

Triton Fun Company

Science Newsletter January 2010

Science Newsletter

January 2010

The Starry Message –

The 400th Anniversary of the discovery of the “three little stars” of Galileo: the moons of Jupiter

T. Dockweiler

Special points of interest:

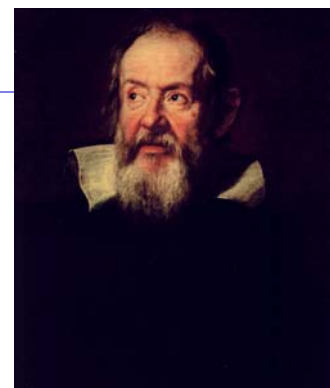
Galileo's new moons..
Triton Fun stuff
Superfluous questions

The peoples of our world planet Earth owe a great celebration to and blessings upon the life and achievements of Galileo Galilei. Galileo culturally has received the remarkable status of being referred to on a first name basis when most notables are known by their surnames. Thursday, 2010 January 07 (Gregorian) marked the 400th anniversary of the night, Thursday, 1610 January 07 (Gregorian) when Galileo, age 45, first observed “three little stars” in a straight line arrangement with the planet Jupiter using his fifth constructed telescope (magnification 30x) in the east-southeastern sky in the direction over the Adriatic Sea in the early evening just after sunset or the beginning of nightfall. Observation of this strange configuration in the nights ahead began the thought-shattering confirmation and view by Aristarchus and Copernicus that our Earth was heliocentrically based, contrary to the ancient Aristotelian and accepted geocentric view that we were the center of an unchangeable universe. Galileo would publish this event in his book entitled *Sidereus Nuncius* with a dedicatory letter on 1610 March 12 causing a spectacular period of conversation in Europe during that Easter Spring.

The “three little stars”, or moons, would eventually be given the names known to the present day as Callisto, Io, and Europa by Simon Mayr in 1614. The fourth “star” found 1610 January 11 just outside the field of view of the former would be named Gany-mede.

In his book *Sidereus Nuncius* Galileo states:

“I have now finished my brief account of the observations which I have thus far made with regard to the Moon, the Fixed Stars, and the Galaxy. There remains the matter, which seems to me to deserve to be considered the most important in this work, namely, that I should disclose and publish to the world the occasion of discovering and observing four PLANETS, never seen from the very beginning of the world up to our own times, their positions, and the observations made during the last two months about their movements and their changes of magnitude; and I summon all astronomers to apply themselves to examine and determine their periodic times, which it has not been permitted me to achieve up to this day, owing the restriction of my time.”



Galileo Galilei
Portrait by Sustermans

On 1610 January 07, in the first hour of the night, that is the first hour after sunset, Galileo noticed the following:

* * O *

and commented:

“On the 7th day of January in the present year, 1610, in the first hour of the following night, when I was viewing the constellations of the heavens through a telescope, the planet Jupiter presented itself to my view, and as I had prepared for myself a very excellent instrument, I noticed a circumstance which I had never been able to notice before, owing to want of power in my other telescope, namely, that three little stars, small but very bright, were near the planet;

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continued, pg 2 —>

Galileo's discoveries: *continued*

Photos/Info: Rice University, Houston, Texas: The Galileo Project; <http://galileo.rice.edu>

and although I believed them to belong to the number of the fixed stars, yet they made me somewhat wonder, because they seemed to be arranged exactly in a straight line, parallel to the ecliptic, and to be brighter than the rest of the stars, equal to them in magnitude; The position of them with reference to one another and to Jupiter was as follows (Fig. 1).” [see depiction above].

He further commented:

“On the east side there were two stars, and a single one towards the west. The star which was furthest towards the east, and the western star, appeared rather larger than the third.”

And further:

“I scarcely troubled at all about the distance between them and Jupiter, for, as I have already said at first I believed them to be fixed stars; but when on January 8th, led by some fatality, I turned again to look at the same part of the heavens, I found a very different state of things, for there were three little stars all west of Jupiter, and nearer together than on the previous night, and they were separated from one another by equal intervals, as the accompanying illustration (Fig. 2) shows.”:

O * * *

Thus, Galileo had observed the motion of the moons of Jupiter around their planet, showing that not everything in the universe revolves around the Earth.

Not long after Galileo’s monograph *Sidereus Nuncius* was published, he found something else unusual: Saturn’s rings. He was unable to resolve the rings and speculated that two moons, one on each side, existed. Unknown to him the rings were not long from having a ring plane crossing in which the Earth and the plane of the rings cross making the rings invisible.

When Galileo looked in 1612 he saw nothing and was surprised as the two moons had disappeared. He clearly sees the elliptical more apparent rings in 1616. A Saturnian ring plane crossing occurs roughly every 15 years.

Galileo lived to the age of 77 years, until 1642, a day after the 32nd anniversary of his initial discovery night of Jupiter’s moons, and a month short of reaching age 78. One can actually view an original copy of the *Sidereus Nuncius* at certain colleges and libraries. A movie depiction with both accuracy and errors (like Jupiter having a crescent phase as seen from Earth which is not possible), aggrandizement, and humorous amusement can be found in *Galileo: On The Shoulders of Giants* (1997), part of the series *The Inventors’ Specials*. In real life Galileo did see Venus with a crescent phase. Happy quadricentennial, Galileo!

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References:

- (1.) DiCanzio, Albert G. (1996), *Galileo: His science and his significance for the future of Man*, ADASI Publishing Company, Portsmouth, New Hampshire, U.S.A., ISBN 0-9641295-6-6.
- (2.) Fahie, John Joseph (1903), *Galileo – His life and work*, John Murray (publisher), London.
- (3.) Galilei, Galileo (1610), *Sidereus Nuncius* [Starry Message], Thomam Baglionum [Tommaso Baglioni] (printer/publisher), Venice.
- (4.) Gingerich, Owen; & Van Helden, Albert (2003), “From *Occhiale* To printed page: The making Of Galileo’s *Sidereus Nuncius*”, *J. Hist. Astronomy*, ISSN 0021-8286, Vol. 34, pp. 251-267, August 2003.



Photo next page:

This is a copy of the notes that Galileo recorded on the night that he first saw the four moons of Jupiter that are now known as the Galilean satellites. —>



Statue of Galileo Galilei
in Florence, Italy

(Photo: JoJan)

30

Adi 7. di Gennaio 1610 Giove si vedeva in l'armonie con
 3. stelle fisse così * * * delle quali restò il comune
 minore si vedeva. ^{ori: *} a di 8. appariva così * * * era dug
 diretto et non retrogrado come sogliono i calculatori.
 Adi 9. si rugolo. a di 10. si vedeva così * * * ^{ciò è d-}
 giato è la più occidentale si che si occultava, quanto si può vedere.
 Adi 11. era in questa guisa * * * et la stella più vicina
 a Giove era l'armonia minore dell'altra, et vicinissima all'altra
 come che le altre sere erano le dette stelle apparse tutte tre
 di equal grandezza et tra di loro equalm. lontane; dal che
 appare intorno a Giove esser 3. altre stelle erranti invisibili ad
 ogni uno sino a questo tempo.
 Adi 12. si vedde in tale costituzione ^{ori:} * * * era la stella
 occidentale poco minor della orientale, et Giove era in mezzo lontano
 da l'una et dall'altra quanto il suo diametro è in red: et forse era
 una stella picciola et vicinissima a γ verso orione; anzi pur vi era
 veramp. havendo io la più diligente osservato, et uedeo più imbrunita la
 notte.
 Adi 13. havendo benissimo osservato si vedono vicinissime a Giove
 4. stelle in questa costituzione * * * ^{ori:} è meglio così * * *
 e tutte apparivano della medesima grandezza, lo spazio delle 3. occidentali
 non era maggiore del diametro di γ . et erano fra di loro notabilm.
 più vicine che le altre sere; ne erano in linea retta equidistanti come
 si auanti ma la media delle 3. occidentali era un poco elevata, si uero
 più occidentale alquanto depressa; sono queste stelle tutte molto lucide et
 picciolissime et altre fixe et appariscono della medesima grandezza non sono
 così splendide.
 Adi 14. fu rugolo. Adi 15. era così * * * ^{ori:} la pross.^a a
 24. era la minore et le altre di mano è mano maggiori: gli interstitij
 tra 24 et la 3. seguenti erano ^{si uedeano} quanto il diametro di γ . ma la 4.^a era di-
 stante dalla 3.^a il doppio circa; non face-
 vano iteram linea retta, ma come mostra
 l'esempio, erano al solito lucidissime et che più
 le et meno scintillavano come uno gli altri

4.
 γ long. 71. 38. lat. 1. 13. Me: 2. 30
 1. 17
 1. 17

Mailing Address:

Triton Fun Company
P.O. Box 1522
La Canada Flintridge, California 91012

Phone: 800-778-0560

E-mail: info@tritonfun.com

Website: <http://www.tritonfun.com>



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** Send us your superfluous questions for a future issue ! They can be on any subject. The funnier, the better. M.D., our editor, appreciates the help and will send you a free Triton Fun coffee mug as compensation for your question. Or write an article for us and be read by professional and amateur astronomers and scientists in the U.S. and Canada ! **

Superfluous Questions:

- 1) In the TV show *The Odd Couple*, Felix' grandfathers name was *what* ?
a) Henry b) Albert c) James d) Teddy
- 2) Astronaut John Glenn was the first American to orbit the Earth in 1962. His eyes are *what color* ?
a) blue b) hazel c) green d) brown
- 3) Wild Horse Island State Park is located in *what state* ?
a) Wyoming b) Montana c) Colorado d) Nevada
- 4) What Major League Baseball expansion team has appeared most often in the World Series ?
a) Texas Rangers b) New York Mets c) Colorado Rockies d) Florida Marlins

→ ANSWERS in next months issue of the Science Newsletter ! ←---

** ANSWERS to December's Superfluous Questions: 1. b) Himiko 2. d) July 15 3. a) Ruth 4. a) Maxwell Montes