

The Post-Office Department, in consequence, loses \$5,000, which it would have received but for the change in the rate. This is but a small item, to be sure, to so large a department as the General Post Office, but be it remembered that this loss is from only one concern, while there are probably others who will do the same to a greater or less extent: which in the aggregate is likely to reduce the Post Office revenue very largely. It is hoped that, on the convening of our next Congress, one of its first acts will be to amend the postal law, so that the tax upon publishers and the public shall not be more oppressive than it was under the old law.

Newspaper and other publishers should commence early to agitate a reform in this matter. It will not do to take a retrograde step in the matter of cheap postage. Persons who have been in the habit of advertising in our usual special edition, referred to, are advised to avail themselves of the advertising pages of our regular edition to announce their fall business. The circulation of the SCIENTIFIC AMERICAN has never been so large at this season of the year as now, by several thousands. The number of regular subscribers at this time exceeds that of last year by over four thousand, making an aggregate issue of not less than 44,000 every week, and it frequently reaches as high as 50,000.

#### CONSERVATISM VERSUS PROGRESS.

Extreme opposing parties of conservatives and progressists are found in the field of Science, as well as in politics and religion. Their continual strife is mutually beneficial, each serving as a check on the other. Without conservatism, the world would certainly rush into all kinds of new theories, such as those in which men of a progressive turn of mind are very apt to indulge; while without men of progress and improvement, the world would stand still, and no advance would be possible. It is doubtful which of the two would be the more deplorable state of society.

History abounds with records of this strife between conservatism and progress: but in no field has the latter been so successful as in that of Science, for the simple reason that its triumphs, which are only to be achieved by the labor of research, are based on positive facts, which no opposition of conservatism can upset; and the benefit of this opposition consists only in the prevention of a too rash acceptance of theories, before they are sufficiently based on such facts as make them incontrovertible.

We will take a few illustrations from the fields of astronomy and geology, and remind the reader that there was a time when the whole human race considered our earth to be flat, and to consist of three connected continents—Europe, Asia, and Africa—with some islands in the inland seas, and many others surrounding the continents, all being situated in a boundless ocean, the limits of which were unknown, and their investigation seriously dreaded. The ancient astronomers who announced the rotundity of the earth were not believed, especially when contradicted by the theological priests, who then, as well as later, arrogated to themselves the enforcement of any peculiar doctrines which best suited their self-interest. But ultimately progressive Science prevailed, and conservative theology had to acknowledge that it had been in the wrong.

Next came the doctrine of the motion of the earth. The history of the persecution of the great Galileo is of so comparatively recent a date that, looking at the progress of the present day, it is almost incredible that only two centuries ago the everlasting and important truth of the earth's motion was denied, and condemned as ungodly, by the whole Christian priesthood, Protestant as well as Roman Catholic. But notwithstanding that this good man was compelled, when weakened by age and persecution, to swear to the falsehoods of the priests, the truth has been demonstrated, and progressive Science was again victorious over conservative theology.

Afterwards—toward the end of the eighteenth and beginning of the nineteenth century—came the doctrine of the great antiquity of the earth; while the accumulating evidences of its existence for millions of years, gathered by the then young science of geology, compelled all clear-minded and well informed persons to reject the popular idea, which we inherited from the Mosaic theology, that the whole earth was scarcely 6,000 years old, and was made in six days. As the evidence of the rocks proved that millions upon millions of years have elapsed during its transformation from a highly heated globe to its present condition, the better informed theologians did not combat the scientific conclusion; but the less informed priests, not worthy of the name of theologians, attempted some show of resistance to this phase of progress. But the time of persecution had passed, and priestly influence had been curtailed; so that this opposition was comparatively feeble, and utterly unable to stay the diffusion of the truth.

Still the idea that at least the human race was only about 6,000 years old was adhered to, and theologians made a kind of armistice, surrendering the theory of the six days of creation, and admitting the possibility of a creation and development lasting for millions of years, while still maintaining that 6,000 years was the antiquity of the human race. Unfortunately for them, about fifty years ago facts commenced to accumulate, proving that man has existed at least 100,000 years. The discovery that a glacial epoch took place at this time, and the relation of this grand and important event to the human race, and the accumulating proofs of man's existence immediately after, and even perhaps during or before the glacial period, are sufficient to settle this point; and society no longer heeds the opinions of any theologians who deny these demonstrated facts.

But the most serious blow to Jewish and Christian orthodox conservatism is the modern theory concerning the primi-

tive condition of man. All the geological records found tend to show, more and more, that the first existing men, instead of having fallen from a perfect condition, had improved from the lowest state, and that the first man was a perfect savage, such as we find nowadays in some of the isolated islands of the Australian archipelago, where, for want of conflict, there was no cause for progress, the inferior men not being exterminated by the superior, a destructive process to which much human improvement is due. Progressive Science teaches that the modern civilized and enlightened society has slowly been developed from a primitive savage and ignorant condition.

The final strife of the present day, closely allied to the last mentioned theory of the continual improvement of mankind, is the evolution theory, now carried to its furthest extent. It ascribes the origin of man not only to an inferior human race, but to still lower types, now extinguished: nay, even ascribes the origin of all living beings to a single original type or even cell. It does not teach that man descends from a monkey, as the enemies of progress falsely accuse the evolutionists of maintaining, but that man is closely allied to the whole animal creation, as proved by comparative anatomy, by embryology, by the geological record, and even by psychological and ontological researches, and studies of the mind and instinct of animals, coming thus to the conclusion that the past man may have as well been evolved from a lower prototype as have been created out of dirt. Human pride is perhaps generally at the bottom of the opposition to this doctrine, as the proof of man's origin among lower beings tends, in a certain sense, to abate his arrogance; but on the other hand, man may be proud of what his race has accomplished in a short period of time, if in the beginning he sprang from a condition so low.

#### THE FAIR OF THE AMERICAN INSTITUTE.

To any one unacquainted with machinery, we can readily imagine that the performances of an apparatus which throws out bundles of

##### KINDLING WOOD,

neatly tied, at the rate of 400 per hour, must be a source of considerable astonishment; and hence the expression of wonder, which comes over the face of the throng which is constantly gathered about the machine, while amusing to contemplate, is quite to be expected. To gather an idea of this curious device, the reader must imagine four horizontal bars arranged as spokes, placed equidistant about a rotating hub. Each bar has at its extremity a circular vertical frame, of a depth equal to the length of a stick of kindling wood. In each frame or cylinder works a follower, moving outward. An immense hopper filled with the sticks is provided with three openings, at each of which a boy is stationed. Boy No. 1 fills the frame nearest him loosely with wood. The bars then rotate so as to bring that frame opposite boy No. 2, whose business it is to pack in more sticks, so as to make the bundle a little tighter; then boy No. 3, when the same frame reaches him, shoves in the little sticks which complete and wedge the bundle tight. Of course, as fast as one frame departs from each operator another takes its place, and the operations above described are repeated. After leaving boy No. 3, the frame comes opposite a rod controlled by mechanism from the center, which pushes the bundle out of the frame and between a pair of vertical semi-circular jaws which come together, tightly compressing the bundle. Then a piece of annealed iron wire is led from a reel through a pair of small vertical clamps, and pushed from underneath up into the jaws, the inner periphery of which it follows, thus encircling the bundle. The end comes back to the clamp, between which a central piece then rises, grasps the wire, twists the ends together, and a knife at the same time cuts the wire off. By this time another bundle has arrived, which pushes its place to undergo the same fastening. The machine is really a study for the mechanic. One gear wheel in particular, which communicates motion to the frame bars and at the same time operates the knife cam and the wire-twisting device, is a remarkable example of adaptive ingenuity. The inventor, Mr. F. Myers of this city, tells us that the apparatus easily accomplishes the work of fifteen boys, and runs ordinarily at the rate of 4,000 bundles per day of ten hours.

Another novel machine is one for

##### MAKING WIRE FENCE,

an inexpensive and excellent form of enclosure, which deserves to be popular among farmers. The wire, led from a series of reels, is brought up and under two sets of vertical hammers, the latter actuated, one set at a time, by cam mechanism. The uprights which support the wire are of wood, and are laid, one at a time, on the projections of endless bands, which carry them under the wire and beneath the hammers. Under the first row of hammers are guides which conduct copper staples, one at a time, over each intersection of wire and post. Then the first hammers fall and drive the staples partially in, and the second hammers, as the fence is carried along, deliver their blow and complete the insertion. There are six wires, and the pickets are four feet in length. The fence can be made with 15 or 30 pickets to the rod, and is usually formed in sections of ten rods each. It appears to be very strong. It is portable, and can be rolled and secured as easily as so much carpet. Farmers who use it might thus readily, on moving from one residence to another, take up their fences and transport them with their other farm appurtenances. Mr. A. C. Betts is the inventor, and he says that the machine will make 400 rods of fence per day.

##### AN ELECTRICAL COPYING MACHINE,

the invention of Mr. T. A. Edison, the well known electri-

cian, is a novelty in apparatus of this description. A small battery of considerable intensity transmits its current to a pair of miniature electro-magnets mounted on the end of a pointed metal rod, which serves as a writing instrument. The magnets cause the rotation of a bit of iron, the motion of which is regulated by a minute fly wheel, and the result of the rapid interruption of the current is a series of sparks from the end of the instrument, which penetrate the paper written upon, and so convert the latter into a stencil plate of the characters inscribed. It only remains to put clean paper under that marked, and pass a roller charged with a prepared ink over the latter, to make as many copies of the writing as is desired, the ink passing through the holes made by the passage of the spark.

We have had sewing machines without number, button-hole and knitting machines of all descriptions, but now something entirely new is added to the mechanical part of the sewing room in the shape of

##### A DARNING MACHINE.

Imagine, ye mothers of large families, who ruefully contemplate dilapidated socks by the dozen, after the week's washing, with visions of strained eyes and tired backs floating across your minds: imagine a little apparatus infinitely more simple than the sewing machine, which repairs the hugest darn in much less time than we can describe the operation, and far more neatly than you can do it with all your years of practice. This is what it is. Two small plates, one stationary and the other movable, are placed one above the other. The faces are corrugated, and between them the "holy" portion of the stocking is laid. Twelve long eye pointed needles are arranged side by side in a frame, which last is carried forward so that the needles penetrate opposite edges of the hole, passing in the corrugations between the plates. Hinged just in front of the plate is an upright bar, and on this is a crosspiece carrying twelve knobs. The yarn is secured to an end knob, and then, with a bit of flat wire, pushed through the needle eyes. Then the loop between each needle is caught by the hand and hooked over the opposite knob, so that each needle carries really two threads. Now the needles are carried back to their first position, and, in so doing, they draw the threads, which slip off the knobs through the edges of the fabric. A little push forward again brings the sharp rear edges of the needle eye against the threads, cutting all at once. This is repeated until the darn is finished, and beautifully finished it is. The inventor is Mr. O. S. Hosmer of Boston, and we predict for him the blessings of the entire feminine community. The cost of the machine is but ten dollars.

##### A NEW ELECTRIC MOTOR,

the invention of Mr. C. A. Hussey of this city, is at work driving a sewing machine. The engine, which is quite small, is operated by five Bunsen cells, and its movements are controlled by a simple device by connecting or disconnecting a greater or less number of elements. The machine is driven at the rate of 560 stitches per minute. Mr. Hussey's engine combines several new and excellent improvements, mention of which lack of space just at present compels us to defer to another issue.

#### SCIENTIFIC AND PRACTICAL INFORMATION.

##### AMERICAN COMPETITION.

United States hardware producers do not seem inclined to limit their competition with English manufacturers either in this country or in foreign markets by offering American made goods. When these cannot be sold in England at a good profit, current action of individual firms seem to point to the probability of United States makers starting manufactories upon our own shores. Messrs. Hussey, Binns, and Co., of Pittsburgh, have during the past twelve months been making—but only since last spring been selling—what they term a "plain black solid cast steel shovel." Their patent consists mainly in combining the iron straps with the pan of the shovel when the steel is run into the mold. Shaping and shearing, and even hardening, is done mostly under the drop hammer, to the exclusion of all but a minimum of manual labor. The result is a good tool produced at a cost that leaves a profit with which even American manufacturers ought to be satisfied; but large as these profits are, they will be increased when the existing facilities of the makers are supplemented by a 24-pot Siemens furnace which is being laid down. On behalf of Messrs. Hussey, inquiries are now being made in our own hardware districts by a gentleman who has recently come to England. His report will determine the American firm whether they shall start a works in England, or offer here their process upon royalty or purchase. The inquiries are conclusive that the process can be carried on in this country at a cost greatly under that entailed in the States; and that both throughout the export and also the home market the common iron and iron-steeled goods are giving way before those made wholly of steel. The Americans have furnished our agriculturists with some excellent forks, and their axes are unrivaled; yet the English makers of edge tools keep mostly well employed. If under these circumstances, our transatlantic cousins will, at an equally moderate price, put into the hands of our navvies, our miners, and our farm laborers a shovel which shall be equally good, they have our best wishes for their success in every legitimate effort which on this side they may put forth.—*The Engineer.*

##### INTERNAL PARASITES OF THE HOUSE FLY.

A correspondent of *Nature* writes that he saw a small, decrepit house fly making its way across a sheet of paper, when three minute, active animals, apparently beetles, tumbled out of it; they were light brown in color and resembled *aphides* in shape, and were of about the size of a medium pin hole.