

## Original Communications.

## LETTERS FROM THE HILLS. V.

The *Equatorial* instrument which occupies the central room of the edifice, and which the University inherited from the society, is not so rare of its kind or so remarkable as to call for any special description. The facility with which it may be moved, the nice arrangements for accurate observation, &c., can only be appreciated by a person on the spot. A long slit in the revolving dome gives ready access to any point of the sky, and opens easily even in the most frosty weather by an apparatus devised by Prof. Langley himself. It is worth mentioning that the lenses of this and the transit instrument suffer from the all pervading smoke, which settles in the form of fine particles of carbon upon their outer surface. As the gentlest removal of this will abrade their highly polished surface, it is allowed to remain as long as the instrument can be used without cleaning.

In the third room of the observatory, occupying the right wing of the building, the *Transit Instrument* and the astronomical clock are the most interesting objects. The former is so mounted on two pillars of solid stone that it revolves in the line of the meridian of Pittsburg, and sliding doors open in the roof above and in both the back and front walls, to give the observer access to the sky. Its axes are brass cylinders turned with the greatest possible accuracy, and the heights of the supporting pillars are as exactly equal as human ingenuity can devise. Yet so imperfect is man's best work, that deductions have to be made in every observation for the inaccuracy of the axes, or else the observation must be repeated after lifting the weighty instrument by a screw, and reversing the positions of the axes. The mean between these two gives the correct datum so far as these are concerned, but beside other deductions—known to astronomers—a deduction must be made for the unevenness of the height of the stone pillars. If even the light is falling on one more than on the other, it expands and throws the instrument out of the perpendicular. How much the error is, must be ascertained by the use of a spirit level, which as it may not be accurate itself is reversed in position, and the mean taken between the two observations. A very slight error in the position of an instrument, makes a very great error in determining the transit of a star. Other deductions, for instance, must be made according to the altitude of the star above the horizon, as only stars at the zenith are moving in orbits which appear to us as great circles.

The *Astronomical Clock* in this room is one of Frodsham's best, imported from London, and is of course the most accurate time-keeper in the whole city, yet not accurate enough for astronomical calculations without a deduction for unavoidable errors. Let us explain: The pendulum is the clock. Get that right, and all the rest is but seeing that the wheels have the right number of teeth, and the weights or spring is wound up at the proper time. But "there's the rub." How to get that right. A pendulum of a given length in a given medium, will always swing exactly the same number of times a minute. But with every change in the temperature of a room, the length of the pendulum and the density of the medium varies. (1) With every increase in the heat of the metal of which it is composed, the pendulum grows larger, the centre of oscillation falls lower, the motion is accelerated. To meet this difficulty the pendulum is constructed with a hollow tube of just the right diameter, which is filled to just the right height with mercury. The heat which lengthens the pendulum itself, expands the mercury, causing it to rise in the tube thereby increasing the weight in the upper part of the pendulum and keeping the centre of oscillation fixed. Such a pendulum keeps time which is perfectly correct for every purpose except for an astronomical calculation, while our common pendulums make the clocks go faster in winter, and slower in summer. (2) The motion of pendulum is slower in a rarified than in a dense medium. Any one who has lifted a bucket of water up through the denser water of a well, and then through the air to the well's mouth, will see that this is true. But every increase in the heat of the air makes it rarer and thinner, and tends to increase the speed of the pendulum. For this no corrective has yet been applied in practice, but if the pendulum were made to move in a perfect vacuum, *i. e.*, were all air taken out and kept out of the clock-case, it would be free from this drawback. As it is, a deduction has to be made in astronomical calculations, according to the density of the air as indicated by the barometer.

But this difference is so slight that the clock is accurate down to the finest period of time of which we ordinarily make any account, while common clocks, without self adjusting compensating pendulums, are by no means so. Of course such pendulums cost too much for every private person to have one swinging on his kitchen wall. But in fact one is enough to regulate the clocks of a whole city. By a very simple telegraphic arrangement, a wire may be run from one of these accurate clocks through house after house, and down street after street, until the whole city would tick in unison, and with less than half the trouble we now have, we could secure perfectly accurate time, from the worst clock in the city,

*i. e.*, if it had the right wheels and they would run. Perhaps the cities of the future will lay in time, as they now lay down gas and water, and men shall look to their private time-pieces with the same confiding faith with which Philadelphians look up to the tower upon the State House. In England already, the Railroad clocks all run by the clock at the Greenwich Observatory. The Chicago University's Observatory are trying to have the clocks at the many Railroad depots of that city regulated by their astronomical clock, and unless the selfishness of private jewellers, and the sacredness of their vested rights prevent, that lively young city will have the honor of inaugurating a great reform on this continent.

I spent nearly two hours on this Allegheny hill, and they were two of the most profitable and pleasant that I remember. When we came out of the Observatory, and before parting from my very kind Mentor, we looked down towards Pittsburg, below us. I say towards not to, for a dense cloud of murk and smoke was spread below us, through which only the highest chimneys and the tops of the spires thrust themselves heavenward. The wind was blowing down the Ohio valley, and miles away the Dixmont Hospital, at Bellevue was invisible. In an hour after an adieu to J. S. T., I was on the way to Philadelphia.

ON THE WING.

## PRESBYTERIANISM IN BOSTON.—II.

Presbyterianism in Boston has a history in the past, which runs back within almost fifty years of the first settlement of the city. The first Presbyterian church was gathered as early as the year 1687. It was composed of French refugees who had fled from France, and had taken up their abode in Boston upon the revocation of the Edict of Nantes, by Louis the XIV., in 1685. It had an existence of about fifty years, and during this time, had, as far as can now be ascertained, two pastors. Their first minister, of whom we have any record, was Rev. Pierre Daille. He held the pastoral office until his death, which occurred on the 21st of May, 1715. He was distinguished for his earnest piety, affable manner, and exemplary life; and his death was much lamented by his church. His successor was Rev. Andrew Le Mercier, who continued to be the pastor of the church until it had so far diminished in members and wealth, that it ceased to exist. This church does not seem to have been disbanded, at any time, but to have gradually died out. Mr. Le Mercier, like his predecessor, was a man of fine character, and of acknowledged ability, and was particularly noted for his interest in all philanthropic enterprises.

This church was modelled after the order of the Reformed churches of France. But owing to the distance by which it was separated from other churches of the same order, it was of necessity an independent Presbyterian church, and, as such, could not have differed much from the Congregational churches as they were then constituted. It was the custom then, not for all, but for most of the Congregational churches, to have one or more ruling elders, who performed duties similar to those of the same officers in the Presbyterian church. But in connection with this, it must be remembered that the consent of the church, expressed or implied, was supposed to accompany the action of the ruling elders, and was, probably, in most of the churches, considered necessary to make their action authoritative.

Whatever may have been the sympathies of individuals, ministers or church members, there were at that period, no Presbyterian churches in Massachusetts, in the modern sense of the word; *i. e.*, none of our churches held that a number of churches, associated together, had, in their associated capacity, any jurisdiction over single churches, or any power either to govern or to discipline the churches or their members. They did not hold to a Presbytery over the church. The Congregational churches were all a unit, with reference to the independence of each church. But from the beginning, the name Presbyterian was applied to many of our ministers and churches. The reason of this was because many of our ministers and churches held to a Presbytery within the church itself, composed of its teaching and ruling elders. Such ministers and churches were called Presbyterian, to distinguish them from others who rejected the idea of a Presbytery in the church. The name Presbyterian may have been often used, without discrimination, and applied to any Congregational church, but it had its origin in the reason that we have given.

When the French refugees came to Boston, they were received by the Congregationalists as their brethren in Christ, and treated with kindness. Upon the organization of their church, they were permitted to worship in the town school-house, free of all expense. They worshiped in this place for a number of years. Their services were always conducted in the French language. Though cordially received and welcomed, they labored under some disabilities. While the Congregational church had good will toward them, and did not wish to oppress them, it was determined not to encourage them in building up a church differing from its own. The Congregational was the church established by law, the State Church, and a Presbyterian church after the model of the French church, would be simply endured. It could not receive the same patronage and favor as if it had been Congregational.

We need not be surprised then, when we learn that this French church did have to suffer a little persecution. Like all other dissenting churches they had to contribute to the support of the established church. In 1704, after having worshipped seventeen years in the school house, they bought a lot and petitioned the select men of the town for liberty to erect a meeting house upon it. Their request was denied. The select men judged it to be "not convenient to grant the same, since they have the free liberty to meet in the new school house, as they had for some years past done in the old, and that being sufficient for a greater number of persons than doth belong to their congregation." The erection of a house of worship would have rendered the permanence of this church more probable, and that was, without a doubt, the reason why they were not allowed to build it. But this unreasonable obstinacy on the part of the town authorities after awhile gave way, and twelve years later, in 1716, they were permitted to build for themselves a meeting house.

The precise time when this church became extinct is not known. Their house of worship was sold to a Congregational society in 1748, and it had not been used by them for several years before. But Mr. Le Mercier styles himself "pastor of the French church" as late as 1753. Viewed, as this church was, with distrust by the established church, always conducting the public services in the French language, receiving no accession by emigration, and isolated from all other churches of the same order, we do not wonder that as its original founders passed away, it ceased to exist.

ATELL.

## MISSION SCHOOLS, AND THE REFORM MOVEMENT IN INDIA.

One of the Reform leaders is a native of this city, Kolapoer, a very gifted young Brahman, whose course I have watched with great interest for sixteen years. Intent on a thorough education, after reaching the limits of his opportunities here, he took a note of introduction from me to the Rev. Dr. Wilson, Scotch Free Church Mission, Bombay, studied for a while in their Institution, then in the Elphinstone College, became a graduate of the Bombay University, and is now Professor of English literature in the same University. His stupid old father—a Brahman of the strictest sect, is private minister to His Highness, the rajah here, and shows special zeal in cursing his noble son for his Reform principles, is ready to discard all natural ties, and to treat his son as a vile Mahar, notwithstanding his high position and University honors.

It were easy from the details of this case, and this whole Reform movement in all parts of India, to deduce a mighty argument in favor of Mission Schools, and the grand system of working upon the masses by educational agencies, instead of expending the energies of missionaries and the funds of the Church, in comparatively futile verbal efforts for the conversion of individuals. Religion is a personal matter between each immortal soul and its Maker, but the most valuable individual converts are won to Christ by this very system of acting on the masses by the force of Christian education. A most happy illustration of this fact has just occurred in the baptism of a young Hindu, Dr. A. S. Jayakar, by our Irish Presbyterian brethren at Ahmedabad. This young Hindu was for years a pupil in the College-Department of the same Scotch Free Church Mission Institution, Bombay; then went through a regular course of study in the Grant Medical College, and took his degree from the University; then going to England, he studied for a time in the best Institutions there, passed the prescribed examinations, and returned to India a member of the covenanted Medical Service. He has now at length yielded to his convictions of the truth and professed his faith in Christ. From the brief statement he gave at his baptism, it appears that he lost all confidence in Hinduisim, while studying in the Mission Institution years ago, and, for a time, embraced infidel views; but at length became convinced that the Christian faith, and that alone, meets the necessities of sinful man, by providing an atonement for his sins and a Mediator with God. Hence he says: "Believing, therefore, that the Christian religion is true and divine, I now make a public profession of it, and my prayer to God is, that others similarly convinced, may acknowledge Christ as the Son of God, our Teacher and Saviour, and follow His instructions."

I have no doubt there are thousands of intelligent, educated young Hindus "similarly convinced," who have not yet courage to imitate this young man in openly professing Christ before their countrymen. But here is our special hope for India. This large body of educated and convinced young Hindus, constitute a kind of shield between such converts and the cruel persecutions of the more superstitious Hindus, and we may look for increasing numbers to break away from their ranks, and, like Dr. Jayakar, boldly profess their faith in Christ. For this result we look and work and pray in hope. Cease not to help us with your prayers. In the service of the Gospel, yours sincerely,

R. G. WILDER.

P. S.—Our mission work is progressing in all departments to the limits of our strength, but we grieve unceasingly that we have not a stronger missionary force, larger pecuniary means, and a more effective educational agency whereby to

bring the intelligent youth of this stronghold of idolatry under Christian teaching and influence.

W.

Kolapoer, India, August 14, 1869.

## REV. A. M. STEWART'S LETTERS.—XLVII.

FOUR DAYS' VACATION.

This was spent at Lake Tahoe, on the borders of California and Nevada, nestled away on and in the Sierra Mountains.

JOURNEY HITHER.

Our mission at White Pine ended with the last Sabbath of September. The nearly four months' stay in that strange land, was rugged and laborious, yet full of interest—the pleasure of hopeful toil—and was left with not a few regrets. Preaching the gospel in regions entirely new—extending the kingdom into regions beyond, has in it a satisfaction, which to be realized must be felt.

The Sacrament of the Supper was dispensed to the new organization in White Pine, on the Sabbath before our leaving, and thus, for the first time, in all that vast region, was the death of Jesus commemorated according to His dying command. Previous to its celebration, twenty-one persons were added to the communion of the Church. The season was one of earnestness, pleasure and profit.

DUST.

If this material be referred to a second time, it is because of its prolific abundance along the travelled ways in this rainless land. The amount of pulverized alkaline earth along the one hundred and twenty-five miles of staging road between Treasure City and Elko, on the railroad, would not be easy of measurement. It is the great inconvenience, the choking discomfort on this otherwise pleasant journey. When hurried through by the jehu drivers no one could tell the nationality, the color or fabric of dress belonging to the traveller. The dust could be scraped off each one by handfuls.

RAIL ROAD TOWNS.

These along the Central Pacific Road for five hundred miles through Nevada, have not sprung so rapidly into importance as many anticipated. Not a few, as yet, are only stopping-places, with the railroad buildings the only ones there. No settlements nor adjacent mining sections as yet exist to afford increase to these. Towns cannot exist without houses nor houses long without people. A few places are slowly growing into importance and present hopeful mission stations.

TRUCKEE.

This town was of more apparent importance last year than now; being an immense lumber region. From here were drawn nearly all the ties, and material for bridges, station houses, &c., for five to six hundred miles of railroad, stretching far into the treeless regions of Nevada and Utah. When the road was completed, the demand largely decreased. Mills stopped, employees were idle, many have left, and the former bustle of the place is no longer seen. Another cause for present deadness no doubt is, that the railroad owns half the timber land on each side of it for twenty miles, and government the remaining portion, save what has been settled. All owners have forbidden farther trespass on the timber.

At Truckee, we left the railroad and took stage for Tahoe City, at the Northern extremity of that romantic Lake, and fifteen miles from the cars. A stage road has been opened, at much labor and expense, and leads all the way up the Truckee River, which is formed by the outlet of the Lake.

A more delightful and romantic ride it would be difficult to find, in a world of travel. To us, who had been for four months in the treeless, rainless, springless, grassless regions of Nevada, the pleasure was almost overpowering. The river, which discharges as much water as the Schuykill in an ordinary stage, is followed up the whole fifteen miles. The waters all the way come rushing, dashing, foaming, eddying down—the high projecting, ever varying mountains—the enormous pine and fir trees with considerable under shrubbery—the autumn tinges at the close of September, together with a dreamy sunshine hunting its way down through the entangled pine boughs—all combined to make a scene of solemn, majestic, sublime grandeur.

TROUT RAISING.

On our way up to the Lake, we stopped for half an hour at the only tenanted house between the railroad and the Lake, where an enthusiastic yankee, within a grove of beautiful young pines, and where crystal fountains flow from the mountain side, has undertaken the artificial raising of spotted trout for the market. The operations were started two summers since, and he has now houses and ponds of two year, one year and three months old fish. In the oldest pond were hundreds, even thousands of fish about a foot long and weighing about a pound. When we approached their limpid dwelling, hundreds on hundreds of the beautiful creatures swam towards us, and struggled which could get nearest, tame as chickens huddling around their feeder in a poultry yard. It was a most interesting sight. The man is certain of making money by his operation. He expects to sell several thousand dollars worth next season. He says fish can be more easily and cheaply raised than pigs or chickens. His fish are fed on curd of milk and beef's liver. We wish him and his family abundant success. Of Lake Tahoe in my next.

A. M. STEWART.

## THE GLORY OF SERVICE.

Thousands of miles away, in an old German town, Dorcas Hicks is thinking to-day of the dear friends whom she has left at home, and somehow her thoughts will take to themselves form and substance. And after resisting for a time the impulse to send these thoughts homeward in tangible shape, she has at last put on her writing spectacles, and let her meditations have their way.

September is more than half gone. People at home, have come back from their summer travels, and are settling down into the accustomed grooves of winter work and winter enjoyments. It gives an absent one a pang akin to home sickness, to think of church-services, and church-work, and church-fellowship begun again—yet it is pleasant to feel that there will still be something left to do, when the time comes to step into one's place once more. There is always work to do for the dear Master, if we only look for it with ready hand and willing heart.

But I am afraid we do not always realize that it is not enough to do the work—we must do it for the Master. If the offering of our hands be not consecrated by this spirit, it cannot be acceptable to Him who claims our whole lives as His own, by every right of creation and redemption.

And how it may comfort us in our frequent dissatisfaction with the results of our labors, and in the knowledge that our best efforts are so weak and imperfect, to remember that if there is but a sincere, loving desire to serve Him whom we rejoice to call Master, our service will be accepted and blessed—yes, more than the greatest work done from no such motive. It is nothing new or original that I have said, but is it not good to have old truths constantly brought before us, lest they hide away somewhere, in dark corners, and are not readily to be found when the need comes to use them?

An old truth has been brought home to my heart to-day, by a Scotch clergyman, who preached in a large church, one half of which is devoted to Catholic, and the other half to Protestant worship. His subject was the duty and the glory of service for Christ, and as he dwelt upon it with great simplicity and force, it seemed to come into my heart with peculiar power. And in thinking of it afterwards, I felt that we too often fail to realize the glory of such service. We fail to recognize and improve opportunities of serving Christ our Lord in the person of our fellow creatures. There is too often a feeling that dignity must be maintained, and rights defended, and that too much service for others might endanger them. We forget that our blessed Lord said: "Whosoever of you will be the chiefest, shall be the servant of all," that He "came not to be ministered unto, but to minister." The more we serve others, then, whether by active work, or only by kind words and unselfish acts, the greater, according to this standard, we are—the more we are like Jesus. It may give us no grandeur or importance in the eyes of the world. No one may know of our service as such, though hearts here and there may be helped and cheered more than we ourselves know, by our loving words and acts. But the service is rendered; the likeness to our Saviour is increased; and the blessing promised to all work faithfully done for Him is secured. Is not such "greatness" worth seeking?

A habit of such service, so formed that it becomes part of our nature, is a precious possession; but let us not feel that because it does not come easily to us, it is therefore unattainable. It is far easier to some people than it is to others, to serve their fellow creatures. For some the manner of service is so clearly defined, that they must shut their eyes intentionally if they would avoid seeing it. Such is the care of a mother for her child, loving attendance of children upon parents, or the affectionate ministering of husband and wife, each to the happiness and comfort of the other. But many a one must seek the service which is to produce the likeness to Christ, and bring down His blessing. The seeking will never be in vain, however. If it be earnest and honest, the work will be found, the smile of our Lord will rest upon its performance, and the reward will not be withheld.

DORCAS HICKS.

—The *Semaine Catholique*, of Toulouse, gives the following comparative statement of the number of members of the various religious sects of the world: Roman Catholics, 208,000,000; Greek and Russian, 70,000,000; Protestant, 66,000,000; Jews, 4,000,000 Mohammedans, 100,000,000; Brahmans, 68,759,000; Buddhists, 180,000,000; followers of Confucius, of Sinto, idolators, &c., 152,000,000. The Catholics are distributed in the following manner in the four quarters of the globe; In Europe, 147,000,000; in Asia, 9,000,000; in Africa, 4,000,000; in America, 46,000,000. In France, according to the official census of 1866, the population under the head of religion is thus divided: Catholics, 37,107,212; Calvinists, 515,759; Lutherans, 386,759 other Protestant sects, 44,353; Jews, 89,096; neither Christians nor Jews, 1,400; not classified, 22,786. [This is a Romish estimate, and must be taken with considerable allowance.]

—The Bishop of Moulins, in the center of France, has recently asserted that the Roman Church has always "abhorred blood," and that it has always been careful to prevent Protestants from being persecuted in the exercise of their worship!