= Canis Minor =

Canis Minor / ?ke?n?s ?ma?n?r / is a small constellation in the northern celestial hemisphere . In the second century , it was included as an asterism , or pattern , of two stars in Ptolemy 's 48 constellations , and it is counted among the 88 modern constellations . Its name is Latin for " lesser dog " , in contrast to Canis Major , the " greater dog " ; both figures are commonly represented as following the constellation of Orion the hunter .

Canis Minor contains only two stars brighter than the fourth magnitude , Procyon (Alpha Canis Minoris) , with a magnitude of 0 @.@ 34 , and Gomeisa (Beta Canis Minoris) , with a magnitude of 2 @.@ 9 . The constellation 's dimmer stars were noted by Johann Bayer , who named eight stars including Alpha and Beta , and John Flamsteed , who numbered fourteen . Procyon is the seventh @-@ brightest star in the night sky , as well as one of the closest . A yellow @-@ white main sequence star , it has a white dwarf companion . Gomeisa is a blue @-@ white main sequence star . Luyten 's Star is a ninth @-@ magnitude red dwarf and the Solar System 's next closest stellar neighbour in the constellation after Procyon . The fourth @-@ magnitude HD 66141 , which has evolved into an orange giant towards the end of its life cycle , was discovered to have a planet in 2012 . There are two faint deep sky objects within the constellation 's borders . The 11 Canis @-@ Minorids are a meteor shower that can be seen in early December .

= = History and mythology = =

Though strongly associated with the Classical Greek uranographic tradition , Canis Minor originates from ancient Mesopotamia . Procyon and Gomeisa were called MASH.TAB.BA or " twins " in the Three Stars Each tablets , dating to around 1100 BC . In the later MUL.APIN , this name was also applied to the pairs of Pi3 and Pi4 Orionis and Zeta and Xi Orionis . The meaning of MASH.TAB.BA evolved as well , becoming the twin deities Lulal and Latarak , who are on the opposite side of the sky from Papsukal , the True Shepherd of Heaven in Babylonian mythology . Canis Minor was also given the name DAR.LUGAL , which translates to " the star which stands behind it " , in the MUL.APIN ; the constellation represents a rooster . This name may have also referred to the constellation Lepus . DAR.LUGAL was also denoted DAR.MU?EN and DAR.LUGAL.MU?EN in Babylonia . Canis Minor was then called tarlugallu in Akkadian astronomy .

Canis Minor was one of the original 48 constellations formulated by Ptolemy in his second @-@ century Almagest , in which it was defined as a specific pattern (asterism) of stars ; Ptolemy identified only two stars and hence no depiction was possible . The Ancient Greeks called the constellation ??????? / Procyon , " coming before the dog " , transliterated into Latin as Antecanis , Praecanis , or variations thereof , by Cicero and others . Roman writers also appended the descriptors parvus , minor or minusculus (" small " or " lesser " , for its faintness) , septentrionalis (" northerly " , for its position in relation to Canis Major) , primus (rising " first ") or sinister (rising to the " left ") to its name Canis . In Greek mythology , Canis Minor was sometimes connected with the Teumessian Fox , a beast turned into stone with its hunter , Laelaps , by Zeus , who placed them in heaven as Canis Major (Laelaps) and Canis Minor (Teumessian Fox) . Eratosthenes accompanied the Little Dog with Orion , while Hyginus linked the constellation with Maera , a dog owned by Icarius of Athens . On discovering the latter 's death , the dog and Icarius ' daughter Erigone took their lives and all three were placed in the sky ? Erigone as Virgo and Icarius as Boötes . As a reward for his faithfulness , the dog was placed along the " banks " of the Milky Way , which the ancients believed to be a heavenly river , where he would never suffer from thirst .

The medieval Arabic astronomers maintained the depiction of Canis Minor (al @-@ Kalb al @-@ Asghar in Arabic) as a dog ; in his Book of the Fixed Stars , Abd al @-@ Rahman al @-@ Sufi included a diagram of the constellation with a canine figure superimposed . There was one slight difference between the Ptolemaic vision of Canis Minor and the Arabic ; al @-@ Sufi claims Mirzam , now assigned to Orion , as part of both Canis Minor ? the collar of the dog ? and its modern home . The Arabic names for both Procyon and Gomeisa alluded to their proximity and resemblance to Sirius , though they were not direct translations of the Greek ; Procyon was called ash @-@ Shi 'ra

ash @-@ Shamiya , the " Syrian Sirius " and Gomeisa was called ash @-@ Shira al @-@ Ghamisa , the Sirius with bleary eyes . Among the Merazig of Tunisia , shepherds note six constellations that mark the passage of the dry , hot season . One of them , called Merzem , includes the stars of Canis Minor and Canis Major and is the herald of two weeks of hot weather .

The ancient Egyptians thought of this constellation as Anubis , the jackal god .

Alternative names have been proposed : Johann Bayer in the early 17th century termed the constellation Fovea " The Pit " , and Morus " Sycamine Tree " . Seventeenth @-@ century German poet and author Philippus Caesius linked it to the dog of Tobias from the Apocrypha . Richard A. Proctor gave the constellation the name Felis " the Cat " in 1870 (contrasting with Canis Major , which he had abbreviated to Canis " the Dog ") , explaining that he sought to shorten the constellation names to make them more manageable on celestial charts . Occasionally , Canis Minor is confused with Canis Major and given the name Canis Orionis (" Orion 's Dog ") .

= = = In non @-@ Western astronomy = = =

In Chinese astronomy , the stars corresponding to Canis Minor lie in the The Vermilion Bird of the South (???? , Nán F?ng Zh? Què) . Procyon , Gomeisa and Eta Canis Minoris form an asterism known as Nánhé , the Southern River . With its counterpart , the Northern River Beihe (Castor and Pollux) , Nánhé was also associated with a gate or sentry . Along with Zeta and 8 Cancri , 6 Canis Minoris and 11 Canis Minoris formed the asterism Shuiwei , which literally means " water level " . Combined with additional stars in Gemini , Shuiwei represented an official who managed floodwaters or a marker of the water level . Neighboring Korea recognized four stars in Canis Minor as part of a different constellation , " the position of the water " . This constellation was located in the Red Bird , the southern portion of the sky .

Polynesian peoples often did not recognize Canis Minor as a constellation , but they saw Procyon as significant and often named it ; in the Tuamotu Archipelago it was known as Hiro , meaning " twist as a thread of coconut fiber " , and Kopu @-@ nui @-@ o @-@ Hiro (" great paunch of Hiro ") , which was either a name for the modern figure of Canis Minor or an alternative name for Procyon . Other names included Vena (after a goddess) , on Mangaia and Puanga @-@ hori (false Puanga , the name for Rigel) , in New Zealand . In the Society Islands , Procyon was called Ana @-@ tahua @-@ vahine @-@ o @-@ toa @-@ te @-@ manava , literally " Aster the priestess of brave heart " , figuratively the " pillar for elocution " . The Wardaman people of the Northern Territory in Australia gave Procyon and Gomeisa the names Magum and Gurumana , describing them as humans who were transformed into gum trees in the dreamtime . Although their skin had turned to bark , they were able to speak with a human voice by rustling their leaves .

The Aztec calendar was related to their cosmology . The stars of Canis Minor were incorporated along with some stars of Orion and Gemini into an asterism associated with the day called " Water " .

= = Characteristics = =

Lying directly south of Gemini 's bright stars Castor and Pollux , Canis Minor is a small constellation bordered by Monoceros to the south , Gemini to the north , Cancer to the northeast , and Hydra to the east . It does not border Canis Major ; Monoceros is in between the two . Covering 183 square degrees , Canis Minor ranks seventy @-@ first of the 88 constellations in size . It appears prominently in the southern sky during the Northern Hemisphere 's winter . The constellation boundaries , as set by Eugène Delporte in 1930 , are defined by a polygon of 14 sides . In the equatorial coordinate system , the right ascension coordinates of these borders lie between 07h 06.4m and 08h 11.4m , while the declination coordinates are between 13 @.@ 22 ° and ? 0 @.@ 36 ° . Most visible in the evening sky from January to March , Canis Minor is most prominent at 10 PM during mid @-@ February . It is then seen earlier in the evening until July , when it is only visible after sunset before setting itself , and rising in the morning sky before dawn . The constellation 's three @-@ letter abbreviation , as adopted by the International Astronomical Union in 1922 , is "

CMi " .

= = Notable features = =

= = = Stars = = =

Canis Minor contains only two stars brighter than fourth magnitude . At magnitude 0 @.@ 34 , Procyon , or Alpha Canis Minoris , is the seventh @-@ brightest star in the night sky , as well as one of the closest . Its name means " before the dog " or " preceding the dog " in Greek , as it rises an hour before the " Dog Star " , Sirius , of Canis Major . It is a binary star system , consisting of a yellow @-@ white main sequence star of spectral type F5 IV @-@ V , named Procyon A , and a faint white dwarf companion of spectral type DA , named Procyon B. Procyon B , which orbits the more massive star every 41 years , is of magnitude 10 @.@ 7 . Procyon A is 1 @.@ 4 times the Sun 's mass , while its smaller companion is 0 @.@ 6 times as massive as the Sun . The system is 11 @.@ 4 light @-@ years (3 @.@ 5 parsecs) from Earth , the shortest distance to a northern @-@ hemisphere star of the first magnitude . Gomeisa , or Beta Canis Minoris , with a magnitude of 2 @.@ 89 , is the second @-@ brightest star in Canis Minor . Lying 162 light @-@ years (50 parsecs) from the Solar System , it is a blue @-@ white main sequence star of spectral class B8 Ve . Although fainter to Earth observers , it is much brighter than Procyon , and is 250 times as luminous and three times as massive as the Sun . Although its variations are slight , Gomeisa is classified as a shell star (Gamma Cassiopeiae variable) , with a maximum magnitude of 2 @.@ 84 and a minimum magnitude of 2 @.@ 92 . It is surrounded by a disk of gas which it heats and causes to emit radiation .

Johann Bayer used the Greek letters Alpha to Eta to label the most prominent eight stars in the constellation , designating two stars as Delta (named Delta1 and Delta2) . John Flamsteed numbered fourteen stars , discerning a third star he named Delta3 ; his star 12 Canis Minoris was not found subsequently . In Bayer 's 1603 work Uranometria , Procyon is located on the dog 's belly , and Gomeisa on its neck . Gamma , Epsilon and Eta Canis Minoris lie nearby , marking the dog 's neck , crown and chest respectively . Although it has an apparent magnitude of 4 @.@ 34 , Gamma Canis Minoris is an orange K @-@ type giant of spectral class K3 @-@ III C , which lies 318 light @-@ years (97 parsecs) away . Its colour is obvious when seen through binoculars . It is a multiple system , consisting of the spectroscopic binary Gamma A and three optical companions , Gamma B , magnitude 13 ; Gamma C , magnitude 12 ; and Gamma D , magnitude 10 . The two components of Gamma A orbit each other every 389 @.@ 2 days , with an eccentric orbit that takes their separation between 2 @.@ 3 and 1 @.@ 4 astronomical units (AU) . Epsilon Canis Minoris is a yellow bright giant of spectral class G6.5IIb of magnitude of 4 @.@ 99 . It lies 988 ? 1 @,@ 196 light @-@ years (303 ? 367 parsecs) from Earth , with 13 times the diameter and 750 times the luminosity of the Sun . Eta Canis Minoris is a giant of spectral class F0III of magnitude 5 @.@ 24 , which has a yellowish hue when viewed through binoculars as well as a faint companion of magnitude 11 @.@ 1 . Located 4 arcseconds from the primary , the companion star is actually around 440 AU from the main star and takes around 5000 years to orbit it .

Near Procyon , three stars share the name Delta Canis Minoris . Delta1 is a yellow @-@ white F @-@ type giant of magnitude 5 @.@ 25 located around 790 light @-@ years (240 parsecs) from Earth . About 360 times as luminous and 3 @.@ 75 times as massive as the Sun , it is expanding and cooling as it ages , having spent much of its life as a main sequence star of spectrum B6V . Also known as 8 Canis Minoris , Delta2 is an F @-@ type main @-@ sequence star of spectral type F2V and magnitude 5 @.@ 59 which is 136 light @-@ years (42 parsecs) distant . The last of the trio , Delta3 (also known as 9 Canis Minoris) , is a white main sequence star of spectral type A0Vnn and magnitude 5 @.@ 83 which is 680 light @-@ years (210 parsecs) distant . These stars mark the paws of the Lesser Dog 's left hind leg , while magnitude 5 @.@ 13 Zeta marks the right . A blue @-@ white bright giant of spectral type B8II , Zeta lies around 623 light @-@ years (191 parsecs) away from the Solar System .

Lying approximately 264 light @-@ years (81 parsecs) away with an apparent magnitude of 4 @.@ 39 , HD 66141 is 6 @.@ 8 billion years old and has evolved into an orange giant of spectral type K2III with a diameter around 22 times that of the Sun , and weighing 1 @.@ 1 solar masses . It is 174 times as luminous as the Sun , with an absolute magnitude of ? 0 @.@ 15 . HD 66141 was mistakenly named 13 Puppis , as its celestial coordinates were recorded incorrectly when catalogued and hence mistakenly thought to be in the constellation of Puppis ; Bode gave it the name Lambda Canis Minoris , which is now obsolete . The orange giant is orbited by a planet , HD 66141b , which was detected in 2012 by measuring the star 's radial velocity . The planet has a mass around 6 times that of Jupiter and a period of 480 days .

A red giant of spectral type M4III , BC Canis Minoris lies around 500 light @-@ years (150 parsecs) distant from the Solar System . It is a semiregular variable star that varies between a maximum magnitude of 6 @.@ 14 and minimum magnitude of 6 @.@ 42 . Periods of 27 @.@ 7 , 143 @.@ 3 and 208 @.@ 3 days have been recorded in its pulsations . AZ , AD and BI Canis Minoris are Delta Scuti variables ? short period (six hours at most) pulsating stars that have been used as standard candles and as subjects to study astroseismology . AZ is of spectral type F0III , and ranges between magnitudes 6 @.@ 44 and 6 @.@ 51 over a period of 2 @.@ 3 hours . AD has a spectral type of F2III , and has a maximum magnitude of 9 @.@ 21 and minimum of 9 @.@ 51 , with a period of approximately 2 @.@ 95 hours . BI is of spectral type F2 with an apparent magnitude varying around 9 @.@ 19 and a period of approximately 2 @.@ 91 hours .

At least three red giants are Mira variables in Canis Minor . S Canis Minoris , of spectral type M7e , is the brightest , ranging from magnitude 6 @.@ 6 to 13 @.@ 2 over a period of 332 @.@ 94 days . V Canis Minoris ranges from magnitude 7 @.@ 4 to 15 @.@ 1 over a period of 366 @.@ 1 days . Similar in magnitude is R Canis Minoris , which has a maximum of 7 @.@ 3 , but a significantly brighter minimum of 11 @.@ 6 . An S @-@ type star , it has a period of 337 @.@ 8 days .

YZ Canis Minoris is a red dwarf of spectral type M4.5V and magnitude 11 @.@ 2 , roughly three times the size of Jupiter and 20 light @-@ years (6 @.@ 1 parsecs) from Earth . It is a flare star , emitting unpredictable outbursts of energy for mere minutes , which might be much more powerful analogues of solar flares . Luyten 's Star (GJ 273) is a red dwarf star of spectral type M3.5V and close neighbour of the Solar System . Its visual magnitude of 9 @.@ 9 renders it too faint to be seen with the naked eye , even though it is only 12 @.@ 39 light @-@ years (3 @.@ 80 parsecs) away . Fainter still is PSS 544 @-@ 7 , an eighteenth @-@ magnitude red dwarf around 20 percent the mass of the Sun , located 685 light @-@ years (210 parsecs) from Earth . First noticed in 1991 , it is thought to be a cannonball star , shot out of a star cluster and now moving rapidly through space directly away from the galactic disc .

The WZ Sagittae @-@ type dwarf nova DY CMi (also known as VSX J074727.6 + 065050) flared up to magnitude 11 @.@ 4 over January and February 2008 before dropping eight magnitudes to around 19 @.@ 5 over approximately 80 days . It is a remote binary star system where a white dwarf and low mass star orbit each other close enough for the former star to draw material off the latter and form an accretion disc . This material builds up until it erupts dramatically .

= = = Deep @-@ sky objects = = =

The Milky Way passes through much of Canis Minor , yet it has few deep @-@ sky objects . William Herschel recorded four objects in his 1786 work Catalogue of Nebulae and Clusters of Stars , including two he mistakenly believed were star clusters . NGC 2459 is a group of five thirteenth- and fourteenth @-@ magnitude stars that appear to lie close together in the sky but are not related . A similar situation has occurred with NGC 2394 , also in Canis Minor . This is a collection of fifteen unrelated stars of ninth @-@ magnitude and fainter .

Herschel also observed three faint galaxies , two of which are interacting with each other . NGC 2508 is a lenticular galaxy of thirteenth @-@ magnitude , estimated at 205 million light @-@ years (63 million parsecs) distance with a diameter of 80 thousand light @-@ years (25 thousand parsecs) . Named as a single object by Herschel , NGC 2402 is actually a pair of near @-@ adjacent galaxies that appear to be interacting with each other . Only of fourteenth- and fifteenth @-@

magnitudes respectively , the elliptical and spiral galaxy are thought to be approximately 245 million light @-@ years distant , and each measure 55 @,@ 000 light @-@ years in diameter .

= = = Canis Minorids = = =

The 11 Canis @-@ Minorids , also called the Beta Canis Minorids , are a meteor shower that arise near the fifth @-@ magnitude star 11 Canis Minoris and were discovered in 1964 by Keith Hindley , who investigated their trajectory and proposed a common origin with the comet D / 1917 F1 Mellish . However , this conclusion has been refuted subsequently as the number of orbits analysed was low and their trajectories too disparate to confirm a link . They last from 4 to 15 December , peaking over 10 and 11 December .