

A machine for dropping corn and other seed at regular intervals, and also dropping at the same time a regulated supply of fertilizing material into the hill, has been patented by Mr. Geo. W. Miller, of Fawn Grove, Pa.

An improvement in harrows, patented by Mr. George Lettenmyer, of Little Georgetown, W. Va., consists in an arrangement of yielding teeth, which renders the draught of the implement light, and lessens the chance of breakage.

Mr. Henry M. Keller, of Newark, O., has patented an improved harrow having teeth of peculiar form, and provided with a clod crusher, that breaks up the clods as the harrow advances.

GERARD MERCATOR, THE COSMOGRAPHER.

Gerard Mercator, the cosmographer, and inventor of the map projection which bears his name, was born on the 5th of March, 1512, in the small town called Rupelmonde, in East Flanders, about eight miles from Antwerp. He was the youngest of six children of a poor shoemaker. Losing both parents at an early age, he was kindly cared for by a great-uncle, to whom he became indebted for the advantage of an education in the best schools of the Netherlands. At the age of eighteen he entered the University of Louvain, where he was eventually matriculated under the faculty of arts, which nearly corresponded with the faculty of philosophy in a modern German university. Remaining at Louvain till his removal to Germany, he at first devoted himself to philosophical studies of such abstruse subjects as the origin, nature, and destination of the physical universe, and became absorbed in the great problems of science and revelation. He found it impossible to reconcile the Mosaic account of creation with the doctrines of Aristotle. Here he began to tread upon dangerous ground, for in Louvain, as at Paris, the authority of Aristotle in the domain of physical philosophy was sacred and supreme. To dispute or question the perfect consistency and harmony of his teachings with those of the church was heresy. Finding no one to sympathize with him in his doubts, Mercator left Louvain and secluded himself for study at Antwerp for several months; but whatever skeptical views he may have had in regard to the divine inspiration of the Scriptures were dispelled before he returned to Louvain.

As Mercator grew older he began to turn his attention to the practical problem as to the best means of earning a livelihood. Having obtained permission from the Faculty of Arts of the University of Louvain to give private instruction in mathematics, he thus began to support himself; and having previously chosen for his vocation the manufacture of mathematical instruments, he was thus enabled to establish a workshop of his own, where he manufactured astrolabes, astronomical rings, globes, etc., of great accuracy.

As a chartographer, Mercator appears to have begun his career by the publication of a map of Palestine, at Louvain, in 1537. Increased interest in religious matters naturally led to an increased demand for such maps. No copy of this has come down to us; but it seems to have been well received, as it was highly praised by his contemporaries. His next work was a map of Flanders, undertaken at the request of certain Flemish merchants. He traveled over the country, making surveys and measuring heights and distances. It took three years to complete the work, and it was published at Louvain in the year 1540. A masterpiece of his handiwork, at this period of his life, was a large terrestrial globe, which he finished in 1541. This is now lost, but the original drawings for its exterior surface are still preserved at Brussels. This became the means of commending him to the favor of Charles V., from whom he received an order for a complete set of mathematical instruments for use on his expeditions. About this time he was maimed. In 1544, there occurred in his life an incident which has been only recently brought to light—he was imprisoned as a heretic. It appears that an imperial edict was issued at Brussels, by Mary, queen dowager of Hungary, condemning all heretics to death. Under the operation of this edict, forty-three citizens of Louvain, Mercator among the number, were accused of participation in what was styled the "Lutheran heresy."

We have no information as to the cause or circumstances of Mercator's discharge from imprisonment; all is shrouded in mystery; we can only glean from the records of the time that he must have been imprisoned nearly four months. After his release he resided at Louvain seven or eight years. He made a new set of instruments for the Emperor, to replace the former, which had been destroyed; and completed and dedicated to the Bishop of Liege a celestial globe of the same size and style as the terrestrial one which he had before presented to Granville.

In 1552 he removed to Duisburg, in Germany. Here he shortly after completed for the Emperor an astronomical ring and a set of globes elegantly equipped and ornamented. There was a celestial globe of glass or crystal, and on it were engraved the constellations with a diamond. Inside of this was a terrestrial globe of wood. Attached to this set were a compass, an hour circle, a quadrant of altitudes, and other instruments. In 1554 Mercator published at Duisburg a large map of Europe, which, more than any other work of his, contributed to his fame as a chartographer among his contemporaries. This is now lost, although a reduced copy of it published by his son still exists. In 1564 he published a map of Great Britain; in the same year, a map of Lorraine, based on a trigonometric survey made by himself. In 1569 he made his first appearance, after his removal to Duisburg, as the author of a printed book—a folio

volume on chronology, written in Latin and published at Cologne.

Even after the discoveries of the 15th and 16th centuries, and in the lifetime of Mercator, the works of Ptolemy were still regarded as the groundwork of all geographical knowledge. Mercator was a great admirer, but not an implicit follower, of this author, and in 1578 published a corrected and revised edition of the maps or charts of Agathodæmon which accompanied the work of Ptolemy. Six years later, he republished this collection of charts, twenty-seven in number, together with the text of Ptolemy's eight books on geography. This work added greatly to the reputation of Mercator as a geographer and scholar, and is still held in high estimation by modern authorities.

We now come to the work of Mercator commonly known as his Atlas of Modern Geography, and which he did not live to complete. The modern application of the word "atlas" we owe to Mercator, and originated with this work. The introductory pages of the book, which was published by his son after his father's death, contain a genealogical tree of the ancestors and descendants of Atlas of Grecian Mythology, who, as a punishment for leading the Titans in their war against Jupiter, was condemned to bear the heavens upon his shoulders. As Humboldt has adopted the Greek word "Kosmos" as a title to the crowning work of his life, so Mercator adopted "Atlas" as the title to the work which he planned and projected as the crowning work of his life. He did not mean to call it an Atlas, or the Atlas, but simply "Atlas." He never intended to give to it the generic sense in which it is now used, as applicable to any and every collection of maps; but as there was no word in the classical or modern languages that had done such service, the title was borrowed in course of time by other chartographers, until it has gradually lost its special application, and come to designate simply a collection of maps. From the treatment to which two of his works were subjected by the Catholic Church, Mercator has been supposed to have been a Catholic; but this is said to be an error. His posthumous work on the creation was condemned in the Index Expurgatorius because its treatment of the doctrine of original sin bore too close a resemblance to the teachings of Luther; and his chronology was prohibited on account of the extracts contained in it from writings that had been condemned. Mercator, having lost his wife in 1586, married again. His second wife was the widow of a burgomaster of Duisburg. The issue of his first marriage was six children, three sons and three daughters. He died in December, 1594.

The fame of Gerard Mercator rests chiefly upon his achievements in the department of mathematical geography and cartography. He is known to us, principally, as the inventor of the projection which bears his name. The value of what is now known as the "Mercator Projection" was so little appreciated at first that his successors did not deem it of sufficient account to place it in the Atlas of Modern Geography. If it ever occurred to the inventor that this rather than any other of his productions would immortalize him, he probably banished the idea long previous to his death. It seems to have been thrown aside and forgotten, or only remembered as a scientific curiosity. It is unknown exactly when Mercator's projection was first used; we only know that about the year 1630, the French seaport Dieppe was the principal emporium for the sale of nautical charts, and that those then sold at that place were mostly on this projection. The practical signification of Mercator's projection is this: He says to the mariner: "If you wish to sail from one port to another, here is a chart and a straight line on it, and if you follow this line carefully, you will certainly arrive at your port of destination. The length of the line is not correct, yet it points exactly in the right direction. Consequently, if you follow the line, you may get to your destination sooner than you expect, or you may not get there as soon. But you will certainly get there."

Such are the leading features in the life of one to whom Malte-Brun paid an eloquent and fitting tribute when he said: "Modern geography dates from Mercator." The memory of Mercator has been sadly neglected by the English speaking races, and until the recent paper of Mr. Elial F. Hall before the American Geographical Society, no full account of his life has appeared in our language. We are indebted to Mr. Hall's paper for the materials of this brief sketch of the celebrated cosmographer.

DAVID PAGE.

In the death of Professor David Page, LL.D., which occurred at his residence, Newcastle-on-Tyne, March 9, geology loses one of its most popular expositors and voluminous and practiced writers.

Professor Page was born in Fife, and the earlier years of his life were spent in literary occupations in his native country. Subsequently he entered the employ of Messrs W. & R. Chambers, of Edinburgh, and took an active part in the preparation of their large series of educational works. During his connection with this house, the once-celebrated but now half-forgotten "Vestiges of Creation" made its appearance. Although Robert Chambers has always been credited with the greater share of this anonymous volume, Page is supposed to have lent powerful assistance with his versatile pen. Leaving the service of the Messrs. Chambers, he embarked on the sea of successful authorship, and, following in the wake of Hugh Miller, kept up an interest in geological science, by his voluminous writings, which were characterized by a graceful and easy style not usually possessed by scientific men. He rewrote his "Introductory

Text-Book of Geology," and prepared an advanced text-book on the same science. He also published works on physical geography, and various popular works on geological subjects. Taking up the study originally as an amateur, he ultimately devoted himself to it professionally, although he is not credited with much original power as an observer. In fact, field work for him was almost impossible, owing to physical infirmity, yet he had a most lucid and pleasing way of presenting the discoveries of others before non-scientific readers. On the establishment of the College of Physical Science, at Newcastle, he was chosen Professor of Geology. Here he pursued his vocation with much zeal and success until within a short period of his death. He was in the sixty-fifth year of his age.

The New Northwest.

In a long review of the condition, prospects, and possibilities of the vast and comparatively undeveloped country lying to the north and west of Minneapolis, Minn., the *Northwestern Miller* says that the Northern Pacific Railroad passes nearly through the center of the finest wheat region on the face of the earth. Nearly 300 miles further north another great trans-continental railway is being constructed, and our Canadian neighbors even contemplate building a railroad having its northern terminus on the shores of Hudson's Bay. It will thus be seen that to the north and west of Minneapolis is a vast and productive agricultural region, extending far up into the British possessions on one side, and losing itself in the mountains of Montana on the other. It is capable of producing wheat enough to supply the world, and the water powers of Minnesota alone are capable of converting the larger part of its product into flour. It embraces within its limits immense forests of pine and hard wood, and mines of iron, copper, silver, and gold. Nature has provided in abundance the elements necessary to the support of a great population, and the population is now coming.

It is only within the last few years that a systematic effort has been made to develop this valuable section of the national domain. The success of the pioneer settlers has been such as to attract the attention of others seeking homes in the West, and the stream of immigration thus started has suddenly swollen to gigantic proportions. Last year the settlers poured into Western Minnesota and Eastern Dakota by thousands; this year they are coming by tens of thousands. As yet only a tithe of the magnificent wheat lands of the western portion of this State are under cultivation, and the sod of the greater part of Dakota's fertile prairie is unbroken. There is a steady exodus from the eastern part of this State and from Wisconsin and other States, of young men and old men, to the "promised land," which, if it does not literally flow with milk and honey, does promise an abundant harvest and a competence to those who are willing to work hard and wait patiently.

It cannot be doubted, the *Miller* remarks in another connection, that this great accession to the wheat growing territory of the United States will have a marked influence on the milling industry of the country. With an abundant supply of breadstuffs prices must rule low, and the margins in flour manufacturing be small. Every effort of inventive skill will be made to cheapen the manufacture and better the product. The inevitable result must be that the making of wheat into flour will be done in large mills employing immense capital, and that the class of small combined merchant and custom mills will become a thing of the past. The present high standing of spring wheat flour, which many have thought and some have hoped would be lost with the exhaustion of the Minnesota wheat fields, will be maintained through the superabundant supply of the choicest kinds of hard wheat from the new fields now being opened.

Scientific Views of Nature.

Who does not see that Galileo, Descartes, Newton, Lavoisier, Laplace, have changed the foundation of human thought in modifying totally the idea of the universe and its laws, in substituting for the infantile imaginings of non-scientific ages the notion of an eternal order, in which caprice and particular will have no thought? Have they diminished the universe as some think? For my part I think the contrary. The skies as we see them are far superior to that solid vault spangled with shining dots and upborne some leagues above us by pillars which contented the simpler ages. I do not much regret the little spirits that had wont to guide the planets in their orbits; gravitation does the work much better, and if at times I have a sad remembrance of the nine angelic choirs wheeling round the orbs of the seven planets and for the crystal sea that lay at the feet of the Eternal, I console myself with the thought that the infinite into which we look is really infinite, and a thousand times more sublime to eyes of true contemplation than all the azure circles of Angelico of Fiesole. M. Thiers rarely allowed a fine night to pass without gazing upon that boundless sea. "It is my mass," he said. In how far do the chemist's profound views upon the atom surpass the vague notions of matter on which the scholastic philosophy was fed!—*Renan*.

Clothes Moths.

To keep furs and woolen goods from moths close wrapping in paper is enough, though a little camphor may be put into the package to keep off other insects. Any paper will do if there are no holes in it, and no openings are left for the moth to creep in. Of course care must be taken to have the articles free from moths when put away.