



Two fishes in the Starry Sea

Magda Streicher
magdalena@mweb.co.za

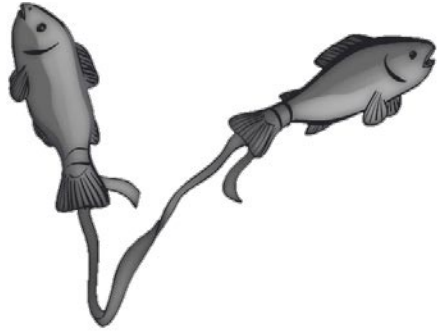


Image source: Stellarium.org

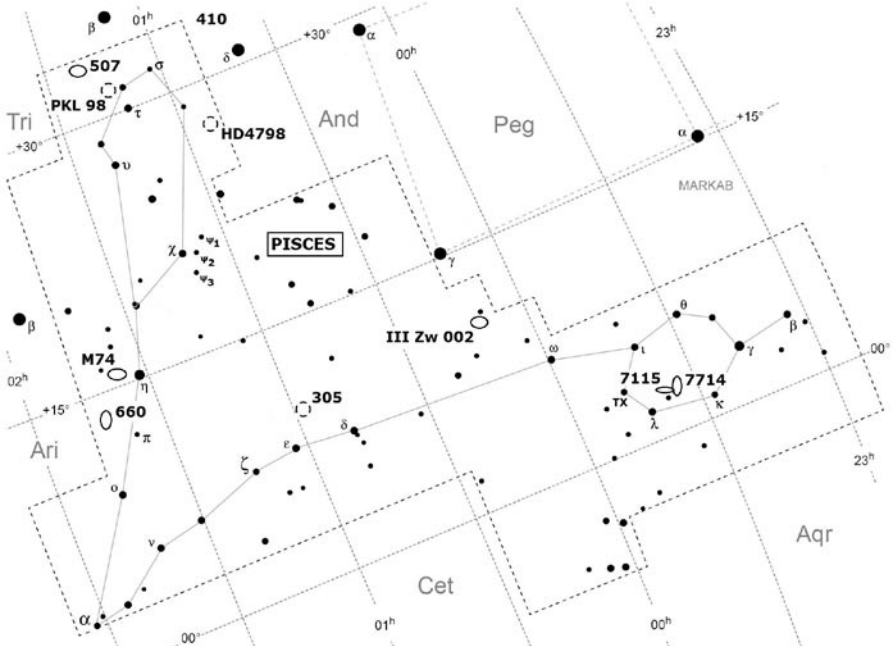
The constellation of Pisces is distinctive and special, with the characteristic “V” formed by the stars within the image. Fishing must certainly have been a major source of food supply in antiquity. Alpha Piscius connects the tails of the two starry fish projected by the constellation at a slight angle just to the north of Cetus. Two circlets hang on to each leg – one to the north-east of Pegasus and the other towards the more southerly side of Pegasus, which appears as the smaller fish as seen from the southern hemisphere. In ancient Babylon the constellation was seen as sacrificed the fishes to the god of water and wisdom. It is even possible that the constellation reflects the period of Christ, which refers back to the two fishes and 12 loaves.

Pisces as a constellation houses some of the objects with the lowest numbers on the NGC list, and is also the last of the 12 zodiac sign constellations to have been named. But alas, because the constellation is so far from the Milky Way it does not contain very bright objects. Pisces does boast a multitude of galaxies, but most of them are too faint to observe; nonetheless, there is a lot of interesting data associated with them.

The larger fish almost appears to be hugging the northern border of Pegasus, perhaps more evident the circlet made up of the stars iota, theta, gamma, kappa, lambda and TX or 19 Piscium, a red irregular star.

Very appropriately, the inner circle swallows up the galaxies **NGC 7714** and **NGC 7715**, which mingle with each other. They are situated in a 1.5° triangle slightly north of kappa and lambda Piscium. NGC 7714, the north-western galaxy, is slightly oval in shape with a sudden brighter nucleus with the companion galaxy NGC 7715 hugging the eastern edge of NGC 7714. This galaxy, in a north-east to south-west direction, is extremely faint and difficult even to glimpse by any means. In-depth photographs of this pair show NGC 7715 only as an elongated stream of faint dust. The yellow-coloured magnitude 5.6 star is situated just $4'$ towards the south-east, which also makes observation difficult, but it is a good star mark to search out this pair. John Herschel discovered this outstanding pair on 18 September 1830.

two fishes in the starry sea



The line-up of stars forming the body of this larger fish are omega, epsilon, delta and zeta Piscium. A strange pair of galaxies that can be found about 5° north of omega Piscium is **III Zw 002**. The smaller galaxy has an extremely high compact redshift for its apparent magnitude and colours that resemble a quasi-stellar source due to hydrogen emission lines. However the larger galaxy was initially classified as a Seyfert-type, but later included in the PG quasar data basis. The galaxy shows dramatic radio outbursts roughly every five years, but interestingly, before and after the rapid expansions, there was a period of virtually no expansion. The jets interacting with a molecular cloud, describing the inflating balloon model and the evolution of radio lobes.

The Zw galaxies was named after Fritz Zwicky (see picture) who was born in Varna, Bulgaria 14 February 1898 and died 8 February 1974. He received an advanced education in mathematics and experimental physics at the Swiss Federal Institute of Technology, located in Zurich Switzerland. He reasoned that the violent collapse and explosion of a massive star would leave a dense ball of neutrons, formed by the crushing together of protons and electrons. Such an object, which he called a “neutron star,” would be only several kilometers across but as dense as an atomic nucleus. This bizarre idea was met with great skepticism. The notion that an entire star could be made of such an exotic form of matter was startling. Zwicky made a

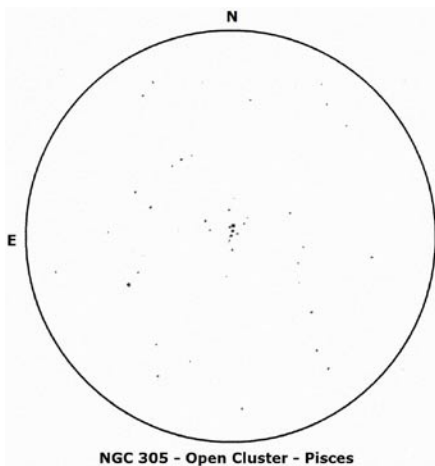
deep-sky delights



Fritz Zwicky , 1898 - 1974 - source Wikipedia.

persuasive case that supernovas actually occur and ought to be observable in other galaxies and predicted the existence of low mass galaxies. He discovered the first such “dwarf” galaxies with the 100-inch telescope at Mt. Wilson observatory. Zwicky in effect discovered that most of the mass in the universe is invisible and called it “dark matter.” He was responsible for positing numerous cosmological theories that have a profound impact on the understanding of our universe today.

Halfway along the slender fish body, epsilon Piscium points the way to a very small, tight, open cluster. **NGC 305** is situated among several galaxies, all very faint. However, this open cluster



NGC 305 - Open Cluster - Pisces

is special and displays a very tight faint grouping of about eight stars running in a north-south direction (see sketch). The brightest northern-most star in this grouping is a buttery-yellow-coloured magnitude 11 star (GSC 608 677 2). It is also a double star with an equally yellow companion to the east. To find such a lovely grouping, although faint, in galaxy world is such a nice surprise. The cluster forms a triangle north of the galaxies IC 62 and IC 57, spanning only 50' distance between them.

Further along this body line of stars the beautiful double star zeta Piscium can be seen – a white-coloured magnitude 5 star with a yellow magnitude 6 companion with a separation of 23" that should be easy to spot through a medium telescope. Further east connecting the two fish at the tail ends is no other than alpha Piscium, a very close pair of magnitude 4 and 5.2 stars.

two fishes in the starry sea

The smaller starry fish stretch along the north-eastern border of Pegasus, with the middle area indicated by eta Piscium, which glows with a magnitude of 3.6 and a yellow colour, with two close outstanding objects only a step away. The very rare galaxy **NGC 660**, which is called a polar ring, can be spotted about 3° south-east from eta Piscium and only one degree west of the constellation Aries. It is a type of galaxy in which an outer ring of gas and stars rotate over the poles (see picture). These polar rings can form when

two galaxies interact with each other. Material is tidily stripped from a passing galaxy or it could be that a smaller galaxy collides with the larger galaxy's plane of rotation. It is impossible to see the ring through ordinary amateur telescopes, but with favourable dark night vision the galaxy might be seen as a fairly soft, hazy oval. Some observers claim that they can spot a shape slightly resembling an "S" through larger telescopes. What stood out for me with high magnification was that the northern part of the galaxy fades



NGC660 - a rare polar ring galaxy. Credit: 24-inch telescope on Mt. Lemmon, AZ. Courtesy Joseph D. Shulman (Gemini)

deep-sky delights

out considerably more than the slightly defined southern part. The nucleus is not at all outstanding, just a slight brightening towards the middle area. On the eastern edge of the galaxy a faint magnitude 13 star just comes to light. Even though the galaxy is visible only as a washed-out oval cloud, it is incredible when one thinks of and tries to grasp the process and composition of the object. William Herschel discovered this galaxy on the night of 12 September 1784.



NGC 628 also known as M74 - a spectacular face-on galaxy. Source: APOD

The showpiece of the Pisces constellation is **NGC 628 (M74)**, the one and only Messier object to be found in Pisces. The large face-on galaxy is situated only 1.3° east of eta Piscium and is relatively outstanding against the starry field. Although listed as relatively bright, the surface brightness is low, since the visible light is spread over a large area. With high magnification and steady observation the soft glow seems granular, enfolding a small nucleus. A flimsy unwinding structure can be glimpsed which cannot be defined, but which probably constitutes the spiral arm structures (see picture). Towards the west a handful of faint stars drape down into the southern field of view. So much more can be discovered and said about this galaxy, but the best is to study this object in more detail for oneself! The distance to this galaxy is about 24

million light years. On 11 July 1991 the asteroid Thisbe crossed over the galaxy, having what many believe to have been a supernova explosion. However a supernova has been reported in M74 on 27 July 2013 and spectroscopically confirmed as a young type II supernova. The Central Bureau reported position $1'.5$ east and $2'.2$ south of the centre of the galaxy. The discovery report gave magnitude 12.4, and a follow-up of magnitude 12.9.

A lovely break away from galaxy world is an asterism known only as the **HD 4798** group, after the identification of its brightest star. Situated in the far north-western part of the constellation and only $8'$ from the Andromeda border, this lovely asterism is a delight.

two fishes in the starry sea

Robert Douglas sees this little gem, which comprises six stars of various magnitudes, as a “Flying Wing”. What stands out is the combination of yellow-coloured stars taking pride of place alongside the brighter magnitude 7 orange star.

A rich galaxy group known as the Pisces Group of Galaxies is situated in the far north-eastern part of the constellation and virtually on the border with Andromeda. In the central concentration of the group, which could total a few hundred galaxies, is the peculiar galaxy **NGC 507**. The galaxy displays a lovely round haze, brighter than one would have expected it to be. The nucleus is a third of the total glow and quite outstanding. NGC 508, another elliptical galaxy on the periphery of NGC 507's northern edge, is considerably smaller, but relatively bright, and shows concentric rings in deep photographs. NGC 504, slightly further south of NGC 507, is a smart, edge-on galaxy, but rather faint to appreciate to

its full capacity. Just west of it, the lovely bright yellow magnitude 7.6 and golden magnitude 10 pair complement this immediate group of galaxies.

About 2.5° further south-west, among a multitude of galaxies, another asterism can be found. Sadly, the little cluster is rather faint, but for the odd diversion within galaxy world, searching for objects like this can be worthwhile and fun. The author could only ferret out three magnitude 12 stars in a north-south formation, together with a few fainter ones, 23' east of the galaxy NGC 420. The asterism is listed as **PKL 98** – the acronym and date derive from Platais, Kozhurina-Platis and Van Leeuwen 1998 (*Star Clusters – Archinal & Hynes*).

If you have time to search, go out and claim galaxies one by one from within the vast starry sea of fish. But be sure to use a moderate to large telescope, and most importantly, pick a very dark starry night ☆

Object	Type	RA (J2000.0)	Dec	Mag	Size
III Zw 002	Galaxy	00 ^h 10 ^m 5	+10°58	18	-
HD 4798	Grouping	00 50 2	+28 22	9.5	5.6'
NGC 305	Open Cluster	00 56 3	+12 04	11.5	2.5'
PKL 98	Asterism	01 13 8	+32 02	12	3'
NGC 507	Galaxy	01 23 7	+33 15	11.2	4.1'x3.5'
NGC 628 - M 74	Galaxy	01 36 7	+15 47	9.4	10.5'x11'
NGC 660	Galaxy	01 43 1	+13 39	11.2	9.2'x4.2'
NGC 7714	Galaxy	23 36 2	+02 09	12.5	1.6'x1.4'
NGC 7715	Galaxy	23 36 4	+02 10	14	2.9'x0.4'