Sidereal Times
Amateur Astronomers Association of Princeton
Duncan Planetarium, Princeton Day School
The Great Road, P. O. Box 75
Princeton, New Jersey 08540

PRINCETON JCT, N.J.
MAY 5
AM
1972
08550

John Church
11 Princeton Place
Princeton, NJ
08540

AMATEUR ASTRONOMER'S ASSOCIATION OF PRINCETON

The Sidereal Times

Director: Barry Hancock

Editor: Roxanne Tobin

Member of the Astronomical League

ol.1 no.4

May, 1972

The next meeting of the Amateur Astronomer's Association of Princeton will be held on Tuesday, May 9, 1972, at 8:00 p.m. in Room A-07 of Princeton University's Jadwin Hall (in the Physics Department). Our speaker will be Mr. Leith Holloway of the A.A.A.P. Mr. Holloway's topic will be on:

"How the Amateur Astronomer can cope with Astrology"

* * * * * * *

The Study Group has its' next meeting on Friday, May 12, 1972, at 8:00 p.m. at Duncan Planetarium. The topic will be Chapter 15, entitled "The Minor Planets". The speaker will be: Mr. George Parker.

* * * * * * *

The next meeting of the Astrophotography/Observation Group is on Friday, May 19, 1972, at 8:00 p.m. at Karl Koehler's home in Bordentown, weather permitting.

* * * * * * *

The next public lecture at Peyton Hall is on May 22, 1972, at 8:30 to 10:30 p.m. Hopefully the sky will be clear enough to permit their fine 9 inch Clarke refractor to be used. Peyton Hall is located on Ivy Lane.

* * * * * * *

Correction: In the last issue of The Sidereal Times in the article "Star Party is a Success" it read "Those present were: Mike Clark, Roxanne Tobin and her father, John Church, Dave Larach, and a few others" It should have read "Those present were: Mike Clark, Roxanne Tobin and her father, John Church, and Dave Kaplan.

EASILY-OBSERVED LUNAR OCCULTATIONS

May-June 1972

by John A. Church

The writer receives detailed predictions for lunar occultations of stars, computed for his exact latitude and longitude by the Naval Observatory. As the members of the Association might be interested in observing these beautiful phenomena, a list of easily-observed occultations which occur in convenient evening hours will appear in this publication every two months. The times given should be accurate to about 15 seconds for those observing within a 10-mile radius of Princeton Junction, except in rare cases. Those who do not have a short-wave radio receiver capable of picking up WWV or CHU time signals can achieve adequate accuracy for this purpose by setting a kitchen electric clock to a television time signal (for example, the network evening news programs begin quite exactly at 7:00 PM). One should be set up and ready to observe at least 5 minutes before the predicted time.

Accurate timings of occultations are useful astronomical data. Anyone with a short-wave radio, a good stopwatch, and a 4" telescope can collect data which will be seriously used by professional astronomers in studies of the motion of the earth and moon, provided he is willing to perfect his timing technique to the point where 0.1 to 0.2 second accuracy is attained. This is not difficult but does require practice. The writer will be pleased to assist anyone who is seriously intersted in starting such a program.

Date	predicted time(EDT)	Star Mag.	Moon % Sunlit	Cusp Angle	Comments
May ~~18~~ 16	10:45:19 PM	6.9	20	25°N	
May ~~18~~ 16	10:56:46 PM	6.9	20	-1°N	reappearance of same star
May ~~18~~ 16	11:14:34 PM	7.1	21	16°S	
May ~~18~~ 16	11:01:54 PM	8.1	21	89°N	
May ~~19~~ 17	10:18:36 PM	5.9	30	50°N	very easy to see
May ~~19~~ 17	10:18:34 PM	8.0	30	87°S	almost simultaneous with preceeding: very unusual
May ~~19~~ 17	11:30:44 PM	8.1	30	83°S	
May ~~21~~ 19	11:23:50 PM	7.2	51	72°S	
June ~~17~~ 15	9:51:02 PM	7.3	25	48°N	
June ~~24~~ 23	11:46:31 PM	5.1	93	76°S	moon nearly full but still should be easy to see.

Note: Cusp angle is the angle in degrees toward the equator of the moon from the north (N) or south(S) cusp of the moon, at which the event will occur. Thus, on May 18, the 8.1 magnitude star will be occulted almost exactly mid way between the cusps of a crescent moon (89° from the north cusp). Also note: the reappearance of the 6.9 magnitude star on May 18 will occur almost exactly at the cusp (1° on the bright limb).

All of the above events will be star disappearances at the dark (advancing) edge of a waxing moon, except for the one reappearance noted. They will all be well within the capability of a 4" telescope. Use 50 to 100 power and reduce glare by keeping the sunlit portion of the moon near or outside of the field of view. With most of the above events, the gradual approach of the earthlit limb of the moon to the star will be very pretty to see. The occultations themselves will be very abrupt.

* * * *

Editors' note: John Church's regular reviews of recent journal articles will resume with the June issue of Sidereal Times.

THE PLANETARIAN, Journal of the International Society of Planetarium Educators, will be published quarterly starting on the coming Summer Solstice. In addition to planetarium specialists, many articles will be of interest to amateur astronomers, astrophysicists and the general public, In the first issue, for example, there will be a dissertation by Isaac Asimov on Science and Communication, written in his customary entertaining and useful manner. Regular columns on astronomy, humor, planetarium operation, and other topics will be complimented by a variety of other articles on similar topics. Advertised cover price is $5.25/year or $1.50/copy. However, through special arrangement, a special price of $3.50/year or $1/copy can be made available. If you are interested, contact Norm Sperling at Duncan Planetarium. Sperling is a member of the ISPE Publications Committee, which has created The Planetarian, published the Catalog of North American Planetaria, and will publish other items of interest in the future. Work on this committee began in the summer of 1970.

* * * * * * * *

Astrophotography with a Polaroid Camera, by Alene D. Oestreicher, Baltimore Astronomical Society, junior member, in the April, 1972 Newsletter.

For those of you who have seen the Polaroid Astro Camera in the Edmund catalog and wondered about its performance, here are a few of the results I obtained when using it in my science fair project, "Lunar Photography with a Polaroid Instrument Camera". My other equipment was a 6", f/8 reflector and a 40mm Kellner eyepiece which formed approximately a 2-1/4" image on the film.

The main problem I was confronted with throughout my work was over-exposure. with the extremely fast black and white film. Since the camera does not have an adjustable shutter, and exposures are controlled manually with a cable release, exposures shorter than about 1/8 second were nearly impossible. Therefore, either auxilliary diaphragms or neutral density filters had to be used, their sizes and densities varying with the moon's phases.

With color film, over-exposure was not the problem. The full moon was recorded well in a short exposure, but the other phases required as long as several seconds.

There were also problems caused by the bulkiness of the camera. The system was often thrown out of focus, or the object moved off-center. Long exposures requiring a clock drive were a problem because the camera cannot be properly supported by a convention bracket (such as Edmund's). Also, once the picture was taken, the camera had to be removed immediately so the film could be pulled out to develop.

All things considered, this camera and its films are not well suited to astrophotography. In order to obtain good results, one must be prepared to do extensive testing (which requires a substantial budget!).

* * * * * * * *

It's time for MERAL again! AAAP had a jolly time hosting the affair a year ago, and the Astronomical Society of Harrisburg, Pa., is trying to do as well now. The activities and speakers they have lined up for us are first-rate, and should make 9-11 June quite interesting for us all. Advance registration is $2; other activities also will cost a bit but seem worth it. Write John A Betz, 5000 Lancaster St, Harrisburg, Pa. 17111, for details (phone 717-564-4677).

METEOR OBSERVATION FOR THE BEGINNER

reprinted from Meteor News, March 1972; editor: Karl Simmons.

Go out and lie under the stars for an hour sometime and you should see half a dozen meteors flash through the sky. If you've never meteor watched before, try it sometime -- it's very relaxing.

Use a sleeping bag or blanket spread on the ground to lie on. You may find a chaise lounge more comfortable, especially if there is snow on the ground. And look in any part of the sky. Feel free to look around the sky to see what constellations are up. As a rule, most meteors will be seen quite a ways above the horizon, so looking overhead is fine if you're on your back -- and your chaise lounge can be reclined almost all of the way back.

If you have artificial lights lighting your sky, the number of meteors you will see will drop sharply. Pick an observing site that is as free of lights as possible, or drive to an observing site in the suburbs or country.

The time of night that you watch will make a difference in meteor rates, too. You may see only 2-3 meteors /hour after sunset to a dozen /hour at midnight to as many as 10-20/hour or more just before dawn.

The only information you need to record is the date; and for each hour observed, note the time started and ended, and the number of meteors seen, and notes on the weather. If you can estimate the magnitude of the faintest star at the zenith (point overhead) this information is also helpful. Remember to keep each hour's count separate from each other, because you are after hourly counts.

At various times of the year you may be able to see 10-100 more meteors than you usually see. These extra meteors will come from a meteor shower, or major shower. The Lyrids and Eta Aquarids are our next two major showers. When one of these showers is active it is useful to keep a separate count of them from the normal (sporadic) background meteors. How can we tell the difference between a major shower meteor and a sporadic one? All the major shower meteors will appear to come from one point in the sky, called the radiant. Trace each meteor you see backwards along the path to see if it intersects with the meteor shower radiant point. The Lyrids in April, for example, will be streaking away from Lyra.

So meteor watch sometime, and send your results to Sidereal Times and Meteor News. Your editors will be glad to answer any questions you have and offer suggestions. Watch soon! You'll be surprised at what you see.

* * * * * * *

Roxanne Tobin challenges you to unscramble these ten astronomical terms:

aygxla	bleanu
vropaesu	lwaykiym
atlpen	uStanr
rluctes	ectom
todiarse	orsteme

With an eye twoard future cooperation among New Jersey planetaria, astronomy clubs and club newsletters, an informal get-together has been called at Duncan Planetarium for 2:30 PM, Sunday, 14 May 1972. All known planetarium directors, club representatives and newsletter editors in the state have been invited. Among the possibilities to be explored will be increased exchange of articles (perhaps extending to common publication of pages or whole issues); a state-wide calendar of lectures and meetings to encourage better attendance; loans of planetarium devices and scripts; and other efforts to eliminate duplication of effort and increase effectiveness in the pursuit of descriptive astronomy.

* * * * * * * *

Alison Hopfield, a ninth-grade student at PDS, has been named a national winner in the student SkyLab program announced several months ago in Sidereal Times. Alison's project involves photographing the suspected clouds of dust at the L_4 and L_5 libration points of the earth-moon system. These are points of gravitational stability 60° ahead of and behind the moon in its orbit around the earth. Dust reaching either point would be able to stay there indefinitely, so clouds of such Solar System dust have probably accumulated. Surface brightness is exceedingly low, however, and the few sightings ever made are in dispute. Information about these clouds may provide some insight into the early history of the Solar System and the earth-moon system. In addition to certificates, pins, a medallion and numerous other tokens of achievement, Ms Hopfield is designated principal investigator for the project, which will be flown on the first SkyLab, a year from now. She and her advisor, Norm Sperling, will attend a PreliminaryDesign Review session at Marshall Space Flight Center, Huntsville, Alabama, 8-10 May, and the SkyLab launchings currently scheduled for 30 April and 1 May 1973 at Cape Kennedy, as guests of NASA and the National Science Teachers Association. It is hoped that she will supply details of the project and its results to readers of Sidereal Times.

* * * * * * *

Three fireballs fell on West Germany in a 26-hour period this spring. The Smithsonian Institution's Center for Short-Lived Phenomena has notified Duncan Planetarium of the observations by the European All-Sky Camera Network, similar to the US's Prairie Network that found the Lost City meteorite last year.

21 March: The first of the fireballs fell at about 19:30 GMT (accuracy 18 minutes) It reached magnitude -9, left a luminous path 62km long in 3.1 seconds. During this time it fell from 85.6km to 35.7km, slowing from 22.1 km/sec to only 12.8 km/sec. Some evidence indicates it may be a compact stone, in which case its probable diameter is about 5cm. Impact was near Bamberg, West Germany. There is no report yet of its recovery.

At 21:30 GMT (accuracy 5 min) that night, another -9 magnitude meteor traveled 39km in 3.4 sec. Beginning at 62.0km height at 12.3 km/sec, it fell to 30.8 km and a velocity of 8.7 km/sec. Impact probably near Büdingen, W Germany. If a compact stone, it would be 20cm across; some evidence indicates it may be a rare carbonaceous chondrite, which would leave several smaller fragments.

At 21:30 (accuracy 18 min) the next night, 22 March, the last of the three fell . Lasting a very long 3.8sec, it left a path 72km long and reached a very bright -11 magnitude. It was luminous from 72.5km to 32.2km altitude and slowed from 21.4 km/sec to 10.2 km/sec. Impact near Marburg, W. Germany. Diameter about 8cm if a compact stone, for which there is some evidence.

Radiants, orbital elements and other data available at the Planetarium.

EARLY MODERN SCIENCE

a paper by Ronald Susswein, a sophomore at Princeton Day School, published in Sidereal Times so that amateur astronomers can understand how the current state of affairs in their science came to be. --Ed.

PREFACE

The word "science" is often defined as a logical sequence of conclusions obtained by studying the data taken from a controlled experiment in some force of nature. This suggests that science is both logical and systematic and that it deals with observable truths. But, science did not always exist in this form. Prior to the 17th and 18th Centuries, science was a form of philosophy. In fact, the term "natural philosophy" was used in place of the word "science". It was an age of stagnation, in which disbelief in an accepted theory was punishable by death. As a result, science stood still for 2,000 years. It was only after the weakening of the power and realm of the Church that the study of nature began anew at an incredible rate.

People were eager to learn and to prosper in their knowledge. It was this rapid succession of discoveries that led to the Industrial Revolution and the triumph of technology which has changed our planet so much in a mere few hundred years.

It is important to probe deeply into the historical changes that occurred during the 17th and 18th Centuries that led to this age of scientific revolution, and to learn something of the interconnections of those events, and the achievements of the scientists.

The position of science in the modern world cannot be fully understood without a knowledge of the changes that occurred during that time.

* * * *

Just when "modern" begins in the history of our Western society is a problem on which historians are not yet agreed. It used to be generally held that the Medieval gave way to the Modern in the Western world at the end of the 15th and beginning of the 16th Centuries, in the period of the Renaissance and Reformation. I cannot deny that these years were years of great changes in many fields of human activity, yet it is my contention that, led by the remarkable development of natural science, and technology, the late 17th and the 18th Centuries saw the process of modernization firmly established in much of the Western world. This set the stage for our contemporary world.

We must remember that during the Middle Ages in the Christian countries the sources of all true knowledge were believed to be the Bible, the writings of the Church Fathers, and, after the middle of the 13th Cenutry, the works of Aristotle. Discoveries in astronomy and physics were providing a more realistic picture of the universe, and man himself was becoming the focal point of interest.

During the 1600s and 1700s, an intellectual revolution swept over Western Europe. Traditional principles that had served scholars for hundreds of years were discarded. The leading thinkers of the era insisted that reason was the sole test of truth. The period became known as the Age of Reason or the Age of Enlightenment.

It was the great and numerous discoveries about the nature of the world, the attitud of doubt that science encouraged, and the breaking away from ancient traditions that caused an upsetting influence in man's outlook in the 17th and 18th Centuries.

"The revolt in science brought to human thought a new spirit of reason and indeed the subsequent great age of philosophy was called the Age of Reason. This movement was characterized by a belief in natural law, human reason and human progress. The thinkers believed that the universe was governed by laws, scientific as those of gravitation, and that all man had to do was discover these laws. With the knowledge of the laws of nature, man could then progress further."[1]

As one can see, science has closely tied up with the kind of intellectual activity we characterize as philosophy. Natural science is a search for truth, but a search conducted by its own rules. In the early 17th Century, Francis Bacon, a theorist and publicist of science, formulated some of these rules:

> To counteract the influence of Aristotle and the Scholastics, Bacon emphasized the need for "induction", that is, the careful accumulation of data through observation and experimentation, and attacked "deduction", that is, reasoning logically from accepted premises. Both induction and deduction are essential to scientific method, but Bacon's emphasis on induction was no doubt a necessary corrective in his time, and helped give science new impetus.[2]

In the past when there was anything that needed to be explained, men would not draw their theories from the observations themselves. They would still draw on that whole system of explanation which was provided for them by ancient philosophy.

So it can be said that the most important contribution of the Age of Reason was probably the development of the modern scientific method. Scientists now applied the reasoning process to their studies of basic natural laws. They organized general rules for reaching scientific conclusions that are still followed today.

By the beginning of the 17th Century, the systematic use of the new methods of experiment had produced results so striking that this movement has been given the name Scientific Revolution.

It is essential that our interest in the experimental method should not cause us to overlook the importance of mathematics in the developments that were taking place. In fact, without the achievements of the mathematicians the Scientific Revolution as we know it would have been impossible.

> The crucial development came to its climax in the time of René Descartes, a French philospher, who put forward the view that sciences involving order and measure, whether the measure affected numbers, forms, shapes, sounds or other objects, are related to mathematics.
>
> "There ought therefore to be a general science -- namely, mathematics" he said, "which should explain all that can be known about order and measure, considered independently of any application to a particular subject." Such a science, he asserted, would surpass in utility and importance all the other sciences, which in reality depended upon it.[3]

---

1. World History, "Western Civilization", Monarch Press, Inc. 1962. p. 14.

2. Crane Brinton, John B. Christopher and Robert Lee Wolff, Civilizations in the West, Prentice-Hall, Inc. 1964. p. 363.

3. Herbert Butterfield, The Origins of Modern Science, The Free Press, NY, 1957. p. 102.

He found that in the space of an hour the heart would throw out more blood than the weight of a man, far more blood than could be created in that time out of any nourishment received. It was impossible to say where all that blood came from and where it could possibly go, unless one adopted the hypothesis that it went streaming through the whole body time after time in a continual circulation.[12]

Harvey's argument is a simple piece of arithmetic, based on his estimate of the amount of blood which the heart sends through the body. Most important was the fact that the establishment of the circulation of the blood released physiology for a new start in the study of living creatures.

Only now could one begin to understand respiration itself properly, or even the digestive and other functions. Given the circulation of the blood running through the arteries and then back by the veins, one could begin to ask "what it carries, and why, how and where it takes up its loads, and how, where and why it parts with them". Both in regard to methods and results, therefore, we seem to have touched something like the genuine scientific revolution at last.[13]

Certainly in the field of science, the century of Galileo, Harvey, Descartes, Newton, van Leeuwenhoek, and their peers deserved to be called the Century of Genius.

In comparison with the 17th century, in which seminal discoveries were made, the 18th was one of systematization, popularization, and the rounding out of earlier work.

The Swedish naturalist Carolus Linnaeus made the classification of plants and animals that is today still the basis for biological taxonomy.

He introduced the two-named, or binomial, method of naming organisms. This system gives every plant or animal two scientific names. One is for the species, and one is for the group, or genus. Of his one hundred and eighty books, Linnaeus' first, Systems Naturæ, was the most important. It contained only 12 pages, but it marked the beginning of modern botany. In it he dealt with the sex and reproduction of plants, a field never before explored.[14]

Benjamin Franklin, the first American to figure prominently in the history of science, experimented with electricity and demonstrated its affinity to lightning. One well-known result of this experiment was his invention of the lightning rod, which helped prevent destruction of lives and property by lightning. His writings on electricity were published in London, translated into foreign languages, and read throughout Europe. He invented many electrical terms such as positive, negative, battery, conductor and condenser.

The French astronomer and mathematician, LaPlace, wrote a work of synthesis entitled Celestial Mechanics. It was of tremendous value to astronomers because it summarized all the achievements in the theory of astronomy since Newton.

---

12. Butterfield, op. cit., p.65.

13. Ibid.

14. Science Encyclopedia, op. cit., p. 967.

He developed a theory about the origin of the Solar System, and although it was later proved incorrect, it did help astronomers better understand double stars and spiral nebulæ.[15]

In chemistry, however, the 18th Century took great initial steps, the revolutionary breakthrough that achieved for this science what the Copernican-Galilean-Newtonian development achieved for astronomy. The modern science of chemical analysis began with Black and Lavoisier.

Joseph Black, a Scottish professor, exploded the old theory that air was composed of a single element and proved the existence of several airlike substances, or gases.

Joseph Priestly, and English clergyman, wrote biographies of important men through the ages. While collecting materials for his biographies, he met Benjamin Franklin. At Franklin's request, Priestly wrote a History of Electricity which was so successful that he was invited to become a member of the Royal Society. It was then he became interested in experimenting with Black's discoveries.

He obtained a new gas from Mercuric oxide that he called a new kind of air. He suggested that it night be used to aid breathing in certain instances, and this suggestion proved to be the forerunner of oxygen tents.[16]

This discovery of a new gas brought Priestly even more fame and led to a meeting with Antoine Lavoisier, a brilliant research chemist. Lavoisier immediately repeated Priestly's experiments with the new gas, and then named the gas oxygen because of its acid-forming properties.

It was Lavoisier who developed the modern concept of the element, and demonstrated that water was composed of oxygen and hydrogen. He asserted that all substances were composed of a relatively few basic chemical elements, of which he identified 23.[17]

Finally, other natural sciences got a good start in the 18th Century, though they did not receive quite the synthesizing touches evident in chemistry and physics.

Geologists, many of them English or Scottish, had established that the earth was far older than the Biblical calculation, and had discovered the natural processes of rock formation and the nature of fossils.

They had already set before Orthodox Christianity the problem of reconciling the findings of science with the traditional Judeo-Christian cosmology of the Book of Genesis, and especially with the time-scale of the Bible, which set the whole creation of the universe with a stationary earth as its center, at about 4000 BC.[18]

A clear sign of how the new sciences were affecting men's view of the world came with the disastrous Lisbon earthquake of 1755.

The orthodox -- the majority of the people -- regarded it as a visitation from God, a warning to sinful man. But others stated that the earthquake had causes quite as "natural", as, say, a rainstorm, that it was, in our language, a seismological event.[19]

15. Science Encyclopedia, "LaPlace, Pierre Simon, Marquis de," Vol 10, p. 942.
16. Science Encyclopedia, "Joseph Priestly", Vol 14, p. 132.
17. Brinton, Christopher and Wolff, op. cit., p. 361.
18. Ibid.
19. Ibid.

Working from a discovery made by Galileo, another Italian, Torricelli, invented the first barometer. Soon after, scientists wondered if it could not be used to show the difference in pressure at sea level and at the tops of high mountains.

The Frenchman, Pascal, using Torricelli's invention, proved by measuring the height of a column of mercury both at the base and at the top of a mountain, that what we call air pressure diminishes with altitude. Pascal also showed that a vaccuum is possible, in spite of the old adage that "Nature Abhors a Vaccuum".[8]

Rene Descartes, chiefly known as a philosopher, was the founder of analytic geometry, which is the application of algebra to geometrical problems.

Geometry helps to supply the language in which scientists do most of their thinking. And the study of reasoning in geometry makes for fairmindedness -- the ability to see both sides of a question -- and for intellectual curiosity. In short, it helps to develop the "Scientific attitude of mind."[9]

Isaac Newton built on the work of Galileo, Torricelli, Pascal, and many others, using newly perfected mathematical aids, such as decimals, logarithms, graphs and above all, the infinitesimal calculus, which he and Leibnitz seem to have invented separately at about the same time.

Newton arrived at the great master-generalization we know as the law of gravitation. The sun, the planets, and their satellites are, according to this theory, held in their orbits by the force of mutual attraction. Newton stated the formula that this force is proportional to the product of the masses of the two bodies attracted one to another, and inversely proportional to the square of the distance between them. Newton's law still holds today, as modified in the early 20th Century by Einstein, who referred to a gravitational "field" rather than a "force".[10]

What the telescope did for astronomy, the microscope achieved for biology. Both instruments rest on the discovery, probably by Dutch glassworkers toward the end of the 16th Century, that placing two lenses together produced a magnification impossible with merely a single lens. By about 1680 the Dutchman, Anton van Leeuwenhoek,noticed by using a microscope the existence of tiny creatures, the protozoa, up to this time unknown.

Leeuwenhoek happened to observe a drop of rain water taken from a barrel beside his house. He discovered that it was filled with "wretched beasties moving about very nimbly." He wrote extensively and drew pictures of what he saw, and although he did not realize that the bacteria he was studying caused disease, his work soon enabled scientists (Spallanzani and Pasteur) to make that discovery.[11]

Although Renaissance scientists had cleared up much about human anatomy, how the heart functioned was a mystery until Englishman William Harvey demonstrated that it is a pump, and that blood is forced by the heart along a system of circulation.

---

8. Brinton, Christopher, Wolff, op. cit., p. 360.

9. The World Book Encyclopedia, Vol. 7, p. 2932.

10. Brinton, Christopher, Wolff, op. cit., p. 360.

11. Science Encyclopedia, Children's Press, Inc., Chicago, 1962, Vol 10, p. 950.

The history of science is the real history of mankind. As scientific knowledge increases, the exact knowledge of the few more rapidly becomes accepted knowledge of the many.

Little by little, man's knowledge of the physical forces of his universe has been increased, but his progress has often been retarded by those who, with good intentions, superstitiously feared the power of the gods. Since the 17th Century, however, so remarkable has been the progress of science, so evident have been its beneficent achievements, that regardless of the present assault upon one phase of science, Western Civilization is committed to this way of discovery.[20]

---

20. Knickerbocker, Lillian S., Classics of Modern Science, Beacon Press, Boston, 1927, p. 7.

* * * * * * * * *

The nominating committee, under Cdr. Joseph L. Richey, nominated the following for 1972-3 officers of the AAAP: Director: Norman Sperling. Assistant Director: John Church. Secretary: Roxanne Tobin. Treasurer: Barry Hancock. Program Chairman: Robert Richardson. No additional nominations were made from the floor at the April business meeting. Other nominations will be in order at the May business meeting, at which time the election will be held.

* * * * * * * * * * * * * * *

As Sidereal Times goes to press, word is received that Cdr. Richey has suffered a heart attack and is resting comfortably in the Intensive Care Unit of Walson Hospital, Fort Dix, NJ. We are sure that his recovery will be hastened by letters and cards from his many friends in the AAAP. News of his condition and substitute arrangements for the many projects of which he is a mainstay will be announced at the meeting on 9 May.

John Church
11 Princeton Place
Princeton, NJ
08540

Sidereal Times
Amateur Astronomers Association of Princeton
Duncan Planetarium, Princeton Day School
The Great Road, P. O. Box 75
Princeton, New Jersey 08540

PRINCETON, NJ 08540
MAY 5 AM 1972