers of the town so leagued together might substantially further the growth of the Museum—might liberalize and democratize its policy, without in any way impairing its present admirable organization.

THE NATIONAL ACADEMY IN NEW YORK.

NEW YORK, November 23, 1904.

The meeting of the National Academy of Sciences last week was not as well attended as one might suppose that a session at Columbia University would be. The hall is one in which few speakers can make themselves heard even in the front row. The programme was not long; a large proportion of the papers were "read by title," and nearly half the rest were by men not in the Academy. Such as were read were hurried through—naturally enough, under the circumstances—although some of them would have been of unusual interest, could they have been listened to with ease.

The scientific session was opened by Dr. Louis Agricola Bauer, one of the savants of the Coast and Geodetic Survey, and one of the very few masters of all that is now known concerning the earth's magnetism. He was introduced to the Academy by Professor Woodward. In a memoir of the good old solid sort that has given the Survey its renown, he explained an analysis of the forces which cause the secular variation of the earth's magnetism. The results, which seem to be irrefragably proved, are of a kind to stimulate curiosity not a little. How the earth ever came to be magnetized, we do not know. It seems that although the earth is in a certain measure an electro-magnet, yet it is mainly a permanent magnet; and in the remote past something must have occurred to render it so. Dr. Bauer expressed a confident hope that the series of investigations which he is conducting with the support of the Carnegie Institution will afford evidence concerning the when and how of that event. Certainly, much the larger part of the forces causing the slow westward drift of the magnetic lines was shown by him to act within the earth's surface. Several unexpected features of these forces were pointed out; but the most startling of them is that for the last three hundred years, at least—that is, for as far back as the history reaches—the earth's magnetism has been steadily diminishing at such a rate that, if something does not check the drain (and no cause for such check is known), we shall wake up some fine morning in A. D. 3500, or thereabouts, to find that the magnetism of the earth has all been spent and gone. Dr. Bauer seemed to the reporter rather concerned lest the newspapers should give a sensational turn to this result. He declared that he did not believe it would ever really come to that; but one does not quite see what a geophysicist has to do with any emotional aspect of his results, one way or the other. We know that the earth is cooling. It is possible that something may occur to restore its heat, just as it is possible that something may occur to restore its magnetism. But its cooling is positive fact, while any restoration of its heat is pure fancy, with which the physicist, as such, has nothing to do. It is not easy to see how the case of magnetism is essentially different.

A paper of great elegance, presented with admirable perspicuity so as to engage the interest of every hearer, and, though involving no new principle of science, yet important in more than one way and especially as a precious augmentation of the resources of physical experiment, was by the well-known Professor Pupin, who was introduced by Professor Woodward. The object was to show how to produce impulses at equal intervals of any desired length, in the neighborhood (say) of a hundred-millionth of a second. The method is founded upon the use of that sort of electrical conductor of Professor Pupin's invention in which there are many small coils of wire, each terminating at either end upon plates, a plate of one coil being separated a little from a parallel plate of the next coil, so as to bring all the coils into a linear series interrupted between every two coils. Such a conductor may be constructed so that a current will pass through it in any desired interval of time (within limits); and the rate of propagation is absolutely uniform from coil to coil, as Professor Pupin demonstrated. Supposing, then, a chain of a hundred coils is passed over by the current in a millionth of a second, the interval between the passages to consecutive coils must be one hundred-millionth of a second, precisely. Now Professor Pupin proposes to attach secondary coils to each of the coils of the chain, in each of which an impulse will be produced by the entrance of the current into its primary coil, and these impulses can be utilized in any way desired. The mere ascertainment that one could thus actually produce distinct impulses at certain excessively short intervals, even if no limit were reached, would be of interest; and it might happen that there should be found to be an absolute limit, which would be a matter of still greater interest. At present, some metaphysicians, like Kant, believe that there are no instants in time unless some instants are marked by some event, while the majority of those who have considered the subject believe that every interval of time consists of an infinite multitude of instants as distinct as so many grains of sand, although no two are consecutive. But some of the most accurate thinkers in the world, such as Mr. F. W. Frankland of Wellington, New Zealand, son of the great chemist, are of opinion that in a finite lapse of time the multitude of instants is finite. Those thinkers may be right; their arguments have not been absolutely refuted. There is, therefore, a possibility that there is some limit to the subdivision of time.

Prof. C. S. Hastings of Yale gave measures and calculations showing for the first time the dispersive power of the human eye. Helmholtz assumed that it was about the same as that of water, but Professor Hastings showed that it was intermediate between the dispersivities of flint and crown glass, and about that of oil of turpentine.

Two interesting biological papers were, the one by Dr. T. H. Morgan, who was introduced by Prof. E. B. Wilson, the other by Professor Wilson himself. It was not the only interesting paper by Professor Wilson, but these two, given consecutively, dealt in part with the same subject, and reached conclusions which, in expression at any rate, were somewhat conflicting. Dr. Morgan's paper related to organic polarity. He showed that, from individuals of all branches of the animal kingdom, it is possible to cut off pieces and have new parts grow out to replace the loss. Thus, taking a certain species of worm, if the individual was cut in two anywhere behind a certain point, a new tail would be grown upon the part containing the head, while if the section was made forward of that point, a new head would be grown upon the tail-piece. Not only that, but, after the former section, the piece of tail cut off would grow a reversed tail upon its forward end, and, after the latter section, the head-piece would grow a sort of reversed head upon its posterior wound. He showed that something similar followed when a limb of a suitable animal was severed in two places and the middle piece was replaced in a reversed position. That is, the foot, or whatever the terminal member was, would be reproduced equally from either end of a piece of the limb. Dr. Morgan had further made longitudinal sections of certain animals with results conforming to the same rule. But no attempt can here be made to explain the formulation of certain German biologists as to the propriety of which the two learned gentlemen were in disagreement. It did not seem to be a very deep separation of opinion.

Professor Wilson further read a paper by one of his students, Mr. Yatsu, about centrosomes. Everybody who interests himself in any branch of natural science has heard of the famed experiments in which Professor Wilson produced these evidences of the power of cell division by subjecting the cells to osmotic pressure. An objection was raised to the conclusiveness of that experiment on ground that the centrosomes which Professor Wilson made to appear might have existed already unseen in the cell. But since that would be the case only if the egg had been fertilized, Professor Wilson has ever since, he told the Academy, been engaged in a quest for a female of the species used containing a ripe egg. His luck, however, was bad, and that of his student, Yatsu, was good; so that it was to the latter that the lot fell. The cell contained the usual sole centrosome beside the nucleus, and, at Professor Wilson's suggestion, was most skilfully cut in halves by Mr. Yatsu so as to leave centrosome and nucleus in one half. This cell, then, could not have been fertilized in the usual way; but, upon being subjected to higher osmotic pressure, there soon appeared many little stellated bodies in it recognizable as centrosomes, and thus the discovery of Professor Wilson is freed from its last blemish. Professor Wilson's style of presenting his papers is simple and elegant in a very high degree. His voice, of penetrating depth, is so soft as not to be heard in the resound, while his enunciation is so perfect that he can be heard when nobody else can be heard. The only complaint that carping envy could conjure up would be that he is so cool; and this last infirmity disappeared when he told of the result of Yatsu's performance.

Mr. C. S. Peirce of the Academy occupied a good deal of time in sketching the contents of a memoir upon Topical Geometry. Topical Geometry is that kind of geometry which considers the motions, not of rigid bodies as elementary geometry and, indeed, metrics generally do, nor yet those of the shadows and rays of light of projective geometry, or graphics (which are such that if they are straight or flat at any one instant they are so at all instants), but of fluid objects which can bend and twist and, without being elastic, can be contracted or expanded in whole or in part in any desired way, the only restriction being that they shall not be ruptured or welded unless at specially designated instants in determinately described ways. Mr. Peirce remarked that this condition of preserving the connection of parts belongs to vacuous space itself, while it is demonstrable that these properties of space which are investigated by metrics and by graphics have nothing corresponding to them in vacuous space itself. Accordingly, Topics, or topical geometry, is alone the science of space itself, and all graphics, and *à fortiori* all metrics, can be regarded as a special problem of topical geometry. The most important part of the little known about Topics is due to Listing, who first distinctly conceived the chorisy, cyclosy, periphraxy, and apeiry—that is, the numbers respectively of separate pieces, of rings, of sacs, and of solid regions that cannot shrink to nothing—and who first gave the census-theorem to which these four numbers ("Listing's numbers") are subject.

Mr. Peirce, in addition to revising Listing's work, has added the conception of topical singularities, or places within places, from which former places bodies can, while remaining in the latter places, move away in fewer or more numerous ways than from any other places in their neighborhood. He has enumerated all the singularities that can exist of three-dimensional spaces, and has given rules from which all problems of map-coloring can, for the first time, be demonstrated and readily solved. He further professes to demonstrate that not a single one of the proper theorems of Topics (that is, none that is more than a property of a lattice) can be demonstrated without virtually assuming that space is not only continuous in such a sense that rational numbers do not suffice for discriminating every point from all others, but that it is continuous in such a sense that every description of any kind is either inapplicable to any non-singular point, or else is such that, exclusive of any collection of such points that may be indicated to which the description applies, there is another and greater describable collection of non-singular points to which it equally applies; so that it is correct to say, with Herz, the correspondent of Kant, that there are no points upon a line until they are in some way marked; and indeed there is no multitude of points that could be marked without leaving room for a greater multitude to be marked. In order to establish this proposition, Mr. Peirce gives a completed doctrine of multitude which solves demonstratively the vexed question whether two collections can each be greater than the other. The memoir was said to solve a number of other problems.

Professor Crittenden gave a sort of appendix to that memoir which so deeply impressed the Academy at the Washington meeting. It was merely to the effect that a small amount of urate might be formed by low proteid metabolism. This slightly detracted from the force of his former argument, illustrating the tediousness of the process of settling questions in physiology by courses of experimentation. The methods of treating such problems by comparing opinions and narrating cases among physicians of great experience not only has the advantage of bringing men into notice, but, after fewer hours of debate than the years the experimentation would have consumed, the whole question is finally settled in the mind of every person who leaves the hall, just as it had been when he came in.

Prof. W. K. Brooks gave a paper on the pelagiac tunicates, convincing everybody that the two kinds of barrel-shaped animals with muscles round the barrel were

not widely remote, the completeness of the hoops in one case against their incompleteness in the other not being an invariable distinction, and two other supposed essential differences being only a difference in the degrees of development of certain parts. Dr. Franz Boas, the distinguished anthropologist, treated of psychic associations in primitive culture, making some interesting remarks that nobody who heard them is likely to forget, although they may have seemed matters of common knowledge. Professor Woodward communicated a brief account of a paper by Mr. C. E. Mendenhall, son of the Academician of that name, concerning the determination of the absolute value of gravity by means of a pendulum in the form of a ring suspended from sixteen different points. The value of the method could not be judged without long and minute study. Professor Woodward described a pendulum of his own invention, in the form of a horizontal bar suspended by long steel ribbons without knife edges. Since this apparatus presents no problems that have not been completely worked out, it is certain that it would be an excellent way of determining gravity. The chief difficulty would be to ascertain the temperature; for unless the suspending ribbons are very long, the advantages of this form will not be secured. Professor Chandler performed before the Academy a determination of the oxygen in the air of the Subway by Hempel's method. It is a very elegant method, and was very beautifully executed by a student of Professor Chandler.

JEAN JACQUES WEISS.

PARIS, November 5, 1904.

Prince Georges Stirbey has published some 'Notes and Impressions, with a Selection of Letters' of his friend J. J. Weiss, one of the most gifted journalists of the time of the Second Empire and of the period which followed the war of 1870 and ended in the establishment of the Republic. Weiss belonged to the unfortunate and brilliant generation of writers who had attained their majority at the time of the December *Coup d'État*. He was a friend and companion of Prévost-Paradol, of Edmond About, of Taine, of Francisque Sarcey. They all entered life, after the most brilliant studies, as natural adversaries of a régime which suppressed the liberty of the press. Everything is known about Prévost-Paradol, who in the end became reconciled to the Empire, and Minister of France at Washington; about About, author of many popular books; about Sarcey, who became a theatrical critic; about Taine, the only one who left a lasting memory, as he wrote books instead of newspaper articles. Weiss was, more than any of his friends, a born journalist, and left no work of importance. As a journalist, he was equal if not superior to all his contemporaries; but the fame of the journalist is as ephemeral as the fate of the actor. Under the Empire, a clever newspaper article was an event; but, after 1870, journalism became absolutely free, and if Weiss had not achieved a reputation under Napoleon III., he would have found it difficult, if not impossible, to attain to any great notoriety amid absolute freedom of the press and the confusion which it creates.

Weiss was so fortunate as to be admitted under the Empire to the staff of the *Journal des Débats*, the most highly reputed of French newspapers.

"It was," says Prince Stirbey in his preface, "an epoch full of difficulties and of dangers for a journalist; for people lived under a reign of warnings, suspensions, suppressions. Weiss knew with a consummate art how to avoid these numerous dangers. It was at this difficult period that he entered into full possession of himself. His talent acquired great surety, without losing anything of its vividness; his mind, an exactness and a clearness fine and subtle; his style, a new precision. Who is there, in our generation, that does not remember Weiss's leaders in the *Débats*? The politicians, even those whom he attacked, read them with a serious fascination; the Liberals were charmed with them; while the Imperial Government felt struck by them, and was powerless to restrain the liberties and audacities so adroitly managed. With what a clever hand, what a mixture of boldness and of caution, what ingenious allusions and citations, Weiss knew how to make his readers understand what he could not say overtly; with what foresight he knew how to prophesy the misfortunes of the foreign policy of France!"

His great success on the *Débats* opened all doors to Weiss; he wrote at times for the then famous *Courrier du Dimanche*, for the *Journal de Paris*, for the *Figaro*, the *Gaulois*, but he always remained faithful to the *Débats*, the most literary of our newspapers. He had received a highly classical culture at the École Normale, and occasionally he tried his hand at articles on purely literary subjects. Many of his essays, literary or political, have been gathered in several volumes. I will here give only their titles: 'A propos de Théâtre,' 'Auteur de la Comédie-Française,' 'Le Drame Historique et le Drame Passionnel,' 'Essais sur l'Histoire de la Littérature Française,' 'Molière,' 'Le Théâtre et les Mœurs,' 'Les Théâtres Parisiens.' This list shows that Weiss had become a theatrical critic as well as Sarcey and some other of his friends; but theatrical matters were always to him a secondary object, and politics remained the great preoccupation of his life.

This new volume of 'Notes et Impressions' contains also a few essays, on the most various subjects, but its chief interest lies in the letters of Weiss which it makes public. I will, however, note a short essay which has, so to speak, a retrospective interest, at a moment when the separation of Church and State is daily discussed in France. It is thus entitled: "Are the ministers of the churches who receive a salary public functionaries?" and was written in September, 1881. It is well known that, after the period of the Revolution, in which all the Church properties had been confiscated, Napoleon made a treaty with Pius VII. which goes under the name of the Concordat. This treaty still subsists, after a century, but there is question of putting an end to it. The State gives a salary to the priests of the Catholic Church, to the ministers of the Reformed Church of France, and to the rabbis of the Jewish persuasion. Three churches are, what is called, recognized by the State—the Catholic, the Protestant, and the Jewish. Weiss maintained that the priests or parsons are not public functionaries, in the ordinary sense of the word.

Weiss's correspondence, which is published in the present volume, has a special interest. It would have been as well to leave unpublished some letters to Madame . . ., which are almost childish; but we can read with pleasure, for instance, letters from Taine to Weiss. In one, dating as far back as 1859, Taine sets forth his method:

"I am not an artist; I do not pretend to be one. I treat moral matters like physiology; I do nothing more. I have borrowed from philosophy and positive science methods which seemed to me powerful, and I have applied them to psychological sciences. I treat of sentiments and ideas as others do of functions and organs; what is more, I believe that the two orders of facts have the same nature, are submitted to equal necessities, and are the two sides of the same thing, the Universe. . . . All my ambition is to put my ideas in writing. As to the form, I make as little of it as you please."

Renan writes to Weiss in 1862, on the subject of the suspension of his lectures at the Collège de France, where he was professor of the Hebrew language:

"I delivered lectures in history, not in theology. It is quite true that the Collège de France is not a school of theology; but I was not theologizing when I treated, from the point of view of positive science, points of history which theologians treat from another point of view. Otherwise the finest and the most important pages of history would be suppressed."

The professorship of French Poetry at the Sorbonne was promised to Weiss in 1863, but Duruy, the Minister of Public Instruction, thought it incompatible with collaboration with the *Débats*, and asked Weiss to choose between the two. Weiss preferred to remain on the *Débats*. This was the occasion of a correspondence with M. Saint-René Taillandier, who obtained the professorship.

In 1867 and 1868, we find several letters addressed to Weiss by Thiers. He congratulates Weiss on his articles, and discusses several points with him. Alluding to a pamphlet which he wrote in 1830, 'La Monarchie de 1830,' now very rare, Thiers says: "It was written during the ministry of Casimir Périer; the monarchy of 1830 had been only six months in existence. . . . Its crime was that it struggled hard against the assaults of the Republicans in Paris and the Chouans in La Vendée." After the war between Austria and Prussia, Thiers writes (September 21, 1868):

"In 1866, on the discussion of the Address, I got it sent back to a committee, as the German question was omitted; thinking that France could not be indifferent in such a question. The committee concocted a senseless phrase, and, thanks to M. Ollivier, the Chamber was content with it. As for myself, I advised, not war, which was unnecessary, but, what was easy, opposition to the union of Italy and Prussia, by declaring that France would join the party which should be attacked by the other. There was but a word to be spoken, and I begged the Government to speak it. . . . The day after Sadowa, it was still possible to repair the evil—not the whole, but a part of it; but the Chamber had adjourned, and I could not speak."

In another letter, he returns to the question. He had told the Chamber:

"Prussia is going to become a formidable power if you don't arrest her. Nothing is easier. Prussia counts upon the alliance of Italy, and Italy depends upon you. Forbid her to ally herself with Prussia, and she will not disobey you. Say to Prussia that France is one of the guarantors of the German Confederacy, and has, therefore, the right and duty to defend its Constitution."

Such were the illusions of M. Thiers. He did not understand the strength of the movement which culminated in the