DOWNLOAD PDF ASTRONOMERS (HISTORY MAKERS)

Chapter 1 : The Astronomy of Many Cultures

*Astronomers (History Makers) [Neil Morris] on blog.quintoapp.com *FREE* shipping on qualifying offers. The dramatic stories of ten astronomers whose discoveries helped advance people's ideas of the universe around them.*

Aristrachus suggests the Earth revolves around the Sun. He provides first estimation of Earth-Sun distance. Eratosthenes measures the circumference of the earth with surprising accuracy! Greece Hipparchus develops the first acccurate star map and star catalogue with over of the brightest stars. Introduction of the Julian calendar, a purely solar calendar, to the Roman Empire. Ptolemy suggests geocentric theory of the universe in famous work Mathematike Syntaxis. Al Mamon founds the Baghdad school of astronomy. Chinese astronomers observe supernova in Taurus. Copernicus publishes his heliocentric theory of the Universe. Tycho Brahe discovers a supernova in constellation of Cassiopeia. Germany Johann Bayer introduces Bayer designation of stars, assigning Greek letters to stars, still in use today. Hans Lippershey, a Dutch spectacles maker invents the telescope. Italy Galileo uses telescope for astronomical purposes. Huygens notes markings on Mars. Martian polar ice caps are noted by Cassini. The first reflecting telescope was built by Newton. Italy Geminiano Montanari discovers the star Algol is not steady in brightness, thus recognizing the first variable star. While in Paris, Danish astronomer Ole Romer measures the speed of light. England Newton publishes his theory of universal gravitation in the work Philosophiae Naturalis Principia Mathematica. This is seen to be the start of Modern Astronomy. The discovery of Uranus by Herschel A. France Messier discovers galaxies, nebula and star clusters while looking comets. He compiles a catalogue of these objects Messier objects. Piazzi discovers first asteroid, Ceres. Samuel Heinrich Schwabe describes the sunspot cycle. Germany Johann Galle observes and discovers Neptune. His observations were prompted by mathematical calculations by French astronomer Joseph Leverrier and English astronomer John Couch Adams. The beginning of spectral analysis of stars by Sir William Huggins A. Jansen and Lockyer observe solar prominences. Henry Draper takes a photograph of the stellar spectrum of Vega. This is the first of its kind. Asaph Hall discovers Phobos and Deimos, the moons of Mars. Shiaparelli observes the canals on Mars. The Great Red Spot on Jupiter becomes prominent.

Chapter 2 : Accelerated Reader Quiz List - Reading Practice

It is in a patent filed by Middelburg spectacle-maker Hans Lippershey with the States General of the Netherlands on 2 October for his instrument "for seeing things far away as if they were nearby". The States General did not award a patent since the knowledge of the device already seemed to be ubiquitous [13] [14] but the Dutch government awarded Lippershey with a contract for copies of his design. The original Dutch telescopes were composed of a convex and a concave lens â€"telescopes that are constructed this way do not invert the image. Telescopes seem to have been made in the Netherlands in considerable numbers soon after this date of "invention", and rapidly found their way all over Europe. Its actual function and creator has been disputed over the years. The magistrate was contacted by a then unknown claimant, Middelburg spectacle maker Johannes Zachariassen, who testified that his father, Zacharias Janssen invented the telescope and the microscope as early as This testimony seemed convincing to Boreel, who now recollected that Zacharias and his father, Hans Martens, must have been who he remembered. This report was issued in October and distributed across Europe, leading to experiments by other scientists, such as the Italian Paolo Sarpi , who received the report in November, and the English mathematician and astronomer Thomas Harriot , who used a six-powered telescope by the summer of to observe features on the moon. The Italian polymath Galileo Galilei was in Venice in June [34] and there heard of the "Dutch perspective glass" by means of which distant objects appeared nearer and larger. Galileo states that he solved the problem of the construction of a telescope the first night after his return to Padua from Venice and made his first telescope the next day by fitting a convex lens in one extremity of a leaden tube and a concave lens in the other one. A few days afterwards, having succeeded in making a better telescope than the first, he took it to Venice where he communicated the details of his invention to the public and presented the instrument itself to the doge Leonardo Donato , who was sitting in full council. The senate in return settled him for life in his lectureship at Padua and doubled his salary. Portrait of Galileo Galilei. Galileo spent his time to improving the telescope, producing telescopes of increased power. His first telescope had a 3x magnification, but he soon made instruments which magnified 8x and finally, one nearly a meter long with a 37mm objective which he would stop down to 16mm or 12mm and a 23x magnification. Galileo noted that the revolution of the satellites of Jupiter, the phases of Venus, rotation of the Sun and the tilted path its spots followed for part of the year pointed to the validity of the sun-centered Copernican system over other Earth-centered systems such as the one proposed by Ptolemy. The first person who actually constructed a telescope of this form was the Jesuit Christoph Scheiner who gives a description of it in his Rosa Ursina This led to his invention of the micrometer , and his application of telescopic sights to precision astronomical instruments. With one of these: From his book, "Machina coelestis" first part , published in The only way to overcome this limitation at high magnifying powers was to create objectives with very long focal lengths. Besides having really long tubes these telescopes needed scaffolding or long masts and cranes to hold them up. Aerial telescope In some of the very long refracting telescopes constructed after , no tube was employed at all. The objective was mounted on a swiveling ball-joint on top of a pole, tree, or any available tall structure and aimed by means of string or connecting rod. The eyepiece was handheld or mounted on a stand at the focus, and the image was found by trial and error. These were consequently termed aerial telescopes. Telescopes of such great length were naturally difficult to use and must have taxed to the utmost the skill and patience of the observers. Reflecting telescopes See also: Reflecting telescope The ability of a curved mirror to form an image may have been known since the time of Euclid [45] and had been extensively studied by Alhazen in the 11th century. Galileo, Giovanni Francesco Sagredo , and others, spurred on by their knowledge that curved mirrors had similar properties to lenses, discussed the idea of building a telescope using a mirror as the image forming objective. Zucchi tried looking into the mirror with a hand held concave lens but did not get a satisfactory image, possibly due to the poor quality of the mirror, the angle it was tilted at, or the fact that his head partially obstructed the image. In Marin Mersenne proposed a telescope consisting of a paraboloidal primary mirror and a paraboloidal secondary mirror bouncing the image through a hole in the primary, solving the problem of viewing the image. The design he came up with bears his name: Light path in a Newtonian telescope. He concluded that light could not be refracted through a lens without causing chromatic aberrations, although he incorrectly concluded from some rough experiments [50] that all refracting substances would diverge the prismatic colors in a constant proportion to their mean refraction. From these experiments Newton concluded that no improvement could be made in the refracting telescope. He later devised means for grinding and polishing them, but chose a spherical shape for his mirror instead of a parabola to simplify construction. This unique addition allowed the image to be viewed with minimal obstruction of the objective mirror. He also made all the tube, mount , and fittings. Encouraged by this success, he made a second telescope with a magnifying power of 38x which he presented to the Royal Society of London in December This type of telescope is still called a Newtonian telescope. Light path in a Cassegrain telescope. A third form of reflecting telescope, the " Cassegrain reflector " was devised in by Laurent Cassegrain. The telescope had a small convex hyperboloidal secondary mirror placed near the prime focus to reflect light through a central hole in the main mirror. No further practical advance appears to have been made in the design or construction of the reflecting telescopes for another 50 years until John Hadley best known as the inventor of the octant developed ways to make precision aspheric and parabolic speculum metal mirrors. In he showed the first parabolic Newtonian reflector to the Royal Society. The instrument was examined by James Pound and James Bradley. They compared its performance with that of a 7. These methods of fabricating mirrors were passed on by Molyneux to two London opticians â€"Scarlet and Hearnâ€" who started a business manufacturing telescopes. He first tried making his mirrors out of glass as suggested by Gregory, but he later switched to speculum metal mirrors creating Gregorian telescopes with original designers parabolic and elliptic figures. Short then adopted telescope-making as his profession which he practised first in Edinburgh, and afterward in London. Short died in London in , having made a considerable fortune selling telescopes. Since speculum metal mirror secondaries or diagonal mirrors greatly reduced the light that reached the eyepiece, several reflecting telescope designers tried to do away with them. In Mikhail Lomonosov presented a reflecting telescope before the Russian Academy of Sciences forum. This innovation was not published until , so this type came to be called the Herschelian telescope after a similar design by William Herschel. About the year William Herschel then a teacher of music in Bath , England began to occupy his leisure hours with the construction of reflector telescope mirrors, finally devoted himself entirely to their construction and use in astronomical research. Using this telescope, he made his early brilliant astronomical discoveries. He observed the heavens with this telescope for some twenty years, replacing the mirror several times. To cut down on the light loss from the poor reflectivity of the speculum mirrors of that day, Herschel eliminated the small diagonal mirror from his design and tilted his primary mirror so he could view the formed image directly. This design has come to be called the Herschelian telescope. However, this large scope was difficult to handle and thus less used than his favorite All of these larger reflectors suffered from the poor reflectivity and fast tarnishing nature of their speculum metal mirrors. This meant they need more than one mirror per telescope since mirrors had to be frequently removed and re-polished. This was time consuming since the polishing process could change the curve of the mirror so it usually had to be " re-figured " to the correct shape. Achromatic refracting telescopes Light path through an achromatic lens. From the time of the invention of the first refracting telescopes it was generally supposed that chromatic errors seen in lenses simply arose from errors in the spherical figure of their surfaces. Opticians tried to construct lenses of varying forms of curvature to correct these errors. This led opticians to experiment with lenses constructed of more than one type of glass in an attempt to canceling the errors produced by each type of glass. It was hoped that this would create an " achromatic lens "; a lens that would focus all colors to a single point, and produce instruments of much shorter focal length. The first person who succeeded in making a practical achromatic refracting telescope was Chester Moore Hall from Essex, England. After devoting some time to the inquiry he found that by combining two lenses formed of different kinds of glass, he could make an achromatic lens where the effects of the unequal refractions of two colors of light red and blue was corrected. In , he succeeded in constructing telescope lenses which exhibited much reduced chromatic aberration. Hall was a man of independent means and seems to have been careless of fame; at least he took no trouble to communicate his invention to the world. Dollond , Hall was admitted to be the first inventor of the achromatic telescope. However, it was ruled by Lord Mansfield that it was not the original inventor who ought to profit from such invention, but the one who brought it forth for the benefit of mankind. In , Leonhard Euler sent to the Prussian Academy of Sciences a paper in which he tried to prove the possibility of correcting both the chromatic and the spherical aberration of a lens. Like Gregory and Hall, he argued that since the various humours of the human eye were so combined as to produce a perfect image, it should be possible by suitable combinations of lenses of different refracting media to construct a perfect telescope objective. Adopting a hypothetical law of the dispersion of differently colored rays of light, he proved analytically the possibility of constructing an achromatic objective composed of lenses of glass and water. Dollond did not reply to this, but soon afterwards he received an abstract of a paper by the Swedish mathematician and astronomer, Samuel Klingenstierna , which led him to doubt the accuracy of the results deduced by Newton on the dispersion of refracted light. As a practical man, Dollond at once put his doubts to the test of experiment: His writings show that with the exception of his bravado , he would have arrived sooner at a discovery for which his mind was fully prepared. In Peter Dollond son of John Dollond introduced the triple objective, which consisted of a combination of two convex lenses of crown glass with a concave flint lens between them. He made many telescopes of this kind. It was in vain that the French Academy of Sciences offered prizes for large perfect disks of optical flint glass. The difficulties with the impractical metal mirrors of reflecting telescopes led to the construction of large refracting telescopes. Since a lens can only be held in place by its edge, the center of a large lens will sag due to gravity, distorting the image it produces. The silver layer was not only much more reflective and longer lasting than the finish on speculum mirrors, it had the advantage of being able to be removed and re-deposited without changing the shape of the glass substrate. Towards the end of the 19th century very large silver on glass mirror reflecting telescopes were built. The beginning of the 20th century saw construction of the first of the "modern" large research reflectors, designed for precision photographic imaging and located at remote high altitude clear sky locations [63] such as the inch Hale telescope of , and the inch 2. John Donavan Strong, a young physicist at the California Institute of Technology , developed a technique for coating a mirror with a much longer lasting aluminum coating using thermal vacuum evaporation. The Hale reflector introduced several technical innovations used in future telescopes, including hydrostatic bearings for very low friction, the Serrurier truss for equal deflections of the two mirrors as the tube sags under gravity, and the use of Pyrex low-expansion glass for the mirrors. The arrival of substantially larger telescopes had to await the introduction of methods other than the rigidity of glass to maintain the proper shape of the mirror. Active and adaptive optics See also: Adaptive optics and List of largest optical reflecting telescopes The s saw the introduction of two new technologies for building larger telescopes and improving image quality, known as active optics and adaptive optics. In active optics, an image analyser senses the aberrations of a star image a few times per minute, and a computer adjusts many support forces on the primary mirror and the location of the secondary mirror to maintain the optics in optimal shape and alignment. Other giant telescopes built since then include: Adaptive optics works by measuring the distortions in a wavefront and then compensating for them by rapid changes of actuators applied to a small deformable mirror or with a liquid crystal array filter. AO was first envisioned by Horace W. Babcock in , but did not come into common usage in astronomical telescopes until advances in computer and detector technology during the s made it possible to calculate the compensation needed in real time.

Chapter 3 : Astronomy Magazine - Interactive Star Charts, Planets, Meteors, Comets, Telescopes

Throughout history there have been people who have inspired others with their innovative minds or leadership qualities. This series reveals the lives of historical figures that have become legends, and describes their enduring legacies.

The sun has risen on the spring equinox. On this day the Temple of the Sun frames exactly the rising sun. Jim Spadaccini, Ideum 1. Aveni, Anthony Conversing with the Planets. Celebrates the traditions of many cultures; emphasizes the importance of seeing them in their own context. Aveni, Anthony Empires of Time. A discussion of calendars, clocks, and cultures, with chapters on the Maya, Aztecs, Incas, Ancient Chinese, and several other early civilizations. Aveni, Anthony Stairways to the Stars: Skywatching in Three Great Ancient Cultures. Focuses of the monuments and astronomy of the people who built Stonehenge, plus the Maya and the Inca. Gleiser, Marcelo The Dancing Universe: From Creation Myths to the Big Bang. An exploration by a physicist of ideas from many cultures of how the universe came to be, including ancient legends and modern science. Hadingham, Evan Early Man and the Cosmos. A clear primer on the subject of ancient sites and the astronomical thinking of ancient cultures around the world. A Survey of Ancient and Cultural Astronomy, 2nd ed. A textbook for a course at the University of Calgary, this volume compiles a lot of information from different cultures. Krupp, Edwin Beyond the Blue Horizon: Superb collection of astronomical tales from many cultures. Best book to start with. Maya official from the town of Oxchuc, Chiapas, attired in traditional dress from his town, observes the Sun through a special telescope. Astronomy and the Archaeology of Power. Fine guide to sites around the world, written for beginners with humor and verve. Krupp, Edwin Echoes of the Ancient Skies: The Astronomy of Lost Civilizations. An excellent introduction on the thoughts and monuments of earlier cultures. Penprase, Bryan The Power of the Stars: Good non-technical introduction to the myths, constellation, calendars, astronomical buildings, and world views of various cultures. Ruggles, Clive Ancient Astronomy: An Encyclopedia of Cosmologies and Myth. Mammoth A-Z compilation of the ancient knowledge of a wide range of cultures. Astronomy Before the Telescope. Creation Stories and Cosmologies from Around the World. Short book introducing and retelling the stories. Websites and Articles on the Web: Ancient Observatories, Timeless Knowledge from the Stanford Solar Center An introduction to ancient sites where the movements of celestial objects were tracked over the years, with a special focus on tracking the Sun. Indiana Jones and the Astronomy of Yore Issue of the Astronomical Society of the Pacific newsletter on teaching astronomy, by Louis Winkler, focusing on archaeaoastronomy: Aveni, Anthony World Archaeoastronomy. Proceedings of an international conference held in , collecting scholarly work on the sites and monuments in many regions. Astronomy for Developing Countries. Published by the Astronomical Society of the Pacific www. Describes the many challenges of starting or continuing astronomy programs in countries without an extensive science infrastructure. Chamberlain, Von Del, et al, eds. Songs from the Sky: Indigenous Astronomical and Cosmological Traditions of the World. Proceedings of a international conference on ethnoastronomy OK, so it took a while to publish. Papers about Chinese, Japanese, Islamic, and Mesoamerican cultures. The History of Non-western Astronomy. A series of scholarly articles on the ancient astronomical traditions and monuments of a wide range of cultures. Visions of the Cosmos in Native American Folklore. A Story about Benjamin Banneker. A powerful editorial on what needs to be done. Neil deGrasse Tyson Price, J. Multi-author report, with some poignant anecdotal notes. On how slaves used songs with the Big Dipper to show them escape routes from the South.

Chapter 4 : RTMC Astronomy Expo |

Throughout human history, scientists have struggled to understand what they see in the night sky. Famous astronomers â€" many of them great scientists who mastered many fields â€" explained the.

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Chapter 6 : List of women astronomers - Wikipedia

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Chapter 7 : HISTORY MAKERS ASTRONOMERS : Morris, Neil :

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Chapter 8 : Astronomers Make a Surprising Discovery from Billion Years Ago

The following is a list of astronomers, astrophysicists and other notable women who have made contributions to the field of astronomy.

Chapter 9 : History of the telescope - Wikipedia

Extreme-ultraviolet astronomy (nm) is a discipline in its own right and involves many of the techniques of X-ray astronomy; the Extreme Ultraviolet Explorer () was a satellite operating at these wavelengths.