Our Astronomical Column.

CONJUNCTION OF MARS WITH SPICA.—Interesting, though not extremely close, approaches of Mars to the bright star Spica Virginis will occur on May 22, when Mars will be situated 2½ degrees north of the star. On that night the planet will pass the meridian at 9.21 G.M.T. at an altitude of about 30 degrees. On succeeding nights Mars will be observed to the N.N.W. of the star, but on June 2 will become stationary, and thereafter move slowly eastwards. On June 12 he will again be in conjunction with Spica Virginis, and about 1°37′ N. of the star. Mars will cross the S. meridian 10 minutes before sunset on the latter night, and a good view will not be obtainable of the planet and star until 9 p.m. G.M.T. and afterwards. Mars will be much the brighter of the pair, and visible at an earlier time than the star. The two conjunctions will form attractive and striking configurations.

THE DUPLICITY OF ν GEMINORUM.—There is an article on this star by Dr. Bernewitz in *Astr. Nach.*, 5041. The orbit as a spectroscopic binary was investigated in the Publications of Ottawa Observatory (vol. iv., No. 19). The period is 9·6 years, and the value of $a \sin i$ is 1,400,000,000 km. This large value suggested that it might not be impossible to detect the duplicity visually. It has been examined with the 65-cm. refractor at Berlin-Babelsberg Observatory by Dr. Bernewitz, Dr. Bottlinger, Prof. Guthnick, and Mr. F. Pavel. All agree that the image is distinctly elongated. Neighbouring stars of similar magnitude appeared perfectly round, so that it is concluded that the effect is not instrumental. On examining Geminorum through increasing thicknesses of a dark wedge it was found that before it disappeared it became round; they conclude from this that the companion is about 1 magnitude fainter than the primary. This difference removes uncertainty as to the quadrant. Dr. Bernewitz and Mr. Pavel each measured the pair on five nights, and their respective results are:

Date	P.A. °	Distance. ″
1920·208	116·2	0·14
1920·205	124·3	0·16

They state that the spectroscopic results indicate that the star is now near elongation. If measures can be obtained over a sufficient arc of the orbit, it will be possible to deduce the parallax and mass. The spectral type is B5, so that a mass-determination would be of particular interest.

KODAIKANAL OBSERVATIONS OF PROMINENCES.—Vol. i., part 2, of the Memoirs of Kodaikanal Observatory has lately been distributed. It contains a full description, with numerous photographs, of the prominence observations made by Mr. and Mrs. Evershed, and a discussion of their distribution and motion. Their preponderance at the sun's eastern limb, which many observers have noticed, is difficult to explain except as an earth effect. It will be remembered that Mr. Evershed has recently noticed another sign of an earth effect in the distribution of line-of-sight velocities in the photosphere.

It is pointed out that besides the principal prominence zones, which coincide with those of sunspots, there are also high-latitude zones. The prominences in these are less active than the equatorial ones; they frequently appear as pyramids, or rows of round patches. Their wave of activity begins in latitude 50°, soon after sunspot maximum; it travels poleward, reaching the pole about the next maximum and dying out there. It is suggested that the change in the corona round the poles, which takes place in the sunspot cycle, may be connected with this prominence fluctuation.

The rotation of the prominences has been studied at Kodaikanal; it is found to be more rapid than that of the photosphere. Line-of-sight velocities and disc observations of long-lived prominences agree in supporting this. It is concluded that the prominences are so tenuous that the free path of the atoms is infinite. Their luminosity "is due to the internal energy of the atoms, perhaps derived mainly from absorption of the intense solar radiation."

Leonardo da Vinci.[1]

By EDWARD MCCURDY.

WITH the list of war inventions may be numbered Leonardo's researches in aviation. He pursued this subject for many years. His studies range from the consideration of the primary causes of flight in birds and other winged creatures to the invention of a screw propeller and the consideration of its applicability to aerial navigation. He also made an actual attempt. Jerome Cardan, the physician who made a horoscope for Edward VI., in his work "De Subtilitate" refers to an unsuccessful attempt at flight made by Leonardo da Vinci, and adds somewhat dryly, "He was a great painter." A sentence on the cover of Leonardo's manuscript, "Sul Volo degli Uccelli," written in 1505, has been interpreted as referring to this attempt. "The great bird," it runs, "will take its first flight upon the back of the great swan, filling the whole world with amazement, and filling all records with its fame; and it will bring eternal glory to the nest where it was born."

This enigmatic utterance may be somewhat more comprehensible if it is remembered that *cecero* is the Italian word for swan, and "the back of the great swan" may therefore be interpreted as a reference to Monte Ceceri, a hill to the south-west of Fiesole, from which it is believed the flight took place.

From the meagre records of the attempt we pass to researches in theory and construction.

The material falls naturally into two groups, the first being a series of investigations of the laws which govern the power of flight as manifested in Nature by birds and other winged creatures, the second consisting of deductions from these principles in the construction of a mechanism which should be capable of sustaining and being worked by man. The interdependence of the two parts of the inquiry is stated with great succinctness in a passage in the Codice Atlantico:

"A bird is an instrument working according to mathematical law, which instrument it is within the capacity of man to reproduce with all its movements, but not with a corresponding degree of strength, though it is deficient only in the power of maintaining equilibrium. We may therefore say that such an instrument constructed by man is lacking in nothing except the life of the bird, and this life must needs be supplied from that of man.

"The life which resides in the bird's members will, without doubt, better conform to their needs than will that of man, which is separated from them, and especially in the almost imperceptible movements which preserve equilibrium.

"But since we see that the bird is equipped for many obvious varieties of movements, we are able from this experience to deduce that the most rudimentary of these movements will be capable of being comprehended by man's understanding; and that he will to a great extent be able to provide against the

[1] From a discourse delivered at the Royal Institution on Friday, March 19. Continued from p. 309.