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CHARLES SHELDON HASTINGS

1848–1932

BY

HORACE S. UHLER

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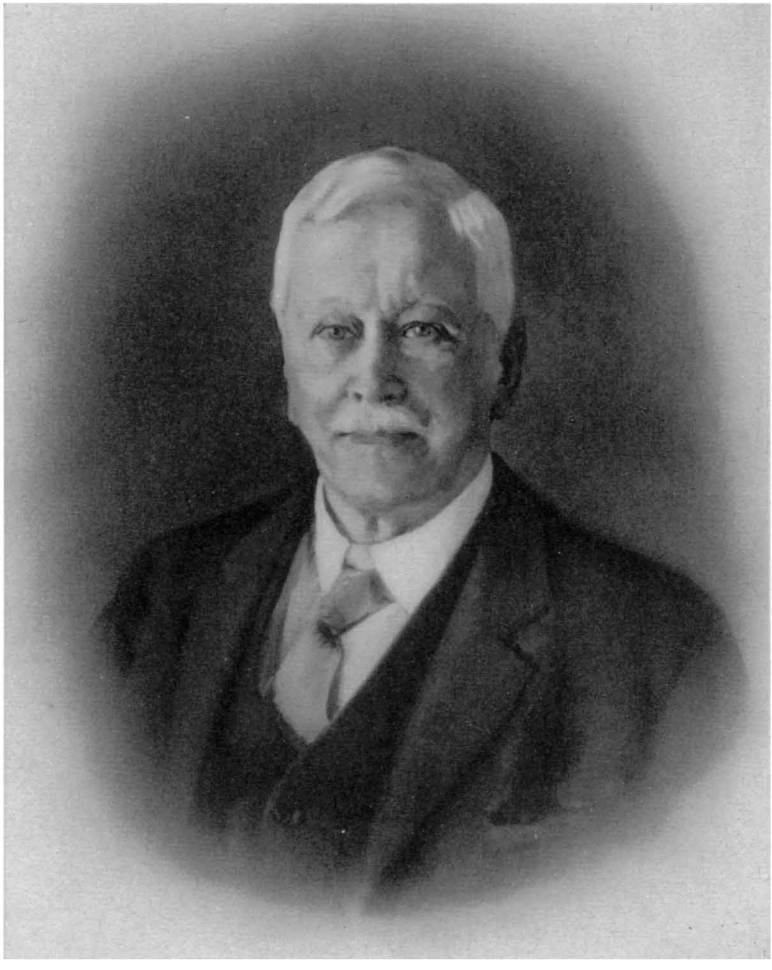

Charles S. Hastings

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Charles Sheldon Hastings was born at Clinton, New York, on November 27, 1848.[1] His New England ancestry included an unusual proportion of professional men, particularly physicians. One of his great grandfathers, Dr. Seth Hastings, was born at Hatfield, Massachusetts, in 1745. After transferring his home to Washington, Connecticut, an eldest son was born to him in 1780 and given the name Seth, Jr. This grandfather of the subject of the present memoir subsequently moved to Clinton, New York, where he also practiced medicine and became, in the year 1816, the father of Panet Marshall Hastings. The latter graduated from Hamilton College at the age of twenty two, became a very prominent physician in Clinton, and gave lectures on anatomy and physiology at his alma mater. In the year 1843 Dr. P. M. Hastings married Jane Sheldon, a lady whose forebears were likewise sterling representatives of New England. About five years later this couple became the parents of Charles Sheldon, and when he was approximately six years old they changed to a permanent residence in Hartford, Connecticut.

In this city Hastings received his early training in the public schools and passed from the Hartford High School to the Sheffield Scientific School of Yale University in the fall of 1867. From this Institution he received the degree of Ph.B. in 1870 and then continued as a graduate student for a period of three more years. The diploma of Hastings' doctorate bears the date of the 26th of June 1873. During the last two years of his enrolment as a graduate student he held the position of Instructor in Physics in the Sheffield Scientific School. He then resigned in order to devote the next three years to study and travel in Europe. It was his inspiring privilege to attend

[1] Biographical notices of C. S. Hastings have been published by Frederick E. Beach and Frank Schlesinger. The respective references are: *Amer. Jour. Science*, **23**, 485 (1932) and *Astrophys. Jour.*, **76**, 149 (1932). With one exception, for which acknowledgment is made in the proper place, the present memoir owes nothing to these earlier papers.

courses given in Berlin by H. L. F. von Helmholtz and in Heidelberg by G. R. Kirchhoff. It may be interesting to record that Hastings' note-books and scattering memoranda indicate that he took Kirchhoff's lectures on optics which commenced on the 24th of April 1874, that he studied advanced mathematical analysis under Professor Königsberger, that he visited Steinheil's on March 11, 1875, and that in Paris during November 1875 he was buying scientific books as requisites to the courses at the Sorbonne. The sojourn in Paris was facilitated by the fact that Hastings was awarded the "Tyndall Scholarship" for the year 1875.

In the next year an event of paramount importance to the development of higher education in the United States of America and to the advancement of scientific research in the world occurred when the Johns Hopkins University was launched in Baltimore, Maryland. At the beginning there were appointed to this faculty—under the sagacious selecting by the first President of the University, Daniel Coit Gilman—six professors and seven "associates". In the list of associates, many of whom became leaders in their several departments of study, the name Charles Sheldon Hastings deservedly appears. Not one of these associates had attained the age of thirty years.

Hastings' academic title was first changed in the fall of 1882 to "Associate in Physics, Sub-Director of the Physical Laboratory, and Lecturer on Solar Physics." In 1883 the first three words of the title just quoted were replaced by "Associate Professor of Physics." He then resigned to accept the call to occupy the newly entitled [2] chair of Professor of Physics in the Sheffield Scientific School, New Haven, Conn.

Before passing to Hastings' career at Yale University the following fact merits presentation because it is presumably virtually unknown and it seems to be historically important. The fact is that the fields of applied optics, physics, and astronomy came very near losing, for a time at least but probably forever, the invaluable services of Hastings. In a note-book containing the long-hand manuscripts of several scientific

[2] Information relative to the founding of chairs in the Sheffield Scientific School may be obtained from the *National Cyclopaedia of American Biography*, vol. I, p. 172.

papers, most of which appeared later in print, there is to be found a letter simply indexed: "Letter to Scudder." [3] The full import of the matter may best be inferred from the letter itself which reads:

"Dec. 25, 1882.

"Your most flattering invitation to associate myself with you in editorial work has given me much more anxious thought than I had anticipated. At first I was strongly inclined to accept your offer, and had no doubt that the week granted me for consideration (for I supposed that an answer was not looked for before last Wednesday) would prove quite sufficient. At the end of that time, however, I was more uncertain than before, for this singular reason: I found that of the seven or eight friends whom I had consulted and whose judgment/opinions seemed to me of more weight than my own, all who were of nearly my own age advised me to go, whereas those who were considerably older strongly advised my remaining for the present in my position.

"The argument as urged by the latter was this: I am in a position which gives congenial work for which I have shown aptitude, and, although it is not such as ought to satisfy the ambition of a man of mature experience, it is one which yields its possessor valuable knowledge and secures him a constantly increasing number of friends. Such a change as contemplated means a change of work which, however kindly may be the judgments of my friends, I am by no means certain to prove well adapted, and from which an agreeable escape, in case the experiment were found to be a failure, would not be easy.

"The force of this reasoning must be granted, and I feel myself impelled to act upon it. In doing so my greatest regret is that I lose the opportunity of justifying in your own mind the gratifying things you have said to me and of me."

The following note written on the back of a list of physical apparatus then constituting the collection of the Sheffield Scientific School was doubtless very welcome and encouraging to the addressee.

"New Haven, Dec. 18, '83.

"My dear Hastings

"Here is the lean list of our apparatus. I am glad to know that $1000 has been put at your disposal by our Trustees to improve it. Mr. Richards, as you may know, has accepted, and it is a matter of course that both of you will be confirmed by the Corporation; so we are all well pleased. As ever

"Truly yours

C. S. Lyman"

[3] Possibly Horace Elisha Scudder.

If Hastings needed a rest in the sense of a complete change of mental stimuli and physical environment the voyage to Caroline Island to observe a total eclipse of the sun came in most opportunely. The American Party, of which he was a responsible member, sailed from New York on March 2, 1883, crossed the Isthmus of Panama by train, and finally arrived at the coral island on Friday, April 20th. From Sunday March 11th until the date just given Hastings wrote a very interesting and instructive diary of his impressions and experiences, especially those which were received or occurred on the trip across the Isthmus and at the successive points of call: Buenaventura, Tumaco, Guayaquil, Pata, and Callao. The group of scientists arrived in San Francisco on June 11, 1883 after having been absent from the United States for one hundred and one days during which about 12,300 miles had been traveled, and fifty days had been spent aboard the U. S. S. *Hartford,* Admiral D. G. Farragut's flagship in the memorable battle of Mobile Bay.

The salient features of Hastings' progress having now been traced from the time of his birth until he became permanently settled in New Haven, Connecticut, as Professor of Physics in the Sheffield Scientific School, attention will be turned in succession to the three chief aspects or phases of his life. These may be conveniently designated as: his optical researches, his character as a teacher, and his fitness relative to his social environment.

It is difficult to state exactly when, or in what way, Hastings' interest in astronomy and optics was first strongly aroused. His early and lasting liking for botany, geology, and zoology was probably initiated and fostered by his companionable father who was also a natural philosopher in the original general sense of this term. Undoubtedly Hastings' ever increasing devotion to astronomy during his undergraduate years was largely due to the influence of Chester Smith Lyman whose academic chair in the Sheffield Scientific School included both physics and astronomy from 1871 to 1884. A single sheet of paper dated October 1, 1869 gives a brief account of the telescopic observations which Hastings had just been making, also one sketch of the rings of Saturn and another of the surface markings of Jupiter, and a diagram of the relative positions of four of the

satellites of the largest planet. This was recorded near the beginning of his senior year in college.

Less than ten years later his skill in making lenses and his keenness of observation were attracting attention outside of Baltimore. This is attested by the fact that the prominent astronomer, S. W. Burnham, wrote Hastings a short letter from Chicago, Illinois, on July 2, 1879, the closing paragraph of which reads: "I have heard something of your glass from Mr. Rockwell. I hope you will follow the thing up, and if it proves to be a success as I have no doubt it is, try it on a larger scale." (The objective referred to had an aperture of 4.1 inches.)

That Hastings did "try it on a larger scale" with extraordinary success is now an accepted fact of scientific history. Since Professor F. Schlesinger was Director of the Allegheny Observatory of the University of Pittsburgh from 1905 to 1920 he was in a position both geographically and by virtue of his special field to observe with interest, and to write authoritatively on, that which may be called for brevity the "Brashear-Hastings-McDowell Association." For these reasons, and with the freely-given permission of its author, the following quotation is made.[4]

"In the late eighties he [Hastings] received a letter from a correspondent in Pittsburgh, at that time unknown to him personally, which was to prove of the greatest importance in shaping his career. A few years before, John A. Brashear and his son-in-law, James B. McDowell, had started the ambitious project of establishing their optical factory, an undertaking that would have been altogether impossible in that day in this country had it not been for the moral and financial backing of William Thaw. After some difficult years this venture prospered and was soon standing upon its own feet. Its prosperity brought with it the necessity for a mathematical expert to take care of the demands that the growing sciences of astronomy and astrophysics were making upon the ingenuity of these opticians. Brashear put this problem to his friend Professor George F. Barker of the University of Pennsylvania, who suggested that he secure the co-operation of Hastings. Brashear wrote at once to this effect and Hastings accepted. This was just as it

[4] Frank Schlesinger. CHARLES SHELDON HASTINGS. *Astrophys. Jour.* **76**, 150-151 (1932). As supplementary reading reference should be made to JAMES B. McDOWELL—AN APPRECIATION, by J. S. Plaskett, Director of the Dominion Astrophysical Observatory. *Jour. Roy. Astron. Soc. Canada*, **18**, 185-193 (1924). The frontispiece shows both Hastings and McDowell in characteristic poses.

should have been. On the one hand, it gave Brashear and McDowell the technical advice without which they could hardly have developed as they did; and, on the other, it gave Hastings precisely the clinic he needed to put to use his then unrivaled skill and knowledge in matters optical.

"These three men remained associates until the death of Brashear in 1920 and that of McDowell in 1923. Their alliance produced among other large instruments the 72-inch reflector at Victoria, the 30-inch Allegheny photographic refractor, the 26-inch Yale photographic refractor at Johannesburg, the Swarthmore 24-inch visual refractor, and the Keeler reflector at Allegheny with all its complicated auxiliary apparatus. They have also provided observatories with many wide-field cameras, including the Bruce doublet for Barnard at the Yerkes Observatory and the twin 16-inch Bruce Camera for Max Wolf at Heidelberg. Almost all the many spectrographs that were installed in American observatories in the early years of this century owe at least something to Hastings' design, and some of them were built entirely by this firm. Spectrographs attached to visual refractors necessitate a correcting lens between the main objective and the slit, and these Hastings computed with great success. For the Allegheny refractor the writer put the converse problem to Hastings, namely, to design an auxiliary lens that would transform the color correction from that of a photographic telescope to a visual, without sensibly changing the position of the focal plane. This, I think, was the most strikingly successful achievement of Hastings and McDowell: they provided a 12-inch corrector which is interposed nearly halfway up the tube and which gives visual images that I defy any observer to distinguish from those obtained directly by a visual objective of the highest quality.

"Among the many other optical problems that engaged Hastings' attention may be mentioned the cause of the various types of solar and lunar halos, the design of an Aplanat magnifier (which has earned him the gratitude of scientific workers in many fields and in all quarters of the globe), better correction for color by the use of two special types of glasses or by three ordinary types, and the optical faults of the human eye."

Toward the end of his life, but definitely before his memory had practically vanished, Hastings was devoting all of his working hours and by far too much of his energy to the design of microscope lenses. At this time he designed and made a 10× ocular which (in his own words) "has an absolutely flat and rectilinear field. Theoretically it is superior in definition to the accustomed 10×, and some of our expert microscopists assert that it is so." On April 24, 1930 he finished making with his own hands and testing an incomparably fine objective of 16 mm focal length,

of numerical aperture 0.3, and consisting of only three discrete lenses. The memorandum written the next day reads: "The objective was finished yesterday and is now about as good as I can make it without beginning all over again. It still has a minute error of excentricity both in back and front. It requires ocular 25× to exhaust its powers and it will bear 30× very well. The most difficult object which I have succeeded in resolving (with dark field illumination) is Pl. Balticum (38000 lines per inch according to Van Heurck)."

Whenever Hastings achieved a material optical triumph he naturally exhibited the apparatus with justifiable pride to some of his friends and colleagues. In this instance his enthusiasm was so great that he assured me that his new lens system was at least one hundred per cent better than anything of its rating then on the market. In order to obtain an independent opinion on this matter I recently made a point of visiting a friend who has had much experience in studying microscopic objects. Although about eight years had elapsed since he made observations with Hastings' best microscope, he recollected the circumstances vividly and said that the exquisite details brought out by this optical system exceeded to such a degree anything which he had ever seen that it seemed as if a whole new world had been unveiled to his vision. Be this as it may, it should be stated, in behalf of unbiased scientific accuracy, that none of us made crucial quantitative tests of these lenses.

The slight residual imperfections in the lenses would assuredly have been entirely removed both theoretically and practically if Hastings could have found the kind of manual help and intelligent cooperation which he had become so accustomed to receiving from McDowell. He did make an appeal for experimental aid but apparently nothing was vouchsafed him. Hastings frankly confesses: "My skill in lens making is limited. Surfaces of short radii and plane surfaces I can manage very well, and, less satisfactorily, concave surfaces of long radius, but convex surfaces of long radius give me a lot of trouble to avoid zonal errors." The lenses in question have disappeared but the work-sheets which contain all of the data and calculations have been jealously preserved.

One thing about Hastings which has not been emphasized sufficiently is his general scholarship. He was really a scientific philosopher—a scholar of broad and accurate attainments. He was an excellent physicist, thoroughly versed in his specialty and fully conversant with the physics of his day. But he was more than that. He paid no little attention to the philosophical implications of science and to its cultural values. His asides during lectures on historical developments in physics and related subjects, the reasons for them and their significance, scientific and other, were always illuminating and consequently interesting and valuable. He nearly always taught more than just the topic he happened to be discussing at the moment. This also made the matter he was presenting stick more firmly in one's mind. Instead of being an isolated fact to remember, it was part of a connected whole which was manifestly incomplete without it. These characteristics were especially marked in his advanced course on optics which I attended as guest in the spring of the year 1911. In particular the influence of Helmholtz was quite apparent and it led the lecturer to say in substance that a thorough study of the eyes of vertebrates would constitute in itself an excellent course in optics.

Hastings was eminently successful as a teacher of undergraduates. His material was wisely chosen and carefully prepared in logical sequence, and the demonstration experiments always worked perfectly because of his unusual dexterity. An interesting sidelight on the reactions which Hastings aroused in undergraduate students in the first years of his teaching at the Johns Hopkins University is afforded by the following quotation from a little book written by Allen Kerr Bond, M.D., entitled *"When the Hopkins Came to Baltimore."* (The Pegasus Press, 1927.) Incidentally Doctor Bond was the second undergraduate to be examined for admission to the Collegiate Department.

"The instructor in Physics, Dr. Hastings, had a seraphic smile which appeared only when one of his pupils at the blackboard was heading for a fall. When we saw it break out over his face, we sure knew that Trouble was waiting for us around the corner. He was the only teacher I ever had who defamed Spelling. He said he had wasted endless hours learning spelling, which now-a-days he left entirely to the proof-reader, as beneath his own notice.

"He was very expert in lens-grinding and made the fine lens of the telescope in our Academy of Sciences on Franklin Street.

"It was at his Physics class that I first heard a phonograph. One day he brought in a machine which he said had been made for him in a little shop on Eutaw Street, where an expert mechanic was employed in making models of inventions such as Professor Rowland's spectrum gratings and things needed for demonstrations. He set the machine a-going and it related to us the tragic story of Jack and Jill,—ending with 'Jill came tumbling after *him.*' 'I know,' said Dr. Hastings, 'that the apprentice boy spoke that record; for that is the way he always recites it.' "

A few comments on the text-book known almost everywhere as "Hastings and Beach" should be made because at the time of its publication (1898) it undoubtedly set a standard above anything before it in this country. The book is difficult chiefly because of its vigor and the amount of ground which it covers with very brief discussions in general. Hence it was an excellent text for students with good heads and a bad one for those with poor heads—excellent for those who wanted to know physics as physicists and engineers but poor for those who desired to learn something about physics as part of a general education. A copy now before me contains an inscription which speaks eloquently for one class of head.

"If we should have another flood
"For safety hither fly.
"Although the earth would be submerged
"This book would still be dry."

Another book by Hastings—the mere existence of which is apparently known to only a few specialists—deserves consideration in this memoir because it is potentially the guarded answer of its author to the oft repeated suggestion of fear on the part of his intimate friends that his method of designing lenses might be lost to posterity because most, if not all, of his research papers in this field give results and not specific directions. The title is *NEW METHODS IN GEOMETRICAL OPTICS with Special Reference to the Design of Centered Optical Systems.* (The Macmillan Co., 1927.) The opinions expressed below concerning the character of this volume should be nearly correct because they are based on actual experience with its contents in two different ways. In the first, a general

but rather superficial view was obtained by reading the page proof. In the second, I used the book as a text in the next giving of the first part of my graduate course on geometrical optics and the theory of spectroscopic apparatus. Although the book was not particularly designed for class use, I was surprised and disappointed to find that the pedagogical experiment did not succeed. The chief reason seemed to be that the material presented had been extremely condensed. After finding that it usually required from six to eight hours of computation and preparation on my part to discover precisely how Hastings had obtained even one of his illustrative numerical tables the conviction became gradually forced upon me that, aside from the easy purely mathematical analysis,[5] the text was essentially a compilation of results which its author had accumulated during his life-long experience as consultant and theorist for the John A. Brashear Optical Co. Nevertheless it should not be inferred from the preceding critique that this text is useless, rather it is "necessary but not sufficient", to borrow a mathematical phrase which fits the case admirably. The Rosetta stone is to be found in Hastings' work-sheets which give implicitly the trains of thought followed while repeating the calculations (with only a single card of four-place logarithms) until the errors of the centered optical system under design were made either to vanish or at least to satisfy the required theoretical tolerance. In other words, if Hastings had supplemented his text by including a long appendix exhibiting *all* of the tedious arithmetical labor which he patiently performed in the case of any one compound lens, then a properly prepared reader could find out precisely how to copy, continue, and perhaps extend the master's theoretical designing. Obviously this would not remove the necessity for a great deal of concurrent laboratory work.

A careful study of the available records showed that no graduate student has ever attempted to obtain one of the higher academic degrees by doing his thesis work under Hastings' guidance and in the special field of the latter. This fact may be

[5] Hastings uses the marks ⌋ and ! in his original paper (1893) and in this book, respectively, to denote a continued product and not a factorial. This may lead to confusion because the accepted mathematical symbol is capital pi.

explained on the basis of the following deterrent influences: the drudgery and consumption of time inherent in the computations referred to above, lack of experimental facilities and especially optical glass, and above all the unsympathetic attitude which Hastings invariably took whenever he was asked a direct question about the practical application of the mathematical theory which he gave in his advanced course in optics. This selective taciturnity may have been accidental or temperamental but since, to his intimate friends at least, he was without exception a very approachable person it seems far more probable that the trait was constructively developed for defensive purposes.

Before considering Hastings' personality and social relations a few "fragments" gathered from his loose sheets of paper and note-books will be recorded because some of them may be of interest and probably not one occurs elsewhere in print. Considerations of brevity and of continuity of thought precluded the possibility of incorporating them in the preceding pages.

There exists the original white-on-black drawing by Hastings of satellites I, III, and IV "of Jupiter as seen Sept. 1, 1869." This is accompanied by a printed proof which implies publication. All endeavors at finding the reference have failed. The date corresponds to the beginning of his senior year.

Hastings early discovered an object in the constellation of Taurus to which he refers as "my double star". His first extant memorandum is dated Friday, Oct. 1, 1869. "New double in Taurus divided or rather disks just in contact with 450 solid." [Meaning solid ocular and magnification 450×.] "Compared it to γ^2 Androm. and it seemed a little closer and more difficult on account of faintness." "The components are of nearly equal size." On Feb. 2, 1882 Asaph Hall wrote a letter (from the U. S. Naval Observatory, Washington, D. C.) to Hastings in which he said: "Your star is a fine double. Last night I found $p=298°.3$: $s=0''.54$ the night was only middling; and on a good night it would be an easy object here. When and with what glass did you find it?" On Feb. 11, 1882 A. Hall gave the magnitudes of the components as 8½ and 8.

Oct. 10, 1880. "Compared Steinheil's triplets very carefully

with my solid eyepieces of nearly equivalent powers. I could find no inferiority in point of definition or light, though the available field of mine is about 20% greater." Oct. 20, 1880. "New ¾ in. and $^{3}/_{10}$ in. solid eyepieces; they are very good."

"The glass circle spectrometer seems to have been completed April 22, 1886." [6]

March 2, 1889. "Finished this day the 2¾ in. objective . . ." "It performs beautifully on all kinds of objects . . ." "The following observations were made to test the power of a telescope of 2¾ in. aperture and 38 in. focal length with perfect color correction. The comparisons are made with a 2⅝ in. telescope of 33 in. focal length (the first telescope that I made) which is constructed on the Herschelian type and very admirably corrected." This first telescope antedates Oct. 8, 1880 if it is the same one referred to on that date in the following quotations. "Observed with 2⅝ in. telescope." "Keeler's telescope with 2½ in. objective has slight negative spher. aber. and marked deficiency of light in comparison with mine."

June, 1915. "Finished new type of solid solar ocular (i. e., solid with cemented slip of dark glass inside, to be used with Herschel prism.) Highly satisfactory."

During the years 1920, '21, and '22 Hastings acted as optical adviser for the Prisma Company which was experimenting on the production of colored motion pictures. In this connection it may be worthy of note that the friendship which it was my great privilege to share with Hastings grew out of the very lively interest that we both took in the monochrome motion pictures at the time when the art of pantomime and suggested repartee was at the peak of its development.

In a certain letter dated April 23, 1930: "I am about to send you for inspection my 10× ocular and one of my 16 mm 0.25 objectives." "Please note besides its defining power (with high power ocular) its great working distance and the fact that, the front being removed, the back forms an excellent objective of 32 mm 0.12. The last feature is one which, I should imagine, would be of commercial value. My most

[6] See F. E. Beach, *loc. cit.*, 486.

valuable invention, however, if I except my military telescope, is my 16 mm 0.3 objective together with what it promises. It is of three lenses only . . ."

Honors were received by Hastings from many quarters. At the ninth Cincinnati Industrial Exposition he was awarded, on October 8, 1881, a silver medal for his "Telescope Object Glass." On November 19, 1884 he was elected a member of the Connecticut Academy of Arts and Sciences. To this he tendered his resignation in the year 1915. On April 18, 1889 he was elected to membership in the National Academy of Sciences. In the same year he was appointed an *officier de l'instruction publique* in France. As a member of the committee on photographic proofs and apparatus, for the General Paris Exposition of 1889, he received a commemorative diploma on September 29th. At the Paris Exposition of 1900 he was awarded a gold medal on August 18th. He was elected a member of the American Philosophical Society at a meeting held in Philadelphia, Penna., on April 18, 1906. In 1926 the Franklin Institute of Philadelphia awarded Hastings a medal for the improvements he had made in optical instruments. He was a fellow of the American Association for the Advancement of Science, also of the American Physical Society, an honorary member of the Societá degli Spectroscopisti Italiani, and a collaborating editor of the *Astrophysical Journal*. The Physical Club of Yale University was founded in the autumn of 1899, and when, on October 31st, the first meeting was held the management of the club was placed in the hands of an executive committee consisting of Professors J. W. Gibbs, C. S. Hastings, and A. W. Wright.

Hastings' happy disposition and magnetic personality won him many friends not only among scientists but also among cultured people in general. In New Haven he belonged to two distinct sets. The members of one of these represented the University circle and were engaged in intellectual pursuits. The other set was composed in the main of men prominent in banking, law, manufacturing, etc. He was an active member of the select Colby Club, a group which met on alternate Saturday evenings when a member read a half-hour paper on some cultural sub-

ject. For example, a paper by Hastings bore the title: "On Certain Limitations in Science." He was a charter member of the New Haven Lawn Club Association, and president of the exclusive Graduates Club for the three years beginning with 1905.

The ruddy complexion and vigorous health of Hastings were due to his taking plenty of outdoor exercise. He was especially fond of bicycling, often with his daughter, both in this country and in England. He played tennis until fairly late in life, and even after this he continued swimming in season at his summer home in the town of East River, Connecticut. He derived much pleasure and recreation from fishing, particularly on the yachting excursions to southern waters which were made every spring and fall at the invitation of a certain wealthy friend.

In 1878 Hastings married Elizabeth Tracy Smith of Hartford. About three years later their only child was born and baptized as Katherine Panet. The daughter became Mrs. Horace W. Chittenden. She presented her father with four grandchildren, three girls and finally a boy. After a protracted illness Mrs. Hastings died in the fall of 1930. Although Hastings was not a finished musician he did enjoy playing the flute to the piano accompaniment by his wife.

An interesting sidelight is thrown on Hastings' consistent equanimity and contagious cheerfulness by something that was brought out in the course of a discussion on the philosophy of "happiness". His creed was that happiness is a quality which has to be "learned" by one's own efforts. In reply to a recent inquiry of mine Mrs. Chittenden wrote: "He certainly learned it for himself, and even in his last long illness, when so little was left to him, he was almost entirely cheerful and found contentment and happiness in little simple things." Hastings was not a member of any church in New Haven but he often attended services at St. Johns Episcopal Church with his wife and daughter. It is conjectured that he joined a Congregational church when as a youth he dwelt in Hartford, Connecticut. That he pondered over spiritual problems is established by the fact that on several occasions he propounded to me in all seriousness abstruse questions concerning the concept of the

Holy Ghost. On Sunday, January 31, 1932 Hastings died at his daughter's home in Greenwich, Connecticut. On the afternoon of the following Wednesday a small group of us motored to Cedar Hill Cemetery, Hartford, to attend the last services held over the actual ashes of an irreplaceable friend.

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