Dr. David Alter, a Local Scientist.

BY MISS DELLA MEANS*

In her Introduction to Amiel's *Journal Intime*, Mrs. Humphrey Ward says, "The philosopher has always tended to become unfit for practical life." My sketch deals with such a man—a modest village doctor whose genius should have won the greatest fame the world can give and a fortune beyond any of his day. But he was too engrossed in his studies to court fame and his lack of practical business sense let fortune slip—not once, but many times—even though it was almost within his grasp.

In 1753, the good ship "Beulah" arrived at Philadelphia from Rotterdam with Swiss and German emigrants for the Province of Pennsylvania. Among these were three Germans: Georg Heinrich Alter, Johann Jacob Alter and Georg Friederich Alter. These were possibly father and two sons. One account gives September 10, 1753, as the date of their arrival, while another gives it as the date upon which Johann Jacob Alter took the oath of allegiance to his adopted country. As Johann Jacob was Dr. David Alter's grandfather, this branch of the family will be mentioned briefly.

About 1768, Johann Jacob Alter married Margaretha Landis, daughter of Henry and Veronica (Graafe) Landis, of Lancaster County, Pennsylvania, her maternal grandfather being Hans Graafe, who had come from Switzerland to Philadelphia in 1696. Four daughters and six sons were born of this union. He moved from Lancaster County to Cumberland County and was prominent in that section, being a member of the House of Representatives of Pennsylvania from 1799 to 1805. He died at the age of seventy-three. Of the ten children, only three need be mentioned. (1) The seventh child, Susannah, born October 30, 1780, in 1800, married Joseph Ritner, who was a member of the House of Representatives of Pennsylvania from 1820 to 1825, and

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Dr. David Alter
At the age of sixty.
governor of this state from 1835 to 1839. (2) The fourth child, David, born February 7, 1775, married Elizabeth Mell September 1, 1797, and two years later settled on Puckety Creek, near Parnassus. There he built the blacksmith shop and grist mill which, as "Alter's Mill," is one of the landmarks still to be seen. (3) Dr. Alter's grandfather was Johann Jacob Alter's second son, John, born September 13, 1771, who, in 1794, married Eleanor Sheets of York County. Her father was Peter Sheetz, who was born in the Lake Lucerne region of Switzerland in 1680 and, after many romantic adventures which Dr. Alter loved to relate, came to Philadelphia in the "Loyal Judith" on November 25, 1740. He settled in York County, where he was famous not only as a watchmaker, but as a mechanician with a great gift for invention. He was a man of large frame, great strength, and much comeliness, and a born leader of men. The Alter men are usually tall, so Dr. Alter's exceptional height is easily accounted for.

In 1800, John and Eleanor Alter crossed the mountains and settled on a farm in Allegheny Township, Westmoreland County, near the David previously mentioned. Here they lived the life of the average German pioneer farmers until the death of John in the winter of 1833-34, and of his wife, Eleanor, in 1840 or 1841. Of their eight children, the only daughter became the wife of the Rev. Isaac Van Arsdale; and three sons became physicians, one being their fifth child, David, the subject of this sketch.

Dr. David Alter was born on the Westmoreland farm December 3, 1807. Whether he ever attended a school or was taught by the minister or a master is not known. German was the language of the home, but, after he was nineteen or thereabouts, Dr. Alter would not speak German unless his companion could not speak English. German letters written to the doctor were frequently translated to him by his friend, F. D. Schweitering, a German merchant of Freeport, which shows that the doctor could not read the script easily. He learned English from a Testament principally, which accounts for his wonderful facility in this language.
When eight or nine years of age, he read of the life of Benjamin Franklin, and so developed an interest in electricity. At ten, an uncle brought a Leyden jar and some electrical appliances from the East. Thus learning of the generation of electricity by friction and of its storage in a Leyden jar, the boy began to experiment. Before he was fifteen, he had set up in his father's orchard a pole topped by a wire in an effort to charge his Leyden jars from the clouds.

His eyesight became so impaired that he consulted a physician in Freeport, to whom he afterward always referred as "the Irish Doctor," whose name is now forgotten. Though he prescribed for the eyes, this warm-hearted Irishman could not resist lending the boy a book on electricity which he studied so eagerly that his sight became still more impaired. Later, another physician loaned him a book on chemistry, which was soon mastered. The boy was so eager to learn from his borrowed books that in after years he frequently told of the wrath of his hard-working father when he discovered young David seated upon his plow oblivious to everything but his book. The doctor's amused chuckle always left his auditor to imagine how the sturdy German induced his studious son to resume the much-needed plowing.

He began the study of medicine after he was twenty-one, and in 1831, at the age of twenty-four, was graduated as a physician from the Reformed Medical College of the United States, in New York City, founded by Dr. Wooster Bach, and representing the Eclectic School of Medicine. To attend this school, he was compelled to ride on horseback from his home to Philadelphia, and finish his journey on the railway then just completed.

After his graduation, he began the practice of medicine at Elderton, Armstrong County, Pennsylvania, and his great ability as a physician was soon recognized. Indeed, his reputation in his chosen profession became such as the years passed by, that he was called into consultation in difficult cases all along the Allegheny Valley, as far as Oil City. He was in advance of his time, for he never, under any circumstances, prescribed whisky; although the Rev.
N. P. Kerr tells how the doctor discovered that Mrs. Kerr had made a quantity of grape juice to offer her callers and sent patients for it until the minister’s wife had none left. He never made any charges to poor patients and never sent out any oils. Large sums remain uncollected, of course.

To his modest home in Elderton, after their marriage on January 12, 1832, he brought his first wife, Laura Rowley of Freeport, whose family had come from Vermont, and who was a grandniece of Governor Jonas Galusha of that state.

At Elderton, in 1836, he invented an electric telegraph which consisted of seven wires, electrically deflecting a needle on a disc at the extremity of each wire. As each needle was deflected to the right or to the left, the seven gave in all fourteen movements, or characters, which, in turn, by combination, gave a greater number than was absolutely necessary to transmit messages resolved into letters or figures. Each wire had a separate helix and about three miles of wire were used in the system installed between his house and his workshop, which was in the barn. The honor of transmitting the first message must be given to Dr. Alter and his brother-in-law, Dr. Myron Rowley, and later the members of the family transmitted messages at will. Without doubt, this was the first electric telegraph, for Prof. Wheatstone, of England, invented his one-wire telegraph in 1837, and Prof. Morse’s invention came still later, although he was working upon the idea a number of years before perfecting it.

That Morse stole the idea of the telegraph from Dr. Alter was frequently asserted in the newspapers of the day, the story being still current, despite the fact that Dr. Alter vigorously denied it. To the late Dr. Frank Cowan, of Greensburg, who interviewed Dr. Alter at his home in Freeport in 1878, and afterward published the interview, Dr. Alter said: “I am free to say this story is without the slightest foundation—indeed, I may say that there is no connection at all between the telegraph of Morse and others and that of myself; my system would be inadequate to do the work that is done today by the Morse. Oh, no, no! Prof.
Morse most probably never heard of me or my Elderton telegraph." Dr. Cowan says further: "I was surprised ** * but at the same time pleased that the doctor exhibited more anxiety to disabuse my mind of erroneous impressions of another than to create a favorable impression of himself. Indeed, with respect to his own electric telegraph, he spoke of it as if it had been a toy of his youth, or an ingenious plaything for the amusement of himself and family. Dr. Alter had applied for a patent for his telegraph at least four years prior to that granted Morse, but the patent was refused on the ground that 'the idea was too absurd and chimerical.'"

Years afterward, his idea that "the telegraph could be made to speak," was worked out with baking-powder cans for mouthpiece and receiver and a string for the connection. On this crude telephone, he and his daughter often talked from "the shop" to the yard at the Freeport home. Whispers could be heard for twenty feet. This also was regarded as a toy and not developed.

In 1837, Dr. Alter invented a small electric motor and, on June 29, 1837, he published in the *Kittanning Gazette* an elaborate article on the use of electricity as a motive power, under the heading of "Facts Relating to Electro-Magnetism." This attracted the notice of scientists and inventors and is noted in Silliman's "Principles of Physics," page 616. Thus the forerunner of the electric motor, now so indispensable, is to be accredited to this modest man.

In the article in the *Kittanning Gazette*, Dr. Alter also writes of the possibility of the electrification of railways and points out the advantages of electric locomotives over the steam ones. In 1837, this was regarded as visionary but now we know that the dream has become a reality. At the time of his death, Dr. Alter was working upon plans for an electric locomotive.

In a "History of Armstrong County," there is a short account of Dr. Alter, and 1843 is given as the date of his removal from Elderton to Freeport. He lived in a house—long since destroyed—on Water Street, on what is still known as the Moorhead property, now owned by Mrs. John Shirley. Dr. Alter always loved the beautiful scene about
the house. Water Street runs parallel with the Allegheny River and is opposite the high wooded bluff which extends from Garver's Ferry to the mouth of the Kiskiminitis River. A square west of his home is the mouth of Big Buffalo Creek and still farther on is "the Bend" with the wooded hill on the right bank.

A man named Kline had built a large frame house for a home but soon desiring to leave town, sold the new house to Dr. Alter, who moved four lots away from his first location and lived there for the remainder of his life. Some years after his death, "the old doctor's house," as it was called, was burned to the ground and the contents destroyed. But his only surviving child, Mrs. Anna R. Alter Burtner, erected a new house on the same location and this is still her home.

His first wife died very shortly after coming to Freeport and, on May 14, 1844, Dr. Alter married Elizabeth Amanda Rowley, a sister of his first wife. She survived the doctor, dying November 15, 1900. Of the three children by the first marriage and the eight by the second, only four lived to maturity. Of these, it is claimed that Electa's was the first body to be interred in the present Freeport Cemetery; Ella died in 1881, a few months before her father; Dr. Myron H. died some years later; Mrs. Burtner is spending this year in Denver but gave me all the help possible in preparing this paper before leaving. She was her father's interested helper and talks of his wonderful scientific investigations as easily as I would speak of going down town.

In the Alter home, a room on the second floor soon became known as "the shop." It opened upon an upper porch on the eastern side of the house and it was there that I, the shy, wee youngster of five, who lived next door for the last six months of the doctor's life, recollect clinging to my father's hand in the warm summer darkness and watching the tall old doctor working with his telescope as he observed the northern sky. His reflecting telescope (made by himself) was on a tripod and was about eight feet long, with lenses ten and fifteen inches in diameter. While he was compelled by his poverty to make most of his instruments...
(and often the tools with which to make them) he had an excellent spectroscope presented to him by Hageman, of Sweden. To enlarge the image of the sun spots, Dr. Alter simply hung sheets against the wall of his house and the spots were plainly visible. On his porch he loved to stand and estimate the distance of storms by counting the seconds between the lightning flashes and the loudest part of the thunder.

To my childish mind, that “shop” was fairy-land, though not one thing in all the clutter was to be touched by investigating fingers. A stolen touch upon something that “stung” cured all desire ever to touch anything there again. The doctor was an excellent taxidermist and that place held so many animals and birds that the wonder is how he ever packed in his books and various appliances. His concentration was such that often he never knew that any one had entered or left. But, if not busy, he always had a winning smile and a word for the quiet little neighbor who reveled in the sights of “the shop” for hours.

Here he invented a “shocking machine,” the forerunner of the more perfect machines of today.

Here he invented the large electrical clock run by batteries (Leyden jars) in the cellar. The old clock in the shop was set by electricity. This was the forerunner of the electric clocks now so commonly used.

Here he worked out the plans for an electric motor to run a buggy—the forerunner of the automobile.

Here Mr. Herman Schweitering, of Freeport, saw a butter bowl with wires drawn across the top and was told by Dr. Alter that his experiment showed that some day people would be traveling through the air—a forerunner of airplane.

Here also he utilized the discovery of Daguerre and became an expert operator. His daguerreotypes were made on collodion glass plate and his ambertypes on tin plate. His two daguerreotypes of the dark lines of the Solar Spectrum was a wonderful achievement and showed him to be a master of the art.
Here he invented a rotating retort for the extraction of coal-oil from cannel-coal and the oliferous shales. This apparatus was operated either at Lucesco or Schenley, on the south side of the river from Freeport, and was backed by a company having ample capital, one of the capitalists being a brother of Gov. Johnson of Pennsylvania, a distant relative of Dr. Alter. Dr. Alter was chemist and general superintendent, and the philosopher was on the high road to great wealth when Drake struck oil, and the project collapsed, though the doctor sold his project for a fair sum—the only money which he ever received from any of his discoveries except bromine. The ingenious lamp he had invented in which to use this oil for illuminating purposes was also of no use. Dr. Alter always refused to go into the oil business, as so many did at that time.

Having discovered a method for obtaining wood alcohol, he manufactured it for some time in a small building across Big Buffalo Creek, directly above the present railroad bridge.

In 1845 or 1846, Dr. Alter, in partnership with Dr. Edward Gillespie and his brother, James Gillespie, began the manufacture of bromine from the bittern, or mother liquor of the salt wells at Butler Junction (across the creek from Freeport) and at Karns (upon the property where my brother now lives, and which is owned by Mr. George Beale) and at Natrona where the Pennsylvania Salt Company now has its large plant. The French chemist, Antoine Jerome Balard, had discovered the elementary substance of bromine in 1826, while experimenting with sea water, and Dr. Alter's invention simply improved the method of its manufacture so that there could be produced unlimited quantities of a hitherto scarce and costly product. It sold for $30 a pound, which was little more than half a pint. Its use as a drug was little understood, and it was principally used in making daguerreotypes. A large jar of the precious substance was exhibited in New York in 1853 and attracted great attention because of there being such a large quantity of the rare substance. The Gillespie brothers were excellent business men and obtained two patents for this
process, the first being secured on July 5, 1848. Dr. Alter obtained a third patent for still another improvement in the manufacture of bromine and iodine in 1867. The bromine works were situated on the right bank of the Big Buffalo Creek, opposite the upper end of the island, just below the present Laneville bridge.

The story that Dr. Alter invented an excellent car coupler probably arose from the following: A man talked of his incomplete invention of a coupler to Dr. Myron Alter, at Kittanning, who sent the man to his father. The old doctor soon remedied the trouble and was quite indignant when the man offered him $5 for his help. Then saying he would share any profits with the doctor, the man left, but forgot his promise when he sold his patent for several thousand dollars.

A signal service station was established at Freeport on April 16, 1873, under the charge of Dr. Alter and his son. The present mode of making monthly reports showing the relation between the quantity of rain and the rise in the river is the work of the son. After Dr. Myron had left home, any member of the family who happened in did the work of the station. While calling upon the daughter, Mrs. Burtner, last summer, the telephone rang and the daily weather report was asked for. She stepped to the front window, glanced at the guage on the pier of the bridge built some years before to replace Garver's Ferry, in order to ascertain the stage of the river, and then unconcernedly gave such a succinct scientific reply that I was amazed.

The greatest achievement of all was the discovery of the Spectrum Analysis in 1853. The doctor supposed that he was the first discoverer, but last year Dr. Brashear, aided by a librarian in the British Isles, found evidence that this honor must be given to a Scotchman, who is as little honored for the discovery as is Dr. Alter. The honor is commonly accorded to Gustav Robert Kirchhoff, of Königsberg, Germany, who announced his discovery in 1859—six years later than Dr. Alter, whose articles had already been published in the leading scientific journal of this country and copied by Swiss, French, and German journals.
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In his sketch of Dr. Alter published in The Pennsylvania German of March, 1910, James B. Laux, of New York, copies these articles as they were written by Dr. Alter.

Dr. Alter began his first article by saying: “We are indebted to the celebrated M. Fraunhofer (Frauenhofer is now the usual spelling) for the fact that the Solar Spectrum is crossed by numerous fixed lines, and that the light of some of the fixed stars differs from that of the sun in the number and situation of these lines. In order to see some of these lines without the aid of a telescope, I ground a prism of flint glass with a large refracting angle (74 degrees).” He then describes very minutely the results of his observations upon sunlight, upon the blaze of a lamp burning petroleum, the blaze of a tallow candle, the flame of alcohol, a slip of white paper illuminated by a tallow candle, the jet of a blow pipe, the light from a heated wire or charcoal, the electric spark from a Leyden jar, and various minerals when subjected to the powerful electrical discharges of a magneto-electric machine. These are silver, copper, zinc, mercury, platinum, gold, antimony, bismuth, tin, lead, iron, brass, an alloy of copper and zinc, and an alloy of silver and copper.

In the second article, he announces the results of his experiments with the electric spark in atmospheric air, hydrogen, nitrogen, chlorine, carbonic acid gas, sulphuretted hydrogen, oxygen, etc. He says, “From this, we perceive the cause of the difference in color in the flashes of lightning—for when the electricity has a watery conductor in much of
its course, it will emit red light; but when it passes through air, the light will be white, as in the spark through that medium the bands (of color) are well distributed among the colors of the spectrum. The colors also observed in the aurora borealis probably indicate the elements involved in that phenomenon. The prism may also detect the elements in shooting stars, or luminous meteors."

The little prism with which Dr. Alter made his remarkable experiments was made by himself from a fragment of a great mass of very brilliant flint glass found in a pot in the ruins of Bakewell's glass-house after the disastrous fire which, on April 10th, 1845, nearly destroyed the city of Pittsburgh. Because of his interest in Dr. Alter's work, this prism was given to Dr. Frank Cowan, by the old doctor. After Dr. Cowan's death, the Carnegie Museum of Pittsburgh came into possession of his scientific collection and this prism may now be found in the case just inside the front doorway of the museum. An oil portrait of Dr. Alter painted by Dr. William J. Holland from a photograph, hangs upon the wall to the right of the case.

These experiments show the limitless patience of the man in his conscientious effort to secure exact truth. He was bitterly disappointed that so little notice was taken of his discovery of the spectrum analysis, for he had expected that the entire scientific world would take notice of it.

The disappointed old doctor, broken in health, was forced to suffer a bitter humiliation in the last year of his life. The Freeport Journal of January 14, 1881, says: "The doctor met with misfortunes in his old age, not from any misconduct of his, but from circumstances over which he had no control. His homestead property was sold from him, as well as all his other property and he was left entirely destitute, but a few kind friends came to his rescue and, without the doctor's knowledge, raised a sufficient amount of money to re-purchase his homestead, and on New Year's evening a self-constituted committee of two waited upon the old gentleman and presented him with the deed of the old homestead, free from all incumbrances, and a handsome bonus besides." Of the same incident, the Kittanning Free
Press says, "Through some business complications, Dr. Alter became embarrassed and was forced to mortgage the old homestead. A few months ago the mortgage was foreclosed, and, after a long and busy life, it seemed he would have to leave the roof which had sheltered him so long. Freeport and Kittanning friends made up a fund for its repurchase and Dr. Alter was moved to tears at the kindness of these friends." The item closes with, "The act shows in what high esteem he is held by his neighbors." From the Freeport Journal, I copy the following:

"Card of Thanks.

To the many friends, who participated in the gift of New Year, it is impossible to convey the depth of my gratitude. May each of you be blessed with a thousand-fold return for your kindness."

David Alter, M. D."

Happy that he need not leave his old home and secure in the love of his friends, the old doctor could not stay the progress of disease but became resigned to the knowledge of approaching death. Although a strong believer in the early coming of the millenium, he had hoped to live until that time had come. He had joined the First Methodist Episcopal Church of Freeport late in life, but the church records unfortunately have been lost and the date cannot be obtained. The Misses Mary and Anna Boyd informed me that they remembered very well when Dr. Alter and his nephew, Milton, went to the mourner's bench together in a revival held by the Rev. E. M. Wood. The record gives the date of this pastorate as 1867-1868. Dr. Charles Gillespie attended Dr. Alter in his last illness and walked the floor in distress when he found that human skill could do nothing that would avail to save the life of his old friend, who died of a complication of diseases, but pneumonia principally, on Sabbath, September 18th, 1881.

My father and mother helped to care for the doctor all of the night preceding his death. The next night my exhausted parents were awakened by the struggle of my bro-
ther in an attack of membraneous croup and my frightened mother startled the watchers in the Alter home by rushing in and calling for Dr. Myron. True to the lifelong habit of helping any one in distress, their own grief was put aside and not only Dr. Myron but his mother and other friends, ran to our home, and it is to them we owe my brother's life.

The funeral was held in the present First Methodist Episcopal Church, which had been built only a short time previous. All the ministers of the town were present, as well as a number of the former pastors of his church. The church was so crowded that not all could obtain entrance. Probably more than two hundred vehicles filled with sorrowing friends followed "the old doctor" (as he is lovingly called to this day) to his last resting-place in the Alter lot, which is adjacent to the circular plot marking the center of the cemetery. In the middle of the plot the Alter monument now stands.

The *Freeport Journal* of September 23, 1881, contains the following:

"Obituary.

Alter—At his residence, Freeport, Sabbath, September 18th, Dr. David Alter, aged 74. In the death of Dr. Alter our community loses a good citizen, and the State one of the ablest minds of the age. His whole life was spent in the interest of science and humanity. ** While he has sown others have reaped and in a pecuniary sense he died poor. But in that higher, nobler wealth he was rich—rich in love for his fellow man—rich in good deeds, rich in Christian experience, rich in the pure life he lived and the good name he left behind him. **"

Years passed by and the grave remained unmarked; not through neglect, but because of lack of money in the family, which now consists of Mrs. Burtner and her daughter, Mrs. H. E. (Laverna) Scott, who with her husband and three children, reside at Vandergrift, Pennsylvania. But after reading Laux' article in 1910, Mr. R. B. McKee, editor of the *Freeport Journal*, determined that a memorial should be erected to Dr. Alter's memory. A resolution to that ef-
fect was offered at the next Board of Trade meeting and unanimously adopted, the president appointing Burgess Wilson Dougherty, R. B. McKee, J. H. Shoop, H. H. Sweitering, and A. Sweeney to prosecute the work. The matter was presented to the people through the Journal, but no funds were solicited, believing that whatever was given should be a perfect free-will offering. Many were glad to contribute, as was I, when the opportunity came.

To a committee composed of Mrs. J. O. Ralston, Miss Minnie Heck and Miss Anna Boyd was given the work of selecting the inscription for the stone. They selected the one written by Mrs. Ralston. It was decided that a plain block of dark Barre granite, sarcophagus style, would best be in keeping with the character of the doctor.

At the close of the Memorial Day services at the soldiers' monument on May 30th, 1911, the great crowd gathered to witness the unveiling of the monument. After a selection by the band, the Rev. N. P. Kerr, of Oakmont, (Dr. Alter's close friend and former pastor) offered prayer; the Dixie Quartette sang and a poem was read by the author, the Rev. J. J. Francis, D. D., who was a friend of the old doctor's also; then Dr. John A. Brashear, in a brief address, gave a grand tribute to his old friend's memory. As Mrs. Burtner drew the cord, unveiling the memorial to her father, R. B. McKee presented it to the citizens and gave it into the keeping of the Cemetery Board. Mr. Samuel Turner, president of the Board, accepted the trust. Afterward all sang "America," the benediction was pronounced by the Rev. A. H. Davies, the minister of the First Methodist Episcopal Church.

BIBLIOGRAPHY.

4. Ibid, for the year 1855, p. 107.
7. Evening Telegraph of Pittsburgh, October 11, 1881: "A Dead Philosopher"; Dr. Alter's Life and Labors, by Dr. Frank Cowan, Greensburg, Pa.; David Alter, the Discoverer of Spectrum Analysis—A Sketch of His Life and Labors, by Dr. Frank Cowan, Greensburg, Pa., (1894).