

The Open Court

A MONTHLY MAGAZINE

Devoted to the Science of Religion, the Religion of Science, and the
Extension of the Religious Parliament Idea

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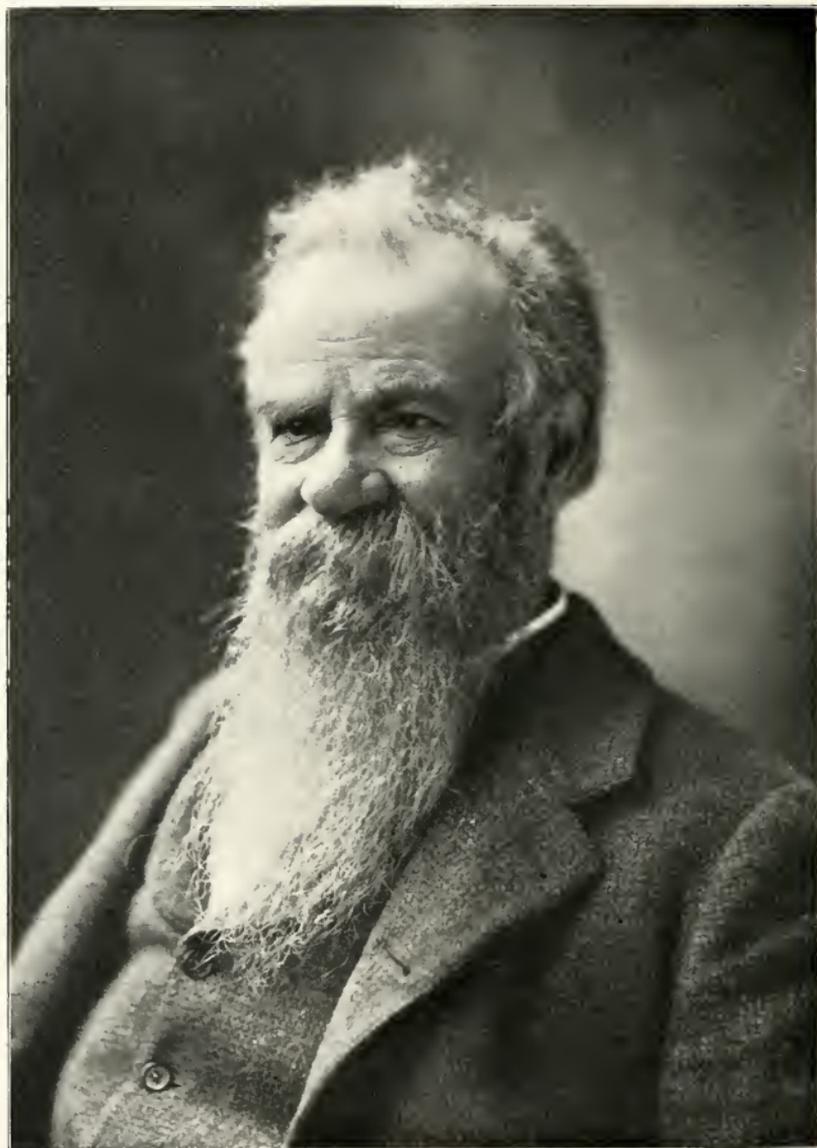
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MAJOR JOHN WESLEY POWELL.

(1834-1902.)

Frontispiece to The Open Court.

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MITHRAIC ART.¹

BY PROFESSOR FRANZ CUMONT.

THE monuments of Mithraism, which have been found in considerable numbers in the provinces of the Occident and even in the Orient, constitute a homogeneous group, of which it is desirable to characterise the importance for the history of Roman art. In point of fact, their artistic merit is far below that of their value as historical documents, and their chief worth is not æsthetic but religious. The late epoch in which these works were produced destroys the least hope of finding in them any expression of true creative power or of following in them the progress of any original development. But it would be unjust if, inspired by a narrow-minded Atticism, we should cast upon them all a like degree of reproach. In the absence of inventive genius, their cleverness in the adaptation of ancient *motifs* and the manual skill shown in their execution,—all technical qualities of which they give evidence,—would alone be sufficient to claim our attention. Some of the groups in high and low relief,—for the paintings and mosaics which have been preserved are so few and mediocre as to dispense us from speaking of them,—hold a very honorable place in the multitude of sculptured works which the imperial period has left us, and are deserving of some consideration.

It can be proved² that all our representations of the tauroctonus Mithra, the hieratic figure of which was fixed before the propagation of the Mysteries in the Occident, are more or less faithful replicas of a type created by a sculptor of the school of Pergamos,

¹ Extracted by the author from his *Textes et Monuments figurés relatifs aux Mystères de Mithra* (Brussels: H. Lamertin). Translated by T. J. McCormack.

² Compare my large work *Textes et Monuments figurés relatifs aux Mystères de Mithra*, Vol. II., pp. 180 et seq.

in imitation of the sacrificing Victory which adorned the balustrade of the temple of Athena Nike on the Acropolis. Certain marbles discovered at Rome and at Ostium (see Fig. 1), which unquestionably go back to the beginning of the second century, still reflect the splendor of the powerful compositions of the Hellenistic epoch. After an ardent pursuit, the god captures the bull, which has fallen to the earth; with one knee on its croup and his foot on one of its hoofs, he bears down upon it, pressing it against the earth; and grasping it by the nostrils with one hand, with the other he plunges a knife into its flank. The impetuosity of this animated scene throws in high relief the agility and strength of the invincible hero. On the other hand, the suffering of the moribund victim gasping



Fig. 1. TAUROCTONOUS MITHRA.
Marble Group in the British Museum.

its last, with its limbs contracted in the spasms of death, the singular mixture of exaltation and remorse depicted in the countenance of its slayer, give prominence to the pathetic side of this sacred drama, and even to-day inspire in the heart of the spectator an emotion which the faithful of old experienced in all its living power.

The traditional type of torch-bearers, or *dadophori*, was not susceptible of a similar impassioned treatment. But one remarks, nevertheless, in the best specimens the advantageous effect which the artist has produced by the ample Phrygian garments and by emphasising the different emotions of hope and sadness portrayed

on the countenances of the two young men. We possess a remarkable reproduction of this divine couple in the two statues discovered near the Tiber, which Zoëga attributed to the epoch of Hadrian and which were possibly imported from the Orient to Italy.¹ It will be seen how their author succeeded in offsetting the defec-

FIG. 2. BAS-RELIEF OF AQUILRID.



tive symmetry resulting from the fact that the two figures, which are intended as counterparts, have both their mantles fastened at the right shoulder and falling down at the right side.

The solicitous concern for details which characterises the

¹ *T et M*, Mon. 27, Plate II, opposite page 209, Vol. II.

works of the Antonine epoch was also bestowed with more or less felicity upon the monuments of a slightly more recent date. Consider the group of Ostia, which dates from the reign of Commodus, or the bas-relief of the Villa Albani, which appears to be contemporaneous with the first.¹ The artist delighted in multiplying the folds of the garments and in increasing the undulations of the hair merely to show his skill in conquering the difficulties which he had himself created; yet even this *bizarre* mannerism does not atone for the coldness of the total impression. The success of this minute execution of details is more felicitous in fragments of smaller dimensions. A small marble recently discovered in Aquileia, and here reproduced in Fig. 2, is distinguished in this respect by a "bewildering cleverness of technique." The delicately carved figures are almost entirely severed from their massive base, to which they are attached only by the thinnest supports. It is a piece of artistic braggadocio in which the sculptor parades his virtuosity in producing with a brittle material the same effects that are obtained by workers in ductile metals.²

But these comparatively perfect compositions are rare in Italy and especially so in the provinces, and it has to be acknowledged that the great mass of the Mithraic monuments is of discouraging mediocrity. The hewers and cutters of stone—they deserve no other name—who are responsible for these productions, were often content with roughly outlining by a few strokes of the chisel the scene which they pretended to reproduce. A garish coloring then emphasised certain details. The work is sometimes so hastily executed that the contours alone are distinctly marked, as in the hieroglyphics. It sufficed, it is true, merely to outline representations, the meaning of which every faithful devotee knew and which he completed in imagination; and it is our ignorance that feels so vividly the imperfections of these awkward and vague compositions. Still, some of the smaller bas-reliefs could never have been more than downright caricatures bordering on the grotesque, and their deformities strongly remind us of the little toy gingerbread men which are sold at our fairs.

¹ *T et M. Mon.* 79, Fig. 67; and Mon. 38, Fig. 45.

² M. von Schneider, *loc. cit.*, Vol. II., p. 488, who sees in this composition "*ein verblüffendes technisches Geschick*," compares it with the relief on the base of the Antonine column (Brunn, *Denkmäler gr. u. röm. Skulptur*, Pl. 210b), and a bas-relief of the Campo Santo of Pisa (Dütschke, *Bildwerke in Ober-Italien*, I., No. 60), and the bust of Commodus in the Palais des Conservateurs (Helbig, *Führer*, second ed., No. 524). The same application of the technique of metal-working to marble may be noticed in two admirably preserved busts which were discovered at Smyrna and are to-day to be found in the Museum at Brussels (*Catal. des antiquités acquises par les musées royaux depuis le 1^{er} janvier 1900*, Bruxelles, 1901, Nos. 110-111).

The carelessness with which these tablets were executed is excused by their places of destination. The mystics of Mithra were wont not only to consecrate them in their temples, but also to adorn with them their modest dwelling-houses. This domestic consumption explains the enormous quantity of these monuments, which have been found wherever the cult penetrated. To satisfy the incessant demand of the faithful for these figures, the workshops in which they were carved must have produced them rapidly and in quantities. The manufacturers of this brummagem sculpture had no other thought than that of cheaply satisfying their clientele of devotees, whose artistic tastes were far from exacting. The ancient manufacturers turned out hundreds of smaller tauroctonus Mithras,¹ just as our image-makers multiply in profusion the very same crucifixes and the very same Virgin Mary. It was the religious imagery of the epoch, and it was not more æsthetic than is ours to-day.

These manufacturers did not restrict themselves to the unceasing production of replicas of the same traditional type; they sought to diversify their wares, in order to recommend them to all tastes and purses. Look only at the series of ex-votos found in the Mithræum of Sarmizegetusa in Dacia.² We find here specimens of all the models that the workshops of the place reproduced. High reliefs, which are difficult and costly, are avoided. At most, the marble was perforated in places, so as to show forth the group of the tauroctonus god. But what a wondrous variety in the small bas-reliefs which were affixed to the walls of the sanctuaries! For a mere bagatelle square tablets could be obtained bearing only the immolation of the bull. Sometimes its value is enhanced by the addition of a sort of predella, divided into three or four smaller scenes. Again, its composition is complicated by an upper panel decorated with accessory scenes. These, finally, also occupy the borders of the monuments, and encompass on four sides the principal representation. Again, the fancy of the workman taking flight, the tauroctonus god has been enclosed in a circle ornamented with the signs of the zodiac, or in a crown of foliage. Frames were added or omitted. Considerable ingenuity was exercised to give new forms to the sculptured plaques. They were indiscriminately square, oblong, semicircular, trapezoidal, or even round. There are no two of these pieces which are exactly alike.

¹ The absence of machinery naturally excluded any absolute resemblance, but some of our bas-reliefs are certainly from the same hand or at least from the same workshop. Cp. *T et M*, Vol. II., Mon. 45 and 46; 93, Fig. 85 and 95. Fig. 87; 192 and 192 bis; 194 and 195.

² *T et M*, Vol. II., Nos. 138 to 183.

If these commercial products of labor for hire have only the remotest relationship with art, they nevertheless furnish a valuable commentary upon the stone hewing industry of antiquity. We have many proofs that a goodly portion of the sculptures intended for the provincial cities were executed during the imperial epoch at Rome.¹ This is probably the case with some of the monuments discovered in Gaul, and also for those which adorned a Mithræum in London.² On the other hand, certain statues discovered in the capital were presumably imported from Asia Minor.³ The beautiful bas-reliefs of Virunum were likewise brought from abroad, probably by way of Aquileia. We know by the passion of the Four Crowned Ones the importance of the quarries of Pannonia in the third century,⁴ where marble was not only quarried but worked. These stone-yards appear to have been an important center for the manufacture of Mithraic votive offerings. In any event, there are several of them, exhumed in the temples of Germany, which were unquestionably sculptured on the banks of the Danube. These facts cast an interesting light on the traffic in church ornaments during the days of paganism.

Yet the majority of the Mithraic monuments were undoubtedly executed on the spot. The matter is clear for those which were sculptured on the walls of natural rocks smoothed for the purpose,—they are unfortunately all greatly damaged,—but the proof of local manufacture for many others is also forcibly forthcoming from the nature of the stone employed. The construction of these fragments likewise clearly reveals that they are not the handiwork of foreign masters and of some great center of art, nor even of those nomadic sculptors who traversed the land in quest of lucrative or honorific employment, but of the modest stone-cutters of some neighboring town.

The local origin of the largest monuments is best established, since their transportation would have involved both numerous risks and extravagant expenditures. Our collection of large Mithraic bas-reliefs thus constitutes a highly interesting group for the study of the provincial art of the empire. Like the mass of votive tablets that have come down to us, these sculptures, which were exhibited

¹ Friedländer, *Sittengeschichte*, Vol. III, p. 280.

² *T et M*, Vol. II., Mon. 267 and the note on p. 390.

³ *T et M*. Vol. II., Mon. 235 and the note on p. 338. Cf. *The Open Court* for September, 1902, p. 530.

⁴ Wattenbach, *Passio sancti, quatuor coronat.*, with the notes of Benndorf and Max Büdinger, 1870; cf. Friedländer, *op. cit.*, p. 282. A new text has been published by Wattenbach, *Sitzungsber. Akad., Berlin*, XLVII., 1896, p. 1281 et seq. There still exists of this work an unpublished Greek translation; cf. *Analecta Bollandiana*, XVI., 1897, p. 337.

in the apse of the temples for the adoration of the faithful, are also far from being masterpieces of art. But they were nevertheless not executed with the same carelessness, and we feel in their presence that their authors bestowed upon them their best energies. If the artists afforded no proof of originality in the invention of subjects, they nevertheless give evidence of ingenuity in the arrangement of their figures and of their skill in handling the material.

It must not be forgotten, further, in judging of these fragments, that the painter came to the aid of the sculptor and that the brush completed what the chisel had only sketched. On the naked marble or on stone coated with plaster, flaring colors were laid: green, blue, yellow, black, and all shades of red were wantonly intermingled. This glaring contrast of tones accentuated the main contours of the figures, and made prominent their secondary parts. In many cases the details were only indicated with the brush. Gilding, finally, emphasised certain subsidiary features. In the penumbral darkness of the subterranean crypts, the reliefs of these sculptured compositions would have been almost invisible without this brilliant polychromatic vesture. Vivid variety of coloring, moreover, was one of the traditions of Oriental art, and Lucian had already contrasted the simple and graceful forms of the Hellenic deities with the ostentatious gaudery of the gods imported from Asia.¹

The most remarkable of these sculptures have been brought to light in the north of Gaul, or, more precisely, on the Rhenish frontier. It appears that we must attribute this entire group of monuments to that interesting school of sculpture which flourished in Belgium in the second and third centuries, the productions of which unquestionably surpass those of the workshops of the south. One cannot contemplate the bas-reliefs of Osterburken, which are the most complete of the series, without being impressed with the wealth and the general harmony of this vast composition. The confused impression resulting from the accumulation of personages and groups,—a defect which the Mithraic monuments show with many others of their epoch, and especially with the sarcophagi, the composition of which is generally intricate,—is here tempered by the judicious use of separating bands and frames. If we were anxious to criticise the details of these works, it would be easy to point out the disproportion of certain of their figures, the awkwardness of certain of their movements, and sometimes the stiffness of

¹ Lucian, *Jup. trag.*, § 8.

their attitudes and vestments. But these defects should not render us oblivious to the delicacy of the work here performed with a crumbling material, and especially to the praiseworthy success with which a conception of real grandeur has been realised. To attempt to represent on stone not only the gods but the cosmogony of the Mysteries and the episodes of the legend of Mithra, even to the final immolation of the bull, was an undertaking attended with great perils and is a meritorious achievement even in partial success. Even prior to this date, and particularly on the sarcophagi,



GRAND BORGHESI BAS-RELIEF. (Louvre.)

instances occur where the successive moments of the drama are depicted on superposed or parallel plates, but we cannot, nevertheless, cite a single monument of Roman paganism which can be compared in this respect to our grand bas-reliefs, and for similar productions we must wait for the lengthy compositions with which the Christian mosaicists decorated the walls of their churches.

We shall not inquire here into the origin of each one of the different representations which are portrayed upon our monuments ; we shall merely observe that in spite of their variety two or even

three clearly marked classes may be distinguished. Some of the figures have been borrowed outright from the traditional types of Græco-Roman art. Ahura Mazda destroying the monsters that had risen against him is a Hellenic Zeus annihilating the giants with his bolts; Verethragna is transformed into a Hercules; Helios is



Fig. 3. MITHRAIC KRONOS, OR PERSONIFICATION OF INFINITE TIME.

Here represented without the head of a lion, which appears on the breast of the figure. This is a Roman beautification of the horrific features of the Oriental God. (Bas-Relief of Modena.)

a young man with long flowing hair, mounted on the usual quadriga; Neptune, Venus, Diana, Mercury, Mars, Pluto, Saturn, are

shown to us in their ordinary aspect with the garb and attributes which are known from time immemorial to have been theirs. Similarly, the Winds, the Seasons, and the Planets had been personified long before the propagation of Mithraism, and the latter cult had only to reproduce in its temples the models that had long since been made popular.

On the other hand, one personage at least is a transformation of an Asiatic archetype; this is the leontocephalic, or lion-headed, Kronos (see Fig. 3). Like the majority of his compeers, this animal-headed monster is a creation of the Oriental imagination. His genealogy would doubtless carry us back to the period of Assyrian sculpture. But the artists of the Occident, having to represent a deity entirely strange to the Greek Pantheon, and being un-



Fig. 4. MITHRA BORN FROM THE ROCK.
Bas-Relief found in the Crypt of St. Clements at Rome.

trammelled by the traditions of any school, gave free rein to their fancy. The various transformations to which they subjected his figure were in part influenced by religious considerations, which tended to complicate the symbolism of this deified abstraction and to multiply more and more his attributes, and in part by an æsthetic solicitude to soften as much as possible the monstrous character of this barbaric personage, and thus gradually to humanise it. Ultimately they suppressed the lion's head, and contented themselves with representing this animal by its feet only, or with placing the head of the beast on the figure's breast.

The leontocephalic god of Eternity is the most original creation of Mithraic art, and if it is totally destitute of the charm of

grace, its unwonted aspect and the suggestive accumulation of its attributes awakened curiosity and provoked reflection. With the exception of this god of Time, we can establish the Oriental origin of certain emblems only, like the Phrygian bonnet topping a staff, or the sphere surmounted by an eagle representing the Heavens. As the Mithra immolating the bull, so also the other scenes in which this hero appears as actor, are unquestionably in greater part the transpositions of *motifs* popular in the Hellenistic epoch, although we are unable in every case to rediscover the original which the Roman marble-cutter imitated or the elements which he combined in his composition. As for the rest, the artistic value of these



Fig. 5. BIRTH OF ERICHTHONIOS.
From a Greek Vase.

adaptations is generally very slight. We have only to compare the lifeless group of Mithra issuing from the rock (Fig. 4) with the animated picture of the birth of Erichthonios as it is portrayed on Greek vases (see for example Fig. 5) to note the superior artistic effect which the ancient Hellenic ceramists could produce from a similar theme. The poverty of the innovations which the Mithraic iconography introduced contrasts painfully with the importance of the religious movement that provoked them. We have, in this, additional corroboration of the fact that in the epoch in which the Persian Mysteries spread throughout the empire, the ancient sculpture was doomed beyond recall. Whereas, during

the Hellenistic period, sculptors were still able to conceive new forms felicitously adapted to the character of the Egyptian divinities, under the empire, on the other hand, the majority of the Mazdean gods, despite their very peculiar nature, were compelled, whether or no, to take the form and the garb of the denizens of Olympus. And if for some of these strange subjects new types were actually invented, they were in every instance distressingly commonplace. The superabundant wealth inherited from the ancient generations had enervated the generative potencies of art, and, accustomed to draw from these rich stores, art had grown incapable of all individual productivity.

But we should be wrong in exacting from the adepts of Mithraism something which they never made the pretence of offering. The religion which they preached was not a cult of beauty, and love of plastic form would doubtless have appeared to them a vain, if not a condemnable, taste. Religious emotion alone was of consequence in their eyes, and to awaken it they addressed themselves mainly to the reason. In spite of the many appropriations which it made from the treasury of types created by Greek sculptors, Mithraic art rested at heart Asiatic, like the Mysteries of which it was the expression. Its predominating idea was not to provoke an æsthetic impression; it aimed not to fascinate, but to tell its mission and to instruct,—faithful in this also to the traditions of the ancient Orient. The jumbled mass of personages and groups which are presented on some of the bas-reliefs, the host of attributes with which it surcharged the eternal Kronos,¹ shows us that a new ideal was born with the new religion. These uncouth and unappealing symbols, the manifold use of which our monuments exhibit, did not allure by their elegance or nobility; they fascinated the mind by the disquieting attractions of the Unknown, and provoked in souls reverential fear for an august mystery.

Thus is explained why this art, extremely refined despite its imperfections, exercised a durable influence. It was united to Christian art by an affinity of nature, and the symbolism which it had popularised in the Occident did not perish with it. Even the allegorical figures of the cosmic cycle which the devotees of the Persian god had reproduced in great profusion (for all nature was for them divine throughout) were adopted by Christianity, although in essence they were diametrically opposed to its spirit. So with the images of the Heavens, the Earth, and the Ocean, of the Sun, the Moon, and the Planets, and of the signs of the zodiac, of the

¹ Cp. *The Open Court* for October, 1902, p. 605, and for September, 1902, p. 523.

Winds, the Seasons, and the Elements, so frequent on the Christian sarcophagi, the mosaics, and miniatures.

The mediocre compositions which the artists had conceived to represent the episodes of the legend of Mithra appeared also worthy of imitation to the Christian ages, which were even more powerless than their predecessors to shake off the traditions of the workshops. When, after the triumph of the Church, Christian sculptors were confronted with subjects hitherto unattempted, and found themselves under the embarrassing obligation of depicting on stone the personages and stories of the Bible, they were happy in the opportunity of being able to draw inspiration from the portrayals which the Persian Mysteries had popularised. A few alterations in costume and attitude transformed a pagan scene into a Christian picture. Mithra discharging his arrows against the rock became Moses causing the waters of the mountain of Horeb to gush forth; the Sun, raising his ally out of the Ocean, served to express the ascension of Elijah in the chariot of fire; and to the time of the Middle Ages the type of the tauroctonous god was perpetuated in the images of Samson rending the lion.

JOHN WESLEY POWELL.

BY MRS. M. D. LINCOLN (BESSIE BEECH).

[CONTINUED.]

II. THE SOLDIER.

IN the winter of 1860-1861, our devoted and successful young scientist was teaching school for the second year at Hennepin. Of fine physique, commanding respect everywhere by virtue of his mental acquirements and natural endowments, a sound, earnest thinker, it is not strange that when Abraham Lincoln issued his call for 75,000 troops, this stanch abolitionist should immediately organise a company of soldiers. Some days later a company at Granville was accepted by the Governor as one of the companies to constitute the twentieth regiment of Illinois Infantry. With the small party assembled at Hennepin John Powell went to Granville and joined the Granville Company as a private soldier.

Vividly the days of childhood came back to him, and the anti-slavery sentiments which he had inherited and which were fostered by his father's teaching and daring example, made him enlist for a purpose higher and greater than the glory of martial triumph. He enlisted with the avowed purpose of doing his part in the extinction of slavery in this country; and from the first day after the call was made for troops, he felt thoroughly convinced that American slavery was doomed. He found reasons later in life for enlarging his opinions regarding the importance of the issue at stake; for he says in a letter to a friend:

"It was a great thing to destroy slavery, but the integrity of the Union was of no less importance: and on and beyond it all, was to be counted the result of the war as an influence which should extend far into the history of the future, not only establishing in North America a great predominating nation, with a popular and powerful government; but also as securing the ascendancy of the Anglo-Saxon branch of the Aryan family, and the ultimate spread of Anglo-Saxon civilisation over the globe. Perhaps it is only a dreamer's vision wherein I see the English

language become the language of the world ; of the science, the institutions, and the arts of the world ; and the nations integrated as a congeries of republican states."

The eradication of slavery and the preservation of the Union, were, he believed, the important epochs in the course of history which would lead to these results ; and he carried the musket to help as best he could to secure the fruition of what he saw in prophetic vision. And thousands more saw the shadow of fulfilment as the scathing fire mowed them down.

When the Twentieth Illinois was organised at Joliet, our hero was made the Sergeant-Major of the regiment. At the end of the month, when it was mustered into the United States service, he was commissioned as Second Lieutenant. Before the regiment was mustered, and while he was still Sergeant-Major, he obtained permission of its Colonel to go to Chicago, which was only sixty miles distant, on a plea that he desired to purchase a uniform. His main object, however, was a desire to obtain some books on military science, and while in Chicago he obtained Mahan's and Vauhan's works on military engineering. He returned to Joliet, where the regiment was still stationed. These books, together with a small volume of Tactics and the Army Regulations, furnished study for some weeks, and whenever possible he went some distance away from camp for the purpose of looking over and studying topographical features and planning military works for the defense. The Lieutenant-Colonel of the regiment, who was subsequently killed at Donaldsonville, finding the Lieutenant studying military science, would sometimes join him, and they often had discussions about military works, such as entrenchments, fortifications, and bridges. Civil engineering and the construction of bridges had been previously studied by Lieutenant Powell.

When finally the regiment was ordered into the field at Cape Girardeau, Missouri, the Colonel of the regiment directed Lieutenant Powell to look over the ground, select a camp, and prepare plan for the entrenchment of the camp ; and his orders were satisfactorily carried out. At Cape Girardeau there were four regiments commanded by C. C. Marsh, the Colonel of the Twentieth Illinois Infantry, to which Lieutenant Powell belonged. During the first week of the occupation of Cape Girardeau, he carefully studied the country about the camp and made a map of it, and prepared a plan of works for the defense of the town, should it be necessary ; but no work was done in the field to carry out this plan, until one day General Fremont arrived at Cape Girardeau with a

large retinue of foreign officers, and informed Colonel Marsh that he desired to have the city fortified. Colonel Marsh sent for Lieutenant Powell and asked him to submit the map and his plan to General Fremont and his staff. They approved his plan and Colonel Marsh was ordered to prosecute the work with the greatest possible vigor.

The summer, fall, and winter were occupied in carrying out his order. At one time a Prussian officer was sent by General Fremont to take charge of the work, but as he could not speak English and was a very old man, he occupied himself in the construction of a small fort which could perhaps cover three or four hundred men at most, and Lieutenant Powell went on with the construction of a system of works inclosing the city.

After a time, Captain (afterwards Colonel) Fladd, who had been engaged on the works at St. Louis, and was an accomplished engineer, came down and took charge, and he made Lieutenant Powell his assistant, a good school of engineering for the young lieutenant. Altogether the works were on an extensive scale, and many thousand men were employed. When General Grant took command, some time in the early winter, the operations of this character were limited to the completion of a part of the work already under way; and the entire plan was never fully executed.

One day General Grant came up from Cairo to inspect the works, and Lieutenant Powell rode with him two or three hours; and after the ride was over he invited the young soldier to take supper with him on his boat. After supper, Lieutenant Powell said to the General that he desired a leave of absence for one week, and frankly told him that he had been engaged to a young lady in Detroit for a long time, and that he wished to go home to get married, and would return in a week. The General gave him the leave of absence; he went to Detroit, arrived there about six o'clock in the evening, was immediately married to Miss Emma Dean of that city, and started on the train at eight o'clock with his bride on the return to Girardeau.

Their wedding journey was to the Seat of War in the southwest, a moveable grand division, with its "headquarters" as apt to be in the saddle as in the fields of Kentucky or Tennessee; it then being under the leadership of that great Captain of the culminating victory who in taking Fort Donaldson, introduced to the world the leaders of the waiting hosts east and west.

Not a very delightful situation this for a "honey-moon"—but Mrs. Powell had heroic blood in her veins, and she followed the

army without hesitation, bearing the inevitable inconveniences and privations of camp-life with womanly fortitude; one of the ways in which the sex stimulated the other half of the world to do their duty as men, and show their own valor through privations and waiting—sometimes harder to endure than being in the midst of the battle.

Lieutenant Powell was on General McPherson's staff; within a month after his marriage he lost his right arm at the battle of Pittsburgh Landing or Shiloh.

General Grant was again at Cape Girardeau and Lieutenant Powell, who then was on General McPherson's staff, begged that he might be relieved from duty at that point as engineer, and ordered back to his regiment, which was then at Bird's Point. To this the General would not consent, but shortly after sent him a commission as Captain of Artillery. It seems the General had written to Governor Yates, telling him he did not wish Lieutenant Powell to return to his regiment, and that as the State of Illinois was organising batteries of Artillery, he thought Lieutenant Powell could make up a battery with some Missouri soldiers that were there, and who had been enlisted without authority from Washington, under instructions from General Fremont, and that if Governor Yates could send a few men from Illinois, they would be put together in this battery.

When Lieutenant Powell received this commission, he was instructed to take the Missouri soldiers who were camped outside of the city of Cape Girardeau, together with some men sent by Governor Yates, and with them organise under his command as their captain the company which was afterwards known as "Battery F, Second Illinois Light Artillery."

While stationed at Cape Girardeau, the troops on two occasions were sent into the interior of Missouri to operate against Jeff. Thompson. On two occasions Captain Powell went with them as staff-officer, his principal duty being to study the country and give information of routes and to construct maps of the region to be travelled.

In the latter part of the month of March, 1862, he was ordered to the Tennessee River.

In his six weeks' experience with the Twentieth Illinois Infantry he paid close attention to the study of tactics, and as the Lieutenant of Company H of that regiment he became a good drill-master. When the battery was organised he manifested great interest in artillery tactics, and became proud of the performance of

his battery on drill and parade. Full of activity, with zeal not always characterised by the wisdom which more deliberate men would have advised, he was a severe and almost unreasonable disciplinarian, drilling his men on every possible opportunity. When the battery went up the Tennessee, it had 156 stalwart men; and a finer lot of horses was never, perhaps, attached to a battery. Although this company had been organised but a few weeks, it went into park on the bluffs above Pittsburgh Landing, a grand body of men, well drilled, and with an equipment complete and in the best possible condition.

A week later everything was sadly changed. It was within a month of the young captain's marriage that the battle of Shiloh or Pittsburgh Landing took place, and in it his battery played an important and heroic part. Most of the horses were lost, many of the men were killed, still more wounded, and Captain Powell had his right arm shot off.

[Capt. Powell was crippled for life, and the stump of his right arm was subject to incessant pain until in his advanced years, I believe in 1898, a successful operation on the terminating nerves gave him relief; and henceforth he felt as if he had been regenerated and had received back his original vigor.

In connection with the loss of his right arm, I wish to record an incident which is typical of American conditions. In the same battle of Shiloh, a Southern officer, Col. Charles E. Hooker, afterwards Member of Congress from Mississippi, lost his left arm, and after the war the warriors met and became friends. It happened that their hands were of the same size, and henceforward whenever either purchased a pair of gloves he sent the unnecessary one to his enemy; the two veterans ever after remained friends.]¹

The officer left in command probably could not muster more than half of the number that had gone up to Pittsburgh Landing. His [Captain Powell's] young wife was on the field—at headquarters—when he was wounded, and she then and there enlisted for the war, General Grant giving her a "perpetual pass" to follow the army and thus enable her to act as right arm for her husband. Otherwise he would have had to leave the service, and that would have been a great loss, as his skill as an engineer and artilleryman ranked high; and General McPherson relied upon his knowledge most implicitly; placing him always—with his dogs of war—in the most responsible positions.

Mrs. Powell nursed her husband back to life in the hospital;

¹ The passage in brackets was inserted by the editor, on the authority of Major Powell.

and he did not hesitate to say that he believed he "owed his life to his wife's presence, fortitude, and unwearied devotion, united to her skilful nursing."

In the summer of 1862 the captain returned to the command of his battery at Corinth, Mississippi. During the fall and early winter nothing of importance occurred at that point in the theatre of war in which his battery was engaged. Some short expeditions were made, each proving fruitless; they remained in camp during the greater part of the time until early in February, when they were ordered to Lake Providence. On arriving there with his command, the battery was parked in the lawn of one of those great southern mansions, and the house was occupied by the commander and his officers. For nearly a month he was principally occupied in drilling his battery and putting it in order for the spring campaign.

The ground on which the battery were parked was very beautiful. The roomy old mansion had probably been abandoned for a year or two. On every side rose-bushes had grown up and there were acres of them. In the early spring these burst forth into bloom, and the trees and shrubs were filled with mocking-birds, and here in this garden of loveliness, where one could almost forget the calamities of war, a month passed, remembered by Captain Powell as one of the most delightful periods of his life.

In the meantime General Grant's army had been attempting to make a cut-off across the peninsula opposite Vicksburg. This having failed, the army took up its line of march across the peninsula to Grand Gulf, encountering deep mud. Captain Powell was then acting as Chief of Artillery under General Ransom, who commanded the Fourth Division of the Seventeenth Corps. One or two regiments of the division were away at the time. Three batteries were under Capt. Powell's command, and to get these across the peninsula, through the mud and over bayous, was a somewhat difficult task. He had to build many bridges and corduroy many miles of road, a work necessary not only for the battery but for the whole division, and for trains that followed in the line of the troops. At last, when the division had reached Grand Gulf and pushed back into the interior of the State of Mississippi to Jackson, Johnson's army having been driven eastward from Jackson, General Grant turned back toward Vicksburg in order to meet General Pemberton. On the march toward Vicksburg, Captain Powell took part in the battle of Champion Hill and that of Black River Bridge.

An incident worthy of note occurred at the battle of Champion Hill. When Captain Powell enlisted in Company H of the Twentieth Illinois Infantry, he took with him some of the men who had agreed to join his company at Hennepin, to fill out the company organised at Granville. One of these men was a tall Scotchman by the name of Morgrave, brave and trustworthy as a soldier as he had been respected and valued as a private citizen. At the battle of Champion Hill, Morgrave who was then a non-commissioned officer in the Twentieth Illinois, was sent to the right of the Twentieth to reconnoiter. There was a body of troops on the right, and the colonel of the regiment was uncertain whether they were Union or Confederate soldiers. Morgrave went out and fell into the hands of the enemy. Fighting soon began. The soldier in whose charge Morgrave was placed told him to lie down under a log, and the guard lay down by him. Soon the enemy gave way, and the Union troops passed over the ground, driving the Confederates back. As they lay behind the fallen tree, the movements of the troops were uncertain to the hiding party; but finally Morgrave concluded that he had as much right to the position as his guard. Laying his hand upon the gun, he called upon the guard to surrender; and the guard surrendered. Neither party yet knew who were victorious, the Confederates or the Union troops. A few moments after this, Captain Powell chanced to be riding over the ground for the purpose of bringing up the battery that was in the rear, and he saw Morgrave and his man. They called to him, and Morgrave in great earnestness asked which of the two should be considered the prisoner. When informed of the result of the battle, he was much delighted.

After the battle of Champion Hill, General Pemberton's army was driven across Black River, and the bank of the river was occupied by the Union troops. About two o'clock in the afternoon the railroad bridge was burned by the enemy, and bridges had to be built immediately. During that afternoon and night they were constructed across the river, and by daylight two divisions had crossed on this bridge, including the batteries which he commanded.

For two days they fought their way toward Vicksburg and on the 21st of June invested the works that sheltered General Pemberton. During the night of the 21st Captain Powell was occupied in arranging the lines of the division to which he belonged (Ransom's division), and in getting the batteries into position under cover of rude and hastily constructed earthworks. On the 22nd a severe en-

gagement occurred; and on the 23rd the siege operations fairly commenced, and he was engaged in them, day and night, from that time until the fourth of July. In no other forty days of his life had he ever worked so hard. It was his custom to lay out the works at night, and to direct the digging by the troops; and during the day he was engaged in preparing materials.

The work consisted chiefly in running parallels, and in constructing batteries and defensive works for the artillery. The ground was covered with fallen trees through which a dense jungle of cane was growing. This cane was cut and used in making fascines and other materials used in the construction of gabions to be employed for revetment. On the evening of the 22nd, while engaged in laying out work of this kind, one of his soldiers suggested that the telegraph wire could be used for binding the fascines, and at night nearly three hundred men were set to work making fascines and tying them with wire, the rude machinery for this being devised upon the spot. The telegraph wire ran towards Jackson from a point which was occupied by Ransom's division, and gradually this wire for many miles back was brought in to be used for this purpose.

The hills about Vicksburg are composed of loess, and this material was of a character well adapted to their purposes. They ran long galleries in it without any support, and they soon had a system of galleries extending quite under the enemy's guns, and their own troops were gradually brought up by a system of parallels to the very ditches of the enemy's main works. All the enemy's salients were abandoned quite early in the siege, and the Union guns were so arranged that they would enfilade every rod of his breastworks; and for several days before the surrender no man could safely show himself above the works of the enemy.

During all this work, Generals Grant, McPherson, and Ransom daily watched the siege operations immediately controlled by Captain Powell, and it was here that he first comprehended the genius of the great Commander. Often at night the General came to inspect the work in the darkness, and they walked together while Captain Powell explained what he was doing, the position of the enemy's guns, the topographic features, and other conditions which determined his plans. To all of these explanations General Grant lent a most intelligent hearing, rarely making suggestions, but when made, they were always of the most important character. Then during the day the Captain would further explain the work in his charge, and would find that General Grant had carried in his

mind a complete conception of the situation, and remembered all the details of the work.

He would often listen to explanations in silence, but when he asked a question it was pertinent. Captain Powell declared that never in his life had he associated with a general who so thoroughly understood the principles and details of military engineering.

On the third of July, General McPherson rode up near where Captain Powell was at work and sent for him, and soon after General Ransom came up, and General McPherson asked General Ransom if he thought the works could be successfully stormed from his (Ransom's) front; Ransom believed they could, and the details of the movement along that route were then explained and agreed upon; but just when it should take place was left uncertain. General McPherson thought it would probably be at daybreak on the morning of the fifth, but that circumstances might demand that it should be made sooner, and expressed a desire that General Ransom should be prepared to move at any time. After consultation the generals went away. A few minutes later General McPherson returned, and taking pen and ink from an orderly he wrote an order for Captain Powell to have the batteries open upon the enemy's line, with a national salute at daybreak on the morning of the fourth. At daybreak, however, the enemy had surrendered, and instead of firing a national salute the Union troops moved forward a few yards over the enemy's works and took possession of his lines.

Two or three days after, McPherson was informed that the enemy was crossing a large body of horses and cattle over the Mississippi at Natchez, and General Ransom was ordered to take boats, descend the river, and capture the cattle if possible. Natchez was soon reached, and on landing Ransom's division was hurriedly run into the country, and a large district including the city of Natchez was surrounded with troops. The line was gradually concentrated as it moved toward Natchez, and within the circle some hundreds, perhaps thousands, of cattle were enclosed. Some of these cattle were speedily sent to Vicksburg, and orders were soon received to take others to New Orleans and supply General Banks's army.

Captain Powell went down with the troops to New Orleans, and on returning to Natchez he obtained a leave of absence. During the siege of Vicksburg the excessive work had greatly reduced him in flesh, and in addition to this his arm had given almost incessant pain. After a consultation of the surgeons it was decided that he should have a resection, and for that operation he preferred to go home. During all the campaign up to that time his wife had been

with him, and they went together to Detroit, where the operation was performed.

He soon recovered, and in the fall returned to Natchez, where he found General Crocker of Iowa in command, General Ransom having been ordered to report to General Banks. General Crocker remained in Natchez a few weeks after Captain Powell's return, and then was ordered to Vicksburg, and finally back of Vicksburg to a little place called Hebron, where winter quarters were established. Captain Powell had their batteries parked on a beautiful piece of ground, barracks were constructed for the men, and stables erected for the horses, and the weeks were spent in recruiting men and horses and preparing for more active operations.

Then the expedition to Meridian was made by General Sherman, and the division to which Captain Powell was attached took part. The movement was one of destruction, its purpose being to attack a small body of troops which had occupied the country not far from Jackson, drive them across the State of Mississippi and back into Georgia, and destroy all railroad communication with Vicksburg, in order that the captured city might be garrisoned with a small force, and the main body of the army withdrawn to take part in operations elsewhere.

In the march to Meridian the army met with but little opposition; from day to day there was skirmishing, and some loss of life on both sides, but the railroads over a broad zone of country were torn up, and everything that could be utilised by an enemy in support of troops was destroyed. This destruction often involved the burning of farm-houses and barns, and many buildings were reduced to ashes. On the return a vast horde of negroes, men, women, and children, with horses, mules, and cattle, were brought back from Vicksburg, and once more General Crocker's division went into camp at Hebron.

Early in the spring his division was ordered to Chattanooga, but in the meantime a regiment of colored troops was partly organised at Vicksburg, and Captain Powell, upon the request of General Thomas, consented to take charge of them. He soon came to the conclusion that these troops were not likely to take an active part in the war, but would probably be held behind for garrison duty; so he determined not to be mustered in as colonel of the regiment, though a commission had been sent him, and he obtained permission to join the Fourth Division once more.

On his return to the Fourteenth Division he was made Chief of Artillery, of the Seventeenth Corps, having previously been com-

missioned as Major, and took part in the operations around Atlanta. Subsequently he was made Chief of Artillery of the Department of the Tennessee.

When General Hood turned back toward Nashville, Major Powell was with the pursuing army under Sherman, and was with him on Kenesaw mountain when General Corse was attacked at Altoona. Having driven Hood westward towards Rome, General Sherman turned back towards Atlanta once more, and went on beyond Jonesboro. A day or two before the railroad communication was broken with Nashville General Sherman concluded that the artillery could be moved across to Savannah. During the campaign there was great loss of horses, and the artillery was using old horses and mules to slowly drag the pieces over the country. Sherman deciding that all these animals were necessary for the quartermaster's train, Powell was ordered to take sixteen batteries of the Army of the Tennessee back to Nashville and ship them around to Savannah. He reached Nashville with the batteries just before the battle of Franklin was fought, and received instruction from Washington to report to General Thomas. Thus it happened that he participated in the battle of Nashville.

For some days before the battle, he was busily occupied in superintending the constructions of defense. On the morning of the battle, under General Thomas's instructions, he had the sixteen batteries under his command arranged in four divisions and distributed at as many different points along the rear of our army. From time to time, as the battle raged, these batteries were sent to the front under orders from General Thomas, and engaged in the conflict. Major Powell, riding from point to point, occasionally returning to General Thomas for further instructions, was for the first time during the war witness of an entire battle; that is, he was able to comprehend the operations on the various parts of the line, and to see the most important engagements on the first and second day.

When, on the morning of the first day, General Hatch's mounted infantry attacked the enemy on the extreme right with two of his batteries, the entire operation could be dimly seen in the mist from the hill where General Thomas stood, and by his side Major Powell watched the progress of the battle. When the Union troops fought their way to the top of the hill, and up to the enemy's works, for a few moments a cloud of mist obscured the scene; then the wind drove the clouds away, and with their glasses the two officers could see the stars and stripes waving over the enemy's

fort, four or five miles in the distance. When the facts were fully demonstrated, General Thomas expressed unmeasured delight, and affirmed that he had no more fear of the result; the only thing then necessary was to press General Hood so that he could not escape.

After the destruction of General Hood's army, Major Powell remained in Nashville some time until the sixteen batteries under his command were once more thoroughly equipped with horses and munitions.

Early in the spring of 1865 he asked for orders to report to the Commander of the Army of the Tennessee, General Howard, and receiving such orders, he was soon at his old post. In the meantime the Confederacy was gradually falling to pieces, and when Major Powell arrived at Louisville he was confident the end was near at hand. His term of enlistment had expired also, and general orders were issued permitting the troops to go home.

When the surrender finally came and the little white flags of capitulation began to flutter along the fortifications, such extravagant demonstrations of joy, such shouts, went like a wave through our lines and besiegers as "to have heard is never to be forgotten," says Mrs. Powell. To have been there and to have suffered some of the privations and anxieties of those days of "weary waiting" she considers to have been among her "greatest privileges."

Mrs. Powell had a hard life; her home was often a Sibley tent; her furniture of the rudest; her table service of tin; but her cheerful acceptance of the conditions so as to be able to serve the Major proved her soldiership; and she deserves a brevet of at least "ornamental aid" for having kept a most serviceable man at the front, when if she had been less heroic they would have made the circumstances an excuse for returning to the pursuits of private life.

They now went to Detroit to visit his wife's family for a few weeks, and then to Wheaton, Illinois, the home of his father.

(TO BE CONCLUDED.)

SKETCH OF THE HISTORY OF THERMOMETRY.¹

BY DR. ERNST MACH.

[CONCLUDED.]

THE rapid increase of the expansive force (pressure) and density of saturated vapors suggested to Cagniard de la Tour² the idea that at high pressures and temperatures vapors could be produced the density of which varied only slightly from that of their liquids. He filled a portion of a musket-barrel nearly half full of alcohol, and inserting in it a bullet of flint closed it. As the barrel was raised to higher and higher temperatures, the sound which the bullet produced when shaken against the sides of the

barrel suddenly changed. In a glass tube from which the air had been expelled a quantity of liquid alcohol nearly half filling the tube was rendered entirely invisible by heating. When the tube was cooled, it again made its appearance as a dense shower. The experiments were then continued with the tube shown in Fig. 21. Ether was introduced at *a* and separated from the air in *b* by mercury. The compression of the air gave the pressure of the liquid, the thermometer of the bath in which the tube was immersed gave

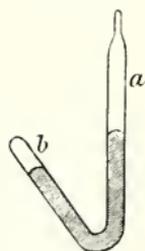


Fig. 21.

its temperature. Ether disappeared at 30 atmospheres and 160° C, alcohol at 119 atmospheres and 207° C, their vapors occupying something more than twice the space taken up by the liquid. Water disappeared at the temperature of melting zinc, and took up four times the space occupied by the liquid. Seeing that the tubes when too small for the expansion did not burst immediately, Latour correctly concluded that the liquids were extremely compressible in this state and had very large coefficients of expansion.

¹ Translated from Mach's *Principien der Wärmelehre* by Thomas J. McCormack.

² *Ann. de chim.*, XXI., 1822, pp. 127, 178, XXII., 1823, p. 410.

Prompted by Davy, and perhaps also by the researches of Latour, Faraday¹ endeavored to liquefy chemically developed gases confined in closed spaces,—an undertaking in which he was in several instances successful. The idea of these experiments had, indeed, been clearly suggested by the proof which Gay-Lussac had furnished of the like deportment of *gases* and *non-saturated vapors*, as well as by Latour's experiment, showing that vapors at high pressures were liquefied by a slight diminution of temperature and re-vaporised by a slight increase of temperature. A simple example is that of the liquefaction of cyanogen, which occurs when mercuric cyanide is heated in one end *a* of a glass tube (Fig. 22), and the other end *b* of the tube is cooled in water. The generated gas is liquefied at *b*. These experiments were continued on a larger scale with carbonic acid gas by Thilorier and Natterer,² the latter of whom especially was successful in liquefying large quantities of carbonic acid gas by means of an appropriately constructed force-pump.

The experiments of Andrews³ first indicated the mode of procedure by which finally Cailletet and Pictet (1877) were enabled to liquefy all gases. Andrews compressed dried, deaerated carbonic acid gas by means of mercury forced with a screw into a glass tube *G* ending in a capillary prolongation *g* (Fig. 23). The phenomena occurring in *g*, which was plunged in baths of varying temperatures, could thus be observed at leisure, whilst air confined in a similar tube and subjected to the same pressure served as a manometer. It was found that carbonic acid gas could not possibly be liquefied by any pressure at a temperature *above* +30.92 C, whereas it was possible to liquefy it at temperatures *below* this point. Andrews called this temperature the *critical temperature*, and it was demonstrated that every vapor and every gas possessed such a critical point, the sole difference being that the point in question was *high* for the so-called vapors and easily condensable gases, and very low for the so-called permanent gases. Utilising the results of Andrews's researches and employing extreme degrees of cold, Cailletet and Pictet succeeded in liquefying all gases.

Aeriform bodies above the critical temperature are, accordingly, in Andrews's conception, *gases*, and those under the critical temperature *vapors*. The very rapidity of the augmentation of the



Fig. 22.

¹ *Ann. de chim.*, XXII., 1823, p. 323, XXIV., 1823, pp. 297, 401, 403.

² *Pogg. Ann.*, Bd. 67, 1844.

³ *Philosoph. Transact.*, 1869, p. 575.

curve of maximum pressures is suggestive of the idea that above a certain temperature this maximum pressure transcends all limits or becomes infinitely great. This limiting point actually exists; it is Andrews's critical temperature.

Mendeleeff calls the critical temperature the "absolute boiling point." As the pressure increases, the temperature of boiling rises until the maximum expansive force of the liquid equals the pressure to which it is subjected. But at the critical temperature the pressure that could prevent the liquid from boiling is infinitely great; it boils under every pressure. Mendeleeff also showed that the superficial tension of the liquid, which decreases as the temperature rises, *disappears* at the critical temperature.



Fig. 23.

The deportment of carbonic acid gas as thus revealed by Andrews, and its deviations from the law of Boyle and Gay-Lussac, are graphically represented in Fig. 24. The curves correspond to those of Fig. 18.

The abscissæ represent the volumes. The curves of the figure extend from the second to the fourteenth thousandth part of the volume of carbonic acid gas at 1 atmosphere of pressure and 0° C. The dotted line bounds the region within which the carbonic acid gas can exist partly in a liquid and partly in a gaseous form.

Fig. 16 may by a slight modification be made to visualise the deportment of gases and vapors. This modification is shown in Fig. 25. The pressure of the vapor at a given temperature ascends by the curve mn ; but at n liquefaction begins. The pressure of the vapor at a higher temperature ascends by the curve pg to the greater maximum g ; and so with the rest. To the right of the curve $ngrs$, the vapors behave as gases; to the left, liquefaction sets in. Conceiving a distant light with rays parallel to VO to cast a shadow of the curve $ngrs$ on the plane POT , we should obtain Regnault's curve visualising the increase of the maximum pressure of the vapor with the temperature. The *lowest* temperature at which the curve ut , by which the rise of the pressure with diminishing volume is indicated, *no longer cuts the curve ngrs*, is the critical temperature. Accurately viewed, the sections of the surface of Fig. 25 parallel to POV are not exact hyperbolas for either gases or vapors. This is approximately true only of the sections to the right of $ngrs$ at some distance from this curve. In the vicinity of the curve and to the left of it, the forms appear which the graphs of Andrews in Fig. 24 show.

Although the investigation of liquids furnished no such general results as that of gases, yet a few observations in connection with them must be mentioned. Even the Accademia del Cimento is said to have been familiar with the fact that water heated from the freezing-point contracted at first and only later expanded.¹ Deluc²

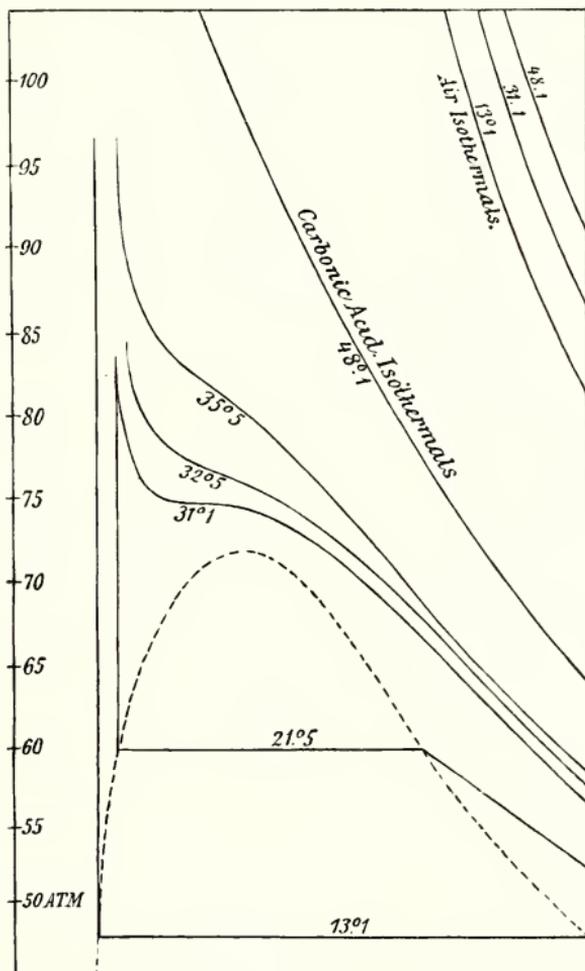


Fig. 24.

observed that the peculiar behavior of water-thermometers was attributable to an anomaly of the water itself, and, taking no account of the expansion of the glass walls, fixed its point of greatest

¹ I have been unable to satisfy myself of the correctness of this report.

² *Sur les modifications de l'atmosphère*, Paris, 1772.

density at $+50^{\circ}$ C. Hällstrom¹ was the first to examine more minutely into this phenomenon by determining the loss of weight of a glass body of known expansibility in water at different temperatures. Hagen and Matthiessen followed the same method. Despretz² observed the temperature of the different layers of water when cooled in a vessel. The water of least density formed the

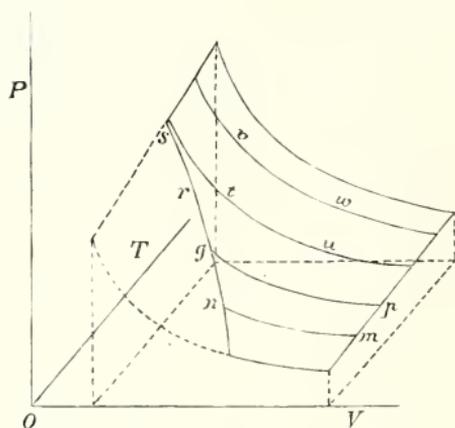


Fig. 25.

uppermost layer, and consequently when the water first began to cool had the highest temperature. On passing through the temperature of maximum density, this relation of things was reversed. F. Exner³ augmented the delicacy of this method by using thermo-elements instead of thermometers. Plücker and Geissler used a thermometer-shaped vessel partly filled with water. The most accurate determination

of the temperature of maximum density was in all probability that made by F. Exner, who found it to be $+3.945^{\circ}$ C. The investigations just mentioned are important in point of principle, as they overthrew the very natural belief in the uniform and parallel behavior of all bodies expanding under the action of heat.

There still remain to be mentioned, for the methods involved, the measurements of the expansion of solids which Lavoisier and Laplace jointly conducted, and which Roy completed after the manner of Ramsden. Lavoisier and Laplace⁴ added to the quadrant pyrometer of Musschenbroek, which was rotated by the expanding rod, a telescope set to a distant scale. The reading was considerably magnified, but every inaccuracy of the apparatus was also reproduced on an enlarged scale. Roy⁵ employs three bars, all in ice (Fig. 26). The first carries two illuminated cross-threads, F, F' ; the second, the one to be investigated, carries two microscopic objectives, A, A' ; the third two oculars with cross-threads, B and B' . The images of the cross-threads F, F' are aligned with the cross-threads of the oculars. If the bar in the middle is now plunged in a bath of higher temperature, the distance between A

¹ *Gilb. Ann.*, 1802.² *Ann. de chim.*, LXX., 1839, LXXIII., 1840.³ *Wiener Acad.*, 1873.⁴ Biot, *Traité de physique*, 1816.⁵ *Philos. Transact.*, 1785.

and A' will be increased. By moving the bar in the direction A , A' the image of F can again be aligned with the cross-threads of the ocular B , and by a micrometric displacement of A' along the bar the image of F' can also be aligned with the cross-threads of ocular B' . This last displacement measures the linear dilatation of the middle bar.

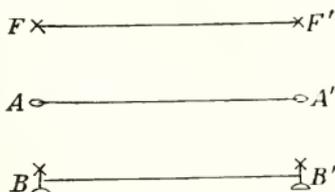


Fig. 26.

Dulong and Petit enriched the thermometric knowledge of their predecessors by a number of careful experiments, and set forth the entire thermometry of their time in a classical work honored with a prize by the Parisian Academy.¹ The labors of these physicists consist essentially in having made an *accurate* comparison of the different thermometric scales within *wide* ranges of temperature. The thermal conditions being the same, the comparative behavior of mercury-thermometers and air-thermometers corrected with regard to the expansion of the glass is as follows :

WHEN THE MERCURY-THERMOMETER INDICATES	THE AIR-THERMOMETER INDICATES
—36	—36
0	0
100	100
360	350

For reducing the indications of the mercury-thermometer to those of the air-thermometer, the foregoing table would be sufficient. But to compare the real dilatations of air and mercury, additional experiments must be made. A siphon tube AB (Fig. 27) was filled with mercury, and one of the arms B was plunged in a bath of melting ice, whilst the other A was immersed in a bath of oil at higher temperatures. The heights of the two columns of mercury, as measured by the cathetometer, were to each other directly as the volumes of the same mass of mercury at the two temperatures in question. The temperatures of the oil bath were determined by means of an air-thermometer and a mercurial weight-thermometer. This latter consisted of a vessel filled with mercury at 0° C and terminating in a bent capillary prolongation, from which quantities of mercury determinable by weight were expelled

¹ *Sur la mesure des températures et sur les lois de la communication de la chaleur, Ann. de chim.*, VII., 1817, p. 113.

as the temperature rose. The amount of mercury expelled, like the *apparent* voluminal dilatation of the ordinary mercury-thermometer, was determined by the *difference of the dilatations* of the mercury and the glass. Column *A* of the following table gives the temperature

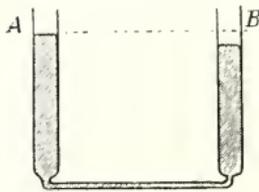


Fig. 27.



derived from the absolute dilatation of the air, *C* that derived from the apparent dilatation of the mercury (as determined by the weight-thermometer), and *B* the mean absolute coefficient of dilatation of the mercury between 0° and the temperature recorded.

<i>A</i>	<i>B</i>	<i>C</i>
0	0	0
100	$\frac{1}{5550}$	100
200	$\frac{1}{5425}$	204.61
300	$\frac{1}{5300}$	313.15

Designating the absolute voluminal dilatation of the mercury by α , that of the glass by β , and the apparent dilatation of the mercury in the glass vessel by γ , we have $\gamma = \alpha - \beta$. Accordingly, the dilatation of glass also is given by the table. Calling the temperature derived from the dilatation of air *A*, that derived from the dilatation of glass at the same thermal state *D*, and supposing the scales to be coincident at 0° and 100° , we obtain :

<i>A</i>	<i>D</i>
100	100
200	213.2
300	352.0

Knowing the dilatation of mercury and glass, there is nothing to prevent our inserting a small rod of iron in a glass-thermometer and filling the remainder of the tube with mercury. Treating this arrangement as a weight thermometer and rendering the surfaces of the enclosed substances proof against amalgamation by oxidising, we obtain in a perfectly obvious manner the voluminal dilatation of iron or of any other metal. If v is the volume of the glass

tube and v_1 the volume of the metallic rod at 0° C, and if α , β , γ be the coefficients of dilatation respectively of mercury, glass, and the metal between 0° and t , then the total volume of the mercury expelled at the temperature t will be $\omega = v\alpha - v\beta + v_1\gamma$, from which γ is determinable.

From experiments like the foregoing, Dulong and Petit reached the following conclusions :

1. Deriving the temperatures from the indications of the air-thermometers, the coefficients of dilatation of all other bodies are found to increase with the temperature.
2. Determining the temperatures by the indications of an iron thermometer, the coefficients of dilatation of all other bodies are found to diminish as the temperature increases.
3. Measuring the temperatures by the absolute voluminal dilatation of mercury, the coefficients of dilatation of iron and copper increase, while those of platinum and air decrease, as the temperature increases.

The dilatations of air, iron, copper, and platinum corresponding to the same thermal states are given by the following table :

AIR	IRON	COPPER	PLATINUM
100	100	100	100
300	372.6	328.8	311.6

Hence, if several different solids are subjected to the same thermal changes, their variations of volume are by no means proportional to *one another*, but each body exhibits an *individual* behavior peculiar to itself. The gases only, as Gay-Lussac showed, obey the same law of dilatation. This result of the labors of Dulong and Petit is, *in point of principle*, of great importance for the theory of thermometry.

Deluc and Crawford early sought for a body the *dilatations* of which should be proportional to the *quantities of heat*¹ it absorbed. Dulong and Petit likewise granted the rationality of a scale of temperature the degrees of which should coincidentally measure the quantities of heat absorbed by the thermometric substance ; and the same idea occurred, as we have seen, in a slightly different form, to Renaldini.² But these inquirers very correctly remarked that such a scale would be of value only provided the same independent relationship as subsisted between capacity for heat and

¹ We are obliged by the context to anticipate here the definitions of quantity of heat, specific heat, and capacity of heat, which will be critically discussed in a later chapter.

² Cp. *The Open Court* for November, 1902, p. 650.

the scale of temperature here in question likewise obtained for all other bodies; or, what is tantamount to the same thing, only provided the variations of the thermal capacities of all bodies for the same variations of thermal state were *proportional to one another*. This question, accordingly, was attacked experimentally.

The capacities of bodies for heat were now investigated with greater accuracy and throughout wider ranges of temperature than ever before. *Boiling water* and *boiling mercury* were employed to raise the bodies to the required temperatures. Accurately weighed quantities of the different substances were then immersed in a like accurately determined large body of water, the ascent of the temperature of which determined the quantities of heat given off by the bodies. The following table gives the results of this experiment:

	MEAN CAPACITY BETWEEN 0° AND 100°	MEAN CAPACITY BETWEEN 0° AND 300°
Mercury	0.0330	0.0350
Zinc	0.0927	0.1015
Antimony	0.0507	0.0549
Silver	0.0557	0.0611
Copper	0.0949	0.1013
Platinum	0.0355	0.0355
Iron	0.1098	0.1218
Glass	0.177	0.190

As will be seen, not only do the capacities for heat increase with the temperature as recorded by the air-thermometer, but they also increase in different proportions with different substances, and would also increase in like manner were the temperature recorded by the mercury-thermometer. The law of the variation of capacity for heat is therefore *peculiar to each substance*.

Dalton imagined himself justified by the state of research of his time in formulating the following singular laws of temperature:

- “All pure homogeneous liquids, as water and mercury, expand from the point of their congelation, or greatest density, a quantity always as the square of the temperature from that point.
- “The force of steam from pure liquids, as water, ether, etc., constitutes a geometrical progression to increments of temperature in arithmetical progression.
- “The expansion of permanent elastic fluids is in geometrical progression to equal increments of temperature.

“The refrigeration of bodies is in geometrical progression in equal increments of time.”¹

Consonantly with these views, Dalton proposed a new scale of temperature, the degrees of which increased in length with the temperature. The mean between freezing and boiling water, or 122° on the new scale, corresponds about to 110° on the Fahrenheit scale. If a quantity of air expands on being heated, in the ratio of 1 to 1.0179, Dalton adds 10° on his new scale; and when its volume diminishes in the ratio of 1.0179 to 1, he subtracts 10° . The points 32 and 212 are identical on Dalton's and Fahrenheit's scale.

Studying unbiassedly the portion of Dalton's treatise with which we are here concerned, one is struck with the wilful caprice with which he frames his assumptions and theories. The clearness and precision of his exposition has suffered so much by the introduction of superfluous hypothetical elements, that it is by no means easy at times to grasp clearly his meaning. He compares the heated body to a vessel, the heat it contains to the liquid the vessel holds, the temperature to the height at which the fluid stands. It is an indisputable fact for him that equal increments of heat in any body correspond to equal increments of temperature. Since, however, according to his conception, the capacity increases with the volume, this conception is again untenable. No precise definition of what he understands by temperature is found in the text. The properties of his new scale are determinable from his table alone.

The following is an illustration of the temerity with which Dalton embraced the most hazardous theories. The higher and more rarefied layers of the atmosphere are *colder*. On rarefaction, the air cools, and consequently gains, according to Dalton's conception, in capacity for heat. Dalton, in explanation of the coldness of the higher regions of the atmosphere, then calmly assumes that layers of air in contact tend, not towards equality of temperature, but towards equality of heat.²

As a matter of fact, Dulong and Petit,³ in consequence of their investigations, which showed the behavior of bodies to be in each case *peculiar to themselves*, and so subject to no general law, found themselves obliged to repudiate utterly the thermometric laws of Dalton. Even Dalton himself subsequently became convinced of the untenability of his laws.⁴

¹ *A New System of Chemical Philosophy*, London, 1808, p. 13. Compare also Henry, *Memoirs of the Life and Scientific Researches of Dalton*, London, 1854, p. 66.

² *A New System of Chemical Philosophy*, Part I., London, 1808, p. 126.

³ *Ann. de chim.*, VII., 1817, pp. 150 et seq.

⁴ Henry, *Life of Dalton*, p. 67.

The researches of Dulong and Petit thus indisputably demonstrated, as their authors in their conclusion claimed, that all thermometric scales were dependent on the particular thermometric substance selected. Universal comparability was, they found, the property of gas-thermometers only, and, without condemning all others, they recommended these thermometers as the best. We have now substantially reached the point of view which we shall assume in the following discussion. It is unnecessary for our purpose, which is entirely one of principle, nay, it would be quite inadmissible, to consider here in detail the recent and more refined investigations in thermometry which Pernet and others have conducted.

The development of thermometry from the employment of the first air-thermometer (probably in 1592) to the attainment of lucidity in points of principle in this domain (1817) covered an interval of some 225 years. Manifold were the paths entered upon, and again and again were they forsaken and re-trodden before the fragments of our knowledge were all gathered and united into a comprehensive view of the whole. The air-thermometer was invented. Its defects led to the employment of liquid thermometers, the insufficient comparability of which provoked new efforts and thus ultimately threw into full consciousness and light the quest for a *rational* scale of temperature. The determination of fixed points and the search for a rational scale required much time and experimentation, the upshot of which was the reinstatement of the air-thermometer as a normal instrument in its proper rights. We are now in a position to consider critically the results of our historical survey, which we shall next proceed to do.

MRS. LYDIA PRATT BONNEY.

BY THE EDITOR.

THAT the wife plays an important part in the life of a man is obvious, but the quiet assistance which she gives him in innumerable instances and the influence which she exercises in many significant but undefinable particulars is but little appreciated. If a man becomes famous and if his deeds and accomplishments are praised, the unostentatious help which he has received from his wife is mostly forgotten or passed over in silence; yet without her his life would have been incomplete. She belongs to him and he to her. Without her he would have been different; his whole career would have taken another course, and it is even possible that he would not have attained the same success in life.

It is the wife that comforts a man in tribulation. She buoys up his spirits when they flag and she encourages him in the most critical moments of his development. She makes him manly, for true manliness can scarcely be thought of without the compensating presence of a wife, and every man is best characterised by the wife that stands at his side.

These comments apply with special force to the late wife of our venerable friend, the Hon. Charles Carroll Bonney.

Mrs. Bonney's maiden name was Lydia Pratt. She was educated in Troy at the Seminary of Mrs. Emma Willard, the famous pioneer in the higher education of women, and she distinguished herself in many ways as a good scholar, but especially by her rare talent for painting. While Miss Pratt was still in the primary grade, it happened that the teacher of art fell ill, and she was at once chosen by Mrs. Willard as her assistant.

In 1852 Miss Pratt visited her brother, Mr. Benoni P. Pratt, at Peoria, Illinois, and there she met on Dec. 3rd a young lawyer who by his steadfast character and sound knowledge had already

gained the confidence of his fellow citizens. It was her future husband Charles Carroll Bonney. They were married in Troy, N. Y., on August 16th, 1855.

Mrs. Bonney died on January 30, 1900, from a stroke of apoplexy suffered on the 10th of that month.

It was my good fortune to make Mr. Bonney's acquaintance at the World's Fair Congress Auxiliary of which he was the inaugurator and president. I came into close contact with him on several occasions during that memorable event, and I found



THE MAIDEN.

After a faded Daguerreotype.



THE WIFE.

After a photograph.

opportunity to admire his extraordinary administrative ability and the tact which he displayed. The crown and glory of all the congresses was the Parliament of Religions which was an unprecedented event in history and which became possible only through the extraordinary discretion with which the delegates of the several creeds and sects were treated.

Mr. Bonney as president of the Congresses showed an impartial justice and at the same time an unstinted friendliness toward all. He gave every one of the delegates the same chance of rep-

resentation, so that a lack of success could only be due, wherever it happened, to their own mistakes. As a fact, almost every one of them returned home contented. Every one had had a hearing, and every faith had had a fair chance of having its tenets explained to the expectant crowds of the large and mixed audiences.

Difficulties frequently arose, for the speakers enjoyed untrammelled liberty, yet the arrangements were such and the spirit of



THE MATRON.

Mrs. Bonney's latest picture.

the meetings so lofty that there was very little abuse of liberty, and whenever a storm threatened to disturb the peace, Mr. Bonney poured oil on the troubled waters, and always remained master of the situation. There was no outburst of discord that was not settled quietly, and without doing any harm.

One might have noticed in the several halls in which Mr. Bonney, on special occasions, made his appearance, a stately lady whose hair was turning white, watching every movement of the venerable President of the World's Fair Congress Auxiliary; it was Mrs. Lydia Pratt Bonney. How often did Mr. Bonney's office boy, who served as aide-de-camp, travel to the platform and whisper a few words or carry a slip of paper containing suggestions which (however trivial they may have been at the moment, sometimes merely relating to the acoustics of the hall and the effect of the speaker's voice) were not without influence upon the man who was the spirit of all these congresses. They represented a spiritual contact with a companion mind who watched over his movements, ever ready to assist him with advice and to keep him informed about the trifles that might mar the effect of the whole.

Mrs. Bonney was possessed of a distinguished presence. No one could see her without being struck by her queen-like, yet affable deportment. She seemed providentially chosen and adapted to do the honors at the receptions of the World's Fair Congresses.

Mr. Bonney, as we have learned in former numbers, is a poet and his Muse takes the flight of the higher style, soaring into themes sublime, such as the patriotic anthem which appeared under the title of "America," in *The Open Court* for December, 1901, or into the realm of religio-philosophical topics such as the New Year vision which was published in *The Open Court* for January, 1900. Mr. Bonney being a lawyer and a man of practical affairs, was very reluctant to publish his poetry, and it is only now when he is enjoying the evening of his well-spent life in the well-deserved rest of retirement, that he has ventured to allow his poetical lines, so far known only to his most intimate friends, to find a general public.

Owing to the fact that I showed an interest in his Muse, Mr. Bonney handed me some time ago a collection of his poems, and I noticed in the Table of Contents of these manuscript leaves some marked with crosses with the remark: "Not for publication." And he added that they are in a lighter vein and might therefore detract from the dignity of the other poems in which he had struck the key-note of the sublime. Such was Mr. Bonney's impression, but the truth is they were more personal and for that reason perhaps more generally human and poetical.

Having enjoyed the perusal of the poem "America" and other lines of a similar strain, I felt tempted to see what kind of poetry Mr. Bonney would cut out from publication, and I found that most

of the poems were dedicated to his wife and extolled the woman of his choice. Upon seeing Mr. Bonney again, I openly avowed my special interest in the lines which he had proposed to discard, and I very soon noticed that after all they were dearer to him than I might have supposed from his first comments, not because he liked the lines better but because the influence of his companion was still powerful upon him. If he showed any discrimination against these verses it was because they did not seem to express the dignity of her to whom they were addressed.

Since we cannot better describe a wife than by showing the effect of her influence upon her husband, and since a public man belongs to the public and the public have a right to see and know him, I propose (with Mr. Bonney's kind permission) to publish some of his poems in order to portray the significance of his wife in his career. There is nothing extraordinary in these productions, nothing that is startling, but they are typical of an alliance between two noble souls whose fates have been locked into one.

We let the poems follow in their natural order without further comment.

TO MY WIFE.

THE IDEAL.

Man is not all an element of earth,
 A being whose existence hath no aim
 Beyond mere sleep and labor; and whose birth
 Is but the prelude to a life of shame :
 Which hath its dearest and its purest springs
 Of hope and joyment, in the world of sense ;
 Nor whose development of being, brings
 But chill and change upon sweet innocence.

But there is something from a higher sphere,
 Inblent with our mortality, which flings
 A glorious radiance o'er our pathway here,
 And lends its beautiful, its unseen wings,
 To all life's better moments, when the soul
 Thirsts for the waters of purer stream,
 And welcomes back the visions fair that stole
 From Eden-land, in youth's first blissful dream.

And in my inner being there doth dwell
 A pure Ideal of a sister heart ;
 A blending of each beauty whose sweet spell
 Hath been upon me, which can ne'er depart
 From out my memory—its lasting shrine.
 And it is with me ever ; and each hour

It mingles its own essence with mine,
 My idolized minister—Love's spirit flower.

It links me with all loveliness and truth,
 And I have twined around it, and still twine,
 A love whose fervor and whose dreamy ruth,
 Are not more earthly than they are divine.
 And I have dreamed, in some loved form to find
 The real of the ideal I have known—
 Dreamed of a union of our dual mind,
 Which yet is desolate, since all alone.

DREAMS.

I have dreamed of a glorious being—
 An angel in earthly shrine—
 A radiant spirit of beauty—
 With feelings attuned to mine.

Whose hopes, whose silent musings,
 Would echo all my own,
 And wake the pleasant music
 Of the spirit's lute-like tone.

And I've dreamed that years would bring me
 The real, whose vision dwells
 In my heart's best fane, as sweetly
 As flowers in wildwood dells.

I have dreamed of a rapturous meeting,
 With the spirit I've loved so long,
 With holy and passionate fervor—
 A being of dream and song.

I have dreamed of an quiet dwelling—
 A home where human flowers
 Would bud and bloom, to gladden
 Life's brighter, better hours.

And many a time, while dreaming,
 I have thought—I have felt her near—
 And my heart, too full for keeping,
 Ran o'er in a silent tear.

And over my spirit stealing,
 I have felt her holy smile,
 And dreamed she came and kissed me,
 And breathed a prayer the while.

And I know if I e'er should meet her,
 I should know, and of her be known,

And my soul, having found its sister,
Would no longer be alone.

HER FACE.

Though crowds of faces be before mine eyes,
They only see but one :
As in the glories of the summer skies,
We only see the Sun.

All other faces are but stars to me ;
I see them in the night.
'Tis only when her own dear face I see,
My soul is filled with light.
To other eyes, she may not seem so fair,
May be 'tis only mine
That, in the picture framed by her soft hair,
See charms that are divine.

Through her sweet eyes, I look into her heart,
And there I do behold
Such blessed beauty as no cunning art
Hath e'er to mortal told.

It is as though you looked in a sweet spring,
And in its mirror bright,
Saw sky and landscape fondly trembling,
As if they felt delight.

Of words, my love and I have little need ;
For if I only look
Into her face, I there her thoughts can read,
As I would read a book.

I have her picture whereso'er I stray ;
I keep it in my heart.
The precious treasure nought can take away ;
Of me it is a part.

And if I seem to worship this dear face,
'Tis no idolatry :
I only worship in it, God's sweet grace,
That shineth there on me.

It is my shield ; when evil thoughts assail,
It charms them all away :
Sooths passion's tempest to a summer gale,
And shows my feet the way.

So I am blest. Whatever may befall,
Whatever woes may come,

Her calm, sweet face shall cheer my heart through all
Till it reach Heaven, her home.

HER VOICE.

From my first memories, my inmost heart
Hath hungered for sweet sounds,
And always, at the touch of music's art,
My soul with gladness bounds.

The thirsty garden doth not drink the rains
With any more delight,
Than doth my spirit, all melodious strains
That show'r it, in their flight.

The language of the soul is melody ;
Love's native tongue is song ;
And all the blessed things of harmony
To its domain belong.

The notes of birds that sing the hymns of morn—
The voices of the trees—
The low, sweet words of waters, mountain-born—
The hum of honey bees.

The tones of anthems, sung in temples grand—
The songs of Italy—
The household memories of every land—
All these are sweet to me.

But I have found a living treasury
Of all I ever heard,
Of charming music, whatsoe'er it be,
Of streamlet, breeze, or bird.

It hath all tender cadences that art,
By instrument, hath made ;
All tones of sympathy that move the heart,
And are by love obeyed.

All its exquisite harmonies abide
Forever in my brain ;
And with the ebb and flow of their sweet tide,
Soothe all my spirit's pain.

It comforts, chides, encourages, and cheers,
Consoles and strengthens me ;
Dispels my doubtings, and allays my fears,
With its sweet melody.

Above all other music ever heard,
 It is my fond heart's choice,
 To hear, in some low, sweet, delicious word,
 Her Own Beloved Voice.

HER NAME.

There is no music heard in happy dream,
 No luring song of fame,
 That to my ear one half so sweet doth seem,
 As Her beloved name.

I hear it always, like the murmur dear,
 Of soft wind, o'er the sea ;
 And my fond heart, with echo sweet and clear,
 Repeats the symphony.

When I awake and see the morning star,
 Shine on Aurora's breast ;
 It seems to whisper from its heights afar,
 Her name of love and rest.

When mid the struggles of my daily life,
 My heart feels faint and sore ;
 Her dear name strengthens to renew the strife,
 And I am sad no more.

When day is over, and the blessed night,
 Comes with its holy calm ;
 Her sweet name soothes my senses with delight,
 And fills my heart with balm.

And always when I lift my heart in prayer,
 I breathe most tenderly
 Her name, and ask that all things good and fair
 About her life may be.

I pray that neither her dear heart, nor mine,
 May keep one wish or thought,
 On which the blessing of the Hand Divine
 May not be truly sought.

Pray that through all my life, her love may warm
 My soul to noble deeds ;
 While I, through every trial, grief, and storm,
 Protect her as she needs.

'Tis not mere letters, formed into a word,
 That make her blessed name ;
 But the sweet tones, by love pronounced and heard,
 That kindle feeling's flame.

THE OPEN COURT.

Its charming mystery cannot be told
 By pen, nor by the voice ;
 My heart alone the secret e'er will hold,
 And over it rejoice.

THE LIPS.

The lips are sacred. In the shining eyes
 The soul is only seen ; but on the lips
 Its very breath and sweetness softly lie,
 And whoso touches them its essence sips.

A kiss is therefore sacred and to be
 Regarded as a rose from Love's sweet land ;
 Not as an act of common courtesy,
 Like greeting of the voice or by the hand.

The heart, untaught, instinctively repels
 All common trade in kisses as profane,
 And 'gainst the sacrilege at once rebels
 With shameful feelings of indignant pain.

Then be the lips kept pure and beautiful,
 And kisses deemed the sweet reward of love ;
 And be the heart kept good and dutiful,
 And blessings will reward it from above.

TO MY BELOVED.

I. PREMONITION.

The thought of you awakes my inmost heart
 With fondest longing to be where thou art.

II. COMING.

The tender fall of your approaching feet
 Fills me with expectations, hushed and sweet.

III. GREETING.

The warm close clasp of your delightful hand,
 Is better than the gold of Ophir's land.

IV. WELCOME.

Your ardent kiss, my hungry heart doth fill,
 With the sweet gladness of its tender thrill.

TO LYDIA.

I am coming, sings the tide,
 O'er the ocean great and wide ;
 And I bear upon my breast
 All the wealth of peace and rest,

For which the weary soul so long hath sighed.
 God grant it may be so
 Ere the wintry breezes blow,
 And that you and I, My Dear,
 May enjoy the coming year
 More than any since the day you were my bride.

SEMPER FIDELIS.

Forever faithful! not alone in ways
 Of violet-bordered gladness, but as well
 In sorrow's dreary, cypress-shaded paths.

Forever faithful! not alone when joy
 Is singing anthems in the spirits' fane,
 But when anxiety, fear, pain, and grief
 Bear some dead hope to burial through its aisles.

Forever faithful! in the little things
 Of life, as in the great, for in the least
 Oft hide the mightiest. An eagle's egg
 Is a small thing, and greatest battles turn
 On seeming trifles. One unfaithful deed
 May blight a life, or change a nation's course.

Forever faithful! if the earnest soul
 That legend on its banner ever bears,
 And on Fidelity, as on a rock,
 Builds up the temple of a worthy life,
 It will be blest. No outward adverse fate
 Can take the treasures of the soul away.

Semper Fidelis! write upon my heart,
 O sovereign Lord, these words, and give me strength
 To live them fearlessly and prove them true.

THE HOME.

To God, whose goodness hath provided it,
 And to the service of our fellow-men,
 Without whose kind support and confidence
 No one is blest with true prosperity,
 With grateful hearts we dedicate this house.

Here let the social virtues all abide;
 Here let domestic peace assert its sway;
 Here let wise recreations be prepared;
 Here let the arts and sciences find friends;
 Here let the muses have their votaries;

THE OPEN COURT.

Here let all honest labor be approved ;
 Here let all sorrows meet with sympathy ;
 Here let all worthy effort meet with praise.

And here against all infidelity ;
 Against all selfishness and avarice ;
 Against all scandal, hatred, and ill-will ;
 Against all idleness and vanity ;
 And other foes of honor, faith, and peace,
 Be constant and successful warfare waged.

Here be the Prince of Peace acknowledged Lord ;
 Here be the Golden Rule acknowledged law.
 And when the poor and sorrowing see this house,
 May they ask God to bless it for their sake.

MY WIFE.

I pray for thee each night before I sleep,
 I pray for thee each morn when I awake,
 Asking the Lord in safety thee to keep
 And from thy dear heart every sorrow take.

Indeed my thoughts of thee are all a prayer,
 That thy dear breast from toil may find repose,
 And all the desert of thy daily care,
 Rejoice and bloom, like Sharon's lovely rose.

And I entreat the Lord to make me such
 A husband as I ought to be to thee ;
 Entreat him that I may not grieve thee much
 By anything that is amiss in me.

PROMISE.

As in the bud the blossom's beauty lies,
 Till, in the fulness of the summer days,
 It opens to soft winds and shining skies,
 And all its fragrant loveliness displays :

So in the baby's arch and dimpled face,
 And all the sweet ways of her babyhood,
 Are blessed omens of a riper grace,
 Adding new beauty to each childish mood.

As in the verdure of the laughing spring
 We read the promise of autumnal store ;
 And when the baby birdling tries its wing
 We see it in the future rise and soar ;

So in the child we see the woman smile
 And feel the charms of the approaching years ;
 So when her new-born dignities beguile
 Our weary hearts, replacing care with cheer,

We think, with mingled faith and hope and fear,
 Of all the future for the dear one keeps ;
 Then with firm heart repress the starting tear,
 And trust in Him whose mercy never sleeps.

We pray that He will guide in peaceful ways
 Her tender feet, and make her wise and strong,
 Will comfort her in all life's winter days,
 And keep her safe from every harm and wrong.

Try not too soon, dear bird, the sunny air,
 Stay the unfolding of thy leaves, sweet flower,
 Be as thou art, so happy and so fair,
 We would not speed thy years a single hour.

HER BIRTHDAY.

(September 29, 1868.)

Her Birthday is dawning, shine softly, Oh sun,
 Touch lightly her beautiful eyes ;
 She is lovelier now than the day she was won,
 Bend tenderly o'er her fair skies.

Soft breeze from the billows, sweet wind from the plains,
 Come, laden with melody's dreams,
 Sing lullaby music, in tenderest strains,
 Bring visions of valleys and streams.

Let all the bright angels that guarded her birth,
 Return to caress her to-day ;
 To measure with gladness the wealth of her worth,
 And guide her dear feet in thy way.

Rise, Children, to bless her and cherish her name,
 Who never missed yours in her prayers ;
 She justly your love and your homage may claim,
 Who gives you a Mother's fond care.

Sing hymns in her honor, wreath flowers in her hair.
 For this is the day of her days,
 And she who our sorrows and trials doth share
 Hath right to our love and our praise.

Oh blessed and bounteous Heaven send down
 Thy Gladness to bless her to-day ;

Thy Peace, to encircle her brow like a crown,
Thy Love, to sustain her always.

THE GOLDEN WEDDING.

Blessed are they who see the fiftieth year
Of wedded life dawn on their love, and hear
Each in the other's voice the sweet refrain
Of their betrothal vows come back again.

Blessed, who after half a century
Of mingled joys and sorrows still can see
It was the gracious Lord's benign command
That bade them meet life's trials, hand in hand.

Blessed are they whose children round them throng,
To celebrate with feast and cheer, and song,
Their Golden Wedding. Well may they upraise
Their voices in triumphant hymns of praise.

I DREAM OF THEE.

TO ONE IN HEAVEN.

When the last morn-stars are beaming
From the amethyst of heaven,
And away are slowly streaming
The shadows Night hath given,
When golden sunbeams falling
Upon the deep blue sea,
To life are ripples calling,
Dear One, I dream of thee.

When glad free birds are singing
Their orisons at morn,
And wild sweet blossoms springing,
And holy thoughts are born,
When brooklets bright are leaping
Along so merrily,
Through bloom-decked valleys sweeping,
I dream, I dream of thee.

When balmy breezes sighing
Make music mid green leaves,
Like low dear love-tones dying
When some fond spirit grieves;
When dew-stars bright are shining
On blushing bloom and tree,
And hope, bright love-wreaths twining,
I dream, dear one, of thee.

Where'er the glow of beauty
From eyelight, or from flower,
Or voice of truth-toned duty,
My heart thrills with its power ;
Whene'er a voice of gladness
Gives some dear tone to me,
Awakes perchance sweet sadness,
I dream, I dream of thee.

When twilight's blush is stealing
Sweet o'er the silent earth,
And purest, deepest feeling
Hath with the stars its birth,
When pure prayer heavenward goeth,
Like dew-drops from the lea,
My soul thine own soul knoweth,
Oh, do you dream of me ?

Whene'er the soft moon floateth
Up in the azure sky,
And every glad soul noteth
Bright angels floating by,
Whene'er the daylight fadeth
And slumber comes to me,
And sleep's dark pinion shadeth
My soul, it dreams of thee.

I dream, Oh beautiful spirit flower,
I dream, I dream of thee
In every place, at every hour,
Oh, dream you thus of me ?
At morn, at noon, at starry even,
I dream, dear one, of thee,
Oh glorious child of the spirit land,
Say, dreamest thou thus of me ?

FOUNDATION OF A LAY CHURCH.

A SUGGESTION.

BY THE EDITOR.

WHAT is the reason that so many people, and sometimes the very best ones, those who think, stay at home on Sunday and do not attend church? Is it because our clergymen preach antiquated dogmas and the people are tired of listening to them; or is it because the churches themselves are antiquated and their methods have become obsolete? To many these reasons may seem a sufficient explanation; but I believe there are other reasons, and even if in many places and for various reasons religious life is flagging, we ought to revive, and modernise, and sustain church life; we ought to favor the ideals of religious organisations; we ought to create opportunities for the busy world to ponder from time to time on the ultimate questions of life, the problems of death, of eternity, of the interrelation of all mankind, of the brotherhood of man, of international justice, of universal righteousness, and other matters of conscience, etc.

The churches have, at least to a great extent, ceased to be the guides of the people, and among many other reasons there is one quite obvious which has nothing to do with religion or dogma. In former times the clergyman was sometimes the only educated and scholarly person in his congregation, and he was naturally the leader of his flock. But education has spread. Thinking is no longer a clerical prerogative, and there are more men than our ministers worthy of hearing in matters of a religious import. In other words, formerly the pulpit was naturally the ruler in matters ecclesiastic, but now the pews begin to have rights too.

Wherever the churches prosper, let them continue their work; but for the sake of the people over whom the churches have lost

their influence the following proposition would be in order, which will best and most concisely be expressed in the shape of a ready-made

PROGRAM FOR THE ESTABLISHMENT OF A LAY CHURCH.

GENERAL PRINCIPLE.

It is proposed to form a congregation whose bond of union, instead of a fixed creed, shall be the common purpose of ascertaining religious truth, which shall be accomplished, not under the guidance of one and the same man in the pulpit, but by the communal effort of its members in the pews.

NAME AND FURTHER PARTICULARS.

This congregation shall be known by the name of The Lay Church, or whatever name may be deemed suitable in our different communities, and a characteristic feature of it shall be that it will have no minister, but the preaching will be done by its own members or invited speakers.

Far from antagonising the religious life of any Church, The Lay Church proposes to bring to life religious forces that now lie dormant. Religious aspirations have as many aspects as there are pursuits in life, and it is the object of The Lay Church to have representatives of the several professions, of business, the sciences, the arts, and the trades, express their religious convictions upon the moral, political, and social questions of the day.

The Lay Church will establish a free platform for diverse religious views, not excluding the faiths of the established Churches: provided the statements are made with sincerity and reverence.

Since The Lay Church as such will, on the one hand, not be held responsible for the opinions expressed by its speakers, and, on the other hand, not be indifferent to errors and aberrations, monthly meetings shall be held for a discussion of the current Sunday addresses.

The man of definite conviction will find in The Lay Church a platform for propaganda, provided it be carried on with propriety and with the necessary regard for the belief of others: while the searcher for truth will have the problems on which he has not yet been able to form an opinion of his own ventilated from different standpoints.

It is in the nature of this Church that its patrons may at the same time belong to other Churches or to no Church. Nor does

membership imply the severing of old ties or the surrendering of former beliefs.

The spirit of the organisation shall be the same as that which pervaded the Religious Parliament of 1893. Every one to whom the privilege of the platform is granted is expected to present the best he can offer, expounding his own views without disparaging others. And the common ground will be the usual methods of argument such as are vindicated by universal experience, normally applied to all enterprises in practical life, and approved of by the universal standards of truth—commonly called science.

MISCELLANEOUS.

THE CHINESE CHAIR AT COLUMBIA.

The foundation of chairs of Chinese language and literature at our universities is a highly significant symptom of the broadening spirit of civilisation. It is to be hoped that the many mistakes made in former years by almost all governments of the white race in their dealings with our yellow brothers (in which of course the latter are by no means blameless either) will be more and more avoided the better we become acquainted with the peculiarities of their civilisation. If we wish them to accept our views and methods in matters of politics, science, ethics, and religion, we must first show them that we appreciate their good qualities. Happily we are making good advances, and the time will come when every great educational institution that makes any pretense of being abreast of the times will have to follow the example of Columbia University.

Professor Hirth proposes to open courses for beginners as well as for advanced students; he will have seminary exercises and also deliver lectures for university students and the general public who do not possess any knowledge of the language.

In his practical study of Chinese characters for beginners Professor Hirth will aim to impress upon the student's memory a stock of ideograms such as are of the most frequent occurrence in the written language. Selected characters collected and arranged according to the frequency of their occurrence will be written on cardboard tablets, on the back of which the sound and meaning of the character is to be noted. By the aid of these tablets the student will be able to practice until he is absolutely familiar with the shape, sound, and meaning of the characters. The structure of these characters, their hieroglyphic origin, grammatical bearing, and any peculiarity of meaning attaching to the words they represent, will be shown as examples occur. So soon as a couple of hundred are mastered, attempts to form short sentences will be made by placing certain tablets side by side, an opportunity being thus afforded to illustrate the rules of position in what may be termed Chinese grammar.

This study will be continued until students are in possession of say about 1,000 characters, after which they will be introduced to the use of Chinese and English dictionaries. Explanations regarding sound and tone will be given, followed by a review of the various systems of transcription. Numerous exercises in the use of the dictionary from every point of view will follow.

In the Seminary for the study of Chinese Government matters, special attention will be paid to the latest development of the Chinese Government in connection with its history since the year 1898. A foundation will also be laid towards

acquiring a good knowledge of the epistolary style and of the running handwriting in which familiar letters are penned.

Other seminary courses will be devoted to research work in the ancient and mediæval history of Central Asia in connection with the discoveries made by modern explorers in Eastern Turkestan, and also based on the Chinese literature regarding the various branches of Chinese culture such as bronzes, stone sculptures, porcelain, pictorial art, and objects of daily life in connection with certain exhibits in the ethnographical department of the American Museum of Natural History and objects borrowed from private collections.

A NEW FIELD FOR PHILOSOPHY.

To the Editor of The Open Court :

The following narrative, while it was in the making, seemed to express a criticism, an account of an experience, a confession of faith, "an insight and a plan of action." Now that it is cold it seems rather a grotesque conglomerate. Nevertheless it may suggest as well as anything I could say, an opportunity, which it seems to me the philosophical world strangely ignores, to do the American people an immense service. I do not see how else the professional world is to come out of its emotional "spree." The workingman naturally follows where the educated lead him. Nothing is to be hoped for from the press so long as advertising rates vary in proportion to circulation—and that condition may be expected to hold. Plenty of business men see plainly that our great new social problems have no real existence but are only a false appearance due to the fact that in recent years that public sentiment for law and order on which everything we have is based, has sadly degenerated. But they would not be listened to.

THE PHILOSOPHY OF ACTION.

A few years ago a friend prevailed upon me to cut business for a bit and make a little excursion with him into the region of philosophy. I learned there, to my surprise, that the traditional firing into the air, for which the inhabitants of that region have acquired some reputation, has had the effect of creating, at last, a small but apparently very promising rain belt. A very direct route, moreover, was open to this promised and promising land, and it came to pass that after my first visit I fell into the way of making little personally conducted excursions of my own into this interesting country. Even the especially arid districts came to have a certain attraction. The remains of the extreme prototype of our statisticians I found there in those deserts; also the limit of stock-jobbing—accounts of a world whose ultimate issue was nothing but water. Airy worlds too, and fiery worlds, had been begun and had ended there before ours of the earth earthy established its present supremacy.

Many an idle hour I spent in the "Bad Lands" of that wilderness, watching the antics and contortions of grave and spectacled gentlemen who endeavored to move things without motion, or construct things out of nothing. And always there was the joy of listening to the skinless and bootstrapless fraternity—those late fit dwellers in that barren land. "Place your hand upon my arm," one of these would say, "Skin? Sure, are you? Well, I'm not. Maybe I have a skin, maybe I haven't. Positive knowledge is impossible. Never thought of that, did you? Tell you how I know—don't know, I should say. It's this way, (here he swung his arms and jumped strenuously, squirmed and twisted). See? Can't jump out of

my skin, therefore I can't say for sure that I *have* a skin. No getting around *that*, is there? How am I *sure* I can't get outside of my skin? Why—why—Great Scot! a child might know that."

And off he would go railing at the perverted "common sense" of the "plain man," giving place to others who, failing to raise themselves by their bootstraps triumphantly declared that there was no certainty that they had any bootstraps.

Wearying of these amusing performances one could always pass the time sitting on the wall at the edge of the finite lot, kicking one's heels together, and observing the efforts of the *Ding-an-sich* and the Unknowable to avoid running into each other.

But these entertainments alone could not have drawn me again and again to that strange land. In that rain belt aforesaid, the barrenness of the soil was already overcome; oases had sprung up, fertile, pleasant places where men could be found who tried to use their eyes for the purpose of seeing; men who feared nothing in heaven nor hell nor in the world between, except only blindness. From these men I learned untechnically, and as a business man may, the outline and the drift of some large new notions about life. And the point that sunk deepest into the element of speculation in my make-up was this: "Life," said one of these men "is dynamic. It is a movement, an activity, a striving of some sort; and the end of life is death; cessation of striving, or call it Nirvāna, perfection, the millennium—any one of the dozen statical synonyms you please—connotes mere nothingness."

"So it would seem," I agreed, somewhat dubiously, for the landscape was behaving strangely and my attention wandered. Fogs lifted here and there and the horizon took up its bed and walked.

"I doubt," my friend continued, "whether you can have fully understood. Does it quite sink into your mind that this amounts to saying that our ideals are not conceivably attainable? For the conception of an attained ideal, of perfection realised, is a statical conception, and a statical conception is, again, a conception of inaction, Nirvāna, death, nothingness—or tries to be." "Yes," I replied, "I caught that vaguely. Just let me think. What you say sounds true enough, but—well, things are kaleidoscoping so my mind is confused. But now—now all seems to come to order again, and— See here my friend, am I dreaming or—what? Things have settled back just as they were before, all but my standpoint, and—man alive! the horizon is *gone*."

"Yes," said my friend calmly. "Never mind, you will not miss it."

"But look here," I broke out presently, when I had gathered my wits together, "there is no room in this world of yours for ideals, and you may say what you like, but I *have* some ideals."

"Who said there is no room left for ideals?"

"Why, you did—in effect—in your incantation"

"I did not."

"You—pardon me—you—"

"I said that our ideals of life are not envisagements of nothingness; i. e., of the *end* or *goal* of striving. And I might have added that in the due course of ages men will probably find this truth in kindergarten curricula.

"We *have* ideals—we know this as well as we know anything—and these ideals are ideals of that affair of striving which we call life. They cannot therefore envisage anything but the worthy *direction* of that striving. What we have upon our hands then is the inevitable and omnipresent *It is* of our actual situation, and also the ideal sense, the sense of the *Ought to be*. The problem of life is practical

and not theoretical. There is no thought of goals nor peace nor perfection. The problem is to move the *It is* in the direction mysteriously given by our sense of the *Ought to be*. *How* and *when* such movement can, in point of fact, be effected, no man can positively say. Likewise no man can refuse to follow the only guide he has, namely, his honest private judgment as to this *how* and *when*, and escape failure in life. Worthy life is a question of *doing*—not of doing whatever we *like*, but of doing what we honestly judge is productive, on the whole, here and now, of movement in the direction which our ideals mysteriously but indubitably envisage. The *It is* and its *Ought to be* are for our form of consciousness undetachable and unmergable. And I would have you note carefully that this is so whether or not *you* or *I* approve the plan. We know this if we know anything, i. e., we know it with all the certitude of any finite knowing. And the contention that our finite knowing is not *unfinite* or absolute knowing is a monumental platitude. The eternal truth and the practical inconsequence of the agnostic contention is worth observing. If, on the contrary, the agnostic contends that he meant to deny the possibility of *finite* knowledge, he deserves no answer. He can mean a platitude or he can mean nonsense—and there is no third way. Yet again, observe that if you speak of *justice*, or of *right*, and have in mind something other than legal sanction, you can only mean the *Ought to be*; you but voice your sense of the worthy direction of effort. Justice, right, the *ought to be*, the ideal, are synonymous symbols, and symbols, I repeat, of a sense of direction and not of a state attainable. Ponder these things."

So I did, and returned to the world of business.

Strange things I found there; not new things, but a confusion of old ones. Most excellent men were sitting at home or in their offices on the days of primary elections, bemoaning the laws passed by men who had taken up the governmental reins which the "most excellent men" had cast away. "The law is unjust," they declared. "What we want is justice, fairness, right. Give us these and *then* we will go to the primary polls. Meanwhile it is too unpleasant to mix in ward politics. Besides we are very busy, and then there is the question of the Filipino's capacity for self-government that we have to determine, and the great social problems that have fallen to us in these days of our intellectual insolvency. Under such circumstances it is really too inconsiderate to ask us to go to the polls and make the law more *just* if we think it unjust as it stands."

Uncritical minds, hearing these bemoanings, and all unaware of the declared bankruptcy of the intellect, had taken up the refrain and were working tooth and nail unwittingly for social suicide. "Fairness, fairness," was the cry. "I look forward to the time," one labor leader was saying, "when peace and justice and right shall *be secured* for those who toil." In the tumult of these cries it had come to pass that the law was ignored and the non-unionist's life was imperiled and,—here was the very center and essence of the trouble—the voice of vigorous general public sentiment was *not* raised in protest. The strong sound sense for law and order upon which we have so plumed ourselves and upon which we have so relied, had, in the emergency, turned up missing.

Back I hurried to the oasis. "For God's sake," I cried to the philosophers of the dynamical view of life, "come over to the every-day world and start some neighborhood settlements among our submerging, over-worked, down-treading educated!

S. D. MERTON.

CHRISTMAS.

Time hath not sundered every chain
 That holds us to the ruder thought,
 For many a link our fathers wrought
 Twists in and out our heart and brain.

We treasure still an ample store
 Of myth and fable, tale and song,
 That to the elder days belong,—
 Bloom that the race's childhood bore.

And be its vision ne'er so dim,
 Through all the strivings of our race
 Messiah-hopes we faintly trace,—
 Age after age hath looked for him.

He came, men dreamt, in Palestine ;
 Upon the holy Christmas night
 A mother gave a child to light,
 Whom longing hearts proclaimed divine.

And legend saith, a bright star led
 Earth's wisest to the cradled God ;
 While shepherds, who their night-watch trod,
 Heard angel-voices overhead.

The myth may fade, the dream may melt,
 God's truth within it never dies :
 Though sweeter visions bless our eyes,
 We read the word our fathers spelt.

To-day no star the wise men brings,
 The simplest soul can find the child ;
 O'er every cradle undefiled
 The mother-heart her Christ-child sings.

ALEXANDER F. CHAMBERLAIN.

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TOLSTOY AND FRAU SEURON.

To the Editor of The Open Court:

Mr. Aylmer Maude's article "The Misinterpretation of Tolstoy" in *The Open Court* for October repeatedly calls attention to Mrs. Evans's transliteration of the distinguished Russian's name and graciously condescends to "correct her orthography"; he also adduces her "wrong spelling" as conclusive proof of her ignorance of Tolstoy's works, but only succeeds in revealing his own narrow-mindedness and petty pedantry. So far as the pronunciation is concerned it makes no

difference whether Tolstoy or Tolstoi is used, and although the former is the usual English orthography, the latter is by no means incorrect and is preferred by many good writers of the English language. Mr. Ernest Howard Crosby, a disciple of Tolstoy in the province of social reform, who forwarded Mr. Maude's article to the editor of *The Open Court*, informs us in the sketch of his own life that on his return home from Alexandria to New York he "visited Tolstoi in Russia"; and a book recently published by G. P. Putnam's Sons bears the title *Tolstoi as Man and Artist. With an Essay on Dostoievski. By Dmitri Merejkowski*. Of course it would be sufficient for Mr. Maude to read the title-page of this volume in order to be convinced that the author "knows nothing about Russia and nothing about Tolstoy."

Mr. Maude was formerly an English tradesman in Moscow and seems to show in his present occupation as an interpreter of Tolstoy a marked tendency to what the Germans call *Kleinkrämerei*. It is a characteristic common to men who devote themselves to a specialty to imagine that no one else knows anything about it and Mr. Maude seems to furnish a striking illustration of this general truth. As regards Frau Seuron the very fact that she submitted the manuscript of her book to Tolstoy for correction shows that she was not animated by malice and that she wished to tell the truth. Tolstoy's remark that "he felt sure she would not write what should not be written" implies that he had confidence in her. This would not have been the case if she had been "dismissed for disgraceful conduct" as Mr. Maude affirms.

FAIR PLAY.

BOOK REVIEWS.

OUR BENEVOLENT FEUDALISM. By *W. J. Ghent*. New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1902. Pages, vii, 202. Price, \$1 25 net.

This interesting book is a caustic criticism of recent industrial, social, and political tendencies in the United States. The irresistible movement toward great combinations in certain trades, toward coalescence of kindred industries and the consequent complete integration of capital, and the rise of the social, industrial, and political power of the captains and lieutenants of industry,—these are the dominating marks of the time. The state is growing stronger, so the author argues, in its relation to the propertyless citizen and weaker in its relation to the man of capital; subordination of classes and a tremendous increase in the numbers of the lower orders follow; the petty industries are eliminated; defenceless labor,—the labor of women and children,—increases both absolutely and relatively; men's wages decline or remain stationary, while the value of the product and the cost of living advance by steady steps; the old system of independent farming is being gradually done away with; in a word, says Mr. Ghent: "They who desire to live—whether farmers, workmen, middlemen, teachers, or ministers—must make their peace with those who have the disposition of the livings. The result is a renascent Feudalism, which, though it differs in many forms from that of the time of Edward I., is yet based upon the same status of lord, agent, and underling. It is a Feudalism somewhat graced by a sense of ethics and somewhat restrained by a fear of democracy. The new barons seek a public sanction through conspicuous giving, and they avoid a too obvious exercise of their power upon political institutions. Their beneficence, however, though large, is but rarely prodigal. It betokens, as in the case of the careful spouse of John Gilpin, a frugal mind. They

demand the full terms nominated in the bond ; they exact from the traffic all it will bear. Out of the tremendous revenues that flow to them some of them return a part in benefactions to the public ; and these benefactions, whether or not primarily devoted to the easement of conscience, are always shrewdly disposed with an eye to the allayment of pain and the quieting of discontent. They are given to hospitals ; to colleges and churches which teach reverence for the existing régime, and to libraries, wherein the enforced leisure of the unemployed may be whiled away in relative contentment. They are never given, even by accident, to any of the movements making for the correction of what reformers term injustice. But not to look too curiously into motives, our new Feudalism is at least considerate. It is a paternal, a Benevolent Feudalism."

In this strain, the author develops the details of his subject in chapters entitled : " Utopias and Other Forecasts ;" " Combination and Coalescence ;" " Our Magnates ;" " Our Farmers and Wage-earners ;" " Our Makers of Law ;" " Our Interpreters of Law ;" " Our Moulders of Opinion ;" " General Social Changes ;" and " Transition and Fulfilment."

Lack of space prevents our epitomising the discussions in these chapters, and it only remains for us to say that the attention of persons desirous of considering a hostile but calmly presented view of the present industrial and consequent social difficulties, may well be directed to this work μ.

DEMOCRACY AND THE ORGANIZATION OF POLITICAL PARTIES. By *M. Ostrogorski*.

In Two Volumes. Translated from the French by Frederick Clarke, M A., formerly Taylorian Scholar in the University of Oxford. With a Preface by The Right Hon. James Bryce, M. P. New York : The Macmillan Company. London : Macmillan & Co., Ltd. 1902. Pages, Vol. I., lviii, 627. Vol. II., xliii, 793. Price, \$6.00 net.

De Tocqueville and Mr. Bryce have found in the person of M. Ostrogorski a new follower in the study of democracy. In the two ponderous volumes which constitute the present work, M. Ostrogorski has given us perhaps the most learned and exhaustive criticism of democratic government that exists. He has been fortunate in having had a preface written for his work by Mr. Bryce, who lends the great weight of his authority in praise of M. Ostrogorski's labors. He says :

" The system of party organisation in America, and the incomparably simpler, ruder, and less effective system which the last thirty-five years have created in Great Britain, have now found in M. Ostrogorski a singularly painstaking and intelligent student. He is both scientific in method and philosophical in spirit. He has examined the facts with exemplary diligence. He has described them with a careful attention to the smallest details of the structure and working of the two systems, the English and the American. He has brought to the investigation of their phenomena a breadth of view which recognises the large historical causes by which institutions are moulded, as well as an impartiality which shows no more leniency to the faults of the Republicans than to those of the Democrats in the United States, to the errors of the Tories than to those of the Liberals in England."

But Mr. Bryce intermingles with his laudations a few mild words of criticism ; he continues :

" Leniency is indeed the last thing he shows to any party ; and it is only in respect to the Rhadamanthine attitude he preserves throughout that I feel bound to utter a note of mild dissent. It is for American readers rather than for an Eng-

lishman to say how far his picture of the party machinery of the United States is overcharged with gloom, for gloomy it unquestionably is. As regards Great Britain, I can hardly doubt that his description, a minute, and on the whole accurate, as well as fair description,—though here and there his generalisations seem to me open to question,—will make upon a reader in some other country an impression darker than the realities of the case warrant."

M. Ostrogorski has particularly investigated the *working* of democratic government,—its dynamic as distinguished from its static aspect. It is not institutions that is the object of his research; it is not only political forms, it is on *political forces* that he dwells; and in this respect his book is unique in character and distinctly marked off from the works of his predecessors. The great bulk of his investigations is naturally concerned with the United States of America and England, although other countries have not been neglected. As in England the organisation of parties founded on a popular basis is a very recent creation, M. Ostrogorski's book will be of special value to students in this regard. The work is the outcome of personal study made in both the United States and England, and of laborious investigations extending over many years. It has been admirably translated from the French by Mr. Frederick Clarke, and is apparently issued either before or simultaneously with the French edition.

The *Annual Report of the Smithsonian Institution for 1901*, just issued, is perhaps the most valuable volume of the series that has yet appeared. One of the functions of the Smithsonian Institution at Washington is the diffusion of knowledge "understood of the people," and to this end it issues each year as an appendix to the report of the Board of Regents a popular summary of the most interesting events of the scientific year. The various essays and memoirs are reprints of the addresses of presidents of scientific associations, translations of similar foreign reports, reprints from the proceedings of societies like the Royal Institution of Great Britain, and reprints of important magazine articles. Wireless telegraphy, transatlantic navigation, forest destruction, irrigation, submarine boats, pictures of prehistoric caves in France, bodies smaller than atoms, solid hydrogen, the utilisation of the sun's energy, the greatest flying creatures, the fire-walk ceremony at Tahiti, are some of the subjects discussed, and indicate the wide range of scientific topics included in the Report. The staff of the Institution are deserving of great credit for the discrimination which they have exercised in the selection of these subjects. The Reports are distributed to libraries throughout the world, and may be obtained free of charge from the applicant's member of Congress, or they may be purchased at cost by sending to the superintendent of documents at Washington.

Mr. Alfred Ward Smith, of New Haven, Conn., offers a new contribution to the theory of evolution. His initial views of the subject and his material are largely limited to Spencer's works, the doctrines of which on universal evolution receive "emendation and improvement" by him. Unfortunately Mr. Spencer's theory of evolution is not all of evolution. Mr. Ward's thesis, now set forth in a work entitled *A New Theory of Evolution*, is that the "Principles of Economy, Efficiency, and Harmony are primary and essential traits of Universal Progress"; and that they are transcendent, primary, and paramount in the domains of ethics, æsthetics, economics, and politics. (London, New York, and Montreal: The Abbey Press. 1901. Pages, 256. Price, \$1.25.)

It will be interesting to our readers, especially to members of the Protestant Church, to learn that Prof. Paul Schwartzkopff has written a tragedy reflecting the life of the time of the Reformation, which has been performed on the stage in Halberstadt, Prussian Saxony. The title is *Bruder Gerhard*, and its main character is a knight who through some complications has for good cause slain a rival in a duel, and then renounces the world and his bride to become a monk. His disgust with Tetzels sale of indulgences leads him to Luther, and his sympathy with the peasants involves him in a conflict with the authorities. A pious Catholic convinces him of the error of defending spiritual truths with the sword; and convicted as a rebel he dies at the hands of the executioner. The plot as well as the treatment reminds us of Goethe's "Götz von Berlichingen" and breathes the same spirit of the last flickering up of knighthood, only that Schwartzkopff introduces more of the religious element and the powerful character of Luther looms up in the background. (Halberstadt: Druck von Louis Koch. Pages, 80.)

Yucatan has found its bard in Alice Dixon Le Plongeon who, in the poem "Queen Moo's Talisman" has celebrated the legends of the great empire which once comprised the territory between the Isthmus of Tehuantepec and that of Darien, known collectively to-day as Central America. The argument of the poem is based upon the explorations of Dr. Le Plongeon in Yucatan, and upon the interpretation which he has given to his translations of the so-called Maya inscriptions. From the analogy of this Yucatanese word with the well-known homonyms of India, Europe, and Egypt, Dr. Le Plongeon has deduced some conclusions regarding the connection between the ancient civilisation of Central America and that of the Asiatic and European world, which to some minds will seem extremely conjectural. But the present poem is not an historical document, and the inherent romance of its measures has been heightened by elegant half-tone reproductions of antiquities with which the book has been adorned. (New York: Peter Eckler, 35 Fulton St. Pages, 82.)

The *Letters on Reasoning* of Mr. John M. Robertson is a book for which many people have been searching. It is concerned largely with reasoning in ethical and religious matters, and naturally emphasises in its expositions of these subjects the general point of view of the Rationalist Press Association for which it was issued. The development of the subject is conducted with reference to popular and practical ways of thinking, as distinguished from the artificial procedures of the logical "machinery" of the schools. Especially has Mr. Robertson dwelt upon the dangers of historical fallacies. The work is written for young people, but the discussions are in the main for mature minds. (London: Watts & Co., 17, Johnson's Court, Fleet Street, E. C. 1902. Pages, xxviii, 248. Price, 3s. 6d. net.)

Among the recent publications of the University of Chicago Press, we note (1) "Physical Characters of Indians of Southern Mexico," a statistical and anthropological study carefully illustrated with photographs of rare human types, by Frederick Starr, Professor in the University of Chicago; and (2) a philosophical essay on "The Functional Versus the Representational Theory of Knowledge in Locke's Essay," by Addison Webster Moore, Assistant Professor of Philosophy in the University of Chicago. Professor Starr has also contributed notes upon the "Ethnography of Southern Mexico" to the Proceedings of the Davenport Academy of Sciences, Davenport, Iowa.

Dr. Friedrich Selle, in a pamphlet entitled *The Philosophy of World Power*, makes the attempt to reconcile Nietzsche and Herbert Spencer. His thoughts are a combination of the two; but he tries to discard the incompatible elements in a higher proposition which yet preserves the spirit of both. The pamphlet is a doctor's thesis, and the author wishes us to understand that it is a mere sketch of the philosophy in which he expects to supersede both the happiness-machinery of Spencer and the overman of Nietzsche, in an aggregate organisation in which every one would be a factor according to his own ability to assist in the work of civilisation. (Leipzig: Verlag von Johann Ambrosius Barth. 1902. Pages, vi, 74. Price, M. 2.40.)

Various Views, by William Morton Payne, Associate Editor of *The Dial*, is a companion volume to *Little Leaders* and *Editorial Echoes* of this author, which were noticed a short time ago in *The Open Court*. It consists of thirty leading articles on "the broader aspects of literary history and criticism," written for *The Dial* during recent years. (Chicago: A. C. McClurg & Co. 1902. Pages 280.)

NOTES.

An effort is being made by the Jewish Chautauqua Society for taking up the question of religious instruction systematically, and bringing it into full accord with the results of modern pedagogy. A committee consisting of some of the most prominent Jewish clergymen and educators has been selected. Their names are as follows: Rabbi Henry Berkowitz, Ex. Off., Philadelphia; Rabbi Emil G. Hirsch, Chairman, Chicago; Miss Julia Richman, New York; Rabbi Kaufman Kohler, New York; Rabbi Max Heller, New Orleans; Rabbi J. B. Grossman, Youngstown; Prof. Henry M. Leipziger, New York; Rabbi Moses J. Gries, Cleveland; Rabbi Jos. Stolz, Chicago; Rabbi David Philipson, Cincinnati; Rabbi Leo M. Franklin, Detroit; Rabbi H. P. Mendes, New York; Rabbi Sigmund Hecht, San Francisco; Rabbi Maurice H. Harris, New York; Rabbi Wm. Rosenau, Baltimore; Rabbi Julius Greenstone, Philadelphia; Rabbi Louis Grossman, Cincinnati.

The committee will report at or before the next summer assembly of the Jewish Chautauqua Society.

With the paper on Mithraic art in the present *Open Court*, the series of articles on Mithraism by Prof. Franz Cumont is concluded. These articles have provoked wide-spread interest, and the readers of *The Open Court* will doubtless be pleased to learn that it is the intention of the publishers to issue them in book form. The book will be published in attractive style and will contain a valuable map of the Roman Empire especially executed for the purpose, and showing at a glance the extent of the diffusion of the Persian Mysteries and their consequent great power in the Roman Empire.

We regret to say that the Religious Congress which was announced to be held in Osaka, Japan, in April, 1903, will either not be held at all, or, to say the least, will not have the support of some of the main bodies of Buddhists. Japanese papers declare that its inaugurators and promulgators were not authorised by the representative religious leaders of Japan.

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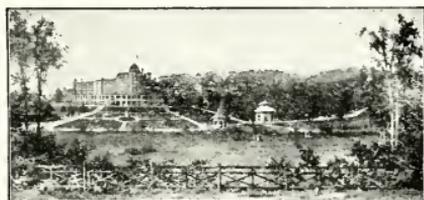
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