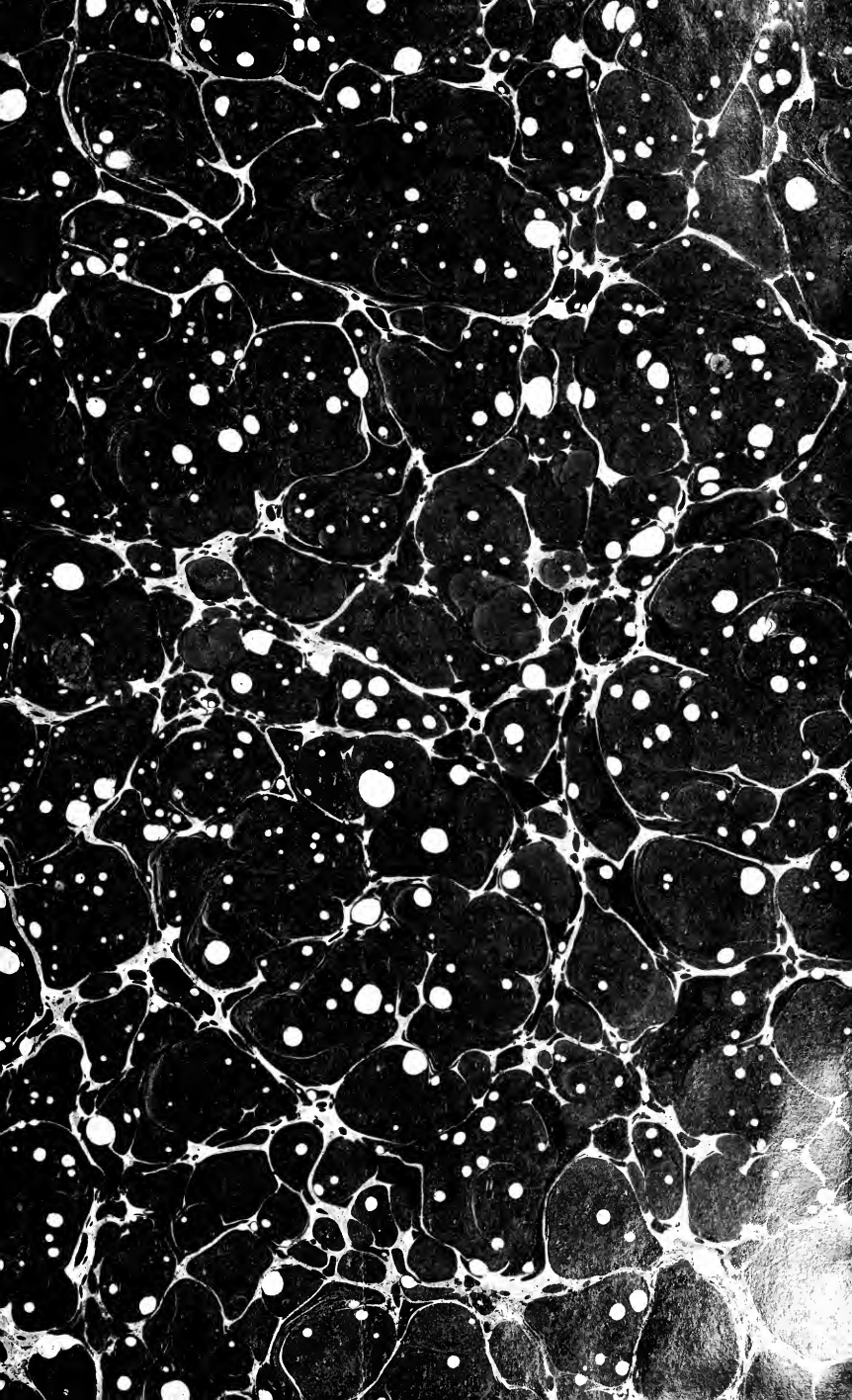




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Astronomical Society of the Pacific

ADDRESS

OF

WILLIAM M. PIERSON

Retiring President of the Society

AT THE

FOURTH ANNUAL MEETING

San Francisco, March 26th, 1892



ADDRESS OF THE RETIRING PRESIDENT OF THE
SOCIETY, AT THE FOURTH ANNUAL
MEETING, MARCH 26TH, 1892.

BY WILLIAM M. PIERSON.

A review of the three years' life of this Society ought to be full of encouragement to all of us. Too often the expectations of the earlier members of a Society, particularly a scientific one, are not realized. Those who join for mutual improvement in the science do not immediately realize their hopes, and those who unite for the love of the novel, frequently fail to have their curiosity gratified. These naturally fall away through the loss of their original interest. But the reverse has been the rule with this organization. The Society has steadily advanced from its feeble beginning, and to-day finds itself a permanent, a practical and a properous organization.

Its first meeting had a record of forty members on the roll. At the end of the first year its membership had increased to one hundred and ninety-two. Its second year closed with a list of three hundred and sixty, and its third year, now finished, discloses a total of four hundred and thirty-two, of whom three hundred and eighty-one are active subscribing members, and fifty-one life members.

Considering that the Society is located in a district of the United States peopled by less than two millions of inhabitants, among whom, aside from public observatories, probably not a dozen are possessed of any telescopic appliances, it is indeed remarkable that the Society has on its roll over two hundred local members, all of whom take or feel an active interest in its progress. Indeed, considering the environment of the Society,

it may well be doubted if any purely scientific organization has ever met with such a degree of prosperity.

Remarkable, however, as this growth has been, it ought to be the aim of each of us to stimulate it still farther. The greater the Society, the more widespread its influence and the more valuable its contributions to the cause of science. It has been the aim of the officers of the Society to maintain its publications at the highest standard of excellence. But they constitute the larger part of its expenses. Many scientific papers of great value, many details of discoveries made by the great refractor of the Lick Observatory, and many reproductions of exquisite celestial photographs could and ought to be published did our means justify it. We all can aid in the accomplishment of this desirable result. If each of us would introduce one new member during the coming year, the Society would be enabled to greatly extend its sphere of usefulness and its advantages to science and to ourselves.

From the Treasurer's report you will learn that the Society is on a sound financial footing. The permanent funds, those which we owe to the munificence of Mr. ALEXANDER MONTGOMERY for the maintainance of the ALEXANDER MONTGOMERY Library, and to Mr. JOSEPH A. DONOHOE for the Comet-Medal, are well and securely invested.

The Society owes a heavy debt of gratitude to its Publication Committee, and particularly to its chairman, Professor HOLDEN, for its and his labors in editing the Publications of the Society. It is a class of labor particularly onerous and exacting, performed without compensation and of a quality that is wholly unexceptionable.

In retiring from the Presidency, I desire to extend to all the officers of the Society my sincere thanks for their hearty assistance and courtesy during my term of office, and to the members for their uniform kindness and good will.

The past year has developed a greatly increased interest in astronomical research. The formation of new sections of this Society, the improvement and enlargement of astronomical periodicals, the establishment of new observatories, both public and private, the system of university extension, and above all the dissemination of celestial discoveries in the public press—that most accessible of all educators—have given a marked impetus to the study of Astronomy. The proximity to us of the Lick Observatory with its grand instrumental power and skillful staff of observers,

has served to make its revelations easily and immediately attainable to the public, and largely increased the general interest in the science.

This increasing interest in astronomical research has not been limited to intellectual sympathy alone, but has also assumed the tangible and valuable form of financial aid. I take great pleasure in announcing that Mrs. PHOEBE HEARST, the widow of Senator HEARST, of our State, is about to found several Fellowships in Astronomy at the Lick Observatory, and to provide a permanent fund, the interest of which is to be used to promote the scientific work of that institution.

While the collection and dissemination of scientific discoveries are the principal objects of the Society, it fulfils, nevertheless, another and equally valuable purpose, the instruction of those of us who are merely amateurs: In a wide sense the Society is a school. And yet a school wherein we may all to a greater or less extent be tutors as well as pupils. While the professional astronomer, in possession as he is of the most powerful and refined instruments and methods of observation, can and does contribute vastly more than others to the general stock of scientific knowledge, yet there are none so meagerly supplied with those facilities who cannot furnish something—if not original discovery, yet that which may supplement and confirm it.

The difficulty with those of us who are amateurs, or at least the difficulty that I, as a novice, first encountered in astronomy, was that, after understanding the general outlines of its descriptive department, I was at a loss where to begin or what to do in the way of observation. The temptation to wander over the sky with a telescope is almost irresistible, but as a rule nothing is so profitless. It hardly gratifies the curiosity, for the reason that one is ever lamenting that he does not see more than his lens is capable of revealing.

I shall be pardoned, I hope, by the professional astronomers, who constitute so large and invaluable a part of our Society, if as an amateur I make some brief suggestions in this connection to its amateur members. I make them with the more freedom because, as my predecessor very properly said, "We should not forget that we are a society of amateurs." They are the result of my own experience, and have not been without value. In the hope that they may be of some service to others, let me state them.

Specializing, particularly in Astronomy, is indispensable to any

success by the amateur. First of all, have some inquiry, some object in view. That is the great charm of all scientific investigation, because in pursuing it you can note your progress—an invaluable stimulus to study. If you are provided with optical instruments, devote yourself to some particular field, some particular planet, or, if you have the time for day work—the Sun.

For example, select a region of the sky, say from one to five degrees square, the area being in inverse proportion to the aperture of your telescope. If the portion you decide on be in the vicinity of the equator or ecliptic, select two at opposite points of the heavens—one for Summer and the other for Winter observation. If near the pole, one would suffice, as it would be visible to you the year round. Make these districts of the sky your special field of observation. Consider that your exclusive domain. Make it a point to observe it on every observing night, whatever else you look at. Use the lowest power of your telescope in sweeping over this field. Familiarize yourself with every object in that region within reach of your lens. Note the magnitudes of all the stars within it, their colors, their arrangement in space, their distances from each other, the presence or absence of any nebulous appearances. Identify every star you can by the aid of your star maps; know them by their names or their catalogue numbers. If you have the means of measuring their distances from each other, do so; if not make eye estimates. A very little practice will enable one to make fair eye estimates of distances. Ascertain the actual angular distances of such stars within your field as are given in your star maps or star catalogues, and compare them with the visual angle between them as seen in your telescope under a given magnifying power, and you will soon be able by comparison to determine with a fair degree of approximation the distances of other stars whose actual position you may not be able to find otherwise.

Above all things, make notes at once of what you observe, with all the details possible. Trust nothing to your memory. An accurate observation of a single phenomenon may be of great importance. No fact is without value, and your observation may at some time fit into a series which would be otherwise incomplete. Remember that celestial phenomena occur but once, and you may happen to be the only person to have observed that one.

If you will do this, it may be your fortune to be the first to

detect a comet, or, if your field be not too far from the ecliptic, a minor planet; for the motion of the latter is very marked with reference to the fixed stars, and that of the former, unless approaching directly in the line of sight, is quite conspicuous. Or mayhap you may be the lucky discoverer of a new star, always a matter of absorbing interest. And if you succeed in neither, you will still have the satisfaction of knowing more about the particular section of the sky which you have made your own, than any one else who has not done the same.

And so, if you select a planet, or our own satellite, or the Sun, make it your special study, whatever else you may choose to examine. Regard that as your specialty. Scrutinize the changes in its appearance—read all there is to be found about it—examine it with reference to the researches of others, and compare them with your own investigations, and again,—make notes of all you observe.

It is remarkable how much more the professional astronomer can see than the novice, even with the same telescope. And yet it is for the very reason that I have given. The veteran is familiar by long study with the details of the special object of his examination, and therefore detects at once the changes, if any, which have occurred in its appearance. That is the reason why it has been so justly said that astronomical observations depend not so much on the power of the telescope as on the man at the small end of it.

The ardor of the amateur is, however, frequently cooled by the feeling that no results attend his labors. He makes no discoveries; he finds himself treading only in the beaten track of others; his progress in science is unmarked with any appreciable improvement. To such let me say: You are accomplishing much more than you think. You are fitting yourselves to appreciate and comprehend the discoveries of others: you are developing your powers of discernment, and your capacity to accept or criticize the theories which may be based on new discoveries. Above all, remember that, anomalous as it may seem, the failure to discover is frequently as valuable as a discovery.

For example, had you selected for your field of observation that region of the sky where the *nova* in Auriga has just been discovered, even if you had not detected the stranger yourself, you would have been able to render a valuable service to astronomy by demonstrating that until a given night it was not visible, and

thus have been the means of fixing accurately the date of its apparition.

And again, how many have been the sharp discussions as to changes in the lunar surface. Suppose that you had selected the moon as your special field of observation, the fact that you had observed no particular feature on a given region of the moon when seen under all its varied angles of illumination, would be of value in proving the disappearance of some crater or other object which may have been delineated on lunar maps or described by former observers. This kind of negative evidence is of high value.

If you possess no optical appliances whatever, but have taken an interest in photography, you can render an efficient service to Astronomy by photographing as frequently as you are able some particular region of the celestial sphere. An examination of your plates from time to time may reward you with like discoveries. Indeed, the photographic plate, when properly exposed, has surpassed the greatest telescope in its revelations. Again, I say, note accurately the time at which your plates are exposed, and the length of exposure. Compare them frequently, and record any apparent changes.

And here let me say that the climate of California is peculiarly adapted to observational and photographic Astronomy. In the great valleys the nights are almost uniformly clear from May to November, and the winter and spring evenings, when not clouded are exceptionally fine. I have no data as to the number of observing nights in those localities, but in San Francisco I have kept a record since October, 1888. Even in that place, so much abused for its summer fogs and winter rains, there is a considerable majority of the nights free from fogs and clouds. Out of 1253 nights, I have a record of 1182; of these, 645 were unobscured by cloud or fog, and 537 obscured. Many of them were first-class observing nights, in which the highest power of the telescope could be used with advantage, and the remainder of the 645 were more or less satisfactory with lower powers.

But you may have neither optical or photographic apparatus, nor the opportunity or taste for observation. Then consider the fertile field which yet remains in the department of theoretical astronomy. I do not mean that we should indulge in mere conjecture or speculation. That is pernicious and idle to the last degree. But the collation and examination and testing the ob-

servations and data of others, and the working out of theories and hypotheses is both instructive and interesting.

When we consider that the very foundation stones of planetary astronomy,—the three immortal laws of KEPLER,—were the results not of observation but of reasoning from the observations of others, and that the “harmonic law” itself was but a long-continued attempt at guessing the proportions between the periods and distances of the planets; that the result when attained was to him based on no principle, and, until the time of NEWTON, wholly arbitrary, we may be encouraged to think that there are other laws and other phenomena which might yield to the same class of inquiry if earnestly pursued.

Take up one of the hundreds of unsolved problems and mysteries of the celestial universe. What is the Zodiacal light, the Gegenschein, the Aurora Borealis, the solar corona, the substance of comets? Why do the planets rotate on their axis; what is the law governing that rotation? Why are the orbits of the planets inclined to the ecliptic if the nebular hypothesis be sound? Why are the axis of the planets inclined to their orbits? Why do the different portions of the Sun's and *Jupiter's* surfaces rotate in different times? Why are there periods of maximum and minimum sun spots?—and scores of other riddles which Nature, the Sphinx, addresses to us. Mass your reading on the problem you take up. Study all the observations at command. Frame your theories. See how they meet all the facts. Do this, and I assure you that you will find the pursuit as fascinating as it is instructive. If you arrive at a conclusion which seems to you to amount to a working hypothesis, communicate the result to the Society. Let it lead to debate, discussion. Out of it will come your own improvement in the science, and the instruction of us all.

A word of caution, and I have done. The enthusiasm of the amateur is boundless, It is well that it is so. Do not conclude, however, that the first dip into astronomy enables us to discuss the complex problems of the sky with the veterans in science. Be not too eager. Do not expect to discover a planet or a comet the second night you observe, nor hope to expose a fallacy in the law of gravitation on the first examination. Patience is genius. As the master painter said when asked the secret of his art, “I mix my colors with my brains,” so do you mix patience with your observations, and conservatism with your reasoning.

In all your work, whether you have much or little opportunity

for it, remember that in science the future is richer than the past. Valuable as have been the treasures extorted from reluctant Nature, those yet to be rifled from her storehouse will far surpass them. Be one of those who, like Sir JOHN HERSCHEL and his two friends, recorded a vow to "do their best to leave the world wiser than they found it."

