# Class 12 and the Constellations of the Zodiac

by NORMAN DAVIDSON

The illustration in figure 1* shows the position of the planet Jupiter at its brightest in 1989 (end of December) among the stars of Gemini, the Twins. When pupils now in Class 12 in Waldorf schools entered Class 1, Jupiter was almost in the same position, and in the intervening years moved one complete circuit of the zodiac.

When the pupils were in Class 6, Jupiter had moved only half-way round the zodiac and stood among the stars of Saggitarius. Then, they were about to have an introductory lesson in observational astronomy, making them familiar with the zodiacal constellations, among others, and with the basic laws of the turning sky.

In Class 12, when Jupiter has stepped through the entire zodiac and returned to its position at the feet of the Twins, the pupils are ready for another major study of astronomy, apart from any supportive studies of the subject in the years between.

For Class 12, Jupiter and the zodiac parallel the progress of the pupil through the school years. The zodiac itself stands as a complete circle in space and time, imaging the totality which the final-year student is brought, by the Waldorf curriculum, to experience in every subject, and to experience in the sum of all the subjects put together.

Figure 2 is a map by Albert Dürer** showing the zodiacal stars, and others, seen as if from "outside" the starry realm, looking back on a celestial sphere of constellations. Positions of Jupiter at its brightest for the past 12 years are marked by dots on the circle (ecliptic) running through the centre of the zodiac. The positions of Jupiter at its brightest in 1977 and 1989 can be seen close together at the feet of the Twins.

In this map by Dürer the line at top right showing the end of the segment marked with the Symbol X, cuts through the body of Pegasus the horse. The position of the line is correct for Dürer's time, but today must be shifted clockwise by about seven degrees towards the head of the horse and the constellation of Aquarius. Why is this? To answer the question in Class 12 is not only to grapple with the technicalities of observational astronomy, but also to raise into clear consciousness something which is often enshrouded in cloudy, pseudo-occult thinking today — i.e., the Age of Aquarius, brought about by the precession (moving forward) of the spring equinox position of the sun through the zodiacal stars over thousands of years.

The pupils can discover that there are at least two zodiacs — one comprising the actual stars and constellation figures, called the sidereal zodiac, and the other division of the circle (ecliptic) into twelve equal parts, starting at the sun's spring equinox point, this point being considered the beginning of Aries. This is the tropical zodiac of the sun's seasons. The tropical zodiac is found to shift slowly, century by century, against the background of the fixed stars, so that the spring equinox point makes a complete circuit of the sidereal zodiac in about 25,770 years. Dürer's equally-divided circle therefore makes one complete revolution clockwise in that time through the circle of constellation figures he has drawn.

If one now divides the fixed star constellations into 12 equal lengths along the ecliptic (not done

in the illustration) with the star Aldebaran at the centre of the arc occupied by the constellation of Taurus the Bull (as the Babylonians are understood to have done) then the spring equinox point stood at the centre of the constellation of Taurus in 3000 B.C., of Aries in 852 B.C., of Pisces in 1295 A.D., and will only reach culmination in Aquarius in 3442. As for the spring equinox point "entering" Aquarius in the equal-constellation scheme, this will not happen until 2368. An age of Aquarius may be said to have dawned, but will not be entered or reach

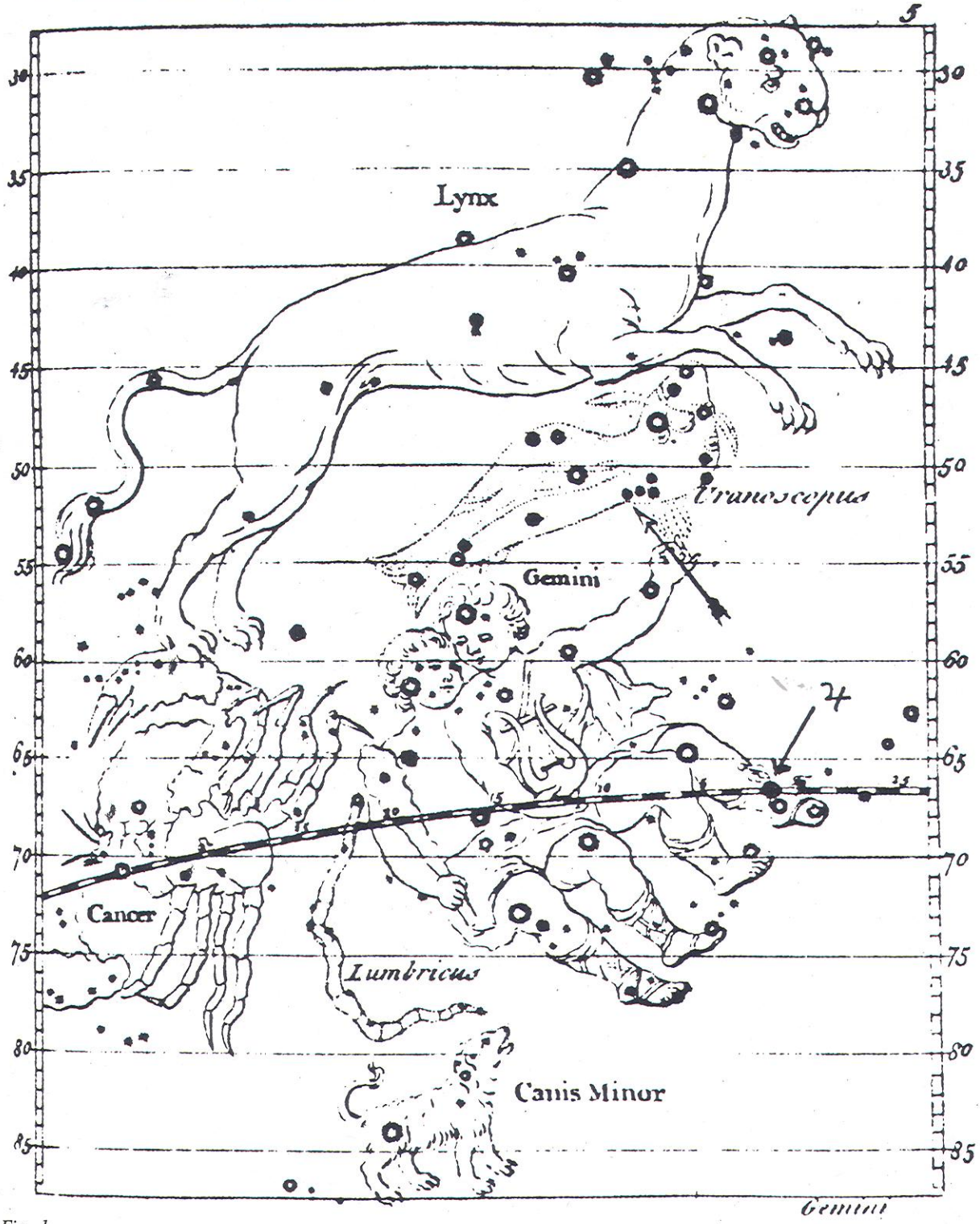


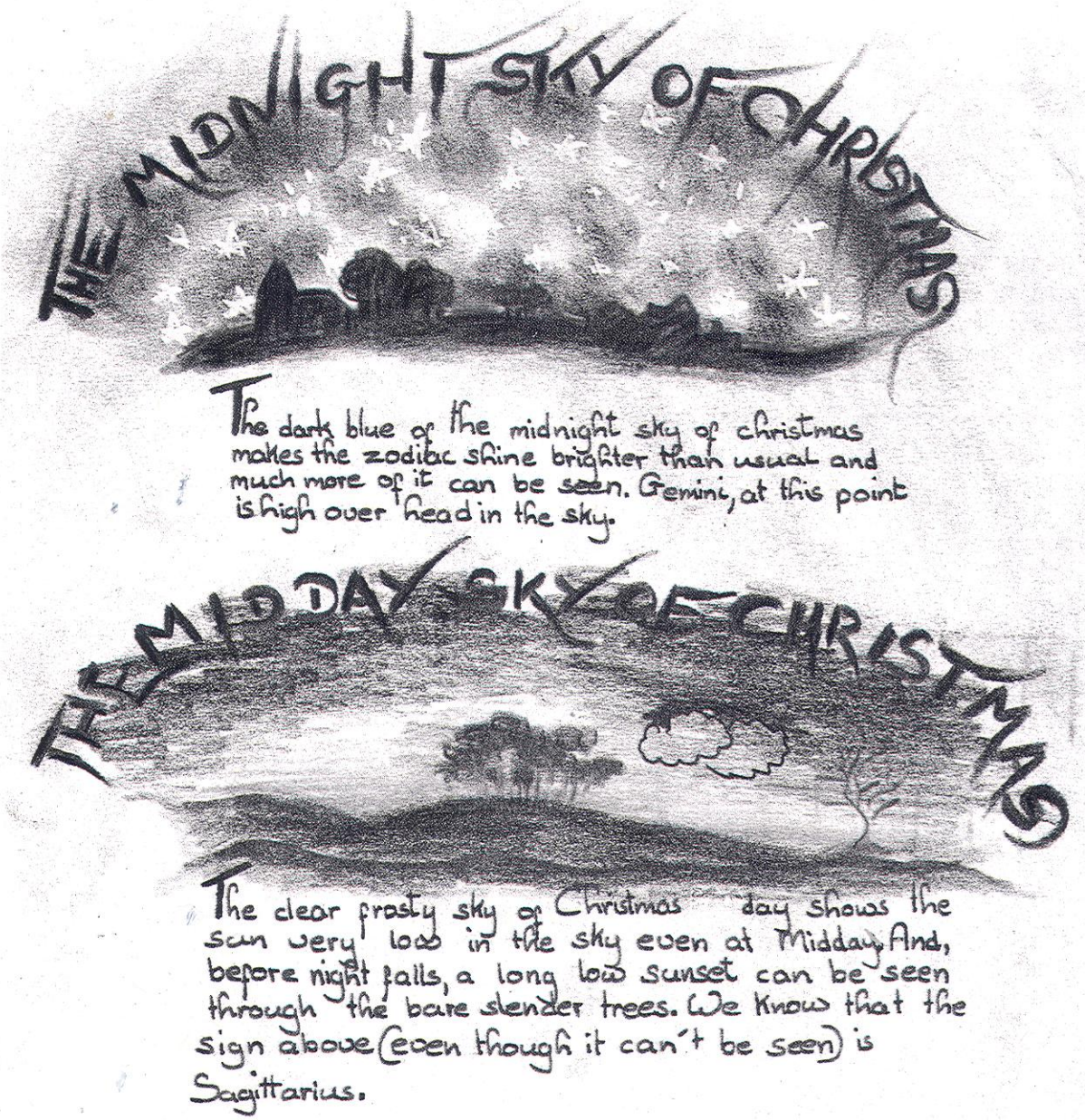

*Fig. 1.*


*Fig. 2.*

culmination for some time. In 2368 the two zodiacs will be shifted from each other by exactly one constellation. In 221 A.D. they exactly coincided.

In these time spans an historical as well as astronomical-type rhythm can be detected, and connections found with sequences of cultures studied in earlier classes (notably 5 and 10). Pupils are probably familiar with aspects of language, art, consciousness, etc., which feature in a development through Ancient India, Ancient Persia, Babylonia/Egypt, Greece/Rome, and the present, in stages of about 2000 years each.

The above could form a background to presenting the zodiac in an astronomy course in Class 12, but a background only. Students of this age are due a rigorous, modern treatment of the subject, and this part of the sky should be understood in terms of astrophysics and three-dimensional space as well. Distances of stars from the earth/sun system can be ascertained, first using the parallax method of the angle between earth, star and sun — just as in triangulation in surveying. One has thus carried the earth's laws of space into the cosmos. Then the two-dimensional, flat band of the zodiac dissolves into three dimensions — and sometimes surprisingly so when one discovers that the




*Astronomy from observation: drawings and text from a 13 year-old's exercise book.*

brightest stars are not necessarily the nearest. Six stars in the zodiac are among the brightest 25 stars in the sky, yet none of these is among the nearest 25. Of these six, Antares in Scorpio is brighter than Castor in Gemini, but much further away.

It can also be pointed out that "fixed" stars do actually have their own motion in relation to each other — a fairly early discovery in the history of modern science, being first made by Edmond Halley in 1710 when he compared the then-known positions of Arcturus, Procyon and Sirius with their positions given by the astronomer Ptolemy hundreds of years earlier, and found them to be significantly different.

Then there is the important subject of the physical constitution of stars as determined by analysis of their spectra to deduce chemical elements in the light. Here not only geometrical instruments have been extended from earth into

the sky, but whole chemical laboratories. Much pioneer work in spectrum analysis was done last century by the English astronomer William Huggins who wrote about his researches taking place around 1860: "Then it was that an astronomical observatory began, for the first time, to take on the appearance of a laboratory. Primary batteries, giving forth noxious gases, were arranged outside one of the windows; a large induction coil stood mounted on a stand on wheels so as to follow the positions of the eye end of the telescope, together with a battery of several Leyden jars; shelves with Bunsen burners, vacuum tubes, and bottles of chemicals, especially of specimens of pure metals, lined its walls. The observatory became a meeting place where terrestrial chemistry was brought into direct touch with celestial chemistry."

Huggins spoke of the "worshippers" of this New Astronomy and of its emerging scientists as "A knightly band, who have shown their knighthood by prowess in discovery . . .in chivalrous quest of Truth." Huggins himself pierced another time-honored shield when he announced to the world in 1868 that there was a connection between a shifting of certain lines towards the red or blue ends of a star spectrum, and the recession or approach of the star. He calculated Sirius to be receding at 29 miles a second (faster than the modern estimate). Yet this episode in astronomy is made more interesting and important today by the fact that one of the world's prominent astrophysicists, Halton Arp, has questioned the recession (redshift) theory by apparently showing in his book "Quasars, Redshifts and Controversies"*** that certain seemingly remote "galaxies" cannot owe their extremely high redshifts to velocity of recession alone, and that the added factor may be the creation of new matter which is ejected from the centres of nearer galaxies, posing the question of whether these galactic cores "involve the normal terrestrial physics that we know about."

Lastly, to return to a zodiac related to the measure of the human being, one cannot omit the phenomena of eclipses which give the "ecliptic" or apparent yearly path of the sun, its name. The word means "circle of the eclipse", for only when the moon approaches the sun's path can eclipses of the sun or moon occur. And when they occur, it is with breathtaking mathematical order and with rythms which repeat themselves in the life of the human being.

Several examples relate the Class 12 pupil (who is around 18 to 19 years of age), 7 once again to the phenomena of the zodiac. The geometrical arrangement of earth, sun and moon has it that in 18.6 years one particular variety of eclipses (say, solar eclipses where the moon crosses the ecliptic from below upwards) has spread itself round the entire zodiac. After 18 years 10 or 11 days, the earth, sun, moon and moon's nodes (where its path crosses the ecliptic) stand in the same relationship to each other. During this latter period, as many solar and lunar eclipses take place as there are years in the normal life-span of the human being. Also, single eclipses occurring 18 years 10 or 11 days after each other form a series (Saros) with again as many eclipses in it as years in a human life. And after 19 years (Metonic Cycle), sun, moon and stars repeat the same relationship to the earth so that the same phase of the moon takes place against the same background of stars.

As above, so below.

*Norman Davidson is Director of Teacher Training at the Waldorf Institute, Spring Valley, New York. Previously he was a Waldorf Upper School teacher in England for 16 years, giving courses in astronomy, geometry, history and literature. He is the author of "Astronomy and the Imagination" (Routledge, 1986) and also plans to publish a book on elementary astronomy for schools.*

**This star map, now in the British Museum, was designed by John Hill, the 18th century English writer on scientific subjects. It contains fascinating additions to traditional star lore.*

*Between Gemini and Cancer is "Lumbricus", representing an earth-worm, and between Gemini and Lynx is "Uranoscopus", or star gazer — "a sea-fish of peculiar figure, and has its name from its eyes being in such a position that it always looks upwards."*

***National Gallery of Art, Washington, D.C.*

****Published by Interstellar Media, 2153 Russell Street, Berkeley, California 94705.*