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JARED POTTER KIRTLAND,

PHYSICIAN, TEACHER, HORTICULTURIST, AND EMINENT NATURALIST.*

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The adolescent in science like the adolescent in youth is more likely to be impressed by good example than by much exhortation. The choice of my subject is in part influenced by the desire to bring to the attention of the younger members of the Ohio Academy of Science a scientist whom they may well emulate.

To the more mature as well as to the younger, it is both of interest and advantageous to be reminded of those who have preceded us and to learn something of their careers. It is especially fitting that the Ohio Academy of Science should acknowledge its indebtedness to the pioneers of science in Ohio.

Therefore I have chosen as my topic to sketch the life and career of Jared Potter Kirtland, who so largely influenced the development of interest in natural science in Ohio.

ANCESTRY.

We have long heard much discussion as to the relative importance of inheritance and environment, not only in biological doctrine, but as well in human society. However, when an individual is the happy recipient of both favorable ancestry and of advantageous surroundings and opportunity there is a summation of the influence of inheritance and environment that promises important results.

*Presidential Address before the Ohio Academy of Science, April 18, 1930.

Nathaniel Kyrtland (1616-1686) came from Tickford, Buckinghamshire, England to Massachusetts Bay in 1635 and settled at Lynn. His son, Lieutenant John Kirtland (1659-1716), migrated to the lower Connecticut Valley and settled at Saybrook, Conn. Here he and his children played important parts in colonial history. He himself became commander of the fort at Saybrook Point and led his fellow colonists in several battles with the Indians in the closing years of the seventeenth century. One of his descendants, John Thornton Kirkland, (1770-1840),—for the two names are but variants—was President of Harvard College from 1810-1828. Rev. Samuel Kirkland, the renowned missionary to the Indians, was also a descendant. Early in the eighteenth century several of the family moved up the river to Wallingford, Connecticut. Here in 1755 was born Turhand Kirtland, the father of the subject of this sketch.

When in 1796 the Connecticut Land Company bought three million acres in that area of north-eastern Ohio known as the Connecticut Western Reserve, its officers sought a man to represent them as resident general agent in this frontier area. Their choice in 1797 fell upon Turhand Kirtland, a veteran of the Revolutionary War then forty-two years of age, and it proved a wise choice, for during the closing years of the eighteenth century and the early decades of the nineteenth century this man showed himself brave, resourceful, and just. He had both breadth of vision and integrity and to him largely is due the fact of unbroken friendliness between settlers and Indians in that region. He was an associate judge, a member of the state senate and a trustee of Western Reserve College.

In testimony of his attitude toward the Indians one incident will suffice. Soon after Turhand Kirtland came to the Western Reserve in 1797, a white man killed an Indian in a drunken brawl. Kirtland at once had the white man arrested. There were no established courts in that part of the state but he sent to Marietta and induced two duly appointed judges to journey two hundred miles to try the white man. Primarily on the testimony of Indians who were eye witnesses of the killing, self defense was proven and the man acquitted. The Indians were entirely satisfied. This incident so firmly established the reputation of Turhand Kirtland for fair dealing that he became the accepted arbitrator when the Indians had any disagreement with the white settlers.

Not only on the paternal side, but also on the maternal side, Jared Potter Kirtland was fortunate in his ancestry. His mother, Mary Potter, counted in her forbears, both direct and collateral, a line of able and influential persons. Her father Dr. Jared Potter (1742-1810) was reputed to be the leading and most learned physician in the Connecticut of his day. Graduated at Yale in 1760, he studied medicine with the most scholarly physician in that colony and early acquired an interest not only in medicine but in many other lines of knowledge including natural history. He continued throughout his life to be a student and a leader in his profession founding the first State Medical Society of Connecticut. He was also a leader in his community and was continuously a member of the legislature for the last eighteen years of his life.

EARLY LIFE AND EDUCATION.

Jared Potter Kirtland, the eldest son of Turhand Kirtland and Mary Potter his wife, was born at Wallingford, Connecticut, November 10, 1793. He was ten years of age when his father moved the family to Ohio, but the lad was not taken to the frontier. Instead he was put into the home of his grandfather, Dr. Jared Potter, under whose guidance for seven years he was carefully educated, and in his boyhood days, learned to like to study. As a boy he took prizes in Mathematics, in Greek, and in Latin. He acquired that taste for the classics that resulted in his reading the classic authors in the original as a recreation up until the closing years of his life.

It was not alone in formal school study that he was trained. His grandfather inculcated in the boy a love of natural history and taught him accurate observation and the habit of recording his observations, a habit which was maintained throughout his life and in large measure accounts for the wealth of original observations shown in all his writing. Dr. Potter had an extensive orchard which included mulberry trees where the attempt was being made to produce silk. At ten years of age the lad was carrying on experiments in improving fruit trees by budding and grafting. At eleven he was making experiments with bees and studying their enemies. At twelve he made his first scientific discovery of importance when he showed, by breeding experiments, that the silk worm moth can reproduce parthenogenetically, something that had never

before been recorded, and preceding by nearly fifty years Siebold's work on parthenogenesis.

At fifteen years of age in 1808 he made a summer trip to Ohio. At seventeen years of age Jared Potter Kirtland came to Ohio to his father's residence at Poland, Ohio. Here he taught school, but his chief interest was in exploring the adjacent country, observing the flora and fauna, and working in his father's orchards.

PROFESSIONAL EDUCATION.

Before a year had elapsed Dr. Jared Potter died (July 1810), making a considerable bequest to his grandson and giving him his rather extensive library. Thereupon young Kirtland returned to Wallingford, Conn. and began the study of medicine under the preceptorship of two local physicians. During a part of this time he was studying at Yale College as a private pupil of Professor Eli Ives in botany and of the elder Silliman in mineralogy and geology, both of these men having been friends of his grandfather. The fortunate circumstances that brought Kirtland in his youth into intimate contact, first with Jared Potter, and later with Ives and Silliman had great influence upon his scientific career for all three were men of outstanding ability and scientific zeal.

With the bequest of his grandfather, Kirtland, yet under twenty years of age was able to plan his career without financial restriction. His purpose was to go to the University of Edinburgh to study medicine, but before he was ready to depart the war of 1812 came on and that procedure had to be abandoned.

It happened that just at that time Dr. Nathan Smith, eminent as a medical teacher, came from Dartmouth to found the Yale Medical Institution and in 1812 at the age of nineteen Kirtland became the first matriculant in that new medical school. After one session, he did the common thing of migrating to another school and went to the University of Pennsylvania where he spent the session of 1813-14. Here he came into close relations to Barton the botanist under whom he wrote a thesis.

In 1814 Kirtland was in bad health and he spent some months in Wallingford and in the autumn of 1814 returned to the Yale Medical Institution where he graduated in medicine in March 1815 at the age of twenty-one.

His education had brought him into contact with the leading medical school of the country and with two of the best colleges, but also it had given him rather intimate relations with three of the leading scientists of the day namely Barton, Ives, and the elder Silliman and with Dr. Nathan Smith, leading medical teacher. This, in addition to his early training under his grandfather Dr. Jared Potter and his own taste for study, gave him a background rarely accorded in that day. His environment and opportunities had been most favorable toward developing his innate ability, a heritage from an able ancestry.

MEDICAL CAREER.

On graduating in medicine Dr. Kirtland married and returned to Wallingford, Conn., his native town, to practice medicine. His popularity is attested by the fact that within about a year, at the age of twenty-three, he was elected judge of probate. He practiced medicine at this location for five years and then moved to Durham, Conn. Here in 1823 his wife and second child died. The result was a great despondency.

He now, at the age of thirty, resolved to abandon medical practice and moved to Poland, Ohio, planning to follow his father, then seventy years of age, in the conduct of the extensive mercantile business he had there developed. But a pioneer community with no other well-trained physician in it would not permit Dr. Kirtland to remain inactive medically. He soon was deep in an extensive medical practice, and had abandoned his idea of store-keeping, but not of avocations. In 1825 he again married. His country riding gave him opportunity to study the flora and fauna, and soon he focused attention on the fresh water bivalve mollusca of the Mahoning river, which led to two important contributions to zoological knowledge. He discovered in 1829 that the individuals of these mollusca are of separate sexes, instead of hermaphroditic as always had been taught before that time. This discovery was first published in 1834 in the American Journal of Science. In the same journal in 1840 he published the discovery of the byssus, the larval organ of attachment in these animals.

These two discoveries made his name known in Europe and brought him the friendship of prominent American zoologists, not least of whom was Louis Agassiz.

Natural history was not his only avocation. He continued the interest of his boyhood in improving fruits and developed on his farm at Poland, Ohio, excellent orchards and small fruits, and as early as 1831 began writing for horticultural journals.

He became well known and popular in his community and in 1827 was elected to the legislature and twice reelected. In the legislature he was at once put on several important committees and on his first reelection he was made chairman of the Committee on the Penitentiary. In that session he carried through a reform in the management of the Ohio penitentiary whereby useful labor replaced solitary confinement, a change so well accepted that he was called the "Father of the Penitentiary." He also had important influence in the legislature toward the construction of the Ohio and Pennsylvania canal.

With all these activities his medical practice extended and, in the middle 1830's he came to have the reputation of being the best and most learned physician in northern Ohio. He was active in the State Medical Convention, being its president at its third session held in Cleveland in 1839, where, as his presidential address, he presented an extensive review of the climate and meteorology of Ohio since its first settlement and the relation of these conditions to the diseases of that period. Later, in 1849 he was made president of the State Medical Association.

CONNECTION WITH OHIO GEOLOGICAL SURVEY.

Beginning in South Carolina in 1823 there was a wave of organization of state geological surveys. By 1836 it included ten of the eastern and southern states and also a United States Survey. In 1836-37 the first Ohio Geological Survey was organized. In this survey Dr. Kirtland was put in charge of Zoology. In the membership of the survey there were three other physicians, namely, Drs. S. P. Hildreth, John Locke, and John L. Riddell. Dr. Kirtland worked with great energy. Financial support from the legislature was scanty but Dr. Kirtland not only suspended his own pay in order that the geological features of the survey might proceed but also he personally paid the stipends of his assistants so that the work in zoology might go on. Only when the project was entirely abandoned did he desist. Out of this work came his list of

Ohio Vertebrates containing 585 entries and his pioneer work on the Fishes of Ohio, which, the state refusing to print, was published in the Journal of the Boston Society of Natural History in 1839-1846. In 1840 he published a description of the kidney worm parasitic in swine, the first record of its occurence in America.

TEACHING CAREER.

In 1837 there was a vacancy in the Professorship of the Theory and Practice of Medicine on the faculty of the Medical College of Ohio at Cincinnati, then the only regular medical school west of the Alleghenies and north of the Ohio river. To this vacancy Dr. Kirtland, a country practitioner, was called. Here at forty-four years of age he began his career in medical teaching which continued for nearly thirty years, a career marked by the reputation of breadth, clarity, scholarliness, and practicability, and withal outstanding in excellence.

In 1837, the same year that he began teaching medicine in Cincinnati, Dr. Kirtland left Poland, Ohio and bought a farm at Rockport, five miles west of the center of Cleveland, where he resided for forty years until his death in 1877. Here he continued extensive experimentation in various branches of horticulture. He spent the teaching term from November to March at Cincinnati and the balance of the year at Rockport. This continued for three years. Then he resigned at Cincinnati and in 1840 joined the faculty of the Willoughby Medical School. This change permitted him to live the year round on his Rockport farm where his experimental work was broadening.

In 1838 he had as a colleague on the medical faculty in Cincinnati, Dr. John Delamater, a man at that time reputed to be the best medical teacher in the United States, and who in his teaching career held professorships in nine different medical schools. Dr. John Delamater was the leading figure in the Willoughby Medical School and it was through his influence that Dr. Kirtland joined that faculty in 1840. There he first met Dr. John Lang Cassels, a Scotchman educated in the University of Glasgow and at a New York medical school, who later did important work in Botany and Geology.

In 1843 Dr. Kirtland with Delamater, Cassels, and Dr. Horace A. Ackley resigned from the Willoughby Medical School and founded the Cleveland Medical School (now the

School of Medicine of Western Reserve University) in which Dr. Kirtland continued as Professor of Medicine until he reached the age of seventy-one, in 1864.

CONNECTION WITH SCIENTIFIC SOCIETIES.

On that faculty was a group of seven scholarly men said to constitute one of the best balanced medical faculties in the country, and also there were other able men in the community who were interested in natural science. These Dr. Kirtland, in 1845, organized into the Cleveland Academy of Natural Sciences. Of it Dr. Kirtland was president for twenty-five years until he was compelled to withdraw by reason of the feebleness of age. In his honor its name was later changed to the Kirtland Society of Natural History.

At its monthly meetings were presented able papers, not only by members but by visiting scientists. The range of subjects was wide and included many fields of Zoology, Botany, Geology, Paleontology, Mineralogy, and Meteorology. The Academy at once started a museum to which was contributed much valuable material. The present Cleveland Museum of Natural History is its direct lineal successor.

Dr. Kirtland had been active in a scientific society at Cincinnati during the three years of teaching there. In 1839 he became a member of the Boston Society of Natural History. He was one of the founders of the American Society of Geology and Natural History in 1840 and also of its successor, the American Association for the Advancement of Science, in 1845. He was a member of the Philadelphia Academy of Natural Science, and of the American Society of Conchology and probably of the natural history societies in New York and Chicago. In 1864 he became a member of the American Academy of Science, being elected to fill the vacancy caused by the death of Benjamin Silliman, the younger. In 1875 at eighty-two years of age he was elected a member of the American Philosophical Society. To all of these societies he contributed papers.

In addition to these societies of Natural Science, he held membership in a group of societies connected with agriculture and horticulture. In many of them he held offices, of several he became president and to all of them he contributed papers.

PUBLIC SERVICE.

Dr. Kirtland was always helpful in public service. Mention has been made of his service as probate judge and his career in the legislature. When the civil war came on he was sixty-eight years old. The government would not send him into the field but he served through the war as examining surgeon at Cleveland and turned over all his pay to be used in aiding soldier's families.

When Cleveland came to seek to supplant its wells and springs with lake water Dr. Kirtland was the most active one of a committee of three that planned and put into operation the first water supply system of Cleveland. Before the civil war he and two others (Drs. Nathan Strange Townshend and John Strong Newberry) established winter courses in agriculture given first at Oberlin and later at Cleveland. He was one of the small committee of the Ohio Agricultural Society that for many years sought the establishment of an agricultural college, a plan finally successful when, in 1874, instruction began in what has now become Ohio State University.

HIS GENERAL REPUTATION.

One would expect with such diversity and versatility there would have been superficiality but no evidence of it appears. On the contrary he appears to have excelled in every vocation or avocation to which he put his hand.

First of all there is plenty of evidence that he was held in high regard by profession and laity, through more than fifty years, as a very good general practitioner of medicine. He was considered both by colleagues and students as an excellent medical teacher. He held professorships of medicine in three different medical schools in Ohio covering a period of twenty-seven years of active teaching.

In horticulture he had an international reputation. This was not only as regards fruits, but extended to ornamental trees and also to floriculture. He did some work in animal breeding. He was elected to honorary membership in the most exclusive horticultural societies. He developed many new varieties of flowers and fruits. His results in the cultivation of cherries included the development of over forty new varieties and his success was so preeminent that he was referred to as the "Cherry King." Also he improved the culture of apples, pears,

grapes, raspberries, and strawberries. In other fields of agriculture he was considered an authority and was frequently quoted, in other parts of the country, on such diverse subjects as bee culture, windmills, and rural architecture.

HIS SCIENTIFIC CONTRIBUTIONS.

Dr. Kirtland was a prolific writer upon a great variety of subjects. In an attempt to compile his bibliography I have so far collected over two hundred titles of signed papers, beside many more, found in journals to which he was accustomed to contribute, that bear imprint of his style of writing but are not signed. Many of these are initialed "K" but may have been written by his brother Dr. Billius Kirtland, who was also a capable naturalist and horticulturist. Dr. Jared Kirtland's papers fall into four groups: medical, zoological, horticultural, and miscellaneous.

The medical papers are not numerous. I have but ten but these bear evidence of careful observation, clear deduction, and progressive thinking as to etiology, diagnosis, and therapeutics. It is of interest to note that in 1851 he wrote a paper in which he said he was convinced that typhoid fever comes from the drinking water. This was thirty years before we knew of bacteria.

Of the zoological papers I have been unable to locate his original description of parthenogenesis in the silk worm moth. In later papers he makes reference as to the facts and date of his experiments and discovery but does not say when it was published nor does he definitely say it was published. The first important papers were on the bisexuality of fresh water bivalve molluscs and the description of the byssus. These were published in the American Journal of Science in 1834 and 1840. The list of 585 Ohio vertebrates was published in the second report of the Ohio Geological Survey in 1838 and the series of papers on the Fishes of Ohio were published in the Journal of the Boston Society of Natural History from 1839-1846. Some seventy other zoological papers relating to parasitic worms, mollusca, lepidoptera, hymenoptera, fishes, reptiles, birds, and mammals appear in a variety of journals and society proceedings.

His zoological interests appear to have been centered on fishes and birds. He was not satisfied with merely possessing preserved specimens, but was interested in their food, their

habitat, habits, and range and especially in the occurence of previously unrecorded species. It will be recalled that a warbler was named after him. It is probably less well known that a bivalve mollusc, a snake and a fossil were also given his name by their discoverers.

INFLUENCE IN POPULARIZING NATURAL SCIENCE.

Great as was his influence upon professional men and those engaged in scientific pursuits, yet perhaps greater was his influence along scientific lines upon the laity. To appreciate this it is necessary to recall that before the Civil War this region was predominantly one of agriculture and that in rural communities reading was a much more popular art than it is today.

In 1850 Dr. Kirtland became editor of the Family Visitor, a popular weekly journal published first at Cleveland and later at Hudson, Ohio. This was less a publication of news events than a compilation of extracts from many sources. These extracts concerned social, literary, religious, and political affairs but there was a large number of articles on natural science including chemistry, physics, astronomy, meteorology, geology, zoology, and botany. Many of these were original articles. Some of these were by J. Lang Cassels and by Samuel St. John and many others were signed by Dr. Kirtland. Here he republished his work on the Fishes of Ohio and extended it. In his three years editorial connection with this periodical he clearly aimed to popularize natural science, and soon his readers began to send in inquiries and observations on fauna and flora and meteorology.

Dr. Kirtland occasionally contributed articles to the Ohio Cultivator founded in 1845. Its editor was Dr. Jehu Brainard another physician naturalist, an adherent of homeopathy, whose interest was more toward geology.

In 1851 was founded at Cleveland the Ohio Farmer. To this Dr. Kirtland became a leading contributor. His articles were given the most prominent position and usually accompanying editorial comment. After reading more than fifty of them I reach the conclusion that he wrote accurately and with a style that gives immediate interest. He tells of his own experiments, he quotes the experiments of others, and writes critically, constantly citing his own observations. All this is in excellent English with a style entirely lacking pedantry.

The Ohio Farmer had a wide circulation from the start and thus Dr. Kirtland had a large audience in those days, until his name was known at nearly every farmer's fireside in northern Ohio. Thus Dr. Kirtland was able to exert a wide influence in natural science. His subjects are varied and range from the description of some new animal form to the physics of windmill pumping. Horticultural subjects were numerous but also floriculture received much attention. Much over a hundred papers on horticultural and floricultural topics show a wide variety. They include papers on small fruits, insect pests, soil condition, manures, ornamental trees, apiculture, and many other things of interest to the farmer.

In a group of about twenty-five miscellaneous papers he discusses such subjects as garden and farm implements, the influence of amusements upon the elevation of taste, Sabbath observation, the peculairities of climate and its effects, methods and value of meteorological observations, public hygiene, animal instinct, the application of science to farming, landscape gardening, and rural architecture. In a paper on the latter subject in 1855 he advocated the use of cement as a building material for houses and barns, citing its advantages over both lumber and stone.

Dr. Kirtland was no mere theoretical writer, but his practice was as successful as his writing. At the county fairs and horticultural exhibitions his name appears again and again among the prize winners except in those instances where he was a member of the board of judges, which often happened, thus indicating that he had the confidence of the public.

Comparable to Dr. Kirtland's efforts and success in popularizing natural science with the laity was the stimulus he gave to interest in natural science through his influence upon his colleagues and his students.

He was the acknowledged leader of that group of professional men who became lovers of natural history and who made up the membership of the Cleveland Academy of Natural Sciences, among whom were such men as Brainard, Cassels, Garlick, Kirkpatrick, St. John, Winslow, and Whittlesy all of whom acknowledged the stimulus that Dr. Kirtland gave them. Dr. Kirtland was a frequent associate of Dr. Townshend to whom chiefly Ohio State University owes its origin. Dr. Townshend, also a physician and an ardent horticulturist, lived only a few miles away from Dr. Kirtland's residence.

Many of the students in the three medical schools where Dr. Kirtland taught caught from him the love of Natural History. All told he taught over three thousand medical students. He early established a museum in Cleveland Medical College and here he met the students to instruct them not only in medicine but in natural history. He lectured to them on birds, and bees, and insects. These men went far and wide to practice medicine and carried some liking for natural science and knowledge of it that they owed to Dr. Kirtland. No measure can be made of the influence of these men in natural science in the localities where they practiced but there is evidence that it was considerable. Some of these students became prominent in science. Of such Dr. John Strong Newberry, eminent geologist, is an example.

PERSONALITY.

One cannot discuss Dr. Kirtland without some reference to his personality. He was of a commanding physique and with a head that indicated intellectuality and carried dignity. He had a kindly countenance that inspired confidence. He was not only the loved physician but also the idol of the community in which he lived. He was familiarly known as the "Sage of Rockport," a testimony to the respect for his knowledge, but also he had an attractive personality that drew all to him.

One incident will illustrate this. In his study of birds he could find no one to do the taxidermy and so he trained himself in this art and then trained others to follow it. His own preparations were excellent enough so that some of them were accepted in leading European museums. Some of his pupils became professionally connected with various museums, but the incident that shows his personal charm is that when he was past seventy years of age a group of society young ladies of Cleveland weekly drove five miles to his residence to take lessons from him in preparing skins and mounting birds. This seems to bear testimony of personal charm when a man of seventy attracted society maidens to indulge in the somewhat messy work of taxidermy.

His simplicity and lack of egotism was proverbial. One anecdote will suffice to show this as well as his sense of humor. On an occasion a prominent eastern horticulturist who had not met Dr. Kirtland came to Cleveland to consult him. Driving

out to Dr. Kirtland's home he stopped his horse and seeing an old gentleman in torn straw hat and overalls hoeing among the flower beds he accosted him with the question "Is this the home of Professor Kirtland." The reply was "It is." "Is Professor Kirtland at home?" The man with the hoe replied, "He is." Then the visitor said, "Well my man come and hold my horse." Obediently the old gentleman advanced and held the stranger's horse while the visitor, preening himself, advanced to the door of the residence which was opened by Dr. Kirtland's daughter. He asked "Where can I find the renowned Professor Kirtland?" The daughter replied "He's out there in the street holding some man's horse."

Dr. Kirtland although not wealthy happily had sufficient resources so that he was able to be benevolent. This extended to both public and private contributions. The incidents in reference to the pay of the assistants on the geological survey and the contributions to soldier's families have been mentioned. Another more extensive is equally pertinent. When in 1845 the erection of a building for the Cleveland Medical College was halted for lack of funds, Dr. Kirtland, though but one of seven organizers of the school, on his personal note borrowed $3000 to complete the $8000 building, a note that was not paid until nearly twenty years later. His private benevolences were also numerous but unheralded.

LATER YEARS OF LIFE.

In 1864 at the age of seventy-one Dr. Kirtland resigned from his teaching duties, and also largely retired from medical practice, to devote himself to natural history and horticulture. A few years later he made a natural history trip of several weeks to Florida, and even at eighty years of age was active but soon his physical vigor began to abate and for the last few months of his life he was physically feeble but still alert mentally and intellectually, approaching the end with dignified confidence. He died quietly and peacefully at Rockport, Ohio, December 10, 1877, having by one month passed his eighty-fourth birthday. The community as a whole watched the closing days of his life and mourned his going but rejoiced in his career, and throughout the country in many a scientific group formal acknowledgment was made of his greatness.

CONCLUSION.

At a distance of a half a century we recognize here a truly great career. Here was a man who was physician, teacher, judge, legislator, editor, writer, horticulturist, and a real scientist. For us who falteringly follow in the footsteps of such great men it is of value to attempt to make an analysis and separate out some of the elements which made this career so outstanding.

First of all was the heritage of the idea of the nobility of accomplishment and service coupled with unselfishness. This came from a line of pioneers, who, by reason of small numbers, were forced to cooperate and could not succeed if they were selfish. The man who makes science his vocation rarely succeeds if his chief aim is personal aggrandizment.

Next was the forcefulness of early education. It seems that if any one individual deserves especial credit for Dr. Kirtland's career that person is his grandfather Dr. Jared Potter who taught this lad to study, to work hard, to record his observations and encouraged him in experimentation and independent thinking.

A third factor was the opportunity for intimate contact with a few great scientists of his day. These he admired and emulated and these contacts guided the capabilities started in the training of boyhood. Today the opportunity for contact with trained scientific minds is so common-place as to be little appreciated and often neglected.

Next comes the fact of Dr. Kirtland's catholicity of interest. He was no narrow specialist shut up in the confines of the study of a single phenomenon or of a single group of biological forms. His breadth of information, originally secured, gave opportunity for comparison which developed judgment, wisdom, and sagacity.

Then comes the habit of orderliness begun in early youth in making records and continued as evidenced by his writing. If one reads any of Dr. Kirtland's papers he is immediately impressed with the logic of presentation. The major premises have their proper position. The elaboration is clearly that and not a part of the premise and in brief and cogent phrases he proceeds to a conclusion which the reader is forced to accept. His style is terse and correspondingly convincing. In science neither the

disorderly mind, nor the disorderly laboratory leads to successful fruition.

Finally the outstanding element in this career is industry, orderly industry, the capability of working constantly and assiduously toward definite goals. At his death his most intimate scientific friend, Dr. Theodatus Garlick, an associate of forty years said of him "His eminent success in the field of science is attributable to his untiring industry and his inextinguishable thirst for knowledge."

ENVOY.

The Ohio Academy of Science has a noble heritage in the careers of Ohio's pioneer naturalists. The lives of Hildreth, Kirtland, and Sullivant, to mention but three, beckon us to fruitful tasks. Today's opportunities for progress are great, far greater, than these pioneers could imagine in their fondest hopes. It remains for us, and those that follow us, to develop those three qualities which characterized the personal career of Jared Potter Kirtland, namely catholicity of interest, orderliness, and personal industry.