The Necessity of Ventilation and Fresh Air.

We had intended to write, in simple language, an appeal for more fresh air in our lecture rooms, churches, and public buildings. Incidentally, however, an esteemed clerical friend in this city, who has himself been "a gasper," handed us the following, which, when backed up by his assertion "that by a course of logical argument he considered it demonstrable that fresh air and ventilation, under certain circumstances, were positive means of grace," we at once decided, upon the weight of his authority, to insert it without offering any remarks of our own. It is credited to the Detroit *Tribune*, and although the orthography is not exactly Websterian, yet we think it is intelligible, and have no desire to spoil the purity of its expression by a translation into the vernacular.

A APPEAL FOR ARE TO THE SEXTANT OF THE OLD BRICK MEETINOUSE.

BY A GASPER.

O sextant of the meetinouse, wich sweeps
And dusts, or is suposed too! and makes fiers,
And lites the gass, and sumtimes leaves a screw loose
in wich case it smells orful—worse than lam-pile;
And wrings the Bel and toles it when men dyes
to the grief of survivin pardners, and sweeps pathes
And for the servases gits $100 per annum,
Wich them that thinks deer, let em try it;
Getin up befoar star-lite in all wethers and
Kindlin fiers when the wether is as cold
As zero, and like as not grean wood for kindlers
i would'nt be hired to do it for no some—
But o sextant! there are 1 kermoddity
Wich's more than gold, wich doant cost nothin,
Worth more than anything exsep the Sole of Mann
i mean pewer Are, sextant, i mene pewer Are!
O it is plenty out o dores, so plenty it doant no
What on airth to dew with itself, but flys about
Scatering leavs and bloin of men's hatts;
in short, its jest "fre as are" out dores.
But o sextant, in our church its scarce as piety,
scarce as bank bills wen agints beg for mischuns,
Wich some say is purty often (taint nothin to me,
Wat i give aint nothin to nobody); but o sextant
u shet 500 men, wimmen and children,
Speshally the latter, up in a tite place,
Some has bad breths, none aint 2 swete,
Some is fevery, some is scrofilus, some has bad teeth,
And some haint none, and some aint over cleen;
But every 1 on em breethes in & out and out and in,
Say 50 times a minit, or 1 million and a half breths an our.
Now how long will a church-ful of are last at that rate,
i ask you, say 15 minits, and then wats to be did?
Why then they must brethe it all over agin,
And then agin, and so on, till each has took it down
At least 10 times, and let it up agin, and wats more
The same individible dont have the priveledge
of breethen his own are, and no ones else;
Each one mus take whatever comes to him.
O sextant, doant you no our lungs is bellusses,
To blo the fier of life, and keep it from
goin out: and how can bellusses blo without wind
And aint wind *are*? i put it to your conschens.
Are is the same to us as milk to babies,
Or water is to fish, or pendlums to clox,
Or roots and airbs unto an injun Doctor,
Or little pils unto an omepath,
Or boys to gurls. Are is for us to breethe.
Wat signifies who preeches if i cant breethe?
Wats Pol? Wats Pollus? to sinners who are ded?
Ded for want of breth? why sextant, when we dye
Its only coz we cant breethe no more—thats all.
And now, o sextant, let me beg of you
2 let a little are into our church.
(Pewer are is sertin proper for the pews)
And do it weak days and Sundays tew.
it aint much trouble—only make a hole
And the are will cum in of itself
(it luvs to cum in whare it can git warm);
And o how it will rouze the people up,
And sperrit up the preecher, and stop garps,
And yawns and figgits as effectooal
As wind on the dry Boans the Proffit tells of.

Iron Girders.—No. 3.

But what forms and what construction do the forces require? This question is not easily determined by experiments on imperfect forms. The way to obtain correct ideas of what is required is, to divest the mind first of all that has been said about forms, and even of the existance of a *beam*, and to regard a load as a force acting vertically over an open space, and with a view of changing its direction, so as to concentrate the action wholly in two points just outside of this open space. It must also be observed that this result is to be accomplished within a given hight, and in the most simple and economical manner. The mind thus being freed from false theories and confused ideas will be able to analyze all the forces in play with as much certainty as the movements of the planets are now calculated, and there will be no difficulty in devising forms suited to all the conditions and requirements of the question. To do this, the magnitude of the force or forces representing the load and the manner of its application, whether concentrated or diffused, must be known. The width of space between the points to which the forces are to be directed, and on which their action is to be concentrated, also the vertical hight between these points of concentration and the points of application, must be known. Having these elements of calculation clearly before us, it will be comparatively easy to determine and trace axes of equilibrium that shall truly represent the sums and direction of the resultants of all the forces, and which will also indicate the form of construction required to sustain all the forces in equilibrio.

To illustrate this point, suppose the load to be represented by a weight of thirty tuns acting vertically on one point, as on the middle of the upper side of a beam, and it is desired to transfer the vertical action of the weight to two other points in a plain five feet lower, such as to bearing under the ends of a beam, and that these bearings are in a horizontal plane, and in a span of sixty feet apart from each other, as in a span of sixty feet—the vertical hight between the plane in which these bearings are situated, and the point of application of the weight being regarded as the depth of the beam. Or suppose that it is desired to accomplish this transfer by means of a beam five feet in depth, and of sixty feet span of the best form. Now, whatever the form may be of the beam, or medium by means of which the pressure of the weight is to be transferred from the point of its application to the bearings, the normal direction or axis of all the forces resulting from the weight will, in this case, be in two straight lines, extending from the point of application to the bearings, and the strain resulting from the weight will be nearly equal at all points within the lengths of these lines, which in this case (weight of structure not included) will be about equal to three times the weight, or ninety tuns. Therefore the most economical form of structure by means of which the vertical pressure of the weight can be conducted to the bearings will be (theoretically) two straight pieces of material, their centers coinciding with the oblique lines or axes of the forces, and each extending in opposite directions from the point of application to the bearings, each being capable of sustaining a pressure at all points of its length of about (in round numbers) ninety tuns. The horizontal thrust at each of the bearings due from the weight will also be about ninety tuns. This may be counteracted by means of abutting resistance, or of a horizontal tie of ninety tuns tensive capacity connecting the lower ends of the oblique thrust pieces. This tie, then, and the two thrust pieces, will form a triangular structure with a base or clear span of sixty feet and a hight of five feet, which is all, theoretically, that is required. Practically, however, the oblique thrust pieces will require a slight addition of depth or strength on their upper sides, to prevent downward deflection from their own weight, and the horizontal tie will require some support to hold it in a straight line.

Such a structure seems to be precisely what is required to provide for all the conditions arising, and to be formed in the most economical manner. The parts are so arranged as to be acted upon only in the direction of their length, and will not be subjected to cross strains.

If these views are right, then the horizontal theory must be wrong, for in this the forces can act horizontally only in the tie and at the vertex, where the weight is applied—there is no place within the depth of the structure for a neutral axis. Every possible line that can be drawn horizontally between the base and vertex, and extending through the length of the structure must not only sustain vertical pressure equal to the weight of thirty tuns, and this will act in every possible horizontal section within the lengths of the oblique thrust pieces. And the case will be essentially the same in a beam uniformly loaded, except the form of the upper chord; this, when made to correspond with the axis of the compressive forces resulting from a uniform load, will be curved in the form of an arch, slightly at the middle, but gradually increasing in curvature towards the ends, until the upper and lower chords meet on the centers of the bearings, and the forces acting through the chords will result in the vertical pressures on the bearings.

BENJAMIN SEVERSON.

Baltimore, Md., October, 1858.

Interesting Notes on the Reaping Machine.

Like many other valuable inventions, says the *Mark Lane Express*, the reaping machine was at first announced to an age that did not want it; and when at last the inadequacy of the old methods to meet modern requirements created a demand, it was revived as a novel wonder both in Great Britain and the go-head country at the other end of the Atlantic "cable." It is not generally known that, as long ago as the year 1780, the Society of Arts proposed the gold medal, or £30, as a premium for "a machine to answer the purpose of mowing or reaping wheat, rye, barley, oats, or beans, by which it might be done more expediously, and cheaper than by any methods then practised, provided that it did not shed the corn or pulse more than the methods in common practice, and that it laid the straw in such manner as might be easily gathered up for binding." Here was an admirable conception of the work required to be done, but too much for inventors to attempt all at once. So that, as Pliny and Palladius had described the Roman reaping machine, pushed by an ox, and combing off the ears by means of teeth on the front, Mr. Pitt, of Pendeford, designed an improvement upon it in the year 1786, namely, a "rippling" cylinder with iron teeth, driven by the carriage wheel. In 1793, a reaping machine was contrived in Lincolnshire; and in November of that year, Mr. John Cartwright, of Brothertoft, near Boston, England, published the fact of his having invented a reaper "acting upon a different principle to one previously constructed by himself." In the same year, Mr. Edmund Cartwright, of Doncaster, advertised his "machinery for reaping or mowing corn, grass, &c., which, by means of one horse and a driver, will cut down six or eight acres of standing corn in a day. It is his intention as soon as one hundred machines are engaged for, to establish a manufactory of them; the price of each machine will be twenty guineas." The purchasers might return the machines if the invention failed to obtain the "previous seal of approbation" of the Board of Agriculture. These antiquarian items of harvesting machines are interesting when we bear in mind their very early date—long before Boyce's patent for revolving scythes (not exactly like those with which Boadicea performed the anti-Cæsarian operation of slashing down Roman invaders)—before the improvements of Plucknet and Gladstone; long before Salmon's clipping shears, or Smith of Deanston's rotary disk and delivery-drum.

The same high authority quoted above gives great credit to American inventors for effecting the introduction of the mower and reaper into the heavy cropped fields of grain.

Crosskill, Dray, Burgess & Key, and other English manufacturers, have, however, incurred great expense in practically testing these machines; still the ingenuity of the American brother Saxons is the source from which new arrivals of improvement are continually forthcoming, so that a common piece of gossip now-a-days is about Messrs. So-and-so's new Yankee grass mower or corn reaper.

We learn also that Mr. B. Samuelson, of Banbury, England, has recently introduced into that country the machine of Messrs. Seymour & Morgan, Brockport, N. Y. Its operation has proved satisfactory, especially the mode of delivering the grain in sheaves instead of swaths.

We are always happy to chronicle the success of our inventors, and particularly so when their ingenuity is matched against that of a people so thoroughly skilled as the English.

Sir Isaac Newton's Taste for Farming.

When Newton had reached his fifteenth year, he was called from the school at Grantham to take charge of his mother's farm. He was thus frequently sent to Grantham market, says Timbs, to dispose of grain and other agricultural produce, which however, he generally left to an old farm servant who accompanied him, and Newton made his way to the garret of the house in which he had lived, to amuse himself with a parcel of old books left there; and afterwards he would entrench himself on the wayside between Woolsthorpe and Grantham, devouring some favorite author till his companion's return from market. And when his mother sent him into the fields to watch the sheep and cattle; he would perch himself under a tree with a book in his hand, or shape models with his knife, or watch the movements of an undershot water-wheel. One of the earliest scientific experiments which Newton made was in 1658, on the day of the great storm, when Cromwell died, and when he himself had just entered his sixteenth year. Newton's mother was now convinced that her son was not destined to be a farmer; and this, with his uncle finding him under a hedge, occupied in the solution of a mathematical problem, led to his being again sent to Grantham School, and then to Trinity College, Cambridge, which thence became the real birthplace of Newton's genius.

The Solar Eclipse.

It will be recollected that our government sent out Lieut. Gillis to take observations of the solar eclipse which was total in some parts of South America on the 6th of last month. He has written a brief letter on the subject to Professor Henry, of the Smithsonian Institute, in which he states that his telescope was mounted near Olmos, in Peru, and his observations were favorable. The usual rose-colored corona attendant on total eclipses was observed rising over the moon's disk, and was very beautiful. The brilliant protuberances usually observed with instruments, shooting from the sun's disk, were also visible, and on this occasion became distinct to the naked eye. These phenomena, witnessed during total eclipses, are supposed to indicate violent action of fire in the sun.

How to get Subscribers.

MESSRS. EDITORS—Enclosed I send you a list of twenty subscribers, with $28. I was only half a day getting them, which I think time well spent. I shall be called to different points in the State this year, and I will try to enlarge the list. I am indebted to the SCIENTIFIC AMERICAN for my present business. I secured a patent right which was advertised in your paper, and am now doing well. Every mechanic would do well by taking your paper. E. G. SMITH.

Auburn, Cal., October, 1858.

[We publish this letter in order to show, in the first place, how easy it is for our friends in some localities to form a club of subscribers for the SCIENTIFIC AMERICAN; in the second place as a specimen of many letters which we receive from persons who date the commencement of their prosperity from some suggestion that they found in our columns, or from having their inventions illustrated in our pages; and lastly, to thank Mr. Smith for his exertions in our behalf, and to assure him that if he never spends a half a day more unprofitable to himself, his friends, and us, we think his life will be a path of roses. Also that others of our readers and friends may profit by his example, and endeavor to do likewise.—EDS.