ARTICLE I.

REPORT OF A CONFERENCE BY PRESBYTERY, ON THE SUB-
JECT OF "THE ORGANIZATION, INSTRUCTION AND DISCIP-
LINE OF THE COLOURED PEOPLE."*

At the last meeting of Presbytery the subject of the
evangelization of the coloured people was discussed in
conference, under the several heads of organization, in-
struction and discipline. The present report is the re-
sult of a motion, by which a committee was appointed
to embody the views presented, and the various intelli-
gence furnished during that conference.

The question of the segregation of the blacks from the
whites in public worship, was not at that time consider-
ed, simply because the policy of Presbytery in that mat-
ter had already been settled and openly adopted. It
has been the almost universal practice of our ministers
for many years, to convene the coloured people into
separate congregations and dispense to them instruction
suited to their exigencies: and at the meeting of this
Presbytery at Barnwell, in April, 1847, a formal sanc-
tion was afforded to this practice by the extension of its
approval and patronage to a scheme contemplating the
establishment of a separate congregation of the blacks
of the 2d Presbyterian Church in Charleston.

The reasons for the collection of the coloured people

* This article is an abstract of a conference had in the Presbytery of
Charleston, on the methods to be pursued for the religious instruction of
our coloured population. It embraces no authorized deliverance of that
ecclesiastical body on this subject, but gives the individual views of the
speakers, some of whom have large experience in the matters discussed.

ARTICLE III.

RELIGION AND MATHEMATICS.

'Tis a popular error that Scientific studies tend to scepticism; that the mathematician, accustomed to receive only demonstrated truths, cannot readily exercise simple faith in matters of religion.   There would be some sense in the objection, so often and so confidently put forth against mathematics, if faith and credulity were synonymous terms, and if the Romish dogma were true that "Ignorance is the Mother of Devotion."   But how foolish is the clamor against Science, if enlightened faith must be based upon the conviction of the understanding, and if the evidences of Christianity are supported by precisely the same sort of reasoning that Euclid employs in demonstrating geometrical propositions.

We trust to be able to show that the study of mathematics is an important auxiliary to a sound faith and manly piety.   This is our position, and to establish it we will lay down several independent propositions.

1st. The reasoning employed by writers on the Evidences of Christianity, is essentially mathematical, and can be best understood and best appreciated by the mathematician.

Paley reasons in precisely the same way to prove the existence of a God, that Euclid does to show that two rectangles having the same base or equal bases are to each other as their altitudes.   Paley does not attempt to prove directly the truth of his proposition; but he shows the innumerable absurdities and inconsistencies which surround the contrary hypothesis.   Euclid, in like manner, attempts no direct proof, but demonstrates that the supposition of the rectangles not being to each other as their altitudes, leads to a gross absurdity.   The argument of Paley was used long before the Christian era, and is as old as the Science of Geometry itself.   We once heard a gentleman, who had occupied some of the most prominent positions in our Republic, say that the argument of Paley was not convincing to his mind.   But he was as ignorant of the elementary principles of Geometry as

any rejected applicant for the honors and dignity of the Freshman Class in College. We do not believe that there is a mathematician living, who will not admit that the reasoning of Paley is perfect.

Leslie's "Short Method with the Deists" is as fine a specimen of mathematical demonstration as is to be found in any language. The veriest Tyro in Geometry knows that the reasoning is identical with that employed on the banks of the Nile, hundreds of years before the Star of the East rested over the manger in Bethlehem. The most thorough man of science, with whom the writer has any acquaintance, was converted from scepticism by reading "Keith on the Prophecies"; and he assigned as a reason for being convinced by this book of the truth of Christianity, that the arguments were purely mathematical in their character, and that, as a mathematician, he could neither gainsay nor deny them. One of the most successful writers on the Evidences of Christianity that Europe has produced, is Olinthus Gregory, L. L. D., F. R. S., &c. Robert Hall said of him that "he united the highest attainments of science with the humility of the Christian." The argumentation of such a man is of course terse and mathematical, and is not the clearness and admirable method of his book due in great measure to the habit of close and accurate thinking, induced by his scientific studies? A cadet at West Point was led to read Gregory's Evidences because the writer was also the author of a Treatise of Mechanics, which was then a text book in the Academy. The student of mathematics was convinced by the reasoning of a mathematician, and his troubled conscience gave him no rest until he found pardon and peace in the blood of the Cross. That cadet is now an Evangelical Bishop of the Episcopal Church. Facts are stubborn things; they will not bend to adapt themselves to silly speculations. The two instances just given, of the conviction wrought in the understanding of two mathematicians by close mathematical arguments, are in themselves sufficient to outweigh all the empty theories in the world upon the baneful effects of scientific studies. The Horæ Paulinæ of Paley is a mathematical gem; a fine specimen of the kind of logic which geometricians call the *reductio ad*

absurdum. He shows that there are so many incidental, and as it were accidental, coincidences and confirmatory passages, in the writings of St. Paul, of the truth of the Acts of the Apostles, that 'tis far more absurd to suppose that the Epistles and Acts are the joint productions of impostors, than to believe the wonderful story of the Cross, and God's strange love to guilty man. There is not a mathematician upon earth, who will not acknowledge the force of Paley's argument, but the mere man of letters cannot appreciate it, or feel its power.

It has been our privilege to have had access to many of the standard writers on the Evidences of Christianity, and the reasoning in all is precisely the same as that employed in Geometry. A ripe scholar has said that this brief summary might be made of all that had been written in support of the truth of the religion of Jesus: "the writers of the New Testament were either deluded men, bad men, or good men. They were not deluded men, for the miracles they professed to have witnessed were of such a character as to admit of no illusion of the senses. They were not the tricks of the juggler. A juggler could not have walked upon a troubled sea and calmed its angry waves. A juggler could not have raised the dead and opened the eyes of the blind. The first hypothesis must then be rejected. 2dly. They were not bad men, for bad men never contended for holiness, justice, purity and truth, and sealed their doctrines with their blood. The second hypothesis must also be rejected. The third hypothesis is then established by the negation of the other two. The Apostles, then, were good men, and their testimony must be received." Exactly thus reasons Legendre, to show that if two angles of a triangle be unequal, the side opposite the greater angle will be greater than the side opposite the other angle; for the side opposite the greater angle must be equal to, less, or greater than the side opposite the less angle.— The first two suppositions are shown to be impossible, therefore the third is established to be correct. A little learning is a dangerous thing. The poor buffoon, Thomas Paine, probably knew the difference between a straight line and an angle, and in his scurrilous attacks upon Christianity, affected great veneration for the de-

monstrations of Euclid, and pretended to employ geometrical reasoning in his foul essays. But Bishop Watson exposed the sciolism of the creature, and demonstrated to the world that the obscene wretch knew more of vulgarity than of Euclid.

2d. The peculiar habit of thinking, induced by mathematical studies, is favourable to the reception, without cavil or gainsaying, of the incomprehensible doctrine of the Christian religion.

The mathematician is accustomed to acquiesce in any conclusion, to which he is legitimately led, by his scientific investigations; whether that conclusion conflict with his previous opinions, or even, apparently, with the evidence of his senses. The simple question with the man of science is, "have I reasoned correctly from correct data?"—satisfied, on these two points, he unhesitatingly accepts the result as true, though he may not be able to understand it in all its bearings and relations. Thus, he believes as firmly as in his own existence, that two columns of water, having the same base and the same altitude, will exert the same pressure upon that base, and lift equal weights; though a pint cup be capable of containing one column, and the bed of the Pacific be too small for the other. The thing seems absurd and impossible, but he has no doubt of the truth of the paradoxical conclusion to which he has been led, because he knows that he *has reasoned correctly from admitted facts.*

Nor is his belief merely speculative, accepting the conclusion as undoubtedly true, though mysterious and incomprehensible, he has gone to work and constructed a machine, (Bramah's Press,) which, in the hands of the greatest Engineer of his age, was used at the Menai Straits in raising masses of iron, far exceeding in weight the heaviest stones in the pyramid of Cheops. 'Tis impossible for any man, not absolutely an Atheist, to become entangled in the meshes of Deism, Pantheism and other forms of Infidelity, who will manifest in the search after Eternal truth, the spirit, which, as we have just seen, is exhibited by the philosopher in his mathematical investigations. Let his data be, the existence of a God, and the necessity of a revelation of God's will and character to his rational creatures; reasoning mathe-

matically upon these premises, he will be convinced that
the Bible is that revelation; then, if he acts as the
mathematician, he will receive the whole as true, though
there be many things that he cannot understand, many
that are contrary to his preconceived notions, and some
even that seem impossible.

We showed in our first proposition, that the Mathe-
matician must abandon his own principles and mode of
reasoning, before he can become an Atheist; because
the existence of a God has been again and again demon-
strated in a strictly mathematical manner. Our second
proposition establishes that the Mathematician can only
reject the Bible, by being grossly inconsistent with
himself, and by doing violence to his peculiar habit of
thought. It follows, then, that the man of true science,
of all men in the world, ought to be the least liable to
fall into scepticism. We will show hereafter, that the
facts agree with this conclusion, and that in every age of
the Church, since the man of Calvary cried " it is finish-
ed," upon the cross, the profoundest mathematicians
have been his most humble and devoted followers. It
can not be otherwise: the difficulties of the Bible, which
prove stumbling blocks in the path of the *belles-lettres*
scholar, are no impediments to the faith of the devotee
of science. He has become accustomed to them in his
daily pursuits, he has learned to reject false reasoning,
but, at the same time, not to be startled by strange and
even incomprehensible conclusions.

Our position is not a novel one: our views are not
new. Dugald Stewart said thirty years ago, "Mathe-
maticians have been led to acquiesce in conclusions
which appear ludicrous to men of different habits." Let
us examine some of these conclusions, to which the
great metaphysician alludes, and see whether the mathe-
matician can, with any sort of consistency, throw away
the word of God because of its incomprehensible doc-
trines.

The time was, when sciolists attacked Newton's Doc-
trine of Fluxions, the Calculus of Leibnitz; but now,
even that most impudent class have not the hardihood
and effrontery to say a word against that great inven-
tion, which, says Herschel, " enables the mathematician

to *think in another language*, and to arrive in a moment at results, that can only be reached by any other process after years of painful investigation." The truth of the Calculus none now doubts, but who can comprehend some of its teachings? An infinite area, enclosed between a straight line and a curve, whose equation is $y^2 = \frac{1}{x}$, is shown by the method of quadratures to be equal to a square whose surface is 2. The finite equal to the infinite! Does the mathematician reject the conclusion because he cannot understand it? Not at all. Does he throw away his Treatise on Fluxions and pronounce the whole false? Not at all. How then, can he, with any sort of propriety, reject the Bible, because he cannot understand the doctrine of the Trinity, or the Divinity of the lowly Nazarene?

Again. Newton regarded all lines, whether straight or curved, as having been generated by the motion of a flowing point. Thus, to illustrate his meaning, a point, moving or flowing with the condition of being in the same plane and always at the same distance from another point, will generate the circumference of a circle. He also considered lines, straight and curved, as the generatrices of surfaces, and surfaces, in their turn, the generatrices of solids. The point, then, is the source of all lines, surfaces and solids; the flowing point generates all geometrical bodies. This was Newton's theory, and he made it the basis of the Doctrines of Fluxions and Fluents, so called from this very fact. Now, a geometrical point is an ideal thing, "it has neither length nor breadth, but position only." So, then, an immaterial thing is the ultimate source of all geometrical magnitudes!

When Euclid was asked by Ptolemy, King of Egypt, if the science of geometry might not be made easier, he replied, "there is no royal road to geometry."

There was no royal road then, but more than fifteen hundred years after Euclid, Francis Vieta found in Algebraic Analysis a royal road to Geometry which even the weakest king may walk in. He showed that the most difficult problems of Geometry could be solved by a few simple operations upon an equation. Analytical Geometry became a science, and has claimed the admi-

ration of the greatest mathematicians for more than five
centuries.   But do not some of its conclusions appear
absurd?   Parallel lines, and none but parallel lines, are
shown to meet in infinity ; the assymptote is not parallel
to, yet it meets the hyperbola in infinity.   The Hyper-
bolic spiral is generated by a point, which starts in in-
finity and eternally approaches toward another point,
every moment becoming nearer and yet never reaching
it.   The shorter the supplemental chord of the eclipse is
made, the greater becomes the angle between it and the
transverse axis, and finally when the chord is reduced
to a point, the angle becomes equal to ninety degrees.
Then the angle between a point and a straight line is a
right angle!   How absurd!   But who so silly as to
abandon Analytical Geometry, because of its incompre-
hensible truths?   At every step in mechanics, astrono-
my, and the higher mathematics, the scientific scholar
meets with results which appear absurd, irreconcilable
and impossible.   Still his faith in science is not shaken,
his devotion is not weakened.   How is it possible then,
for him to reject the Bible, because of its mysteries?
'Tis nonsense to suppose it.   True science never yet
made one sceptic.   Love of sin has made thousands.   If
Laplace and a few other mathematicians were infidels,
'twas not because of their scientific attainments, but be-
cause their corrupt hearts hated the Book that taught,
" the soul that sinneth, it shall die."

   3d. Mathematical studies sober the fancy, and tend
to repress wild, foolish and extravagant speculations.

   Next to the aversion of the corrupt heart to holiness
and truth, the greatest enemy with which Christianity
has had to contend, since its first promulgation by the
Son of God, has undoubtedly been the speculations of
Philosophers, "falsely so called."   Speculation has slain
its thousands, and love of sin its tens of thousands.   The
philosopher *first* makes his theory about the age of the
world, the unity of the human race, the moral right of
involuntary servitude, etc., and *then* examines his Bible,
to see whether its infallible teachings accord with his
silly vagaries.   Finding nothing in its holy pages to
pamper, and everything to rebuke, the wild riotings of
his imagination, he rejects God's inestimable word, ra-

ther than abandon his worthless theory. It was so in the days of the Apostle, and he raised his warning voice against "the opposition of science falsely so called,"—it is so now, it will always be so. Thus the sickly sentimentality of the abolitionist leads him to fancy that God created all men free and equal, and finding that he cannot bend and twist the plain instructions of the Bible to harmonize with his notions, he throws away that which ought to be "a lamp to his feet and a light to his path," as the "device of men's hands." The anti-slavery men of the North are, accordingly, infidel in heart, speech and behaviour. The mathematician pursues an entirely different course from that adopted by the weak, drivelling dreamer. The former does not, like the latter, begin with his theory, and bend facts to suit that theory, but starting with a few well-established or self-evident truths, he reasons logically upon them, and then accepts the conclusion, to which he is led, as unquestionably true, though it may be strange and incomprehensible, and even contrary to his expectations. The latter may be capable of reasoning upon the same premises, but he will not believe in the truth of the result, unless it agree with his pre-formed theory. The abolitionist, the speculative inquirer, will admit that there is no flaw in the argument by which the Bible is proved to be the Word of God, but he will not receive it as such, because some of its teachings are plainly in opposition to his preconceived fancies. The true man of science, unless his understanding is darkened by sin, cannot be led astray by speculation. He will say to the man in the clouds, "Sir, your theory is beautiful, charming, enchanting, but how did you construct it? by what train of thought did you arrive at it? where are your data?" We have heard of a good old elder, in the county of Rockbridge, who said, "I am not afraid of the New-light Preachers, I try all their sermons by the Shorter Catechism, and write Mene: Tekel: Upharsin, upon those that do not agree with it." Though we belong to the school of blue-stocking Presbyterians, we think that the venerable deacon might have gone further and brought all suspected doctrines to the test of the Scriptures of truth. At any rate, he had his guide. So it is with the mathematician. He brings

all speculation to the test of the data, and of the reason-
ing upon that data.   Not a fragment, not a shred, of an
infidel theory will be left, after passing through so fiery
an ordéal.   No wonder that Rousseau hated mathemat-
ics, and that in writing against science, he infused into
his style some of that bitterness, which his colleague,
Voltaire, poured out in his celebrated circular to the in-
fidels of France, ending in these words, "spare no pains,
leave no effort untried to crush the wretch." [It is
scarcely necessary to say that the wretch alluded to,
was he, who lived a life of suffering, and died a death of
shame to save guilty man from a world of endless woe.]
Rosseau well knew that his sneers at Christianity could
have no weight with a well-trained mathematician, ac-
customed to deal in arguments, and that his crude, ill-
digested, ever-shifting theories, upon the relations of the
creature to the Creator, however they might please the
idealist, could make no impression upon the man of sci-
ence, who had long relied upon judgment rather than
fancy.   Nor was Rosseau wrong.   All the world knows
that the heaviest blow infidelity has ever received, was
inflicted by the inductive philosophy of Bacon, a man as
preëminent in mathematical attainments as in the other
departments of knowledge.   And what is the inductive
philosophy, but the application of mathematical reason-
ing to any subject under investigation?   An eminent
British Essayist has said that for centuries previous to
the Baconian era, the world made but little progress in
true knowledge.   'Twas a period of doubt, conjecture,
scepticism, infidelity; the human mind was tossed upon
a troubled sea of visionary speculation.   More advances
have been made in the arts and sciences, and in all that
conduces to the well-being of man, in a quarter of a cen-
tury, since the general adoption of the inductive philoso-
phy, than were made for hundreds of years before.
   We do not wish to be misunderstood.   We are far
from thinking or maintaining that mathematicians alone
apply the inductive method of reasoning, and we are still
farther from supposing that all, who have not had their
fancy crushed out by the tread-mill of mathematics, are
disposed to speculative inquiry.   But we do contend

that men, who are accustomed to receive only demonstrated truths, are not liable to be misled by a fanciful theory, and that men, whose pursuits call for the exercise of the reasoning faculties only, are not apt to give the reins to imagination. Thus mathematicians are rarely capable of producing, or even of relishing poetry. Since the world was made, there never was an epic produced by one of the class, and Playfair, we believe, was the only man of science for three centuries, who could write a sonnet to a lady's eyes. Now, if it be true that the imagination of the mathematician is in abeyance to the reasoning faculties, and if an excess of imagination be unfavorable to religion, it follows that mathematical studies tend to promote rational piety. None will question that mathematicians have but little imagination. We then only have to examine the effects of letting loose the reins of the fancy.

Irææneus tells us in so many words, that the great Gnostic heresy, in the primitive ages of the church, was the natural fruit of letting the imagination run riot, and that their doctrine of *eons*, spiritual emanations, was the offspring of a diseased fancy. Bishop Watson, in his reply to Gibbon, says, in speaking of modern infidels, "they are all miserable copiers of their brethren of antiquity; and neither Morgan, nor Tindal, nor Bolingbroke, nor Voltaire have been able to produce a single new objection not advanced by the Gnostics." Now, if Irææneus and the Bishop are right, the unchecked fancy has been the source of most of the heresy and scepticism in the world. They are high authority, and here we might rest the matter, but a few more facts will strengthen our position. Hume, says his biographer, was led by his fondness for speculation, and his love of applause, to attempt the subversion of all that the Christian holds sacred. He doubted everything, and then doubted whether he doubted. And thus he floundered in the meshes of speculative philosophy, till death and the realities of eternity solved all his doubts. Bishop Berkely wrote an essay against mathematics, and a treatise on mental science. And what has the world gained by the teachings of the hater of mathematics? Why, it has been taught

that all is spirit, and that there is no matter in the uni-
verse.

"When Bishop Berkely said 'there was no matter,'
'Twas no matter what he said."

But there is this much matter in his foolery.   It shows
what a dangerous thing an unrestrained imagination is,
when it can make even a learned prelate rave like a
maniac.   Lord Monboddo was deficient in mathematical
attainments, but eminent as a Greek scholar and meta-
physician.   He believed that man was but an elevated
species of monkey, an improved edition of the ourang
outang.   Had the theorist been a better mathematician,
he would have known that the converse of a proposition
is often true, when the direct proposition is false.   That
though monkeys never rub off their tails and attain to
the 'dignity of the lords of creation, yet the ingenious
speculator, and thousands of others like him, have put
on the airs and grimaces of the ape, and degraded them-
selves to the level of the baboon.   Other theorists, equal-
ly as wise as Lord Monboddo, have supposed that a man
was a compound of the whole animal creation, and that
the predominance of any one animal determined the
character of the individual.   Thus the mean man has
the dog in excess, the rude man too much bear, the
slovenly man too much hog, &c., &c.; thus too, old
maids have invariably, either the lamb or the viper, out
of all proportion to other ingredients in their composi-
tion.

Such have been the follies, into which the greatest
intellects of the world have fallen, when they let their
fancy go unchecked.   Ought we not to be thankful that
there is a class of men, in whom, reason always sways
the imagination?   Are they not, of all men in the world,
the least liable to fall into scepticism, and most apt to
relish the sober teachings of the word of God?

4th. Mathematical studies give the mind something
certain to rest upon, while other studies lead it into a
labyrinth of perplexity, bewilderment and confusion.

The mathematician deals in certainties.   There is no
doubt, no mystery, no ambiguity, no variation, in the
great principles which govern him; he feels that they

are under the immediate control of Him, with whom "there is no variableness, neither shadow of turning." Uncertainty belongs to everything else, history, philology, metaphysics, geology, chemistry, etc.; "the trail of the serpent is over them all," the father of lies has tarnished everything bright and beautiful about them. But the spirit of immutable truth presides over all the investigations of the devotee of science. He can arrive at the same great results, not only by a hundred independent routes, but by a thousand by-paths. Thus, there are more than a hundred direct demonstrations of the square upon the hypothenuse, and yet the truth of the theorem may be made to appear as a consequence of innumerable other propositions in geometry. It can be deduced, for instance, from the properties of similar triangles, and from the area of a triangle in terms of its sides. So, too, the truth that the two tangent lines, which can be drawn to a circle from a point without, are equal in length, may be shown also from the relation of secants to their external segments, or from the relation of a tangent to the whole secant and its external segment. Likewise, the measure of the surface of a sphere may be deduced from that of a zone, and the measure of a solid sphere from that of the spheric segment. Similar remarks may be made of every proposition in Euclid or Legendre. But not only do mathematical truths admit of innumerable direct and indirect demonstrations, in the particular branch to which they appropriately belong; they are moreover confirmed and verified by every other branch of the science. Thus, in arithmetic, the product of two numbers, whose sum is fixed, may be shown to be the greatest possible, when the numbers are equal. Suppose the sum of the numbers to be 10, the numbers themselves may be 1 and 9, 2 and 8, 3 and 7, 4 and 6, or 5 and 5; and it will be seen that the product of 5 by 5 is greater than the product of either of the other sets. The same truth is more rigorously demonstrated in Algebra; it has been elegantly proved by Hutton in his Isoperimetrical Geometry, and by Newton in his Maxima and Minima, and has been used by Vauban in determining the proper form for field and permanent fortifications. Some 250 years ago,

Cavallieri, an Italian, discovered that the sum of the squares, of all the numbers between 0 and H inclusive, could be truly expressed by

$$\frac{2\,H^3 + 3\,H^2 + H.}{6}$$

Suppose, for example, we wish to find the sum of the squares between 0 and 4 inclusive, make H=4 in the above expression, and you will find the sum equal to 30, which agrees with the fact. Here is a simple application of the formula in arithmetic, but it has been used by algebraists in the solution of their most difficult problems, and by geometricians in the determination of the measures of all known surfaces and solids. The formula, too, in all probability, suggested to Newton the beautiful principles of the calculus. Here is something stable to rest upon. The seal of truth has been set to the expression of Cavallieri. It has been tried a thousand times in arithmetic, algebra, geometry and calculus, and been found to give true results. Does it work by blind chance, or does it obey Him who changes not? Again : Euclid, Pappus, Archimedes, and other ancient geometricians, determined the measures of most of the geometrical bodies. Newton's method of quadratures and cubatures gives identically the same measures, but the process, by which they are found, differs in toto, not only in elegance but in ease. Subsequent to the discovery of Newton, the centro-baryc method was introduced, and was found to give the well-known measures in a moment.

An elementary demonstration in algebra establishes that a quantity changes its sign in passing through zero and infinity. This truth appears on almost every page of algebra, is of frequent application in geometry, is verified by the algebraic analysis of Vieta, and is constantly acknowledged in natural philosophy and astronomy. But the most beautiful illustration of it is in optics, where it is shown by experiment as well as theory. An object placed on the prolongation of the radius of curvature of a convex reflector, will give an image between the reflector and centre of curvature; advance the

object towards the reflector, the image will recede from it, and when the object reaches the principal focus, the image will disappear into infinity. Continue to advance the object towards the reflector, the image will return and be seen on the other side, and is erect now, whereas it was inverted before. It has passed through infinity and changed its sign and character.

For the last 150 years, the calculus has been used, among other things, to demonstrate propositions which had been proved during the space of 100 years previous, by the method of indivisibles, and this method itself, took the place of the method of exhaustions, that had been used for 2,000 years. The results obtained by the three methods are precisely the same. How often has the thought occurred to ourselves, and surely to every student of mathematics, that the great truths of science, which have been demonstrated in so many different ways, during so many ages, have remained invariable, because established by Him with whom "one day is as a thousand years and a thousand years as one day." There is but one step between faith in the laws and faith in Him who established those laws. Well was it said, "the undevout Astronomer is mad." Well may it be said, the undevout mathematician is a sin-hardened fool. Surely the study of science, upon which God has stamped his own unchangeable character, must fill the mind with reverence for the being "who is, and was, and is to come." The soul of the heathen geometrician was elevated as he contemplated the grandeur of his subject, the certainty of its results, and the uniformity of its laws, and turning from his fabled Isis and Osiris, he exclaimed in devout rapture, "God works by geometry." There is something so sublime in the certainty of science, that the mind of the student will be almost unconsciously divested of its proneness to doubt and scepticism, and be lifted up in reverential admiration of the Great Unknown, who has said of himself, "I change not." How implicit must have been the confidence of Halley, in the unchanging nature of the laws of science as regulated by this unchangeable Being, when he predicted the return of his comet in 75 years, though the hand that traced the calculation of its elements would

be dust and ashes long before that period. Le Verrier
had the same confidence when he wrote from Paris to a
friend in Berlin to turn his telescope to a particular part
of the Heavens, and there he would find a planet 3000
millions of miles from the earth, which no mortal eye
had seen, but which he knew to be there *from the calcu-
lations of his closet.*

Surely it is the supreme of folly to say that the man
is prone to unbelief, whose daily studies promote confi-
dence and trust. As well may it be said that the child
will be prone to falsehood, who has been brought up in
an atmosphere of truth. All the world knows that the
reverse is the case, that lying parents have lying chil-
dren. So too, the studies that are surrounded with con-
tradiction and uncertainty promote doubt, scepticism,
and infidelity. Let us examine these studies, and see
what effect they leave upon the mind.

History. Herodotus, the oldest Greek historian, has
been called the father of history, and also called the
father of lies. Tacitus, the most eminent Latin histo-
rian, received from Tertullian the appellation, "Menda-
ciorum Loquacissimus," (the most babbling of liars.)
Seven cities claimed to be the birth-place of Homer,
and many deny that Homer ever lived. For two cen-
turies, the world believed that Shakspeare stole deer
from the park of Sir Thomas Lucy, but the whole story
has lately been discredited. The Pictorial History of
England represents "Bloody Mary" as a fiend incar-
nate; Lingard, the Catholic historian, depicts her as an
angel of light. Macaulay describes William Penn as a
monster, the Quaker writes as inferior only to Paul in
courage, constancy and purity. Robertson rejected as
fables the histories of the elegant De Solis, the stout old
Bernal Diaz, and the graphic Cavligero; Prescott has
literally transcribed the same histories in his Conquest
of Mexico. The Naval histories of Cooper and James
agree in but two particulars, in the name of the vessels
engaged, and in the names of their commanders. They
disagree in regard to the size of the vessels, the rate of
their guns, the number of killed and wounded, the mode
of conducting the engagement, &c. The Napoleon of
Las Casas has not a shade of character in common with

the Napoleon of Walter Scott. When the American army entered the Mexican Capitol, they found from the Mexican records, that the Americans had been badly beaten everywhere. The common people could not understand why it was that "Los Yankees" would not stay whipped. These facts are sufficient to show that the study of history must impair confidence in human testimony. Doubt is like "the letting out of great waters," its devastation is at first slight, then greater and greater until it overwhelms all that is lovely beneath its surging waves. Doubt about history, and you are prepared to doubt the testimony of the Evangelists. Suspect one man, and you will be ready to be suspicious of all men.

Philology—Grammar. What a vast field of doubt opens before us here. What contradictory folios about the force of a Greek particle and the root of a Latin word. How infinite the translations of the same passage, and how much learned quibbling about its hidden meaning. We have arbitrary rules of writing and pronunciation to-day, which will be rescinded to-morrow. Change, doubt, and uncertainty beset the poor scholar on every side. Death, with its awful terrors, cannot, at its approach, divest him of his perplexity. "I die," said the learned grammarian, but doubting whether he had expressed himself correctly, he immediately added, "or am dying." We will describe you, grammarians and linguists, in the language of an old writer, as men "doting about questions and strifes of words, whereof cometh envy, strife, railings, &c."

Metaphysics, with its mist and fogs, has enveloped in its murky folds a multitude of the gentlemen of doubt and scepticism, Hume, Adam Smith, Chubb, Bolingbroke, Descartes, &c. &c. Wisely did the Scotchman say, "when the party, who hear, dinna ken what the party who speak mean, and when the party, who speak, dinna ken what they mean themselves; that is Metaphysics."

Geology, had its Wernerian and Huttonian theories, and now has its internal heat and its chemical theories. These to-morrow are to give way to others equally as wise and equally as transient. A science that is "wise above that which is written," may yet give way to Moses and the Prophets.

Chemistry. That which is learned to-day must be unlearned to-morrow. The theory of material particles of light has given place to the theory of undulations, which nobody understands. The two theories of light have still their advocates and partizans. Electricity has been explained in divers and sundry different ways, all equally satisfactory to the explainers.

We conclude, then, that though a knowledge of history and languages be essential to the scholar, and even to the refined and polished gentleman, and though metaphysicians be necessary to impart acumen and vigor to the mind, and though it be impossible to understand the phenomena of nature without acquaintance with chemistry; yet the study of none of these can have the same religious tendency as the study of the only thing which resembles the Creator, in truthfulness and unchangeableness.

We have now given four substantial reasons to prove that mathematical studies are well calculated to promote a sound faith and rational piety: 1st. That mathematicians are more familiar than other men, with the kind of reasoning employed in demonstrating the existence of a God, and in establishing the great truth that the Scriptures are the word of God, and that, as a consequence of this familiarity, they are better prepared to appreciate this peculiar kind of reasoning: 2d. That mathematicians, continually meeting with incomprehensible and apparently impossible facts in their investigations, would not be so likely as other men to reject the Bible, because of its mysteries, and because its teachings conflicted with pre-conceived notions: 3rd. That mathematicians were not apt to give the reins to the fancy, and to indulge in that extravagant speculation, which has made so many infidels, fools and madmen: 4th. That the implicit confidence of the mathematician in the truth of all his results, is favourable to unwavering faith, and well calculated to remove doubt and distrust, the sure fore-runners of scepticism and despair. To these four propositions, which we endeavoured to establish by facts and arguments, we will add a fifth, without however intending to discuss it, because its truth will be universally admit-

ted. 'Tis this : a profound knowledge of mathematics
always produces a spirit of modesty and humility, emi-
nently adapted to receive the doctrines of the lowly
Nazarene. This cannot be otherwise. The mathemati-
cian feels every day the limit of his power. He has
done a little, but the infinite remains untouched ; he has
thrown up his little mole-hill, but it is at the foot of the
mighty Alps. For three centuries the world has made
no advances in the solution of equations. No general
rules are known for solving an equation above the fourth
degree. Numerical equations of high degrees can be
solved in particular cases, but we have arrived no nearer
a general solution than did Tartaglia and Cardan, in the
sixteenth century. The softest Freshman can propose
an equation that the greatest mathematician living can-
not solve. How, then, can the Algebraist be proud of
his powers ? The geometrician must be equally humble.
The trisection of an angle, the duplication of a cube, the
quadrature of the circle, are problems which have been
tried again and again for more than two thousand years.
Robert Simson was probably the greatest geometrician
the world has ever produced, but any stupid boy, who
had just taken in the conception of an angle, could have
proposed to him a problem which his geometry could
not reach. Mere smatterers in science may be vain and
conceited, but the profound scholar has been too often
baffled and foiled in his efforts to feel otherwise than
humble. Thus Newton said, "that when he compared
his attainments with what yet remained to be learned,
he felt like a child picking up pebbles on the sea-shore,
with the vast ocean of truth before him." Laplace, when
congratulated upon his vast stores of knowledge, replied,
" what I know is little, what I do not know is immense."
John Bernouilli was more honoured and flattered than
any sovereign in Europe, and yet he had the modest
simplicity that old writers tell us used to be the charac-
teristic of children. Compare the humility of these men
and that of all eminent mathematicians with the inso-
lence of Voltaire, the vanity of Rousseau, the arrogance
of Gibbon, the conceit of Hume, the coxcombry of By-
ron, Bulwer, etc. The feeling with literary gentlemen

is too often " we are the people, and wisdom shall die
with us."   And this feeling they are by no means care-
ful to conceal.

We will now leave our five propositions to fall by
their weakness, or stand by their strength, and come to
the indebtedness of religion to science. The observed
acceleration of the moon in its orbit, led the infidels of
France to conclude that this satellite would eventually
strike the earth, and supposing that there was a like
acceleration throughout the solar system, they inferred
that all the planets would eventually precipitate them-
selves on the central mass of the sun. They therefore
most sapiently reasoned that either the heavens and
earth are the result of chance, or that their great Archi-
tect could not control their movements. A child can
see the falsity of their logic, but infidels are not remark-
able for sense. A poet has embalmed their folly in most
exquisite verse :

> Roll on, ye stars, exult in youthful prime,
> Mark with bright curves the printless steps of time ;
> Near and more near your beamy cars approach,
> And lessening orbs on lessening orbs encroach.
> Flowers of the sky! ye too to age must yield,
> Frail as your silken sisters of the field!
> Star after star from Heaven's high arch shall rush,
> Suns sink on suns and systems systems crush ;
> *Headlong, extinct, to one dark centre fall,*
> *And death and night and chaos mingle all ;*
> Till o'er the wreck, emerging from the storm,
> Immortal Nature lifts her changeful form ;
> Mounts from her funeral pyre on wings of flame,
> And soars and shines another and the same."

Laplace, however, showed by astronomical calcula-
tions, that the acceleration was merely periodic, that
this noble funeral dirge is uncalled for, and that we may
all go quietly to bed any night, without dread of being
wakened by the man in the moon knocking at our doors.
The infidels were sorely vexed with Laplace, but every
true Christian will thank God that science enables him
to say with the Psalmist, " How manifold are thy works,
Lord God Almighty, *in wisdom hast thou made them
all.*"

Again.   Christianity has nothing to fear from sound
reasoning upon sound premises : everything to fear from

false conclusions drawn from admitted facts, and from just conclusions deduced from false premises. But we are indebted to the geometry of Egypt for the whole science of Logic. Aristotle is the Father of the logic of the schools of the present day. He was for twenty years the pupil of Plato, the greatest mathematician of his age, who always began his instructions with mathematics, because he called it "the purgative of the soul that cleansed it from error, and restored it to the natural exercise of those faculties, in which just thinking consists." How apt a scholar Aristotle was under the great mathematician, we may judge by his frequent allusions to geometrical reasoning, and by his system itself, which is strictly mathematical. Thus his *dilemma* was in common use among the geometricians of his day, it is in constant use now in geometry, and always will be used: his syllogism too, was employed by the mathematicians on the banks of the Nile, hundreds of years before he was born. Every one knows that the syllogism is to be met with everywhere in every treatise on geometry, and Leibnitz tells us that he had seen two books, in which the theorems of the first six books of Euclid were demonstrated by the syllogism. Two Schools of Logic preceded the Aristotelian, the School of Pythagoras, and the School of Thales. Both of these last philosophers made geometry the basis of their systems, because they "were learned in all the learning of the Egyptians." Many an unsophisticated Freshman has wished that Pythagoras had confined himself to his Logic, and had let alone the square upon the hypothenuse.

The *inductive philosophy*, which has crushed infidelity, as the strong man crushes the loathsome reptile beneath his feet, is ascribed by some to Lord Verulam, and by others to Aristotle. Take either hypothesis that you please, a mathematician is still the author of it.

The *theory of probabilities*, invented by the French mathematicians, and employed by them in determining the chances of games of hazard, the value of testimony in courts of laws, the reliability of statistical facts, the present worth of annuities, etc., has had a higher and nobler application in the hands of the Christian philosopher, Olinthus Gregory, and of other pious men, who

have shown the thousands of chances against the concur-
rent meeting in the person of Jesus Christ, of the nine-
teen circumstances predicted of the Messiah, without the
special interference of Him " who rules in the armies of
Heaven, and among the inhabitants of the earth." They
have also applied the same theory to numerous prophe-
cies, and shown that the chances against their fulfilment
were so great, that even the soft-headed Atheist can
scarcely have effrontery enough to deny the miraculous
interposition of God.

Mechanical Philosophy demonstrates on almost every
page that " the Lord by wisdom hath founded the earth ;
by understanding hath he established the heavens."—
The poor, ignorant Atheist thinks, or at least says, that
the planets began to revolve in their orbits by chance.—
But Mechanical philosophy teaches that curvilinear mo-
tion is due to an original projectile, as well as incessant
force : yea, the very point, at which each shining orb
was struck when hurled into boundless space, has been
exactly determined. The chance of the Atheist must
then have had " a mighty hand and an outstretched
arm," thus to have projected with amazing velocity, bo-
dies of such enormous and almost inconceivable magni-
tude.

An elementary demonstration in Mechanics, shows
that the centre of gravity is independent of the *intensity*
and *direction* of the gravitating forces. Were it not in-
dependent of the first, ships could not navigate the
ocean, because the slightest deviation from the parallel
of latitude upon which they ballasted, would capsize
them ; were it not independent of the second, we could
not change the position of our bodies without being lia-
ble to fall. 'Twas long a desideratum with mechani-
cians to know the solid angle of greatest strength. Mac-
laurin demonstrated by the Differential Calculus that
this was the angle under which bees built their cells.—
Where did they get their science? Again, we learn from
Mechanics that an increase of velocity in the motion of
the earth upon its axis, would be accompanied by such
a loss of weight on our part, that a translation to the
upper regions of the air would not be improbable on any
gusty day. Human Kites would be as common as Da-

guerreotype pictures. Who has ordered all things with such consummate skill and wisdom as we are thus taught prevails throughout all nature?

Astronomy opened the gates of Ispahan and Teheran to the Missionary Henry Martin. The Persian mathematicians treated with deference and respect a man superior to themselves in the study, which was their special boast and pride. They could not answer him too, when he showed them that their Prophet was ignorant of the nature and laws of the heavenly bodies. Astronomy has always secured the Missionary a welcome from the Moslem, the Pagan and the worshipper of the Lama. May not that sublime science, which enables a worm of the dust to measure, as with a line, the bright worlds that encircle the Throne of the Eternal, be a chosen instrument in his hand for elevating lost and ruined men from their low and degraded condition, " to shine as stars in the firmament forever and forever?"

We have proved that the mathematician could not become an infidel without abandoning his usual mode of reasoning, and without being grossly false to the principles which he employs in all his scientific investigations. We have also shown that mathematical science has contributed much towards confounding Atheism, and establishing the claims of the religion of Jesus to be from God. We now propose to close the subject with an array of names of the profoundest mathematicians, who have also been the most humble and devoted followers of the Lamb of God.

The Latin Fathers, Augustine, Tertullian, Clemens Alexandrinus, Origen, &c., were "learned in all the wisdom of the Egyptians," and must have been thorougly imbued with a knowledge of mathematics; for in the Egyptian school in which they were taught, Geometry was made the basis of all instruction. A treatise on Geometry, by Augustine, was for centuries the only text-book on that subject in all Europe. Origen tinged his religion with the mathematical philosophy of Plato.

The four greatest mathematicians of modern times, Newton, Leibnitz, Euler and John Bernouilli, were eminent for their Christian faith and piety. We place Newton first, because all men agree that the inscription on

his monument is just, "*Qui genus humanum ingenio superavit.*"   The poet is scarcely thought to be extravagant when he says—

> "Nature and Nature's laws lay hid in night,
> God said, 'let Newton be,' and all was light."

The precocious youth, whose brilliant intellect cannot receive the sober truths of Revelation, and whose sense of right is so great that he is constrained to admire himself because others will not do him justice, will probably be surprised to learn that Newton said he "found more marks of authenticity in the Bible than in any other book whatever;" and that he actually wrote a commentary upon Daniel and the Apocalypse.   Leibnitz, who shared with Newton the glory of the discovery of the differential caculus, was distinguished for his manly piety.   "I am not worthy," says Gibbon, "to praise the mathematician; but his name is connected with all the problems and discoveries of his times, the masters of the art were his rivals or his pupils, and if he borrowed from Newton the sublime Method of Fluxions, Leibnitz was at least, the Prometheus who imparted to mankind the sacred fire which he stole from the gods."   He accomplished more than any human being ever did before. Historian, philologist, grammarian, chemist, theologian, he manifested "by a thousand passages in his writings, his profound respect for religion and morality, and he crowned his glorious life by giving in his Theodicæ the support of his influence to ideas the most sublime, and at the same time, the most necessary to the welfare of humanity."   Surely, the bar-room wit, who sneers at the great truths of the Bible "as old women's fables," has some reason to be startled at learning that the mighty mind of Leibnitz acknowledged that "all Scripture is given by inspiration of God."

John Bernouilli, the mightiest of a race of giants, linguist, chemist, mathematician, mechanician, physician, "he touched the whole circle of the sciences, and adorned them all."   Though an humble follower of the Man of Calvary, his wonderful attainments extorted even from Voltaire the tribute

> Il a fait l'honneur de la Suisse
> Et celui de l'humanite.

We have long reverenced John Bernouilli, and have long admired his acumen and penetration, though it must be acknowledged that he had not the sagacity of the Anti-Bible Conventionists of Boston to discover that "the lamp which God from Heaven to Earth let down," is of human workmanship.

"Euler" says Condorcet, "was one of those men whose genius was equally capable of the greatest efforts and of the most continued labor; who multiplied his productions beyond what might be expected of human strength, and who, notwithstanding, was original in each; whose head was always occupied and his mind always calm." That Euler had profound reverence for the Bible may be judged from the fact, that he at one time studied divinity with the intention of glorifying God in the ministry of his Son. Euler, however, was somewhat old fashioned in his reverence for the Bible; he lived prior to the era of Theodore Parker, Wendell Phillips, *et id omne genus*, and had not the illumination of the lights of the Tabernacle.

Sir Henry Saville, an eminent Christian and mathematician, established early in the 17th century, a chair of geometry and a chair of astronomy in Oxford. It is probably not generally known that the latter chair has been mostly filled by distinguished Clergymen. Among these, we may mention Dr. Robertson, Dr. Bernard, Seth Ward, afterwards Bishop of Exeter, and Dr. Wallis. The latter is well known to every mathematician; the English claim for him that he first proved, what Archimedes suspected, the property of the centre of gravity. Many of the Professors at Cambridge, who have occupied scientific chairs, have also been Clergymen. Among these, Bishop Watson, whose replies to Gibbon and Paine are models of genteel excoriation. Whiston, the successor of Newton, for many years a preacher. Archdeacon Vince, so well known as an astronomer and mechanician, etc. Again, we have among scientific theologians, John Wilkins, Bishop of Chester, the brother-in-law of Oliver Cromwell, and founder of the Royal Society. Dr. Robert Smith, Master of Trinity College, Isaac Barrow, also Master of Trinity, a voluminous writer on theology, and profound mathematician. Robt.

Boyle, Scientific Professor in Eton, the author of the well
known saying that "the Bible is among other books
as the diamond among ores." Boerhave said of him,
that "without Robert Boyle, we would have known no-
thing of nature." Dr. James Bradley, who resigned his
pastoral charge to become Savillian Professor of Astron-
omy in Oxford. The aberration of the fixed stars was
first noticed by him. Horsley, Bishop of St. Asaphs,
the annihilator of the Socinian Priestly, also editor of
the works of Newton. Dr. Abraham Rees, the celebra-
ted author of the Encyclopedia, forty years a preacher,
and long Professor of Mathematics in Hoxton. Doctor
Isaac Milner, President of Queen's College, Professor of
Mathematics and Dean of Carlisle. John Flamsteed,
first Astronomer Royal, to whom Astronomy is more in-
debted than to any other man who ever lived, since he
founded the Observatory at Greenwich, and first taught
Astronomers how to systematise their labors. He was,
for many years, a preacher, and we trust a good man,
though Newton did call him a puppy. Sir John Leslie,
theologian, traveller, chemist, linguist, natural philoso-
pher, geometrician, he seemed to acquire every species
of knowledge with equal facility, and to impart his at-
tainments with an elegance commensurate to the case of
their acquisition.

Robert Simson, we have been accustomed to regard as
the great geometrician of the last three centuries. His
restoration of the Porisms of Euclid, from a single hint in
Pappus, has been often spoken of as the finest effort
ever made by genius. He was educated for the church,
and was a devout believer in the Bible, though like other
gentlemen and ladies, he became very cross and ill-
grained in his old age. John Robison was also educated
for the church. "His piety," says his biographer, "was
ardent and unostentatious, like that of the immortal
Newton, whose memory he cherished with peculiar ven-
eration." He was for more than thirty years Professor
of Mathematics in the University of Edinburg.

William Barlow, the well known author of Theory of
Numbers, was distinguished as a preacher and mathe-
matician.

Blaise Pascal. We find him in the very meridian of

his glory as an Astronomer, laying aside his Transit and his Equatorial to proclaim the everlasting truths of the Gospel. Everybody knows how much his Provincial letters contributed to destroy the power of Jesuitism. There is more sense in a single paragraph of his "Thoughts" than in four mortal columns of a frothy Congressional speech.

To these we might add the names of Henry Martyn, who was treated with so much deference in Shiraz, because of his scientific attainments; of Dr. Dwight, Dr. Chalmers, Thomas Dick, and a host of other Clergymen, almost as much distinguished for their mathematical knowledge as for their piety.

We have a brilliant array of lay-men too. And first we place John Locke. His mathematics was equal to the task of revising the Principia of Newton in manuscript. Possibly some infidel, who has taken off ignorance, "the badge of all his tribe," may have heard of Locke. We will tell him then, how the philosopher died. He advised Lady Masham, who sat by his death-bed, to regard this life as only a preparation for a better. He then asked her to read the Psalms to him; she read until he felt the death-struggle approaching, when he motioned her to desist and "fell asleep in Jesus."

James Ferguson, the Astronomer, we believe, was also a layman. Infidelity is always changing its ground; when driven from one position it takes up another. In the time of Ferguson, the sceptics contended that the darkness at the death of our Saviour was merely an eclipse, but he carried his astronomical calculations back to that period, and proved that this could not have been so in the land of Judea.

Bishop Berkely was the first Spiritual Rapper. The Fox women of Syracuse are not entitled to the honor of the invention of a new science. As far back as 1730, the wise prelate taught that everything is spirit, even the bread and meat that we eat; so, like the Frenchman in the play who had been talking prose forty years without knowing it, the world had been living on etherial food, ambrosia, the diet of the gods, for near six thousand years, without even suspecting it, until the Bishop enlightened their ignorance. MacLaurin, in his reply to

Berkeley's Essay against Mathematics, showed how science might materially aid in Natural Theology by proving, among other things, that the cells of bees are constructed upon mathematical principles. The mitred priest despised mathematics, but the bees did not. Mac-Laurin was the son of a Clergyman of Scotland, and had all the reverence of the Scotch for the Bible and the Shorter Catechism.

Sturm, the author of the celebrated demonstration that bears his name, is also, if we mistake not, the author of "Reflexions," which contains more valuable matter on a single page than is to be found in whole folios of stuff about Greek particles and Latin roots. The study of languages began at the Tower of Babel, (confusion,) and confusion has been written on all the efforts of the Linguists since. We leave it to their discriminating philology to decide whether the word *babble* has not its root in that same Tower of Babel.

Time will fail us to speak of Playfair, whose genius was almost universal, and whose conversational powers were said to be superior to any in Europe; of DeLisle, the Parisian, the friend of Newton, "whose piety was unaffected, whose morals were pure, and whose integrity was undeviating." Of Matthew Stewart, D. D., for more than fifty years Professor of Mathematics in the University of Glasgow. Of Dugald Stewart, his son and successor. Of James Beattie, the celebrated author of the Essay on Truth, equally acquainted with the philosophy of matter and of mind. Simple and modest, though living retired, he yet sought a deeper retirement, like the bird of his own beautiful song, that

> "Breaks from the rustling boughs,
> And down the lone vale sails away
> To more profound repose."