The Palimpsest

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CONTENTS

David E. Hadden

BEN HUR WILSON

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THE PURPOSE OF THIS MAGAZINE

THE PALIMPSEST, issued monthly by the State Historical Society of Iowa, is devoted to the dissemination of Iowa History. Supplementing the other publications of this Society, it aims to present the materials of Iowa History in a form that is attractive and a style that is popular in the best sense—to the end that the story of our Commonwealth may be more widely read and cherished.

BENJ. F. SHAMBAUGH

THE MEANING OF PALIMPSEST

In early times a palimpsest was a parchment or other material from which one or more writings had been erased to give room for later records. But the erasures were not always complete; and so it became the fascinating task of scholars not only to translate the later records but also to reconstruct the original writings by deciphering the dim fragments of letters partly erased and partly covered by subsequent texts.

The history of Iowa may be likened to a palimpsest which holds the records of successive generations. To decipher these records of the past, reconstruct them, and tell the stories which they contain is the task of those who write history.

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THE PALIMPSEST

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Man of Affairs

David E. Hadden was born in Kilrush, Ireland, on October 22, 1866. His father, Dr. George Hadden, was considered well-educated and no doubt contributed much to the early training of the boy. Certainly David acquired studious habits for he made rapid progress in school. By the time he was fourteen he had completed his education in Ireland.

In May, 1881, the Hadden family emigrated to America and settled at LeMars in Plymouth County, where Dr. Hadden practiced his profession. Reared in the home of a physician, David developed a natural interest in medicine, and eventually chose pharmacy as his vocation. About the time he was twenty-one he moved to Alta, in Buena Vista County, where he made his home the rest of his life. On April 4, 1888, he began working in C. E. Cameron's drug store. Five years later, he became a partner in this firm which operated under the name of C. E. Cameron and Company. Upon the death of Mr. Cameron in 1939, he became the sole proprietor of the business. These two men, working together, supplied the pharmaceutical needs of their community for more than half a century.

In his chosen field David Hadden was a thorough student. When he was examined by the Iowa State Pharmacy Commissioners he passed with the highest grade ever awarded up to that time. That he was fond of his vocation was evidenced by the fact that he not only took great interest in his local business, but likewise in the general welfare of pharmacy. Being of a scholarly disposition, he always kept up-to-date and was considered to be a leader in his field.

As the years passed, he became more and more active in the affairs of the Iowa Pharmaceutical Association and as a result was appointed as a Democratic member to fill a vacancy on the State Pharmacy Commission by Governor B. F. Carroll in the spring of 1909. It is characteristic of the man that he did not seek the office, but rather had the honor thrust upon him.

The appointment of David Hadden to the Commission was generally acclaimed and subsequent events justified the wisdom of his selection. He was reappointed by Carroll in 1911, and by succeeding Governors in 1914 and 1917. At various times he served as chairman of the Commission for that position rotated among the three members. During the eleven years of his incumbency the Commission played an active rôle in raising the standards of the profession and advocating constructive legislation.

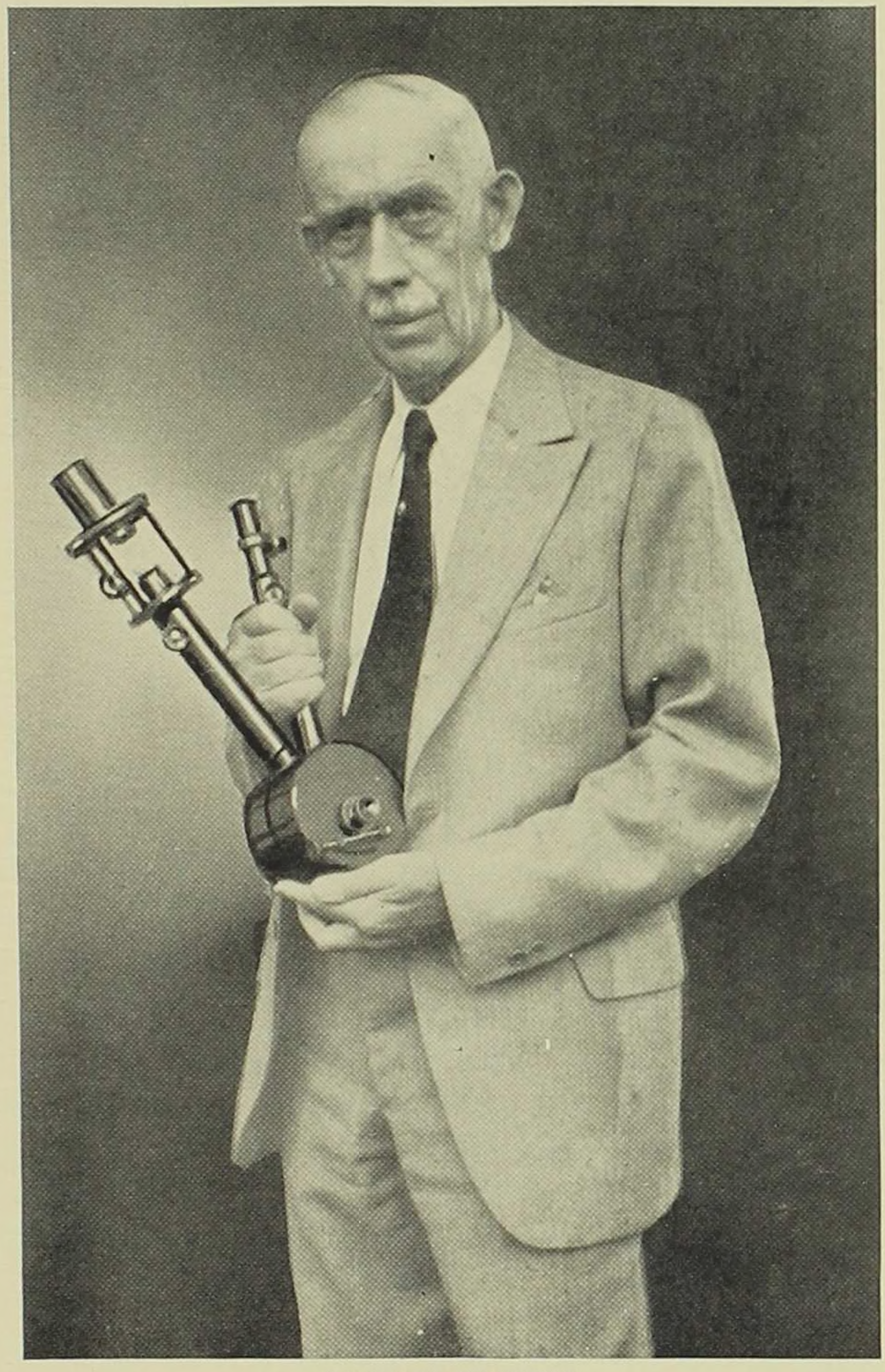
One of the principal accomplishments during this period was the enactment of more adequate statutes regulating the sale of narcotics and other habit-forming drugs. Previously, only meager records of such sales by druggists were required, and even these rules were not always rigidly enforced, so that the traffic in narcotics became almost an open business.

New standards and regulations were also set up governing the examination of those to be admitted to the practice of pharmacy and the plane of the drug business was thereby elevated. Professional qualifications and practices were adopted and enforced which were not only beneficial in many ways to the drug business, but which also promoted the general welfare.

The first comprehensive pure food and drug legislation was enacted in Iowa before Hadden became a member of the Pharmacy Commission, but he was active in promoting this reform and later participated officially in implementing the enforcement of the law. This required financial support as well as the whole-hearted coöperation of the profession. Hadden and others worked tactfully and effectively to win support for these innovations in the interest of the public health.

Another delicate question pertained to the kinds of drugs which might properly be retailed by grocers. This involved many hearings and threats of litigation on the part of Iowa grocers, who naturally wished to protect their trade. In the commercial aspects of the problem the pharmacists were equally interested but their position also coincided with public security. Through the persistent efforts of the Pharmacy Commission the controversy was finally settled and citizens were protected against incompetent vendors.

Had David E. Hadden made no other contribution to the common welfare of the people of Iowa he would certainly have deserved more than passing note. Upon his retirement from the Iowa Pharmacy Commission in 1920, after a continuous service of eleven years, the Official Register of the Association contained the following tribute in the April issue: "No one man in Iowa has labored so faithfully in the performance of his duties, and has rendered such unselfish service for the benefit of pharmacy as has Mr. Hadden, during his term of office. It was largely through Mr. Hadden's efforts that the work of the pharmacy commission



DAVID E. HADDEN

was raised to a high standard, and Iowa druggists owe him a great debt of gratitude. Here's hoping that success will continue to crown his efforts in the private life to which he retired with no regrets and entitled to the feeling of satisfaction that comes with a service well rendered."

Like a polished jewel, David Hadden's life had many facets and each seemed equally brilliant. He lived intensely and his well-rounded life assumed ideal proportions on every side. For an avocation he chose the scholarly subjects of meteorology and astronomy. Indeed, it was in these fields that he made his greatest contributions. In his quest for knowledge he sought formal training. At the age of thirty-seven he attended Morningside College in Sioux City where he received the degree of Bachelor of Science in June, 1904. His major subject was listed as astronomy.

The study of the sun is of course an important phase of astronomy. Hadden's series of observations and studies of sunspots and solar weather were so thorough and systematic that he gained wide recognition as an authority. He influenced astronomical opinion in this field considerably. This was due not only to the high quality of his work, but also to the fact that he took pains to record and publish the results of his labors in accredited scientific journals.

His researches in terrestrial meteorology were likewise outstanding and his efforts along this line were held in highest esteem by the United States Weather Bureau in Washington. Few, if any, workers in this field kept continuous records of weather observations which equaled his. From them government meteorologists have been able to make significant deductions respecting climatological changes which are of vital importance to our future welfare.

As a public speaker, he was "popular and much sought after". His knowledge was accurate and broad. He often spoke to local clubs and frequently at Morningside College and before the Iowa Academy of Science, of which he was a faithful member. It may be said that many a young scientist was inspired to continue study by the enthusiasm which these talks engendered.

David Hadden published many articles on astronomical and kindred subjects in various scientific journals. In recognition of his accomplishments, he received many honors. He was made a fellow in the Royal Astronomical Society of Great Britain and also a member of the Belgian and American Astronomical societies.

While as a rule the meticulous duties of his business kept him close at home and his vacations were few, he did travel on occasion. Perhaps the most notable as well as the most memorable trips were when he joined solar eclipse expeditions. In 1900, for example, he journeyed to Wadesboro, North Carolina, with a party of astronomers to observe the total eclipse of the sun which occurred on May 28th of that year. For any man so thoroughly interested in solar astronomy, this must, indeed, have been a glorious experience. One of his photographs of the solar corona was published in *Popular Astronomy*.

On the business side of the ledger, Mr. Hadden made many contributions to the welfare of his own community. In the first place, he carefully filled thousands of medical prescriptions and often gave advice to those who came to him with minor ailments not requiring the service of a physician. In such matters, he was always approached with confidence. Indicative of his public spirit were his efforts to obtain the establishment of the first telephone exchange in Alta, which, of course, was of great benefit to everyone.

"Dave" Hadden left his indelible impress upon the cultural life of his community in many ways. Serving on the county board of education, his wisdom and good business judgment were frequently used to keep the intricate wheels of education in balance and running smoothly. For ten years, he also served on the Alta school board, and fostered various improvements. The Alta public library board likewise profited from his wide experience.

The church, as a community institution and as a place of worship, was very important in his life. Even as a lad in Ireland he seems to have been identified with the Protestant minority of that country, doubtless through his parents. Upon coming to this country, he made a place for himself in the Methodist Church in LeMars. When he removed to Alta, in 1887, he became a member of the Methodist Church there. For many years, he taught the young people's class in the church school and exercised a wholesome influence in the lives of many of his students. He served the church in other capacities, particularly as steward and for a long term as treasurer.

On September 5, 1888, after establishing himself in business, he married Miss Emeline Dier of LeMars. Mrs. Hadden preceded him in death in 1932. After an illness which began in July, David Hadden, then in his seventy-ninth year, died on September 20, 1943. Funeral services were held in the Methodist Church and he was buried in the local cemetery at Alta. No better tribute could be paid him than the fact that during the funeral all the business houses in town remained closed out of respect to his memory.

BEN HUR WILSON

Volunteer Climatologist

"Climatology suffered a great loss", stated Charles D. Reed, Director of the United States Weather Bureau at Des Moines, "when David E. Hadden, cooperative weather observer at Alta, Iowa, died on September 20, 1943." He was acknowledged to be one of the most reliable weather reporters in the whole country. Beginning on January 1, 1890, he made his final record on August 6, 1943, scarcely a month and a half before he died. Daily for fifty-three years, seven months and five days, he went about this self-imposed task without interruption, except for brief intervals, when the records were kept by members of his immediate family, usually his daughter, Mrs. Lola Pepper.

Throughout all these years this work involved an incredible amount of painstaking attention such as only an ardent enthusiast could or would endure. In addition to the 19,386 daily, and often twice daily observations, there were 2775 weekly, 643 monthly and fifty-three annual reports to be made, requiring many precious hours of time which might otherwise have been devoted to business or recreation. In retrospect this seems to have been a tremendous task, yet when done day by day, a few minutes at a time, the work was more of a pleasure than a burden.

When the Iowa Weather and Crop Service was formally established by law in 1890, one of the principal functions was the collection of meteorological information for the benefit of agriculture. Many competent persons in all parts of the State volunteered to keep accurate records of temperature, precipitation, wind velocity, and other significant data. On the basis of the reports of these observations the Federal Weather Service issued weekly reports. Over a long period the climatic conditions of a region can be determined. In establishing this service neither the State legislature nor Congress recognized the magnitude of the undertaking. While literally thousands of stations were necessary to accomplish the desired ends, only meager funds were provided to finance the project. Under these conditions, an extensive system of weather observation was established, comprising at its peak some five thousand unpaid volunteer coöperative observers, to whom the Weather Bureau furnished only the necessary instruments and stands.

It is truly a remarkable service to which David Hadden contributed his time and talent. In the hustle and bustle of a busy, modern world, when so many people ask only, "What is there in it for me?" one is prone to wonder just what urge should prompt any individual to devote so much energy to such an exacting task as that required of a co-operative weather observer. The answer to this question throws considerable light upon the quality of thinking and the stability of character of the man who undertakes such an obligation. Certainly in the case of David Hadden it was indicative of his scientific interest and methodical habits.

While the duties of a coöperative weather observer may at times have been interesting and pleasant, there were other times in the rigorous climate of northwest Iowa when they became very trying, indeed. For instance, to be compelled to remove many feet of drifted snow to get out to the kiosk (instrument shelter) to take readings in temperatures as low as 30° below zero, and to measure the amount of rainfall on stormy days was certainly no picnic. Pleasures often had to be foregone so that the records might be kept, but such is the life of true scientists who consider such sacrifices all in a day's work.

Specifically, what are these duties of a weather observer? There are a number of measurable factors pertaining to the weather which must be ascertained and kept accurately over long periods of time so that a "mean" may be established for any given region. It is from the annual cyclic variations of the "mean" that the significant changes or trends in climate may be determined and future variations predicted. Of prime importance are the records of temperature and rainfall, but other factors such as prevailing wind direction, barometric readings showing atmospheric pressure, and sky conditions are also of almost equal importance.

In the absence of a thermograph for recording temperature changes, the readings must be taken manually by means of two thermometers which record the maximum and the minimum temperatures in a given period. These must be read daily or oftener, and the indicator shaken down for the next reading. This requires meticulous attention. The making of precipitation records is comparatively simple in summer when all that is necessary is to measure the amount of water (in inches) collected in the rain gauge cylinder, but when precipitation occurs as snow or sleet this must first be melted before the measurements are made. The direction of and hourly changes in the wind may be noted from a wind vane, which is usually kept nearby, or from such natural indicators as the moving clouds, smoke or leaves which may be observed from almost any location where the observer may chance to be. Not only must the extent of cloudiness be noted throughout the day, but also the type and character of the clouds.

This was the type of thought that occupied David Hadden's mind as he went about his daily work. Seldom did the actual record keeping consume more than ten minutes a day, except when reports were made. Perhaps on the average throughout the years, he spent no more than fifteen minutes per day in the discharge of his duties, but even this amounted in the aggregate to a considerable period of time. His work was always so carefully done that month after month passed without errors or inconsistencies being found by rigid examination of his reports at Des Moines and Washington, D. C. "He was alert to detect and report defects that occasionally developed in his instruments, which made prompt replacements possible."

Upon the completion of a half century of service he received a most cordial letter of commendation from the Chief of the United States Weather Bureau in Washington. "Your service, fidelity and devotion are of the kind that cannot be purchased with money", wrote W. R. Gregg. "Your record stands as a monument to your memory that will be revered and appreciated by unborn generations beside which words of commendation from us who at the moment are administering the affairs of the Weather Bureau are but weak, fleeting and transitory."

In 1934 he received a small grant-in-aid from the Carnegie Foundation to conduct some research in statistically analyzing his long and valuable meteorological records. Many interesting things were discovered, such as the decrease of 3.96 inches in the mean annual precipitation at Alta during the period covered by his records. "The fact that the observations were taken in the same ideal spot with the instruments exposed and observed in the same way, makes this record especially valuable."

It is doubtful if the observational record established by Hadden will be excelled by any other volunteer observer. One of the most comparable and valuable collections of climatological data was kept by T. S. Parvin for thirty-four years at Muscatine and Iowa City between 1839 and 1873. But Parvin's statistics cover a much shorter period and possess neither the accuracy nor uniformity of place of Hadden's. In the present era of mobility of residence, distracting events, and rarer sense of public responsibility, few men are likely to challenge the record and reputation of Climatologist David E. Hadden.

BEN HUR WILSON

Amateur Astronomer

To be called an amateur does not detract from the quality of a man's work or his scientific ability. An accepted meaning of the term implies only that the individual does not receive extensive remuneration from his avocation, but rather earns his livelihood through other channels. Business men frequently turn hobbyists to break the monotony of their regular employment or to follow the urge to do creative work in some field in which they have become interested. Among both amateurs and professionals, the degree of their proficiency may range from mediocrity to excellence, depending among other things upon the seriousness of their purpose and their native ability. David E. Hadden was both serious and able. As a result, in the intensive lifelong pursuit of his hobby, he made a greater contribution to the cause of science than many a man whose science was his bread and butter.

To evaluate the life work of a man whose talents were so versatile as his, is indeed a difficult task. The range of astronomical science is so great that no man can undertake to cover all of it, and so most astronomers concentrate their attention on one or two fields of specialization. Hadden's studies, carried on during the leisure moments of a business career, were mainly devoted to solar phenomena and the variable stars. From these subjects he strayed only on rare occasions, when something startling occurred, such as the appearance of a new comet.

His series of sunspot records were begun in August, 1890, and were continued almost without interruption for more than half a century. Suspecting that there might be a close correlation between sunspot maximum and minimum periods and certain climatological conditions on the earth, he made many careful observations. Fifty years ago such phenomena were little understood. It has been ouly through the studies of such men as Hadden that the effects of the solar disturbances have been interpreted.

Most of his observational work was done in a small observatory erected in his own back yard. His first astronomical instrument was an excellent three-inch telescope made by John S. Brashear of Allegheny, Pennsylvania, which was soon replaced by a four-inch instrument of the same maker. His principal auxiliary apparatus then consisted of a spectroscope containing an excellent Rowland diffraction grating. Afterward, on moving into his new observatory in 1910, he acquired a five-and-one-half-inch telescope mounted equatorially upon an iron pillar-stand which was bolted firmly to the floor of his observing room under the dome.

Installed in this manner, it is said, the instruments were not seriously affected by vibration so as to interfere with observation. All but the severest shocks seemed to be absorbed by the rigid construction of the building. The telescope itself was unusually well equipped for the purpose for which it was intended — solar observation. It was supplied with clockwork mechanism and slow motion drive made by Gaertner and Company, and was also equipped with a special polarizer for solar work. An auxiliary grating spectroscope of special construction, a position micrometer, a camera for photographing sunspots, and other apparatus enabled him to make all the essential observations.

For special purposes Hadden owned a 9½-inch reflector-type telescope. This instrument, which was largely home-made, was fitted with "optical parts by Brashear, consisting of the 9½-inch mirror and a hyperbolical secondary mirror for use when the instrument was used as a Cassegrain, also a diagonal mirror to be used in the usual Newtonian form." The tube was of the open pattern and built up with three-fourths-inch steel tubing. For convenience, this was kept in reserve in the lower office room of the observatory building. With this instrument, it was possible to view a wider sky field, and many a pleasant evening through the years was enjoyed by visitors and many small groups who were always welcome to come and share his facilities and hear of the wonders of the heavens, simply told in his own inimitable conversational manner. The acquisition of astronomical knowledge under his skillful tutelage was never painful.

One of the greatest truisms is that a man shall be known by his works. It is also true that some men are remembered by what they have written. What a man knows goes with him to the grave, but the knowledge he publishes becomes thus immortalized. Fortunately David Hadden took time in his busy life to write about many of the results gathered from the thousands of observations he made, and from these writings the pattern of his scientific life can be discerned.

Being a typical scientist, most of his written reports were boiled down to the essential details. Much of the information was shown in recapitulatory tables which he frequently employed at the close of his articles. It should be stated, however, that the information contained therein was always adequate. In so far as his writings are concerned, it might be said that he was a man of few words and these were seldom embellished by rhetoric or superfluous language. His ability as a competent astronomer was widely recognized, and his articles were gladly received by the editors of the scientific journals to which he contributed.

Most of his astronomical notes and longer articles appeared in *Popular Astronomy*, published at the Goodsell Observatory of Carleton College at Northfield, Minnesota. It was perhaps a fortunate coincidence that the first volume of this magazine was issued in 1893 near the beginning of Hadden's work on solar phenomena. Indeed, what appears to be his first contribution on this subject, "Eruptive Solar Prominences", was printed in the second volume of *Popular Astronomy*.

It would be impossible to summarize the contents of all his written works in this brief resumé, but the titles of some of his articles will illustrate his varied interests — "Grating Spectroscope for Small Telescope", "Observations of Variable Star Mira Ceti", "Photographing the Sun" (an outstanding article, with illustrations), "Detonating Meteor", and "Observations of Nova Aquilae". Many of his scientific essays were excellent and have proved to be valuable contributions to the science of astronomy.

By far the greater number of his articles, however, dealt with the "Review of Solar Observations", at Alta, featuring his work on sunspots. This long series of reports commencing in the seventh volume of *Popular Astronomy*, were for a time made annually, but later, as the years passed and the increasing pressure of business encroached more and more upon his time, the intervals between publication became longer.

Gradually, by his consistent efforts, his reputation as an astronomer spread, not only throughout this country but to Europe, until he eventually became recognized as an authority upon solar weather. In 1934, he published what was perhaps his most illuminating article in *Popular Astronomy* on "Some Noteworthy Solar Disturbances Observed at Alta, Iowa, during the Period 1890 to 1929." Probably no better method could be employed to illustrate the depth and quality of his work than to quote liberally from this article.

"The writer has just recently completed a series of sunspot observations extending over a period of forty years and, in the hope that it may interest other amateurs to pursue this fascinating branch of astronomy, he is calling attention in this paper to some of the more noteworthy outbreaks on the sun's surface which he observed during the interval of forty years. . . . The daily detailed count of the sunspots and the yearly reviews of the observations have been published in various astronomical and other publications from time to time.

"During all this period the observations have been made at the same place, while the writer has been engaged in an active business career and carried on other astronomical and meteorological studies, such as variable star work, observations of numerous comets, meteors, novae, and observed two transits of Mercury besides making two trips to observe total eclipses of the sun, also kept a nearly complete meteorological record of the station. All this is mentioned to indicate what may be accomplished by others who, like himself, find this form of recreation of intense interest and fascination.

"During the forty years four maxima in the sunspot cycle were noted and it is mainly in the year or two closely preceding and following the maximum dates that the largest and most interesting disturbances with associated electrical and magnetic phenomena were observed.

"The years 1891 and 1892 were noted for intense solar activity, auroras were brilliant and frequent; perhaps the largest spot visible on the sun's disc in many decades was seen in February, 1892, its length exceeded 100,000 miles and its surface area 2,000,000,000 square miles, later in the same year enormous spots were present and were accompanied by some incomparably brilliant manifestations of the aurora; the maximum was reached during the early autumn of 1893 when the sunspot zones were dotted with spots and the climax of the curve was full of groups of tremendous magnitude with immense areas of penumbrae enclosing umbrae of all forms, — helical, wing-shaped, triangular, fimbriated, cruciform, pitcher-shaped, ell-shaped, tassel-like, etc.

"In June, 1894, a remarkable eruptive prominence was observed with the spectroscope; 'spikes' and 'flames,' 70,000 miles high, had in ten minutes nearly subsided leaving the region of the photosphere farther in on the disc violently agitated. The year 1894 was also noted for the persistence of large and very interesting groups, every month witnessed some giant disturbance. Notwithstanding the fact that 1896 was the third year following the maximum, some unusually large spots were observed. It is worthy of note that the descending curve of solar activity is frequently marked by sudden and enormous outbursts of the solar gases or other forms of energy which give rise to the formation and appearance of sunspots; so a great spot which underwent many changes passed across the disc in July, 1896, which had an area of nearly 400,000,000 square miles. . . .

"The next maximum period was in the closing months of 1905, but in 1903 solar observers were greeted with some outbursts of gigantic proportions; a superb group over 135,000 miles long and 39,000 miles wide and embracing an area of over 5,000,000,000 square miles made the transit of the visible disc. This great spot received much attention by the press and public, and the coincident terrestrial electrical and magnetic effects were marked and wide-spread.

"In 1905 during the latter part of January and early February occurred probably the largest single sunspot of the last thirty years. Its length was over 100,000 miles and width 60,000 miles, spectroscopically it was very active, with brilliant reversals and diagonal distortions of the hydrogen and other lines. The period of maximum activity surrounding the 1905 epoch was not so intense or prolonged as the preceding one of 1893.

"The third maximum epoch of the forty years was passed in the fall of 1917, but two years previously — April, 1915, — the forces concerned with the ushering in of the maximum activity began to assert themselves and a giant group in the form of a long train of large spots fully 175,000 miles in length and visible to the naked eye made the transit of the disc, and later in the summer active regions of the surface were coincident with auroras and earth currents interfering with telegraphic service over the United States.

"On the night of August 26, 1916, the writer witnessed an aurora of surpassing beauty and interest — one of the finest seen in 25 years, — a Boreal crown with colored beams and streamers, double arches and curtains were part of the wonderful display. In this instance it is of interest to note that this aurora occurred when the visible disc was practically free of sunspots.

"The year of actual maximum, 1917, was noted for the presence of large spots almost continuously throughout the year, the ones seen in February, August, and September being of giant magnitudes. The one of August was especially noteworthy for its intricate penumbra containing numerous umbrae and nuclei, and for the auroras which accompanied its transit of the disc. This great group seems to have marked the peak of the 1917 maximum, but again about four years later — in May, 1921, — a wonderful group of the two-spot variety suddenly appeared and was accompanied by widespread disturbances to the telegraph, telephone, and cable lines of Europe and America. The writer's spectroscopic examination of the group on May 15 disclosed great activity in the hydrogen lines around the vicinity of the spots. Another very active group was visible on March 22, the region surrounding an area of spots on the surface on March 8 being violently agitated.

"The last maximum epoch was probably passed in 1928 and preceding this by two or three years we find the beginning of the oncoming of greatest activity manifesting itself by the decided revival of giant groups and many associated brilliant auroras in 1926 to 1928. Some especially fine streams of spots were visible in late November and early December of 1929, but weather conditions did not permit the writer's detailed study of them."

In almost every period of Iowa history certain individuals who possessed unusual talent have, by the sheer force of their own zeal, accomplished remarkable things. Woodcarvers, ornithologists, musicians, artists, architects, archeologists, and astronomers have made their own particular contributions to the common welfare. David Hadden was such an individual and his life should serve as a pattern for all who have the urge to do creative work of any kind.

BEN HUR WILSON

The Alta Observatory

Whenever a man gains wide recognition and distinction outside his normal field of activity, he in effect invites others to seek the cause. Doubtless, Climatologist David Hadden early became intrigued by those rhythmic cycles of the weather, for which there was no satisfactory explanation. Here, indeed, was a challenge for a scientist such as he was. Since he understood the relationship between solar phenomena and terrestrial climatic conditions, and realized that all the earth's light, heat, and energy is derived directly from that body, it is not strange that the suggestion sooner or later occurred to him to investigate more fully all the events occurring on the sun's surface which might in any manner have a bearing upon the final solution of this problem. To do this, of course, required the employment of astronomical instruments, including such other physical accoutrements as might be necessary. Thus the idea of the Alta Observatory was born and the volunteer climatologist became an amateur astronomer.

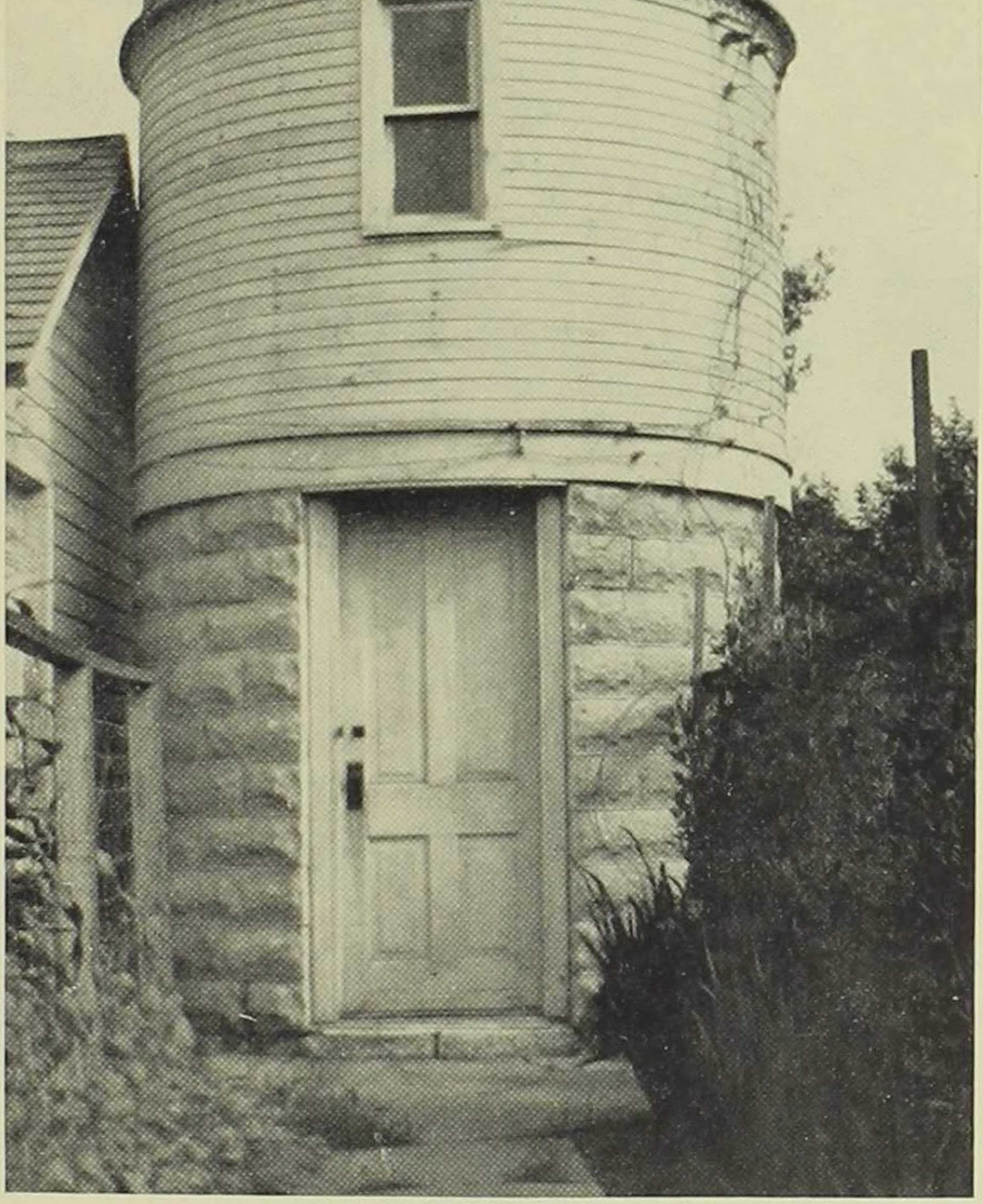
Like similar institutions, the Alta Observatory grew from small beginnings to an efficient scientific workshop. The results accomplished in it were out of all proportion to the size and appearance of the physical equipment. Unpretentious and unimpressive as it seemed, however, when compared with many of the great observatories of the country, Alta's "one man observatory" was nevertheless as convenient and well equipped, for the purpose for which it was intended, as though thousands of dollars had been lavished upon its erection. The instruments employed by Hadden were also well adapted for his use.

As a matter of fact, Hadden built two observatories at Alta. The first, or original one, which he used for many years, was more in the nature of a preliminary or experimental building, housing his instruments temporarily while he worked out plans and saved money for the erection of the more elaborate and permanent one. Even this first small building, however, was more than a mere shelter house, as it possessed a revolving dome which, after a fashion, serves to classify it as a real observatory.

In designing the present observatory, Hadden stated that "other considerations besides the expense had also to be kept in mind. I wished to make it as compact as possible, owing chiefly to the limited room on the residence grounds and its proximity to other buildings." It must be remembered that in planning and erecting these small private observatories, he was pioneering for the entire country. Amateur astronomers were in those days few and far between. In all Iowa, it is said, there were "probably not more than three such endeavors down to the beginning of the present century." It was necessary for him, therefore, to rely almost solely upon his own ingenuity, and that of the mechanically-minded carpenters among his acquaintances.

While the present observatory building had a diameter of only nine feet, this was ample to properly house the five-and-one-half-inch refractor telescope. The footing of the building consisted of a bed of concrete upon which was placed a wall of circular cement blocks. These were built up to a height of about eight feet above the level of the ground. This formed the first story, and served as a substantial foundation to carry the observing room with its heavy instruments and revolving dome above it.

O. P. Dagger, a local carpenter, was employed to build the superstructure. This was constructed of lumber and firmly secured with iron bolts, set in the cement-block wall. The floor joists were made of two-by-eight pine planks suitably cross-braced to give rigidity for the telescope mountings. Around the circumference were placed two-by-four uprights, about one foot apart, upon the exte-



THE ALTA OBSERVATORY

rior of which ordinary house siding was fastened. The interior was finished with three-eighths-inch basswood ceiling lumber nailed horizontally. This method of construction resulted in a very rigid building "which has not warped or deviated from a true circle in the least."

The plate on top was made of several thicknesses of lapped pine, strongly spiked to the two-by-four uprights. The frame and ribs of the dome were cut from one-inch pine boards and all sawed to a circular diameter of nine feet. The covering was of tin, painted both inside and out and nailed firmly to the ribs and all joints or seams were carefully soldered. The opening or slit, through which the sky could be viewed, was eighteen inches wide and covered with slide glides over the dome with suitable tracks on the plates. These glides were manipulated and fastened down with ropes.

The dome itself revolved on large glass balls placed in a V-shaped track on the plate of the building and matched by a similar inverted track on the bottom of the dome. In this track a quantity of petrolatum was placed to insure the proper lubrication of the mechanism and to render the motion smoother and easier. The upper, or observing room, was reached by a small stairway on the inside, the opening for which was closed by a trap door.

The observatory building itself had an over-all height of about eighteen feet, and the lower room, which was well lighted by two windows, was fitted up as a small office and library, containing a desk and folding chairs, and was used as a store room for a nine-and-one-half-inch reflecting telescope which could be wheeled out on to the lawn and used for the observation of the night sky when occasion warranted. The rooms were electrically lighted, a dim-a-lite lamp being placed in the observing room so that the light could be dimmed or extinguished altogether while observing.

Writing in the December, 1910, issue of *Popular Astronomy,* Hadden described his new observatory, for the benefit of amateur astronomers, "who might also wish to consider erecting a similar building for their own use." It seems that by this time his reputation as an astronomer had spread far and wide and that correspondence concerning his observatory had grown to considerable proportions. The article gave more extensive currency to his ideas than was possible by private letters.

A picture of the new observatory accompanied the article. In the background, a few feet farther west, could be seen the original smaller one "which has done duty during the past fifteen years or more and where some of the pleasantest hours of the writer's life have been spent in seeking to learn more of God's handiwork — the universe of stars and suns."

While no published description of the first building has been found, its principal features were plainly shown in this photograph. It was a one-story, frame, octagonal-shaped structure, probably about eight feet in diameter, resting upon a stone or cement foundation. The walls were surmounted by a hemispherical-shaped dome, not unlike the one on the new observatory nearby. It is presumed that this original observatory was removed as soon as practicable after the new one was completed and put into operation.

In this smaller building, wrote Hadden, "was first mounted a superb little three-inch telescope on an equatorial mounting which was purchased from Dr. J. S. Brashear, and the writer will ever cherish as part of life's sweetest memories his first glimpse through such an instrument from a master's hand." This instrument was later replaced by a four-inch one by the same maker, and to this equipment was added, from time to time, such other instruments as the nature of the work required and his purse afforded.

Working here in his observatory, mostly alone, day after day, year after year, over a period of nearly fifty years he kept a complete and accurate record of solar phenomena such as is now attempted only by endowed observatories with the services of a number of professional astronomers. These studies gave him deep personal satisfaction and at the same time won well-merited acclaim.

On August 22, 1940, David Hadden, doubtless realizing that his days of scientific research were rapidly drawing to a close, made arrangements to dispose of his telescope and other instruments to Buena Vista College at Storm Lake for the nominal sum of one dollar and the further stipulation that the college should grant a four-year tuition scholarship to any of his grandchildren who might wish to take advantage of it. In fulfillment of this contract, the equipment was removed to the college campus during the present summer. A Hadden Observatory is to be established there as soon as practicable. One granddaughter, Dorene Hadden of Cushing, Iowa, is attending Buena Vista College on the terms of the scholarship.

Ben Hur Wilson

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