Galileo Galilei and a forgotten poem on the 1604 supernova

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Abstract. In October 1604, when SN1604, the last naked-eye visible supernova in our Galaxy, exploded, Galileo Galilei was professor of mathematics at the University of Padua, teaching the mechanics of planets. He was therefore the figure of reference to whom all the doubts and questions that such an apparition brought with it were addressed. The University asked Galilei to outline the situation by exposing in three public conferences his point of view, in order to answer the many questions that raged among the academic community and the common people. Three conferences that Galilei held between November and December, in the Aula Magna of the Bo, the central building of the University. A month after Galilei’s lectures, a treatise on the supernova appeared in Padua. The unknown Antonio Lorenzini, behind whose name it is easy to see the inspiration of Cesare Cremonini, an Aristotelian professor of natural philosophy in Padua, published a booklet entitled Discourse about the new star which debunked the conclusions of Galilei. One month later was published in Padua by the same editor the Dialogue by Cecco di Ronchitti from Bruzene about the new star, a booklet in Paduan dialect replying to Lorenzini. The Dialogue appears in the Italian national edition of Galilei’s works and is attributed to Galilei himself with the help of the monk Girolamo Spinelli; it does not appear instead a poem in octaves, by an unknown author (presumably Galilei), published as an appendix to the first edition of 1605, and immediately replaced in the second edition. We publish it here, with a comment.

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On the evening of October 9, 1604, curious and enthusiasts from all over the world were observing a rare conjunction between Mars, Jupiter and Saturn, full of astrological implications. Suddenly, near that place in the sky, which was located in the Ophiucus constellation, near the foot of the Serpent bearer (Fig. 1), a new light appeared, brighter than all the planets with the exception of Venus. It remained there for a year and a half and then, as it had appeared, it disappeared. That “new star”, as it was called, changed the history of astronomy and cosmology: it was believed at the time that stars were fixed, immutable and ungenerable, but obviously this was not true. Scientists with different conceptions of the Universe competed and collaborated to explain the nature and origin, including Galilei and Kepler, and also Chinese, Korean and Arab astronomers reported observations [1]. Today we know that that new star was a supernova, the last of the seven supernovae observed with the naked eye in the Milky Way – the six previous ones of which there is documentation were recorded in the years 185, 393, 1006, 1054, 1181, 1572. So not a new star, but a star that dies and explodes. What remains today is a celestial object still full of mysteries: the cloud projected by the explosion is expanding at very high speed, in some places ten thousand kilometers per second, one thirtieth of the speed of light, and the shock waves of this expansion accelerate cosmic particles up to very high energies. We astrophysicists of today still study it carefully [1], always with an eye to the first analysis of our illustrious predecessors of four hundred years ago.

Fig. 1. – Illustration from Johannes Kepler’s book De stella nova in pede Serpentarii (On the new star in Ophiuchus’s foot) indicating the location of the 1604 supernova. The supernova is the star marked with a letter “N” on the right foot of the Ophiuchus (Serpent Bearer) constellation. Source: Wikimedia commons.

In October 1604, Galileo Galilei was professor of mathematics and astronomy at the University of Padua, teaching the mechanics of planets. When the “stella nova” appeared in the sky, he was therefore the figure of reference to whom all the doubts and questions that such an apparition brought with it were addressed.

That bright and pulsating sphere had generated wonder, but also terror and curiosity. The University of Padua asked Galilei to outline the situation by exposing in three public conferences his point of view, in order to answer to the many questions that raged among the academic community and the common people. Three conferences that Galilei held almost immediately, between November and December, in the Aula Magna of the Bo, the central building of the University – fragments of these lectures are in the Italian national edition of the Opere di Galileo Galilei (Works of Galileo Galilei), edited by Antonio Favaro [2], vol. II. Even if today it seems difficult to believe it, Galilei reported that that a thousand people attended each lecture.
Galileo Galilei and a forgotten poem on the 1604 supernova

Galilei demonstrated through the method of parallax that the new star was beyond the Moon, and therefore in that Heaven that according to Aristotle was immutable. Parallax is the apparent displacement of an object due to a change in the observer’s point of view: looking at the tip of your nose with the left eye closed, and then with the right eye closed, your nose will appear to move; knowing the distance between eyes one can determine the length of his/her nose. The same thing could be done from different points on the Earth to measure the position of planets and stars, and Galilei did it in collaboration with Neapolitan and Spanish correspondents. The new star was shown to all observers to be at the same location with respect to the stars of Sagittarius and Scorpio, and therefore it had to be farther away than the Moon and the planets: precisely between the fixed stars. Today only a few fragments of Galilei’s lecture notes remain (vol. II of [2]), and they are fascinating – Galilei was a person of all-round culture, a man of letters as well as a musician, painter and of course a scientist.

A month after Galilei’s lectures, a treatise on the supernova appeared in Padua. The unknown Antonio Lorenzini, behind whose name it is easy to see the inspiration of Cesare Cremonini, an Aristotelian professor of natural philosophy in Padua and friend-rival of his colleague Galilei, published a booklet entitled *Discourse around the new star* which debunked the conclusions of Galilei. In order to justify Aristotle of Stagira’s concept of immutability of the sky, which seemed to be contradicted by the new star, Lorenzini affirmed that looking at the stars to measure their distance was useless: the principles of terrestrial physics did not apply to the sky.

The response to Lorenzini’s speech was rapid and original, but also very detailed. On February 28, 1605 was published in Padua, by the same publisher Tozzi who had published the book of Lorenzini, the *Dialogo de Cecco di Ronchitti da Bruzene in perpuosito de la stella nuova* (Dialogue by Cecco di Ronchitti from Bruzene about the new star), a pseudonymous booklet in Paduan dialect (a local form of Venetian dialect) written according to Antonio Favaro and to many critics by Galilei together with his student and Benedictine monk Girolamo Spinelli (who had a deeper knowledge of the Paduan dialect). It is not known how many copies of the book (whose cover page is shown in Fig. 2) were published; certainly a second edition was printed the same year in Verona by the publisher Merlo, with minimal changes (not substantial but with some improvements from the point of view of readability) to the text and a substantial change in the appendix, which contained *Alcune ottave d’incerto, per la medesima stella, contra Aristotele* (Some octaves by unknown author, for the same star, against Aristotle), in Florentine vernacular, which were substantially modified.

The *Dialogo* was an explicit mockery of what had been published by Lorenzini; it defamed the entire Aristotelian dogma, which explains why the author(s) preferred to hide under the pseudonym of Cecco di Ronchitti. Cecco di Ronchitti from Brugine (a small village of peasants near Padua), an unknown self-proclaimed farmer and land surveyor, gave in the book many indications of being in reality an astronomer from Padua. The fact that the book was written in Paduan dialect instead of Latin, which was the noble language used to deal with relevant subjects, was a sign that the topic around which the booklet was built was not worthy of consideration.

In addition to the fact that the dialect was perfect for light-hearted teasing, the dialect of Padua was in vogue thanks to the writings of Angelo Beolco, a sort of *ante litteram* “blogger” who had published in the first half of the sixteenth century under the name of “Ruzante” or “Ruzzante”, which in Paduan means “scratcher” or “mumbler”, about the events that took place in Padua.

The *Dialogue* takes place between two peasants, Matthio (Matteo) and Nale (Natale), who confront each other after Natale read Lorenzini’s book and summarizes its contents. The booklet analyzes point by point the contradictions and distortions expressed by Lorenzini in his *Discourse*. It is like Galilei did not want to react personally to what Lorenzini had written, but did so through the dialectal, intelligent and frank voices of two peasants.
It is easy to recognize in the content of the Dialogo many characteristics of Galilei, so that already at the time of its publication the treatise was attributed to him. In addition to this, no family named Ronchitti is recorded in the birth registers of the parish of Brugine or in the neighboring towns; moreover, Cecco is also a Tuscan nickname. Galilei had good knowledge of the Paduan vernacular: Niccolò Gherardini, in his Vita del signor Galileo Galilei (Life of Galileo Galilei) [8], writes: “he was still very familiar with a book entitled Il Ruzzante, written in the rustic Paduan language, taking pleasure in those crude tales and ridiculous incidents” (Gherardini confuses the author with the title). Among the Miscellanea galileiana inedita (Unpublished Galilei’s works) published by Favaro in Venice in 1887 [9], one can read a thought of Galilei that contains words of the rustic Paduan dialect. Finally, in his letter to Paolo Gualdo of June 16, 1612, published in volume XI of the Opere [2], Galilei writes whole sentences using the same dialect, and Galilei’s Venetian correspondents often wrote to him in various flavors of the Venetian dialect. In a letter to Paolo Gualdo dated August 16, 1614, Girolamo Spinelli was called by Galilei “one of my students, monk of Santa Giustina, companion of Cecco de’ Ronchetti”. A focus on the form of the text caused Galilei’s contribution to be greatly diminished [10] in editions following Favaro’s (especially from Paduan critics), in favor of Girolamo Spinelli. This gradual deauthorization has certainly also depended on an excessive attention to form, admittedly so particular, which has unfortunately come at the expense of attention to specific content, which is equally (if not even more) important [11].

Fig. 2. – The cover page of the first edition of the Dialogo de Cecco di Ronchitti da Bruzene in perpuosito de la stella nuova.

In the mouth of one of the two interlocutors, Matteo, there are Galilean concepts; we can say that Galilei’s ideas about the new star are all in Matteo’s words. The Copernican idea of the author of the Dialogue is in the explanation of the concept of parallax made in the booklet, which also contemplates the seasonal displacement of
the Earth linked to its revolution around the Sun. Two drawings reproduced from Galilean manuscripts kept at the Biblioteca Nazionale Centrale di Firenze, presumably contemporary to the publication of the Dialogue, and included in a section entitled by Galilei De stella anni 1604 (About the star of 1604), clarify even better the meaning of parallax applied to the Earth’s revolution.

Note the Copernican essence of the drawings, and the outer circle of the Zodiac with the signs. In the first drawing the Earth, third planet from the Sun which is the black point in the center, is indicated by a sign badly written, as if Galilei was afraid that his notes would fall into the wrong hands, but it is still between Mars and Venus and is the center of the observations – a drawing similar will be reproduced in the Dialogue concerning the two chief world systems in 1632. In the second you can see the seasonal variation of parallax. The drawings are not in the original first edition of the Opere, but were added in an appendix to the second volume in later editions.

(1) Manoscritti galileiani 70, c, 16v e 47, c. 10v. Images reproduced by permission of the Italian Ministero della Cultura, Biblioteca Nazionale Centrale di Firenze.
In addition to being more compelling than a treatise, as Plato had already shown and as prescribed in numerous courses on rhetoric of Galilei's times, a dialogue allows for circumventing formalism in certain conclusions that Galilei was probably not able to develop rigorously: a dialogue allows its participants to forego certain rigorous demonstrations and replace them with assumptions of sufficient plausibility, made stronger by the use of common sense and of humour. In this sense the technique of persuasion in this dialogue anticipates by three decades the two great Galilei's dialogues: the Dialogue concerning the two chief world systems (1632) and the Discourses and mathematical demonstrations relating to two new sciences (1638).

The present Dialogue appears as Galilei's work in the second volume of the Italian national edition of the Opere. In this edition it does not appear instead a poem in octaves (i.e., groups or “stanzas” of eight verses), by an unknown author, published as an appendix to the first edition of 1605, and immediately replaced in the second edition. An English translation of the Dialogue appears in a book by Drake; a commented translation in modern Italian is published in. Some (see also for notes on the literary production by Galilei) possibly attribute it to Antonio Querengo (2), to whom the Dialogue is dedicated.

The following elements strengthen the attribution of the poem to Galilei:

- Galilei had likely a strong participation to the Dialogo de Cecco di Ronchitti; being a poet (the full volume IX of the national edition of his Opere is dedicated to his literary activity), it appears strange that the poem in the appendix of the Dialogo itself was written by somebody else, or at least that Galilei did not heavily rework it;
- the style, including the verbal violence, is coherent with Galilei, and there is quite a strong attack to the Aristotelians;
- as Milani observes in her 1992 translation of the Dialogo (the translation of the text is done from the second edition), some rhymes are common with those of Galilei, and one stanza begins with the imperative “Dunque”, as in Galilei's reworking of Andrea Salvadori’s Canzone per le Stelle Medicee (vol. IX of Galilei’s Opere);
- a description of the method of parallax is appropriate for an astronomer, and a Copernican statement is present in the fourth stanza of the poem.

In any case, attribution always contains some degree of arbitrariness.

Here follows the poem published in the appendix of the Dialogue, in the first edition of 1605.

STANZE D’INCERTO CONTRA ARISTOTELE
PER LA STELLA NUOVAMENTE APPARSA

Che più vaneggi, o Stagirita stolto:
e puro il Cielo e ingenerabil credi?
Stella nuova, in lui fissa, il chiaro volto

(2) The Paduan Antonio Querengo (or Querenghi, or Quarenghi, or Antuogno Squerengo in the dialectal mispronunciation) was a very learned diplomat and poet in Latin, a friend of Torquato Tasso. After the death in 1601 of Giovanni Vincenzo Pinelli, a good friend and sponsor of Galilei since his arrival in Padua, Querengo’s house replaced Pinelli’s as a mecca for all important visitors and a meeting place for local scholars and men of letters. Among these were Paolo Gualdo and Lorenzo Pignoria, who were also good friends of Galilei. Querengo continued to follow with interest the career of Galilei after he left Padua, and it is from his pen that we have the most amusing letters concerning the unfortunate campaign of Galilei in Rome in 1615-1616 to support the Copernican point of view.
discopre scintillando, e non la vedi?
O più che mai ne’ primi errori involto
il senso neghì ed altre prove chiedi?
Il senso neghì, onde i principii certi
dicesti avere de le scienze aperti?

Ma che nel Cielo sia la nata stella
stimerai forse non verace assunto;
e chiaro è pur che a questa gente e a quella
si mostra fissa in un medesimo punto.
Vede ciascun che da la punta bella
di Sagittario ha il suo splendor disgiunto
e quasi fugga di Scorpion la coda
s’erge tremante e sovra lei s’inchioda.

Or s’ella è sotto il ciel, sotto la Luna,
sì lungi a quelle del sublime tetto,
come di un altro clima in parte alcuna
non si nasconde o cangia almen l’aspetto,
e al variar de’ siti or sembra in una
or in altra figura aver ricetto,
anzi pur, come a noi torna mostrarse
nel mattutino ove la sera apparse?

Né cessan qui le vere mie parole,
che a ragion ferme e nove ecco ritorno.
Dimmi, se volge la terrestre mole
ventidue mila miglia intorno intorno
e questa nova luce a par del Sole
tutta la gira in una notte e un giorno,
come tre ore e più sull’orizzonte
nostro nel tramontar mostrò la fronte?

Esser non può che, s’ella umile è tanto,
cosi il passo allentar da noi sia vista,
ché in breve spazio di mirarla il vanto
la retta cederebbe umana vista;
né patria sempre assimigliar (se, quanto
da noi s’allunga, mole non acquista
e quella perde poi mentre s’appressa)
a l’occhio nostro la grandezza stessa.

Ma poi ch’ella è fissa nel ciel sublime,
provan l’altezza sua si ferme prove,
ché come posta infra le stelle prime
a ragion seco si mostra e move;
né d’esser può che in altre parti o in ime
varia di mole o sito, ella si trove,
ché nulla face il mutar loco in terra
all’ampiezza del Cielo, in cui si serra.

Dunque di cecità squarciando il panno
omai la lingua sciogli in vere note
e se credesti con tuo scorno e danno
dianzi immutabil le soperne rote,
or che fiamma novella apre l’inganno
This is my translation:

STANZAS BY AN UNKNOWN AUTHOR TO THE NEWLY APPEARED STAR
AGAINST ARISTOTLE

What raving, o foolish Stagirite,
your belief that creations are forbidden in Heaven!
A newborn star, in it fixed, its clear face
shows glittering, and you don’t see it?
Or you deny sense more than ever
getting stuck in your first mistakes, and ask for other proofs?
But how to deny this simple evidence
when all your science was based on sense?

That in Heaven the star was born
maybe you think not to be true;
though every nation sees it
fixed in the same point up on the sky.
Everybody sees it in the beautiful location
where Sagittarius has its splendor separated
and as if from Scorpion’s tail escaping
rises trembling, and it is nailed over it.

Now if it be under the Heavens, under the Moon,
so far from the stars of the sublime roof,
as of another climate, how it does not partly hide,
or at least changes its aspect,
and in a variety of sites seems now
in the same constellation to have shelter?
Indeed, how does it return to us in the morning
where it appeared in the evening?

Nor here cease my true words,
which firm and new now return.
Tell me, if the Earth
turns twenty-two thousand miles around
and this new light, like for the Sun
turns it all round in a night and a day,
how could it for three hours and more
on our horizon show its face at sunset?

It cannot be that, if it is so humble,
it sets its pace as to be seen,
since in a short time
it would become invisible;
nor it could look always similar, unless, as it lengthens from us,
it does acquire mass
and then loses it while it draws near
to look the same in bulk at every place.
But since it is fixed in the sublime sky,
Its height proves so firmly, that
as placed between the first stars
naturally shows itself there and moves accordingly;
nor it could be found in lower parts
varying in size or site,
since its place on Earth does not change
given the enormous circumference of the Heavens.

Therefore, ripping the cloth blinding you,
now let your tongue melt into true notes:
if you believed, at your scorn and harm
the upper wheels to be immutable,
now that this new flame shows your mistake,
you know that Heaven can be generated,
and thank Mother Nature,
who sent you such graceful light of truth.

A second edition of the Dialogo de Cecco di Ronchitti was published later the same year in Verona [7]. The poem was largely amended, with some uncertainties in the poetic language. In addition, the dangerous Copernican allusion to Earth rotation in the fourth stanza was removed, and some criticisms to Aristotle were softened and became “politically correct” (for example, in the first verse the sentence “stolto Stagirita”, where “stolto” literally means “fool”, “foolish”, or even “stupid” [15], became “per altro Stagirista saggio”, i.e., “otherwise sage Stagirite”). This new version, which I leave here untranslated, when compared to other poems by Galilei, lacks the usual verbal aggressivity.

Dunque, o per altro Stagirita saggio,
vaneggi ancora, e l’alte rote credi
immutabili e pure? Un novo raggio
tra quei zaffiri è nato, e non lo vedi?
O pur facendo a te medesmo oltraggio
il senso neghi, ed altre prove chiedi?
Il senso neghi, onde i principii certi
dicesti aver de le scienze aperti?

Ma che in Ciel sia la generata stella
stimerai forse tu pensier fallace;
e chiaro è pur che questa gente e quella
un solo osserva in lei sito verace;
vede tra’ segni luminosi ch’ella
di Sagittario al dardo aggiunge face,
e quasi fugga di Scorpion la coda,
scintilla e s’alza e sovra lei s’inchioda.

Or quando, al tuo parer, sotto la Luna
resti l’obliquo suo camin ristretto,
come non mai s’asconde, e non s’imbruna
a’ varii Climi opposta, o cangia aspetto?
E non rassembra a noi dal Cielo in una,
ad altri in altra parte haver ricetto?
Anzi come il mattin torna mostrarse
fissa nel punto ove la sera apparse?

Aggiungo: e come all’or, che parte o riede
e si mostra or d’appresso, et or distante
al Zenit nostro, non mai muta o cede
la figura, e la luce ogn’or tremante?
Come in lungo passaggio non la vede,
e meno o più distinta, occhio costante?
E non cresce e non scema, al guardo esposta,
qual’or, girando, s’avvicina e scosta?

Meglio dirò: s’ella il suo corso stende
pel vicino sentier de gli Elementi,
come sopra di noi tant’ore splende
quante del sommo Giro i lumi ardenti?
Ed essi regolato il moto apprende,
né vien che più s’affretti, o più s’allenti,
come l’infimo raggio col supremo
ne va del par da l’uno a l’altro estremo?

Esser non può che in cerchio angusto e basso
de’ corpi eccelsi al gran viaggio assista,
e mentre tien su l’Orizonte il passo
di mille aspetti al variar resista,
ché d’umil Cerchio una gran parte il crasso
globo ben toglie a la terrena vista;
ma la spera stellata ei non ingombra,
in cui riguardo egli d’un punto è l’ombra.

Or questi effetti indubitati e veri
son del nostro saper fondate prove,
poiché la stella unita a i segni alteri
tra quei scintilla, e si dimostra, e move;
né da gl’Indi scorrendo a i lidi Iberi,
fia chi di mole o forma altra la trove,
ché simil varietà non cape il senso,
né la distanza di quell’Orbe immenso.

Dunque, o Maestro di color che sanno,
sgombra le nubi omai da l’intelletto,
e se credesti, con tuo scorno e danno,
dianzì immutabil quel soferno oggetto,
or che fiamma novella apre l’inganno
fatto il confessa, e a corruttion soggetto,
e rendi gratie a la Natura Madre,
ond’hai luci del ver tanto leggiadre.

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