



**HAL**  
open science

## Satellites galiléens de Jupiter : phénomènes et configurations pour 1987, suivis d'une méthode permettant de calculer les phénomènes pour 1988

J.-E. Arlot, Th. Derouazi, Y. Jannot, W. Thuillot, D.T. Vu

### ► To cite this version:

J.-E. Arlot, Th. Derouazi, Y. Jannot, W. Thuillot, D.T. Vu. Satellites galiléens de Jupiter : phénomènes et configurations pour 1987, suivis d'une méthode permettant de calculer les phénomènes pour 1988. [Rapport de recherche] Institut de mécanique céleste et de calcul des éphémérides(IMCCE). 1986, 71 p., figures, tableaux. hal-01478866

**HAL Id: hal-01478866**

**<https://hal-lara.archives-ouvertes.fr/hal-01478866>**

Submitted on 28 Feb 2017

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

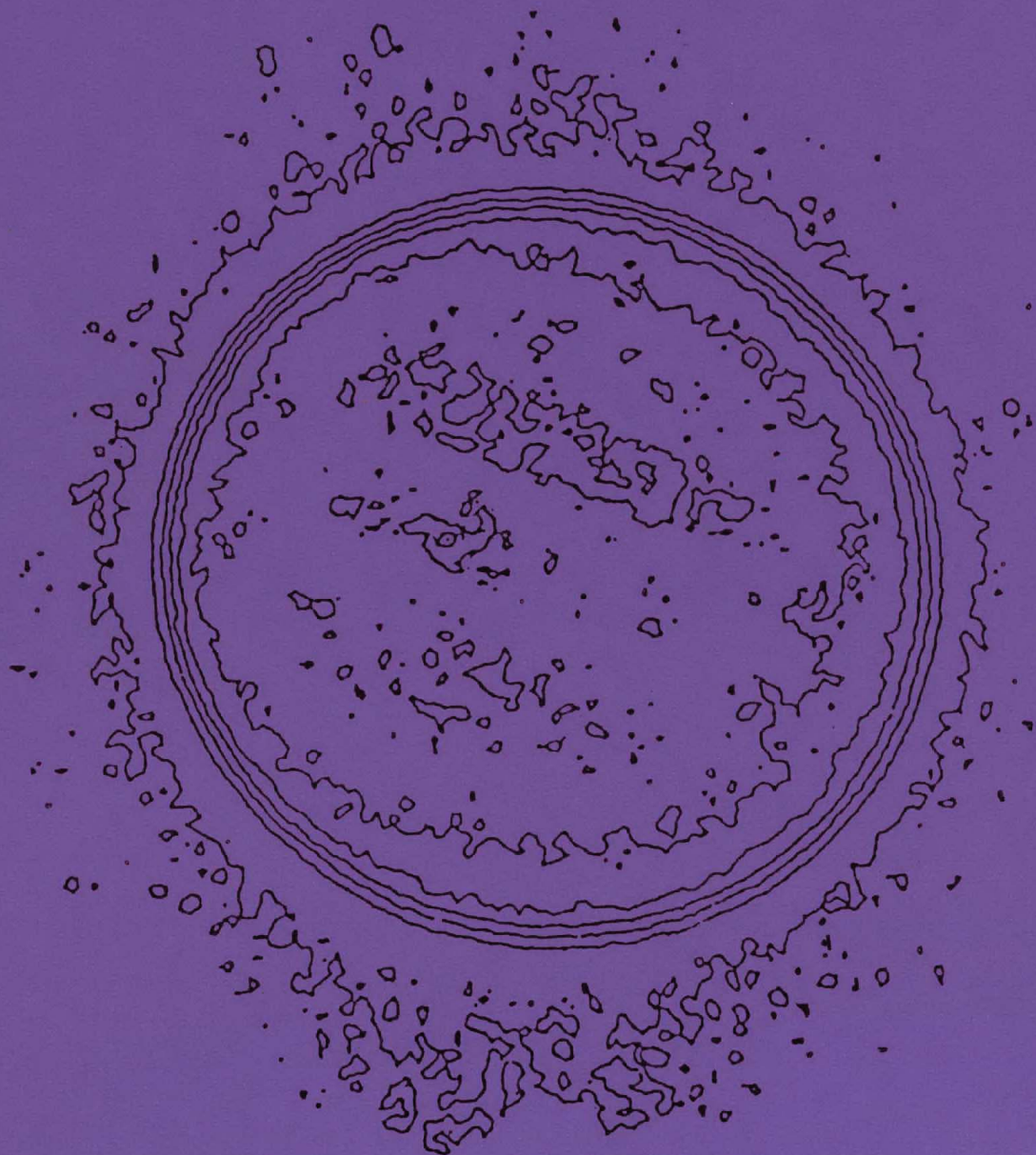
L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# SATELLITES GALILÉENS DE JUPITER

PHENOMENES ET CONFIGURATIONS POUR 1987

SUIVIS D'UNE METHODE PERMETTANT DE CALCULER LES

PHÉNOMÈNES POUR 1988



Supplément à la CONNAISSANCE DES TEMPS  
à l'usage des observateurs

BUREAU DES LONGITUDES

PARIS, NOVEMBRE 1986.

SATELLITES GALILEENS DE JUPITER

GALILEAN SATELLITES OF JUPITER

PHÉNOMÈNES ET CONFIGURATIONS POUR 1987, SUIVIS D'UNE  
MÉTHODE PERMETTANT DE CALCULER LES PHÉNOMÈNES POUR 1988.

PHENOMENA AND CONFIGURATIONS FOR 1987, FOLLOWED BY A  
METHOD FOR THE CALCULATION OF THE PHENOMENA FOR 1988.

SUPPLÉMENT À LA CONNAISSANCE DES TEMPS  
À L'USAGE DES OBSERVATEURS

BUREAU DES LONGITUDES - C.N.R.S.

PARIS, NOVEMBRE 1986

ISSN 079-1033

Dépot légal: 1er trimestre 1987

| SOMMAIRE   | page |
|--|------|
| Avertissement  | 5    |
| Généralités sur les satellites galiléens               | 7    |
| Explication et usage                                   | 10   |
| English explanations                                   | 13   |
| Ephémérides: phénomènes et configurations<br>pour 1987 | 15   |
| Phénomènes pour 1988                                   | 65   |

&&&&&&&&&

## AVERTISSEMENT

Depuis 1980, la *Connaissance des Temps* est présentée d'une façon nouvelle qui fait appel aux développements en polynômes de Tchébychev des coordonnées des astres du système solaire. Ce procédé se montre particulièrement efficace pour les coordonnées différentielles des satellites galiléens de Jupiter puisque, pour l'année, 26 pages de coefficient suffisent pour obtenir les coordonnées de l'un quelconque de ces satellites avec une précision de 0,01 " (0,02 " pour Ganymède). Pour permettre, en revanche, de préserver à la nouvelle *Connaissance des Temps* le caractère de publication peu volumineuse et peu coûteuse qu'autorise la nouvelle présentation, on n'y donne plus ni la liste des phénomènes ni les schémas des configurations des satellites galiléens qui figurent d'ailleurs dans l'*Annuaire du Bureau des Longitudes*.

Cependant certains utilisateurs souhaitent disposer d'une précision supérieure à celle qu'entraînent les dimensions et la présentation de l'*Annuaire du Bureau des Longitudes*. Le présent supplément permet de satisfaire à ces besoins puisqu'il donne à la seconde près les différents instants de chaque phénomène alors que l'*Annuaire* donne à la minute près l'instant du milieu de chaque phénomène. Par ailleurs les schémas des configurations ont été améliorés et permettent en particulier d'avoir la déclinaison des satellites au dessus du plan équatorial si bien qu'on peut espérer obtenir la position d'un satellite par rapport au disque de Jupiter avec une précision d'environ 10 " de degrés grâce à la grande précision du tracé.

A tous ces renseignements on a joint, en début d'ouvrage des données générales sur les satellites galiléens et sur leurs orbites, et en fin d'ouvrage une méthode permettant de calculer les phénomènes pour l'année suivante.

B. MORANDO

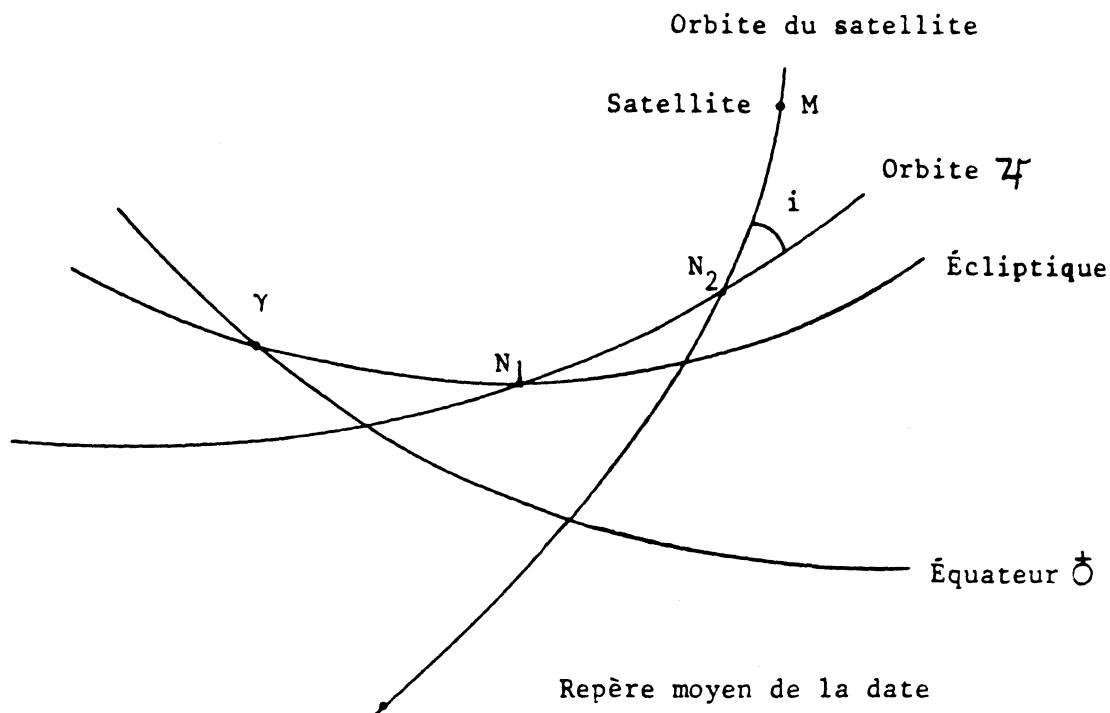
Correspondant du Bureau des Longitudes

Supplément à la *Connaissance des Temps* pour 1987

Rédaction et calculs: J.-E. ARLLOT, Th. DEROUAZI, Y. JANNOT, W. THUILLOT, D.T. VU.

GENERALITES SUR LES SATELLITES GALILEENS

|   | IO (I)       | EUROPE (II)  | GANYMÈDE (III) | CALLISTO (IV) |
|---|--------------|--------------|----------------|---------------|
| <i>Masses (10<sup>-5</sup> masse de Jupiter)</i>  |              |              |                |               |
| Sampson (1921) :  | 4.50         | 2.54         | 7.99           | 4.50          |
| De Sitter (1931) :  | 3.81         | 2.48         | 8.17           | 5.09          |
| Pionner 11 (1976) :   | 4.68         | 2.52         | 7.80           | 5.66          |
| <i>Rayons (km)</i>  |              |              |                |               |
| Danjon (1954) :   | 1650         | 1400         | 2450           | 2300          |
| Dollfus (1961) :  | 1775         | 1550         | 2800           | 2525          |
| Pionner 11 (1976) :   | 1840         | 1552         | 2650           | 2420          |
| Voyager (1983) :  | 1816         | 1563         | 2638           | 2410          |
| <i>Magnitudes visuelles<br/>à l'opposition de Jupiter :</i>   |              |              |                |               |
| Harris (1961) :   | 4.8          | 5.2          | 4.5            | 5.5           |
| <i>Albedos géométriques (Harris, 1961)</i>  |              |              |                |               |
| U : 353 nm  | 0.19         | 0.47         | 0.29           | 0.14          |
| B : 448 nm  | 0.56         | 0.67         | 0.41           | 0.21          |
| V : 554 nm  | 0.92         | 0.83         | 0.49           | 0.26          |
| R : 690 nm  | 1.12         | 0.93         | 0.56           | 0.30          |
| I : 820 nm  | 1.15         | 0.95         | 0.57           | 0.31          |
| <i>Albédo de Bond (visuel)</i>  |              |              |                |               |
|   | 0.54         | 0.49         | 0.29           | 0.15          |
| <i>Demi-grand axe (Sampson, 1921)</i>   |              |              |                |               |
| en UA :   | 0.002820     | 0.004486     | 0.007155       | 0.012586      |
| en rayons de Jupiter :  | 5.87         | 9.34         | 14.91          | 26.22         |
| en kilomètres :   | 421810       | 671140       | 1070500        | 1882900       |
| <i>Plus grande élongation<br/>à l'opposition de Jupiter (minutes<br/>et secondes de degré)</i>              |              |              |                |               |
| Sampson (1921) :  | 2' 17"       | 3' 40"       | 5' 48"         | 10' 13"       |
| <i>Période synodique (jours)</i>  |              |              |                |               |
| Sampson (1921) :  | 1.7698604883 | 3.5540941742 | 7.1663872292   | 16.7535523007 |
| <i>Inclinaison moyenne<br/>sur l'équateur de Jupiter<br/>pour 1987.5 (minutes et secondes<br/>de degré)</i> |              |              |                |               |
| Sampson (1921) :  | 1' 37"       | 26' 24"      | 11' 15"        | 20' 06"       |
| <i>Valeur moyenne de l'excentricité<br/>pour 1987.5</i>   |              |              |                |               |
| Sampson (1921) :  | 0.004        | 0.009        | 0.001          | 0.007         |
| <i>Partie séculaire du mouvement<br/>(degrés par an)</i>  |              |              |                |               |
| nœud :  | - 48.5       | - 11.9       | - 2.6          | - 0.6         |
| périjove :  | 57.0         | 14.6         | 2.7            | 0.7           |
| Sampson (1921)  |              |              |                |               |



Du fait de la complexité du mouvement des satellites galiléens aucun renseignement n'est donné ici sur les nœuds , et les périodes. En effet excentricités et inclinaisons sont faibles (voir tableau précédent ) et tous ces éléments sont soumis à de trop grandes variations .

On donne ci-après les longitudes moyennes (d'après Sampson, 1921 ) dans le plan des orbites , ce plan étant confondu avec l' équateur de Jupiter .

Si T est le temps en jours moyens compté à partir de 1900,0 on a :

$$\gamma N_1 N_2 = 316^{\circ},051 + 0,00003559 T \quad \text{et} \quad i = 3^{\circ},10350$$

|          | $\gamma N_1 + N_1 N_2 + N_2 M$                | Période sidérale  |
|----------|---|-------------------|
| IO       | $142^{\circ},59987 + 203^{\circ},488992435 T$ | $1^j,7691374639$  |
| EUROPE   | $99^{\circ},55081 + 101^{\circ},374761672 T$  | $3^j,5511797420$  |
| GANYMEDE | $168^{\circ},02628 + 50^{\circ},317646290 T$  | $7^j,1545476894$  |
| CALLISTO | $234^{\circ},40790 + 21^{\circ},571109630 T$  | $16^j,6889884746$ |



La théorie du mouvement des satellites galiléens utilisée pour le calcul des positions , et des prédictions des phénomènes est la théorie de Sampson (1), améliorée par Lieske (2), utilisant les constantes calculées par Arlot (3).

Des recherches sont en cours au Bureau des Longitudes afin de remplacer la théorie de Sampson par une nouvelle théorie qui permettra de réduire l'écart que l'on peut constater entre les prédictions et les observations.

(1) R. A. SAMPSON : *Theory of the Four Great Satellites of Jupiter.*  
*Mem. of The Roy. Ast. Soc.* LXIII (1921)

(2) J. H. LIESKE : *Astron. and Astrophys.* Vol 56, p. 333 (1977)

(3) J.-E. ARLOT : *Astron. and Astrophys.* Vol 167, p. 305 (1982)

§§§§§§§§§§

## EXPLICATIONS ET USAGE

### L' échelle de temps :

L'échelle de temps utilisée est le temps uniforme de la Mécanique qui a été utilisé par Sampson pour sa théorie. On ne connaît pas de relation entre le temps universel UTC diffusé par le BIH et ce temps. On peut cependant indiquer qu' il est plus proche du temps des Ephémérides (TE ou TAI+32s) que du temps universel UTC. Connaissant TE-UT2 à une date donnée, la date en UTC d'un phénomène ou d'une position indiquée à t, sera plus proche de  $t - (TE-UT2)$  que de t dans l'échelle UTC.

Donnons ici la différence TE-UT2 que l'on identifiera avec TAI+32s-UT2: (on identifiera également UT2 et UTC)

pour 1981,5 : 52 secondes,  
pour 1982,5 : 53 secondes,  
pour 1983,5 : 54 secondes,  
pour 1984,5 : 54 secondes,  
pour 1985,5 : 55 secondes,  
pour 1986,5 : 56 secondes.

### Les phénomènes :

Les hypothèses utilisées pour le calcul des époques des phénomènes sont les suivantes :

- Jupiter est un ellipsoïde dont l' aplatissement a pour valeur  $1/15$  et dont le rayon équatorial est 71420 kilomètres .
- Les satellites sont des sphères de rayons :  
1840 Km pour Io , 1552 Km pour Europe , 2650 Km pour Ganymède,  
2420 Km pour Callisto. (d'après Pionnier 11)
- Le Soleil est une sphère de rayon 695980 Km
- Les dates sont données pour tout observatoire terrestre puisqu' on peut négliger l' effet de parallaxe dont la grandeur est plus faible que la précision des prédictions .
- L' effet de phase sur les satellites est négligé , mais pris en compte pour la planète .

Les pages paires fournissent les dates des phénomènes que présentent ces satellites :

- Les débuts et fins des passages des satellites devant la planète:  
PA.D.INT et PA.D.EXT  
PA.F.INT et PA.F.EXT
- Les débuts et fins de leurs occultations (anciennement appelées immersions et emmersions ) :  
OC.D.INT et OC.D.EXT  
OC.F.INT et OC.F.EXT

- Les débuts et fins des passages de leur ombre sur Jupiter :  
OM.D.INT et OM.D.EXT  
OM.F.INT et OM.F.EXT

- Les débuts et fins des éclipses des satellites par Jupiter :  
EC.D.INT , EC.D.EXT et EC.D.PEN  
EC.F.INT , EC.F.EXT et EC.F.PEN

Les notations utilisées sont les suivantes:

.D et .F : désignent le début et la fin .

.INT et .EXT: désignent les contacts intérieurs et extérieurs des satellites avec le cône d' ombre pour les éclipses et les passages des ombres sur Jupiter , désignent les mêmes contacts avec le cône de visibilité pour les occultations et les passages devant la planète .

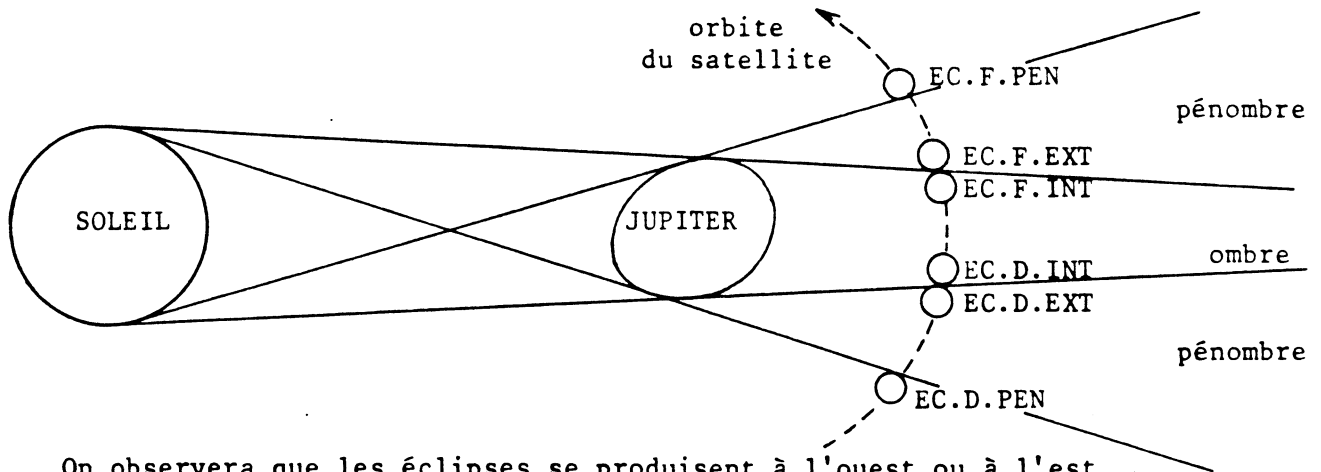
.PEN : désigne , uniquement pour les éclipses , le contact extérieur des satellites avec le cône de pénombre .

Par exemple : (voir dessin) Le déroulement d'un début d'éclipse se fait ainsi :

EC.D.PEN : Contact extérieur du satellite avec le cône de pénombre ( début de l'assombrissement )

EC.D.EXT : Contact extérieur avec le cône d'ombre.

EC.D.INT : Contact intérieur avec le cône d'ombre (assombrissement total ).



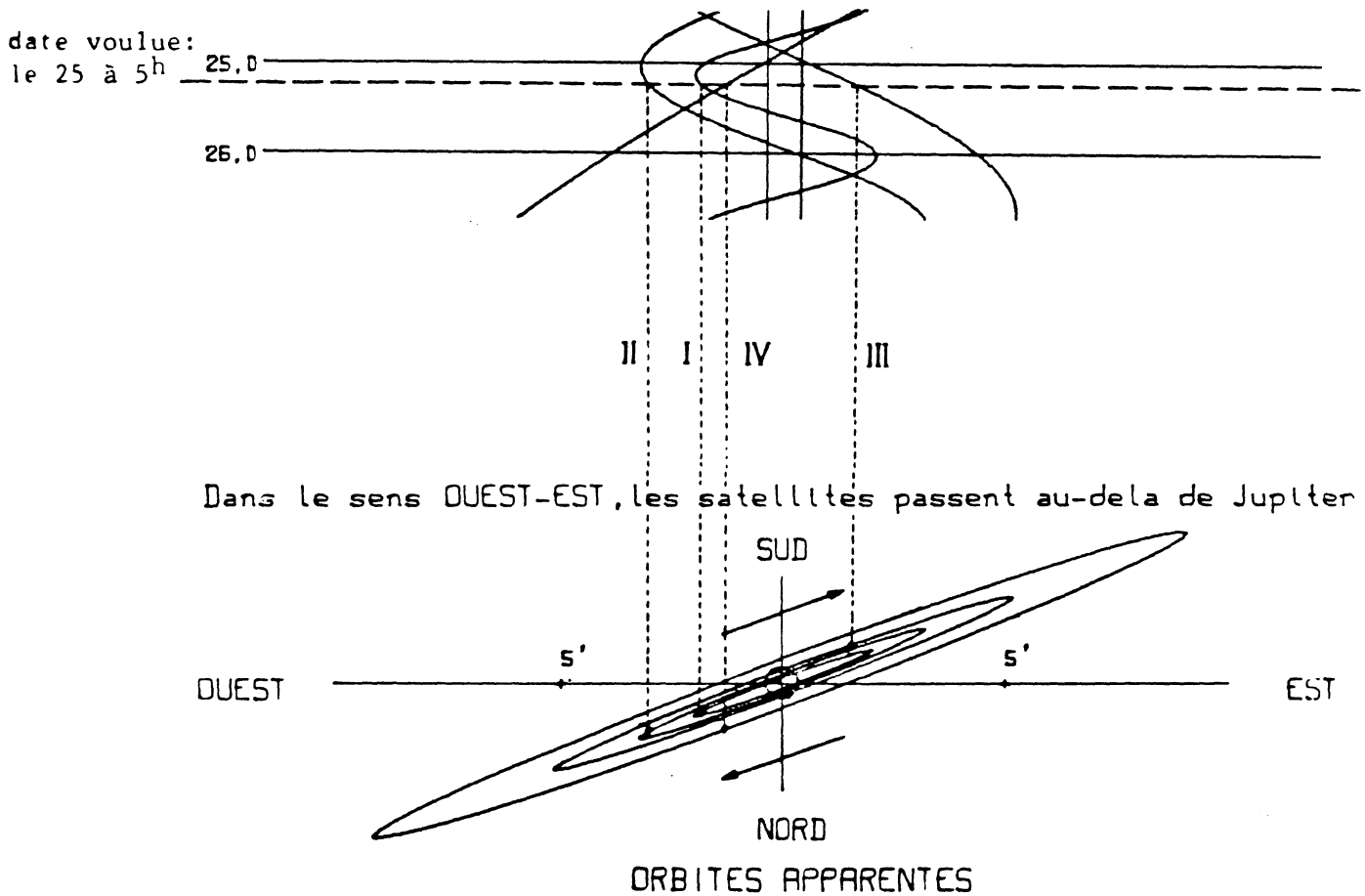
On observera que les éclipses se produisent à l'ouest ou à l'est de la planète, suivant que l'on est avant ou après l'opposition , c'est-à-dire suivant que Jupiter passe au méridien avant minuit . En général pour le premier et le deuxième satellite , on ne peut, avant l'opposition , observer que le début des éclipses et ensuite la fin des occultations . Après l'opposition on ne peut observer que le début des occultations et ensuite la fin des éclipses . Il est possible , d'autre part , que, en raison de l'inclinaison de l'équateur de Jupiter sur l'écliptique et de l'éloignement du satellite 4 (Callisto) par rapport à la planète, aucun phénomène de ce satellite ne se produise .

Les configurations :

Les configurations permettent d'identifier les satellites lors de leur observation, et également de déterminer leur position en coordonnées tangentielles équatoriales relatives à Jupiter avec la précision suivante (pour une lecture des courbes à 0,5 millimètre près) :

- satellite 1 : de 5" à 20" selon la vitesse apparente
- satellite 2 : de 5" à 10" selon la vitesse apparente
- satellite 3 : 5"
- satellite 4 : 5"

L'exemple suivant montre comment déterminer les positions des satellites:



On reporte en abscisse sur l'axe ouest-est les distances  $\Delta \alpha \cos \delta$  mesurées pour une date voulue, sur les courbes. L'ordonnée est donnée par les orbites apparentes. L'indétermination avant/arrière est levée grâce au sens de rotation des satellites.

ENGLISH EXPLANATIONS

Since the phenomena and the configurations of the Galilean Satellites are not given in the " Connaissance des Temps " , this supplement gives detailed predictions for the phenomena with an accuracy of 1 second of time in the calculations. The configurations are also given and they allow the determination of the differential coordinates of the Galilean Satellites with an accuracy of about 10 seconds of arc (").

Several constants related to the satellites are given in the table on page 7 and mean longitudes are given on page 8.

PHENOMENA FOR 1987 :

For the predictions of the phenomena, improved Sampson's theory is used (cf notes 1,2,3 of page 9)

Each phenomenon is described in 3 parts. For example :

EC . D . PEN  
first second third  
part part part

The first part indicates what phenomenon is predicted :

EC means eclipse  
OC means occultation  
OM means transit of the shadow  
PA means transit of the satellite

The second part means :

D : ingress or disappearance  
F : egress or reappearance

The third part indicates the evolution of the phenomenon :

PEN ( only for eclipses ) means that the eclipsed satellite is tangent externally to the cone of penumbra  
EXT means that the satellite or its shadow is tangent externally to the limb of Jupiter or to the terminator or to the cone of shadow ( eclipses )  
INT means that the satellite or its shadow is tangent internally to the limb of Jupiter or to the terminator or to the cone of shadow ( eclipses ).

The figure of page 11 shows the different phases of the phenomena.

All the dates given for the predictions use a time scale which, in practice, is very close to ( TAI+32s ). So the date in UTC of a phenomenon given at the date t will be close to: t - ( TAI+32s-UT2 ).

The differences TAI+32s-UT2 are :

for 1981.5 : 52 seconds,  
for 1982.5 : 53 seconds,  
for 1983.5 : 54 seconds,  
for 1984.5 : 54 seconds,  
for 1985.5 : 55 seconds,  
for 1986.5 : 56 seconds.

THE CONFIGURATIONS

The way to use the configurations diagrams is shown on page 12.  $\Delta\alpha \cos \delta$  is given by the curves (16 days on each page) and  $\Delta\delta$  is given by the apparent orbits of the satellites given for each 16 days at the bottom of each page.

APPROXIMATE DATES FOR THE PHENOMENA OF 1988

On pages 65 to 70, a method based on the use of a polynomial development depending on the time gives a way to calculate the dates of all the phenomena of 1988 with a precision of about 60 seconds of time which is sufficient to prepare observations.

\$

EPHEMERIDES

Phénomènes et configurations

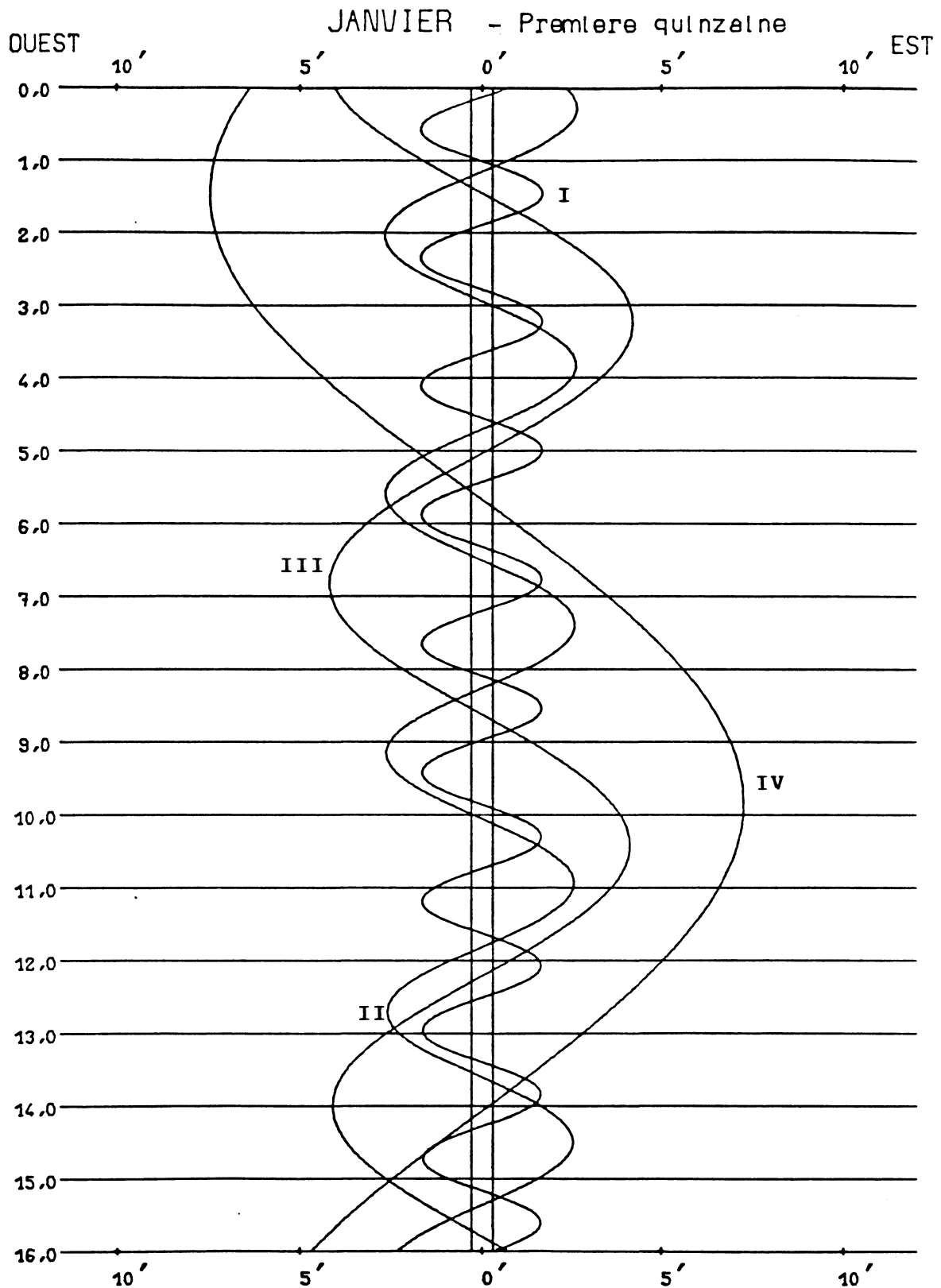
pour 1987

1987 - SATELLITES DE JUPITER -

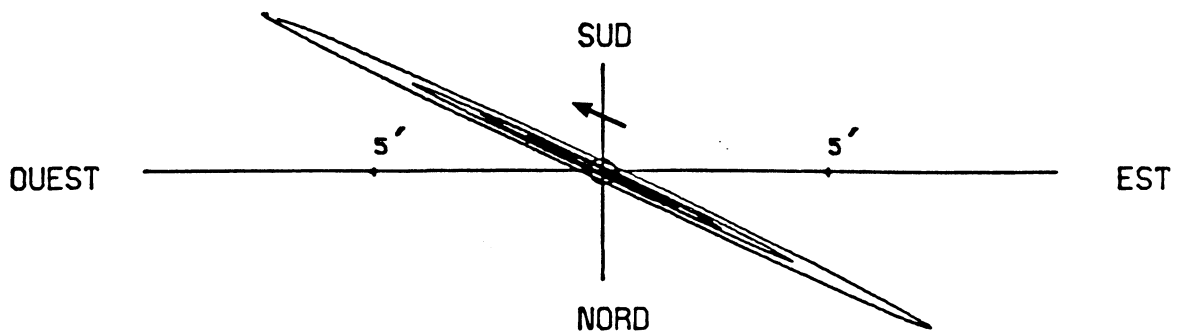
| PHENOMENES |    |    |    |     | MOIS :   | JANVIER |    |    |     |          | - PREMIERE QUINZAINE - |      |    |     |          |          |          |  |
|------------|----|----|----|-----|----------|---------|----|----|-----|----------|------------------------|------|----|-----|----------|----------|----------|--|
| JOUR       | H  | M  | S  | SAT | TYPE     | JOUR    | H  | M  | S   | SAT      | TYPE                   | JOUR | H  | M   | S        | SAT      | TYPE     |  |
| 0          | 1  | 58 | 48 | I   | PA.D.EXT | 9       | 28 | 20 | I   | PA.D.EXT | 18                     | 11   | 11 | I   | OM.D.INT |          |          |  |
|            | 2  | 2  | 28 | I   | PA.D.INT | 9       | 32 | 0  | I   | PA.D.INT | 19                     | 13   | 36 | I   | PA.F.INT |          |          |  |
|            | 3  | 13 | 31 | I   | OM.D.EXT | 10      | 40 | 27 | I   | OM.D.EXT | 19                     | 17   | 16 | I   | PA.F.EXT |          |          |  |
|            | 3  | 17 | 13 | I   | OM.D.INT | 10      | 44 | 10 | I   | OM.D.INT | 20                     | 22   | 1  | I   | OM.F.INT |          |          |  |
|            | 4  | 14 | 1  | I   | PA.F.INT | 11      | 43 | 34 | I   | PA.F.INT | 20                     | 25   | 44 | I   | OM.F.EXT |          |          |  |
|            | 4  | 17 | 41 | I   | PA.F.EXT | 11      | 47 | 14 | I   | PA.F.EXT |                        |      |    |     |          |          |          |  |
|            | 5  | 28 | 4  | I   | OM.F.INT | 12      | 55 | 1  | I   | OM.F.INT | 11                     | 14   | 8  | 31  | I        | OC.D.EXT |          |  |
|            | 5  | 31 | 47 | I   | OM.F.EXT | 12      | 58 | 43 | I   | OM.F.EXT | 14                     | 12   | 10 | I   | OC.D.INT |          |          |  |
|            | 23 | 9  | 42 | I   | OC.D.EXT | 13      | 33 | 9  | IV  | OC.D.EXT | 17                     | 31   | 20 | I   | EC.F.INT |          |          |  |
|            | 23 | 13 | 20 | I   | OC.D.INT | 13      | 48 | 28 | IV  | OC.D.INT | 17                     | 35   | 1  | I   | EC.F.EXT |          |          |  |
|            |    |    |    |     |          | 16      | 46 | 55 | IV  | OC.F.INT | 17                     | 35   | 48 | I   | EC.F.PEN |          |          |  |
| 1          | 2  | 16 | 2  | II  | PA.D.EXT | 17      | 2  | 14 | IV  | OC.F.EXT | 18                     | 21   | 50 | II  | PA.D.EXT |          |          |  |
|            | 2  | 19 | 59 | II  | PA.D.INT |         |    |    |     |          | 18                     | 25   | 47 | II  | PA.D.INT |          |          |  |
|            | 2  | 38 | 18 | I   | EC.F.INT | 6       | 1  | 26 | 34  | IV       | EC.D.PEN               | 20   | 38 | 40  | II       | OM.D.EXT |          |  |
|            | 2  | 42 | 0  | I   | EC.F.EXT | 1       | 46 | 52 | IV  | EC.D.EXT | 20                     | 42   | 46 | II  | OM.D.INT |          |          |  |
|            | 2  | 42 | 46 | I   | EC.F.PEN | 3       | 17 | 28 | IV  | EC.F.EXT | 21                     | 5    | 31 | II  | PA.F.INT |          |          |  |
|            | 4  | 43 | 57 | II  | OM.D.EXT | 3       | 37 | 46 | IV  | EC.F.PEN | 21                     | 9    | 28 | II  | PA.F.EXT |          |          |  |
|            | 4  | 48 | 2  | II  | OM.D.INT | 6       | 38 | 56 | I   | OC.D.EXT | 23                     | 18   | 20 | II  | OM.F.INT |          |          |  |
|            | 4  | 59 | 50 | II  | PA.F.INT | 6       | 42 | 35 | I   | OC.D.INT | 23                     | 22   | 27 | II  | OM.F.EXT |          |          |  |
|            | 5  | 3  | 47 | II  | PA.F.EXT | 10      | 4  | 51 | I   | EC.F.INT |                        |      |    |     |          |          |          |  |
|            | 7  | 23 | 53 | II  | OM.F.INT | 10      | 8  | 32 | I   | EC.F.EXT | 12                     | 3    | 28 | 13  | III      | PA.D.EXT |          |  |
|            | 7  | 27 | 58 | II  | OM.F.EXT | 10      | 9  | 19 | I   | EC.F.PEN | 3                      | 37   | 11 | III | PA.D.INT |          |          |  |
|            | 8  | 49 | 32 | III | OC.D.EXT | 10      | 32 | 3  | II  | OC.D.EXT | 6                      | 48   | 22 | III | PA.F.INT |          |          |  |
|            | 8  | 58 | 27 | III | OC.D.INT | 10      | 36 | 4  | II  | OC.D.INT | 6                      | 57   | 21 | III | PA.F.EXT |          |          |  |
|            | 12 | 12 | 37 | III | OC.F.INT | 15      | 41 | 55 | II  | EC.F.INT | 8                      | 9    | 8  | III | OM.D.EXT |          |          |  |
|            | 12 | 21 | 32 | III | OC.F.EXT | 15      | 46 | 6  | II  | EC.F.EXT | 8                      | 18   | 47 | III | OM.D.INT |          |          |  |
|            | 13 | 55 | 43 | III | EC.D.PEN | 15      | 47 | 48 | II  | EC.F.PEN | 11                     | 18   | 34 | III | OM.F.INT |          |          |  |
|            | 13 | 59 | 19 | III | EC.D.EXT |         |    |    |     |          | 11                     | 28   | 11 | III | OM.F.EXT |          |          |  |
|            | 14 | 9  | 0  | III | EC.D.INT | 7       | 3  | 58 | 19  | I        | PA.D.EXT               | 11   | 28 | 20  | I        | PA.D.EXT |          |  |
|            | 17 | 4  | 48 | III | EC.F.INT | 4       | 1  | 59 | I   | PA.D.INT | 11                     | 32   | 0  | I   | PA.D.INT |          |          |  |
|            | 17 | 14 | 29 | III | EC.F.EXT | 5       | 9  | 29 | I   | OM.D.EXT | 12                     | 36   | 23 | I   | OM.D.EXT |          |          |  |
|            | 17 | 18 | 4  | III | EC.F.PEN | 5       | 13 | 12 | I   | OM.D.INT | 12                     | 40   | 5  | I   | OM.D.INT |          |          |  |
|            | 20 | 28 | 35 | I   | PA.D.EXT | 6       | 13 | 34 | I   | PA.F.INT | 13                     | 43   | 36 | I   | PA.F.INT |          |          |  |
|            | 20 | 32 | 15 | I   | PA.D.INT | 6       | 17 | 14 | I   | PA.F.EXT | 13                     | 47   | 16 | I   | PA.F.EXT |          |          |  |
|            | 21 | 42 | 28 | I   | OM.D.EXT | 7       | 24 | 2  | I   | OM.F.INT | 14                     | 50   | 56 | I   | OM.F.INT |          |          |  |
|            | 21 | 46 | 11 | I   | OM.D.INT | 7       | 27 | 45 | I   | OM.F.EXT | 14                     | 54   | 39 | I   | OM.F.EXT |          |          |  |
|            | 22 | 43 | 48 | I   | PA.F.INT |         |    |    |     |          |                        |      |    |     |          |          |          |  |
|            | 22 | 47 | 28 | I   | PA.F.EXT | 8       | 1  | 8  | 45  | I        | OC.D.EXT               | 13   | 8  | 38  | 30       | I        | OC.D.EXT |  |
|            | 23 | 57 | 2  | I   | OM.F.INT | 1       | 12 | 23 | I   | OC.D.INT | 8                      | 42   | 8  | I   | OC.D.INT |          |          |  |
|            |    |    |    |     |          | 4       | 33 | 40 | I   | EC.F.INT | 12                     | 0    | 12 | I   | EC.F.INT |          |          |  |
| 2          | 0  | 0  | 44 | I   | OM.F.EXT | 4       | 37 | 22 | I   | EC.F.EXT | 12                     | 3    | 54 | I   | EC.F.EXT |          |          |  |
|            | 17 | 39 | 23 | I   | OC.D.EXT | 4       | 38 | 8  | I   | EC.F.PEN | 12                     | 4    | 40 | I   | EC.F.PEN |          |          |  |
|            | 17 | 43 | 2  | I   | OC.D.INT | 4       | 59 | 34 | II  | PA.D.EXT | 13                     | 19   | 38 | II  | OC.D.EXT |          |          |  |
|            | 21 | 7  | 9  | I   | EC.F.INT | 5       | 3  | 31 | II  | PA.D.INT | 13                     | 23   | 40 | II  | OC.D.INT |          |          |  |
|            | 21 | 8  | 20 | II  | OC.D.EXT | 7       | 20 | 26 | II  | OM.D.EXT | 18                     | 20   | 7  | II  | EC.F.INT |          |          |  |
|            | 21 | 10 | 50 | I   | EC.F.EXT | 7       | 24 | 32 | II  | OM.D.INT | 18                     | 24   | 19 | II  | EC.F.EXT |          |          |  |
|            | 21 | 11 | 37 | I   | EC.F.PEN | 7       | 43 | 17 | II  | PA.F.INT | 18                     | 26   | 0  | II  | EC.F.PEN |          |          |  |
|            | 21 | 12 | 21 | II  | OC.D.INT | 7       | 47 | 15 | II  | PA.F.EXT | 23                     | 43   | 38 | IV  | PA.D.EXT |          |          |  |
|            |    |    |    |     |          | 10      | 0  | 11 | II  | OM.F.INT |                        |      |    |     |          |          |          |  |
| 3          | 2  | 22 | 24 | II  | EC.F.INT | 10      | 4  | 17 | II  | OM.F.EXT | 14                     | 0    | 0  | IV  | PA.D.INT |          |          |  |
|            | 2  | 26 | 35 | II  | EC.F.EXT | 13      | 7  | 13 | III | OC.D.EXT | 2                      | 47   | 45 | IV  | PA.F.INT |          |          |  |
|            | 2  | 28 | 16 | II  | EC.F.PEN | 13      | 16 | 10 | III | OC.D.INT | 3                      | 4    | 14 | IV  | PA.F.EXT |          |          |  |
|            | 14 | 58 | 30 | I   | PA.D.EXT | 16      | 29 | 47 | III | OC.F.INT | 5                      | 58   | 28 | I   | PA.D.EXT |          |          |  |
|            | 15 | 2  | 10 | I   | PA.D.INT | 16      | 38 | 44 | III | OC.F.EXT | 6                      | 2    | 9  | I   | PA.D.INT |          |          |  |
|            | 16 | 11 | 31 | I   | OM.D.EXT | 17      | 58 | 11 | III | EC.D.PEN | 7                      | 5    | 23 | I   | OM.D.EXT |          |          |  |
|            | 16 | 15 | 14 | I   | OM.D.INT | 18      | 1  | 48 | III | EC.D.EXT | 7                      | 9    | 6  | I   | OM.D.INT |          |          |  |
|            | 17 | 13 | 43 | I   | PA.F.INT | 18      | 11 | 32 | III | EC.D.INT | 8                      | 13   | 44 | I   | PA.F.INT |          |          |  |
|            | 17 | 17 | 23 | I   | PA.F.EXT | 21      | 6  | 19 | III | EC.F.INT | 8                      | 17   | 24 | I   | PA.F.EXT |          |          |  |
|            | 18 | 26 | 5  | I   | OM.F.INT | 21      | 16 | 3  | III | EC.F.EXT | 9                      | 19   | 56 | I   | OM.F.INT |          |          |  |
|            | 18 | 29 | 47 | I   | OM.F.EXT | 21      | 19 | 40 | III | EC.F.PEN | 9                      | 23   | 39 | I   | OM.F.EXT |          |          |  |
|            |    |    |    |     |          | 22      | 28 | 16 | I   | PA.D.EXT | 11                     | 14   | 33 | IV  | OM.D.EXT |          |          |  |
| 4          | 12 | 9  | 7  | I   | OC.D.EXT | 22      | 31 | 56 | I   | PA.D.INT | 13                     | 4    | 38 | IV  | OM.F.EXT |          |          |  |
|            | 12 | 12 | 46 | I   | OC.D.INT | 23      | 38 | 26 | I   | OM.D.EXT |                        |      |    |     |          |          |          |  |
|            | 15 | 35 | 59 | I   | EC.F.INT | 23      | 42 | 8  | I   | OM.D.INT |                        |      |    |     |          |          |          |  |
|            | 15 | 37 | 35 | II  | PA.D.EXT |         |    |    |     |          | 15                     | 3    | 8  | 28  | I        | OC.D.EXT |          |  |
|            | 15 | 39 | 40 | I   | EC.F.EXT | 9       | 0  | 43 | 31  | I        | PA.F.INT               | 3    | 12 | 7   | I        | OC.D.INT |          |  |
|            | 15 | 40 | 27 | I   | EC.F.PEN | 0       | 47 | 11 | I   | PA.F.EXT | 6                      | 29   | 1  | I   | EC.F.INT |          |          |  |
|            | 15 | 41 | 32 | II  | PA.D.INT | 1       | 52 | 59 | I   | OM.F.INT | 6                      | 32   | 43 | I   | EC.F.EXT |          |          |  |
|            | 18 | 2  | 9  | II  | OM.D.EXT | 1       | 56 | 41 | I   | OM.F.EXT | 6                      | 33   | 29 | I   | EC.F.PEN |          |          |  |
|            | 18 | 6  | 15 | II  | OM.D.INT | 19      | 38 | 37 | I   | OC.D.EXT | 7                      | 44   | 29 | II  | PA.D.EXT |          |          |  |
|            | 18 | 21 | 21 | II  | PA.F.INT | 19      | 42 | 15 | I   | OC.D.INT | 7                      | 48   | 27 | II  | PA.D.INT |          |          |  |
|            | 18 | 25 | 18 | II  | PA.F.EXT | 23      | 2  | 31 | I   | EC.F.INT | 9                      | 56   | 56 | II  | OM.D.EXT |          |          |  |
|            | 20 | 42 | 0  | II  | OM.F.INT | 23      | 6  | 12 | I   | EC.F.EXT | 10                     | 1    | 3  | II  | OM.D.INT |          |          |  |
|            | 20 | 46 | 6  | II  | OM.F.EXT | 23      | 6  | 59 | I   | EC.F.PEN | 10                     | 28   | 6  | II  | PA.F.INT |          |          |  |
|            | 23 | 9  | 13 | III | PA.D.EXT | 23      | 55 | 17 | II  | OC.D.EXT | 10                     | 32   | 4  | II  | PA.F.EXT |          |          |  |
|            | 23 | 18 | 9  | III | PA.D.INT | 23      | 59 | 18 | II  | OC.D.INT | 12                     | 36   | 31 | II  | OM.F.INT |          |          |  |
|            |    |    |    |     |          |         |    |    |     |          | 12                     | 40   | 38 | II  | OM.F.EXT |          |          |  |
| 5          | 2  | 29 | 46 | III | PA.F.INT | 10      | 5  | 0  | 42  | II       | EC.F.INT               | 17   | 28 | 5   | III      | OC.D.EXT |          |  |
|            | 2  | 38 | 43 | III | PA.F.EXT | 5       | 4  | 53 | II  | EC.F.EXT | 17                     | 37   | 4  | III | OC.D.INT |          |          |  |
|            | 4  | 6  | 37 | III | OM.D.EXT | 5       | 6  | 35 | II  | EC.F.PEN | 20                     | 49   | 55 | III | OC.F.INT |          |          |  |
|            | 4  | 16 | 13 | III | OM.D.INT | 16      | 58 | 21 | I   | PA.D.EXT | 20                     | 58   | 55 | III | OC.F.EXT |          |          |  |
|            | 7  | 16 | 49 | III | OM.F.INT | 17      | 2  | 1  | I   | PA.D.INT | 22                     | 0    | 49 | III | EC.D.PEN |          |          |  |
|            | 7  | 26 | 22 | III | OM.F.EXT | 17      | 7  | 28 | I   | OM.D.EXT | 22                     | 4    | 26 | III | EC.D.EXT |          |          |  |
|            |    |    |    |     |          |         |    |    |     |          | 22                     | 14   | 14 | III | EC.D.INT |          |          |  |



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



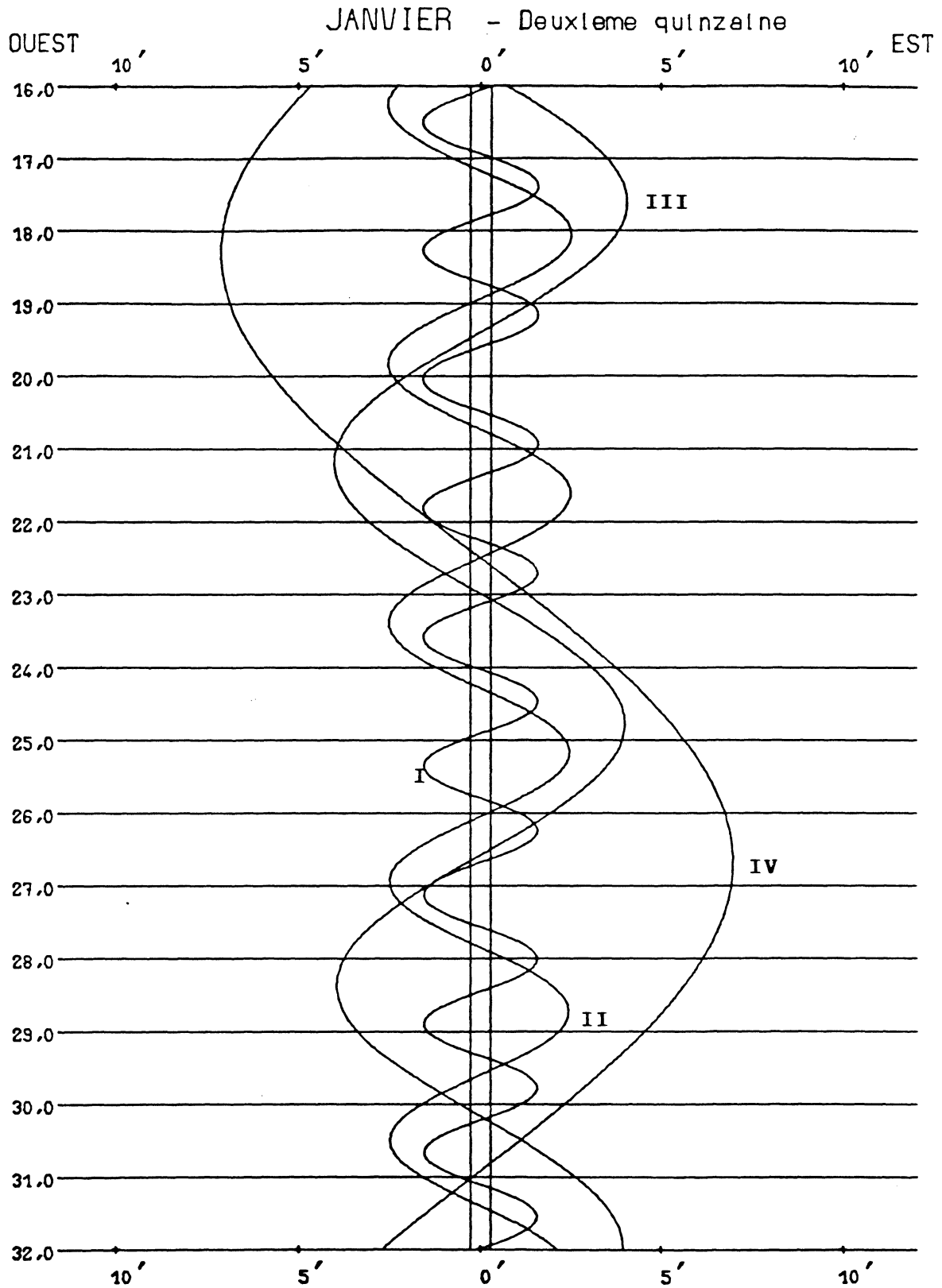
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



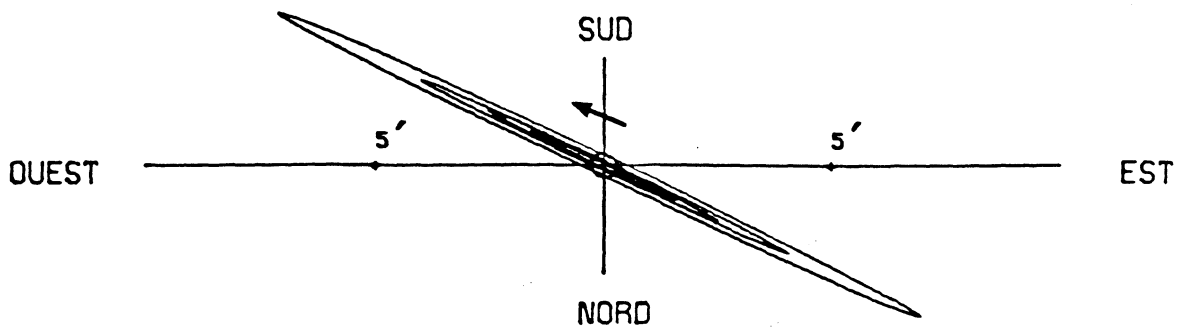
ORBITES APPARENTES



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter

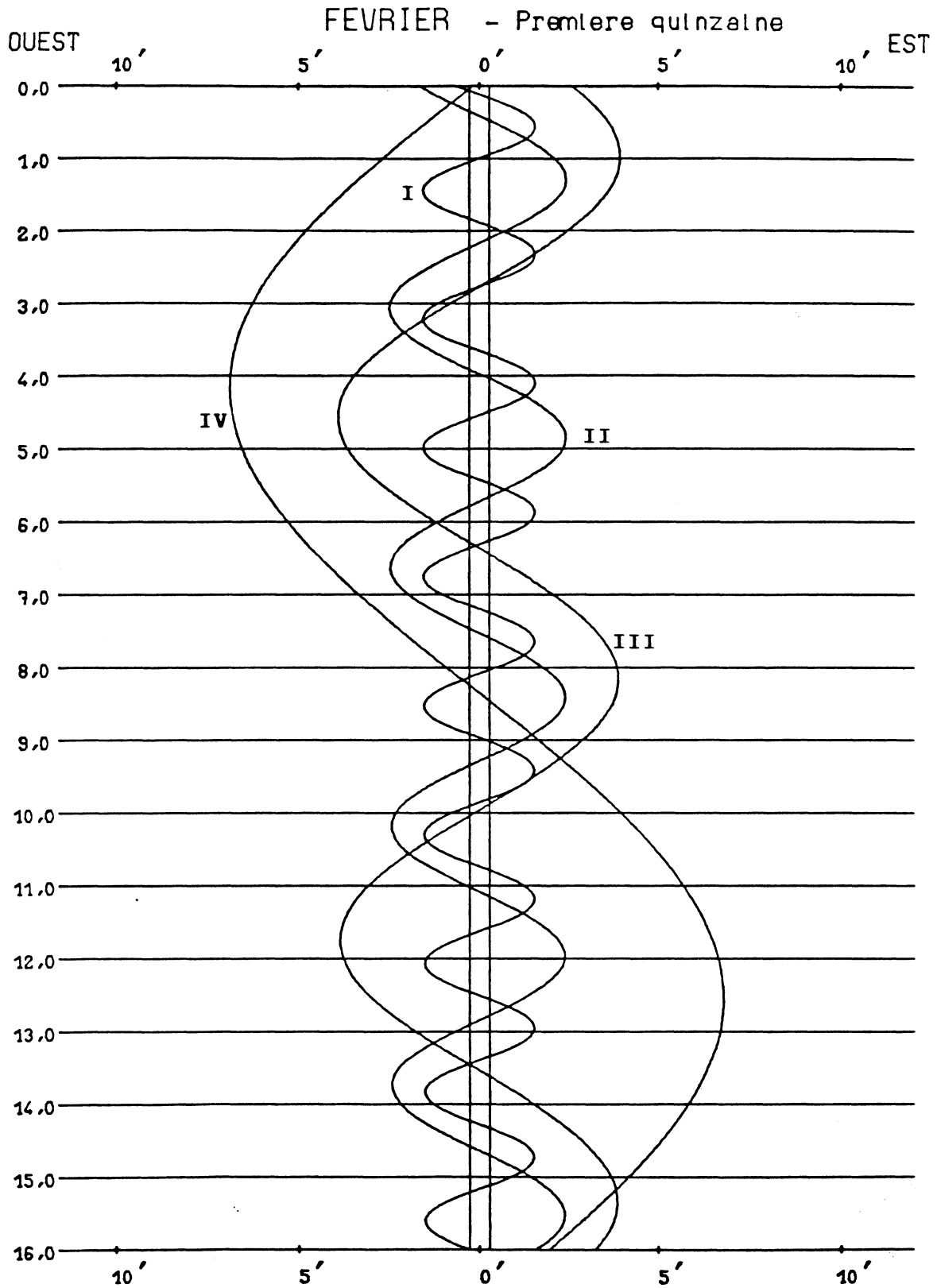


ORBITES APPARENTES

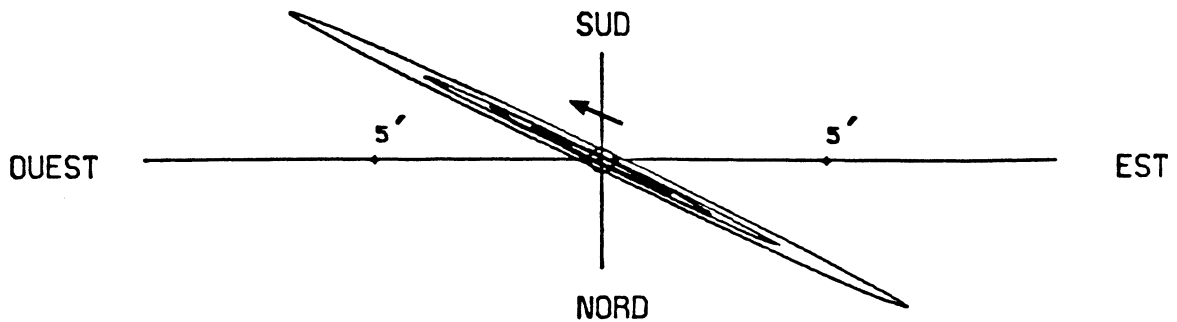
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          | MOIS : FEVRIER - PREMIERE QUINZAINE - |          |          |    |          |          |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|---------------------------------------|----------|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE                                  | JOUR     | H        | M  | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |          |          |
| 1          | 1  | 16 | 22  | I        | PA.F.INT                              | 6        | 36       | 1  | I        | PA.D.INT | 3        | 26       | 20       | III      | OM.F.INT | 3        | 36       | 10       | III      | OM.F.EXT |
|            | 1  | 20 | 2   | I        | PA.F.EXT                              |          | 6        | 42 | 53       | III      |          | OC.D.EXT | 16       | 42       | 7        |          | I        | OC.D.EXT |          |          |
|            | 2  | 9  | 18  | I        | OM.F.INT                              |          | 6        | 52 | 2        | III      |          | OC.D.INT | 16       | 45       | 47       |          | I        | OC.D.INT |          |          |
|            | 2  | 13 | 1   | I        | OM.F.EXT                              |          | 7        | 21 | 28       | I        |          | OM.D.EXT | 19       | 41       | 21       |          | I        | EC.F.INT |          |          |
|            | 20 | 10 | 11  | I        | OC.D.EXT                              |          | 7        | 25 | 11       | I        |          | OM.D.INT | 19       | 45       | 4        |          | I        | EC.F.EXT |          |          |
|            | 20 | 13 | 50  | I        | OC.D.INT                              |          | 8        | 47 | 33       | I        |          | PA.F.INT | 19       | 45       | 51       |          | I        | EC.F.PEN |          |          |
|            | 23 | 17 | 15  | I        | EC.F.INT                              |          | 8        | 51 | 14       | I        |          | PA.F.EXT | 11       | 0        | 39       |          | 43       | II       | OC.D.EXT |          |
|            | 23 | 20 | 58  | I        | EC.F.EXT                              |          | 9        | 35 | 58       | I        |          | OM.F.INT |          | 0        | 43       |          | 47       | II       | OC.D.INT |          |
|            | 23 | 21 | 45  | I        | EC.F.PEN                              |          | 9        | 39 | 41       | I        |          | OM.F.EXT |          | 4        | 50       |          | 56       | II       | EC.F.INT |          |
|            | 2  | 2  | 42  | 20       | II                                    |          | PA.D.EXT | 10 | 1        | 46       |          | III      |          | OC.F.INT | 4        |          | 55       | 10       | II       | EC.F.EXT |
| 2          |    | 46 | 20  | II       | PA.D.INT                              | 10       | 6        | 51 | III      | EC.D.PEN | 4        | 56       |          | 52       | II       | EC.F.PEN |          |          |          |          |
| 4          |    | 28 | 33  | II       | OM.D.EXT                              | 10       | 10       | 33 | III      | OC.D.EXT | 14       | 3        |          | 48       | I        | PA.D.EXT |          |          |          |          |
| 4          |    | 32 | 43  | II       | OM.D.INT                              | 10       | 10       | 55 | III      | OC.F.EXT | 14       | 7        |          | 29       | I        | PA.D.INT |          |          |          |          |
| 5          |    | 25 | 30  | II       | PA.F.INT                              | 13       | 11       | 7  | III      | EC.F.INT | 14       | 48       |          | 9        | I        | OM.D.EXT |          |          |          |          |
| 5          |    | 29 | 30  | II       | PA.F.EXT                              | 13       | 21       | 5  | III      | EC.F.EXT | 14       | 51       |          | 52       | I        | OM.D.INT |          |          |          |          |
| 7          |    | 7  | 45  | II       | OM.F.INT                              | 13       | 24       | 47 | III      | EC.F.PEN | 16       | 18       |          | 59       | I        | PA.F.INT |          |          |          |          |
| 7          |    | 11 | 55  | II       | OM.F.EXT                              | 7        | 3        | 41 | 16       | I        | OC.D.EXT | 16       | 22       | 40       | I        | PA.F.EXT |          |          |          |          |
| 16         |    | 41 | 41  | III      | PA.D.EXT                              |          | 3        | 44 | 56       | I        | OC.D.INT | 17       | 2        | 38       | I        | OM.F.INT |          |          |          |          |
| 16         |    | 50 | 48  | III      | PA.D.INT                              |          | 6        | 43 | 43       | I        | EC.F.INT | 17       | 6        | 21       | I        | OM.F.EXT |          |          |          |          |
| 17         | 31 | 28 | I   | PA.D.EXT | 6                                     |          | 47       | 26 | I        | EC.F.EXT | 12       | 11       | 12       | 32       | I        | OC.D.EXT |          |          |          |          |
| 17         | 35 | 8  | I   | PA.D.INT | 6                                     |          | 48       | 13 | I        | EC.F.PEN |          | 11       | 16       | 12       | I        | OC.D.INT |          |          |          |          |
| 18         | 23 | 40 | I   | OM.D.EXT | 11                                    |          | 13       | 48 | II       | OC.D.EXT |          | 11       | 16       | 12       | I        | OC.D.INT |          |          |          |          |
| 18         | 27 | 23 | I   | OM.D.INT | 11                                    |          | 17       | 52 | II       | OC.D.INT |          | 14       | 10       | 8        | I        | EC.F.INT |          |          |          |          |
| 19         | 46 | 42 | I   | PA.F.INT | 15                                    |          | 32       | 3  | II       | EC.F.INT |          | 14       | 13       | 50       | I        | EC.F.EXT |          |          |          |          |
| 19         | 50 | 23 | I   | PA.F.EXT | 15                                    |          | 36       | 17 | II       | EC.F.EXT |          | 14       | 14       | 37       | I        | EC.F.PEN |          |          |          |          |
| 19         | 59 | 39 | III | PA.F.INT | 15                                    |          | 37       | 59 | II       | EC.F.PEN |          | 18       | 56       | 10       | II       | PA.D.EXT |          |          |          |          |
| 20         | 8  | 47 | III | PA.F.EXT | 8                                     | 1        | 2        | 51 | I        | PA.D.EXT |          | 19       | 0        | 12       | II       | PA.D.INT |          |          |          |          |
| 20         | 17 | 33 | III | OM.D.EXT |                                       | 1        | 6        | 32 | I        | PA.D.INT |          | 20       | 23       | 41       | II       | OM.D.EXT |          |          |          |          |
| 20         | 27 | 22 | III | OM.D.INT |                                       | 1        | 50       | 25 | I        | OM.D.EXT |          | 20       | 27       | 52       | II       | OM.D.INT |          |          |          |          |
| 20         | 38 | 10 | I   | OM.F.INT |                                       | 1        | 54       | 8  | I        | OM.D.INT | 21       | 38       | 51       | II       | PA.F.INT |          |          |          |          |          |
| 20         | 41 | 53 | I   | OM.F.EXT |                                       | 3        | 18       | 3  | I        | PA.F.INT | 21       | 42       | 54       | II       | PA.F.EXT |          |          |          |          |          |
| 23         | 24 | 39 | III | OM.F.INT |                                       | 3        | 21       | 44 | I        | PA.F.EXT | 23       | 3        | 28       | II       | OM.F.INT |          |          |          |          |          |
| 23         | 34 | 26 | III | OM.F.EXT |                                       | 4        | 4        | 55 | I        | OM.F.INT | 23       | 6        | 44       | II       | OM.F.EXT |          |          |          |          |          |
| 3          | 14 | 40 | 33  | I        |                                       | OC.D.EXT | 4        | 8  | 37       | I        | OM.F.EXT | 13       | 8        | 34       | 17       | I        | PA.D.EXT |          |          |          |
|            | 14 | 44 | 13  | I        |                                       | OC.D.INT | 6        | 7  | 41       | IV       | OC.D.EXT |          | 8        | 37       | 58       | I        | PA.D.INT |          |          |          |
|            | 17 | 46 | 7   | I        |                                       | EC.F.INT | 6        | 25 | 52       | IV       | OC.D.INT |          | 9        | 17       | 0        | I        | OM.D.EXT |          |          |          |
|            | 17 | 49 | 49  | I        | EC.F.EXT                              | 8        | 53       | 9  | IV       | OC.F.INT | 9        |          | 20       | 43       | I        | OM.D.INT |          |          |          |          |
|            | 17 | 50 | 36  | I        | EC.F.PEN                              | 9        | 11       | 20 | IV       | OC.F.EXT | 10       |          | 49       | 27       | I        | PA.F.INT |          |          |          |          |
|            | 21 | 48 | 36  | II       | OC.D.EXT                              | 9        | 11       | 20 | IV       | OC.F.EXT | 10       |          | 53       | 7        | I        | PA.F.EXT |          |          |          |          |
|            | 21 | 52 | 39  | II       | OC.D.INT                              | 22       | 11       | 39 | I        | OC.D.EXT | 10       |          | 53       | 7        | I        | PA.F.EXT |          |          |          |          |
|            | 4  | 2  | 13  | 34       | II                                    | EC.F.INT | 22       | 15 | 19       | I        | OC.D.INT |          | 11       | 11       | 48       | III      | OC.D.EXT |          |          |          |
|            |    | 2  | 17  | 48       | II                                    | EC.F.EXT | 9        | 1  | 12       | 30       | I        |          | EC.F.INT | 11       | 21       | 2        | III      | OC.D.INT |          |          |
|            |    | 2  | 19  | 29       | II                                    | EC.F.PEN |          | 1  | 16       | 13       | I        |          | EC.F.EXT | 11       | 31       | 29       | I        | OM.F.INT |          |          |
| 12         |    | 1  | 55  | I        | PA.D.EXT                              | 1        |          | 17 | 0        | I        | EC.F.PEN | 11       | 35       | 11       | I        | OM.F.EXT |          |          |          |          |
| 12         |    | 5  | 36  | I        | PA.D.INT                              | 5        |          | 31 | 22       | II       | PA.D.EXT | 17       | 12       | 19       | III      | EC.F.INT |          |          |          |          |
| 12         |    | 52 | 36  | I        | OM.D.EXT                              | 5        |          | 35 | 23       | II       | PA.D.INT | 17       | 22       | 22       | III      | EC.F.EXT |          |          |          |          |
| 12         |    | 56 | 19  | I        | OM.D.INT                              | 7        |          | 5  | 20       | II       | OM.D.EXT | 17       | 26       | 4        | III      | EC.F.PEN |          |          |          |          |
| 14         |    | 17 | 9   | I        | PA.F.INT                              | 7        |          | 9  | 31       | II       | OM.D.INT | 14       | 5        | 43       | 1        | I        | OC.D.EXT |          |          |          |
| 14         |    | 20 | 50  | I        | PA.F.EXT                              | 8        |          | 14 | 14       | II       | PA.F.INT |          | 5        | 46       | 41       | I        | OC.D.INT |          |          |          |
| 15         |    | 7  | 6   | I        | OM.F.INT                              | 8        |          | 18 | 16       | II       | PA.F.EXT |          | 8        | 38       | 57       | I        | EC.F.INT |          |          |          |
| 15         | 10 | 49 | I   | OM.F.EXT | 9                                     | 44       |          | 23 | II       | OM.F.INT | 8        |          | 42       | 39       | I        | EC.F.EXT |          |          |          |          |
| 5          | 9  | 10 | 53  | I        | OC.D.EXT                              | 9        | 48       | 35 | II       | OM.F.EXT | 8        |          | 43       | 26       | I        | EC.F.PEN |          |          |          |          |
|            | 9  | 14 | 33  | I        | OC.D.INT                              | 19       | 33       | 17 | I        | PA.D.EXT | 14       |          | 5        | 12       | II       | OC.D.EXT |          |          |          |          |
|            | 12 | 14 | 54  | I        | EC.F.INT                              | 19       | 36       | 57 | I        | PA.D.INT | 14       |          | 9        | 17       | II       | OC.D.INT |          |          |          |          |
|            | 12 | 18 | 36  | I        | EC.F.EXT                              | 20       | 19       | 15 | I        | OM.D.EXT | 18       |          | 9        | 20       | II       | EC.F.INT |          |          |          |          |
|            | 12 | 19 | 23  | I        | EC.F.PEN                              | 20       | 22       | 58 | I        | OM.D.INT | 18       |          | 13       | 34       | II       | EC.F.EXT |          |          |          |          |
|            | 16 | 6  | 41  | II       | PA.D.EXT                              | 21       | 10       | 6  | III      | PA.D.EXT | 18       |          | 15       | 16       | II       | EC.F.PEN |          |          |          |          |
|            | 16 | 10 | 42  | II       | PA.D.INT                              | 21       | 19       | 17 | III      | PA.D.INT | 15       | 3        | 4        | 52       | I        | PA.D.EXT |          |          |          |          |
|            | 17 | 46 | 52  | II       | OM.D.EXT                              | 21       | 48       | 28 | I        | PA.F.INT |          | 3        | 8        | 33       | I        | PA.D.INT |          |          |          |          |
|            | 17 | 51 | 2   | II       | OM.D.INT                              | 21       | 52       | 9  | I        | PA.F.EXT |          | 3        | 45       | 55       | I        | OM.D.EXT |          |          |          |          |
|            | 18 | 49 | 42  | II       | PA.F.INT                              | 22       | 33       | 45 | I        | OM.F.INT |          | 3        | 49       | 38       | I        | OM.D.INT |          |          |          |          |
| 18         | 53 | 43 | II  | PA.F.EXT | 22                                    | 37       | 27       | I  | OM.F.EXT | 5        |          | 20       | 0        | I        | PA.F.INT |          |          |          |          |          |
| 20         | 25 | 59 | II  | OM.F.INT | 10                                    | 0        | 20       | 4  | III      | OM.D.EXT |          | 5        | 23       | 41       | I        | PA.F.EXT |          |          |          |          |
| 20         | 30 | 9  | II  | OM.F.EXT |                                       | 0        | 26       | 59 | III      | PA.F.INT |          | 6        | 0        | 23       | I        | OM.F.INT |          |          |          |          |
| 6          | 6  | 32 | 20  | I        |                                       | PA.D.EXT | 0        | 29 | 56       | III      |          | OM.D.INT | 6        | 4        | 6        | I        | OM.F.EXT |          |          |          |
|            | 6  | 32 | 20  | I        |                                       | PA.D.EXT | 0        | 36 | 10       | III      |          | PA.F.EXT |          |          |          |          |          |          |          |          |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



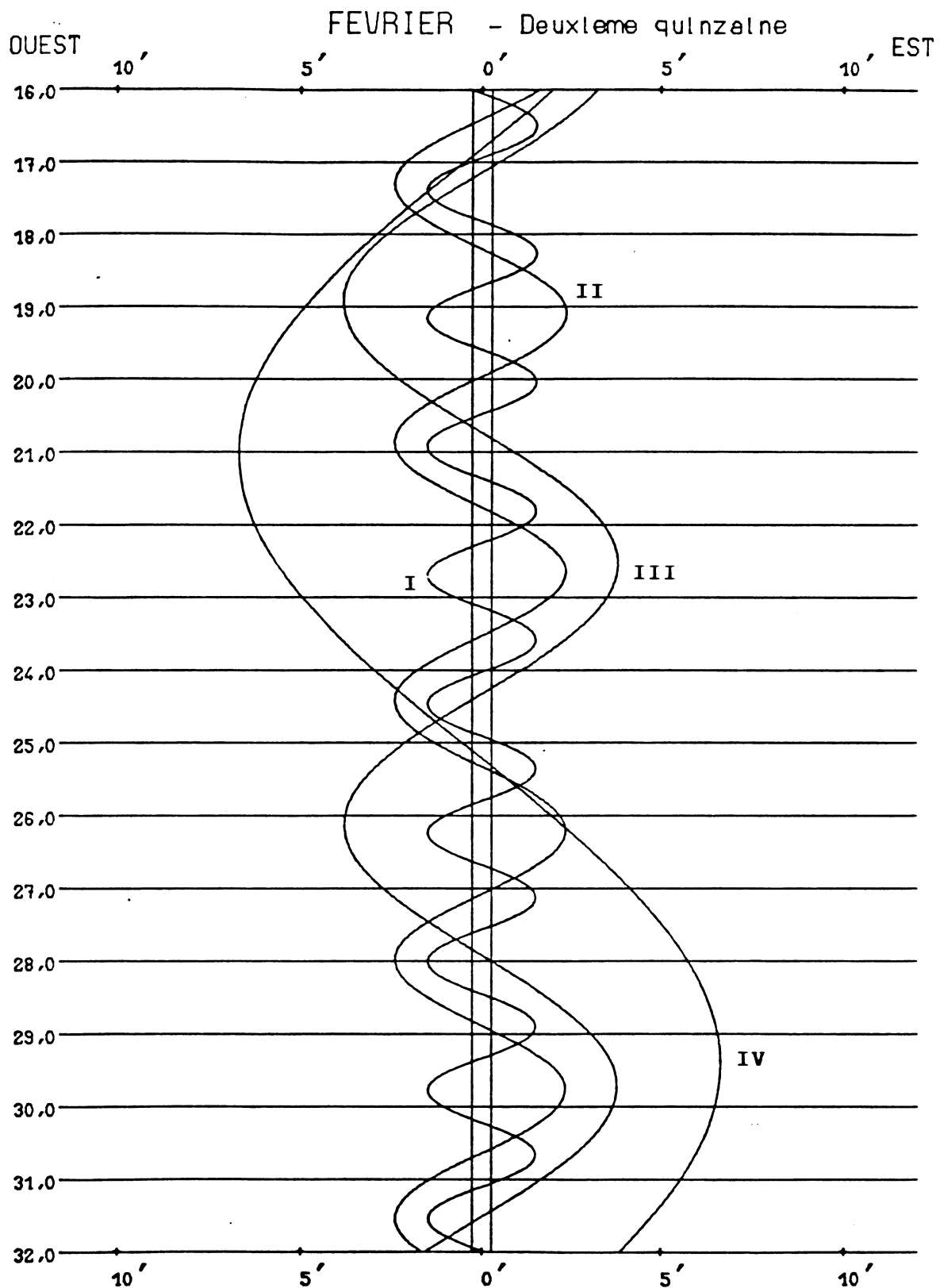
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



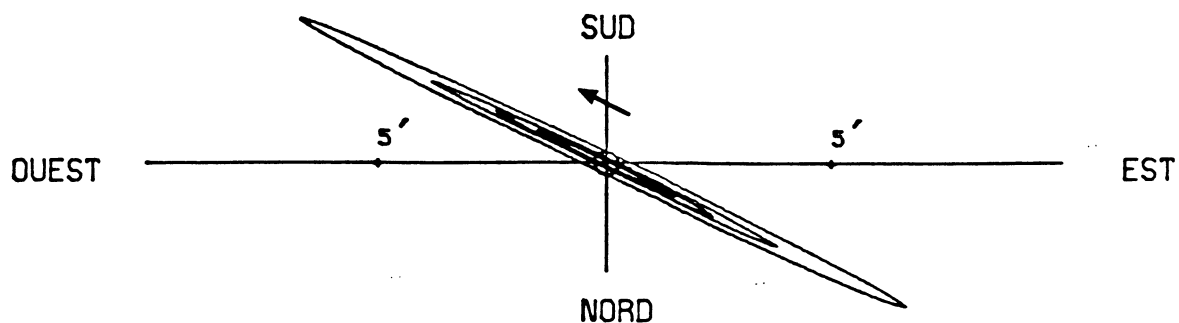
ORBITES APPARENTES

1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |    |     | MOIS : FEVRIER - DEUXIEME QUINZAINE - |      |    |    |    |          |          |      |    |    |    |          |          |          |
|------------|----|----|----|-----|---------------------------------------|------|----|----|----|----------|----------|------|----|----|----|----------|----------|----------|
| JOUR       | H  | M  | S  | SAT | TYPE                                  | JOUR | H  | M  | S  | SAT      | TYPE     | JOUR | H  | M  | S  | SAT      | TYPE     |          |
| 16         | 0  | 13 | 28 | I   | OC.D.EXT                              |      | 0  | 32 | 48 | II       | PA.F.EXT |      | 11 | 28 | 15 | III      | OM.F.INT |          |
|            | 0  | 17 | 8  | I   | OC.D.INT                              |      | 1  | 39 | 16 | II       | OM.F.INT |      | 11 | 38 | 12 | III      | OM.F.EXT |          |
|            | 3  | 7  | 42 | I   | EC.F.INT                              |      | 1  | 43 | 28 | II       | OM.F.EXT |      | 20 | 46 | 9  | I        | OC.D.EXT |          |
|            | 3  | 11 | 25 | I   | EC.F.EXT                              |      | 10 | 36 | 28 | I        | PA.D.EXT |      | 20 | 49 | 50 | I        | OC.D.INT |          |
|            | 3  | 12 | 12 | I   | EC.F.PEN                              |      | 10 | 40 | 9  | I        | PA.D.INT |      | 23 | 31 | 42 | I        | EC.F.INT |          |
|            | 8  | 21 | 15 | II  | PA.D.EXT                              |      | 11 | 12 | 25 | I        | OM.D.EXT |      | 23 | 35 | 26 | I        | EC.F.EXT |          |
|            | 8  | 25 | 19 | II  | PA.D.INT                              |      | 11 | 16 | 8  | I        | OM.D.INT |      | 23 | 36 | 13 | I        | EC.F.PEN |          |
|            | 9  | 42 | 11 | II  | OM.D.EXT                              |      | 12 | 51 | 32 | I        | PA.F.INT |      |    |    |    |          |          |          |
|            | 9  | 46 | 22 | II  | OM.D.INT                              |      | 12 | 55 | 13 | I        | PA.F.EXT |      | 25 | 3  | 3  | 26       | IV       | OC.D.EXT |
|            | 11 | 3  | 46 | II  | PA.F.INT                              |      | 13 | 26 | 51 | I        | OM.F.INT |      | 3  | 25 | 6  | IV       | OC.D.INT |          |
|            | 11 | 7  | 50 | II  | PA.F.EXT                              |      | 13 | 30 | 34 | I        | OM.F.EXT |      | 5  | 23 | 20 | IV       | OC.F.INT |          |
|            | 12 | 21 | 1  | II  | OM.F.INT                              |      | 15 | 42 | 56 | III      | OC.D.EXT |      | 5  | 45 | 0  | IV       | OC.F.EXT |          |
|            | 12 | 25 | 13 | II  | OM.F.EXT                              |      | 15 | 52 | 14 | III      | OC.D.INT |      | 6  | 23 | 13 | II       | OC.D.EXT |          |
|            | 17 | 0  | 57 | IV  | PA.D.EXT                              |      | 21 | 14 | 16 | III      | EC.F.INT |      | 6  | 27 | 19 | II       | OC.D.INT |          |
|            | 17 | 21 | 56 | IV  | PA.D.INT                              |      | 21 | 24 | 23 | III      | EC.F.EXT |      | 10 | 4  | 59 | II       | EC.F.INT |          |
|            | 19 | 27 | 47 | IV  | PA.F.INT                              |      | 21 | 28 | 6  | III      | EC.F.PEN |      | 10 | 9  | 14 | II       | EC.F.EXT |          |
|            | 19 | 48 | 51 | IV  | PA.F.EXT                              |      |    |    |    |          |          |      | 10 | 10 | 56 | II       | EC.F.PEN |          |
|            | 21 | 35 | 21 | I   | PA.D.EXT                              | 21   | 7  | 45 | 2  | I        | OC.D.EXT |      | 18 | 8  | 15 | I        | PA.D.EXT |          |
|            | 21 | 39 | 2  | I   | PA.D.INT                              |      | 7  | 48 | 43 | I        | OC.D.INT |      | 18 | 11 | 56 | I        | PA.D.INT |          |
|            | 22 | 14 | 43 | I   | OM.D.EXT                              |      | 10 | 34 | 7  | I        | EC.F.INT |      | 18 | 38 | 56 | I        | OM.D.EXT |          |
|            | 22 | 18 | 26 | I   | OM.D.INT                              |      | 10 | 37 | 50 | I        | EC.F.EXT |      | 18 | 42 | 39 | I        | OM.D.INT |          |
|            | 23 | 50 | 28 | I   | PA.F.INT                              |      | 10 | 38 | 38 | I        | EC.F.PEN |      | 20 | 23 | 13 | I        | PA.F.INT |          |
|            | 23 | 54 | 9  | I   | PA.F.EXT                              |      | 16 | 57 | 1  | II       | OC.D.EXT |      | 20 | 26 | 54 | I        | PA.F.EXT |          |
|            |    |    |    |     |                                       | 17   | 1  | 7  | II | OC.D.INT |          | 20   | 53 | 20 | I  | OM.F.INT |          |          |
|            |    |    |    |     |                                       | 20   | 46 | 24 | II | EC.F.INT |          | 20   | 57 | 3  | I  | OM.F.EXT |          |          |
| 17         | 0  | 29 | 11 | I   | OM.F.INT                              |      | 20 | 50 | 39 | II       | EC.F.EXT |      |    |    |    |          |          |          |
|            | 0  | 32 | 54 | I   | OM.F.EXT                              |      | 20 | 52 | 21 | II       | EC.F.PEN |      | 26 | 15 | 16 | 42       | I        | OC.D.EXT |
|            | 1  | 39 | 20 | III | PA.D.EXT                              |      |    |    |    |          |          | 26   | 15 | 20 | 23 | I        | OC.D.INT |          |
|            | 1  | 48 | 36 | III | PA.D.INT                              |      |    |    |    |          |          | 18   | 0  | 28 |    | I        | EC.F.INT |          |
|            | 4  | 21 | 56 | III | OM.D.EXT                              | 22   | 5  | 7  | 6  | I        | PA.D.EXT |      | 18 | 4  | 11 |          | I        | EC.F.EXT |
|            | 4  | 31 | 52 | III | OM.D.INT                              |      | 5  | 10 | 47 | I        | PA.D.INT |      | 18 | 4  | 58 |          | I        | EC.F.PEN |
|            | 4  | 54 | 59 | III | PA.F.INT                              |      | 5  | 41 | 18 | I        | OM.D.EXT |      |    |    |    |          |          |          |
|            | 5  | 4  | 15 | III | PA.F.EXT                              |      | 5  | 45 | 1  | I        | OM.D.INT |      |    |    |    |          |          |          |
|            | 7  | 27 | 16 | III | OM.F.INT                              |      | 7  | 22 | 8  | I        | PA.F.INT |      | 27 | 0  | 37 | 28       | II       | PA.D.EXT |
|            | 7  | 37 | 58 | III | OM.F.EXT                              |      | 7  | 25 | 49 | I        | PA.F.EXT |      | 0  | 41 | 34 | II       | PA.D.INT |          |
|            | 18 | 44 | 0  | I   | OC.D.EXT                              |      | 7  | 55 | 44 | I        | OM.F.INT |      | 1  | 37 | 31 | II       | OM.D.EXT |          |
|            | 18 | 47 | 41 | I   | OC.D.INT                              |      | 7  | 59 | 27 | I        | OM.F.EXT |      | 1  | 41 | 44 | II       | OM.D.INT |          |
|            | 21 | 36 | 33 | I   | EC.F.INT                              |      |    |    |    |          |          | 3    | 19 | 16 | II | PA.F.INT |          |          |
|            | 21 | 40 | 16 | I   | EC.F.EXT                              | 23   | 2  | 15 | 33 | I        | OC.D.EXT |      | 3  | 23 | 22 | II       | PA.F.EXT |          |
|            | 21 | 41 | 3  | I   | EC.F.PEN                              |      | 2  | 19 | 14 | I        | OC.D.INT |      | 4  | 16 | 2  | II       | OM.F.INT |          |
| 18         | 3  | 31 | 19 | II  | OC.D.EXT                              |      | 5  | 2  | 53 | I        | EC.F.INT |      | 4  | 20 | 15 | II       | OM.F.EXT |          |
|            | 3  | 35 | 24 | II  | OC.D.INT                              |      | 5  | 6  | 36 | I        | EC.F.EXT |      | 12 | 38 | 49 | I        | PA.D.EXT |          |
|            | 7  | 28 | 5  | II  | EC.F.INT                              |      | 5  | 7  | 23 | I        | EC.F.PEN |      | 12 | 42 | 30 | I        | PA.D.INT |          |
|            | 7  | 32 | 20 | II  | EC.F.EXT                              |      | 11 | 11 | 56 | II       | PA.D.EXT |      | 13 | 7  | 43 | I        | OM.D.EXT |          |
|            | 7  | 34 | 2  | II  | EC.F.PEN                              |      | 11 | 16 | 1  | II       | PA.D.INT |      | 13 | 11 | 26 | I        | OM.D.INT |          |
|            | 16 | 5  | 56 | I   | PA.D.EXT                              |      | 12 | 19 | 6  | II       | OM.D.EXT |      | 14 | 53 | 45 | I        | PA.F.INT |          |
|            | 16 | 9  | 37 | I   | PA.D.INT                              |      | 12 | 23 | 19 | II       | OM.D.INT |      | 14 | 57 | 27 | I        | PA.F.EXT |          |
|            | 16 | 43 | 36 | I   | OM.D.EXT                              |      | 13 | 54 | 0  | II       | PA.F.INT |      | 15 | 22 | 7  | I        | OM.F.INT |          |
|            | 16 | 47 | 19 | I   | OM.D.INT                              |      | 13 | 58 | 5  | II       | PA.F.EXT |      | 15 | 25 | 50 | I        | OM.F.EXT |          |
|            | 18 | 21 | 1  | I   | PA.F.INT                              |      | 14 | 57 | 45 | II       | OM.F.INT |      | 20 | 14 | 31 | III      | OC.D.EXT |          |
|            | 18 | 24 | 42 | I   | PA.F.EXT                              |      | 15 | 1  | 57 | II       | OM.F.EXT |      | 20 | 23 | 55 | III      | OC.D.INT |          |
|            | 18 | 58 | 3  | I   | OM.F.INT                              |      | 23 | 37 | 38 | I        | PA.D.EXT |      |    |    |    |          |          |          |
|            | 19 | 1  | 46 | I   | OM.F.EXT                              |      | 23 | 41 | 19 | I        | PA.D.INT |      | 28 | 1  | 15 | 27       | III      | EC.F.INT |
| 19         | 13 | 14 | 30 | I   | OC.D.EXT                              | 24   | 0  | 10 | 5  | I        | OM.D.EXT |      | 1  | 25 | 37 | III      | EC.F.EXT |          |
|            | 13 | 18 | 10 | I   | OC.D.INT                              |      | 0  | 13 | 48 | I        | OM.D.INT |      | 1  | 29 | 22 | III      | EC.F.PEN |          |
|            | 16 | 5  | 19 | I   | EC.F.INT                              |      | 1  | 52 | 38 | I        | PA.F.INT |      | 9  | 47 | 18 | I        | OC.D.EXT |          |
|            | 16 | 9  | 2  | I   | EC.F.EXT                              |      | 1  | 56 | 19 | I        | PA.F.EXT |      | 9  | 50 | 59 | I        | OC.D.INT |          |
|            | 16 | 9  | 49 | I   | EC.F.PEN                              |      | 2  | 24 | 31 | I        | OM.F.INT |      | 12 | 29 | 16 | I        | EC.F.INT |          |
|            | 21 | 46 | 26 | II  | PA.D.EXT                              |      | 2  | 28 | 14 | I        | OM.F.EXT |      | 12 | 32 | 59 | I        | EC.F.EXT |          |
|            | 21 | 50 | 30 | II  | PA.D.INT                              |      | 2  | 28 | 14 | I        | OM.F.EXT |      | 12 | 33 | 46 | I        | EC.F.PEN |          |
|            | 23 | 0  | 33 | II  | OM.D.EXT                              |      | 6  | 9  | 42 | III      | PA.D.EXT |      | 19 | 49 | 4  | II       | OC.D.EXT |          |
|            | 23 | 4  | 45 | II  | OM.D.INT                              |      | 6  | 19 | 3  | III      | PA.D.INT |      | 19 | 53 | 11 | II       | OC.D.INT |          |
|            |    |    |    |     |                                       |      | 8  | 23 | 39 | III      | OM.D.EXT |      | 23 | 23 | 12 | II       | EC.F.INT |          |
|            |    |    |    |     |                                       |      | 8  | 33 | 38 | III      | OM.D.INT |      | 23 | 27 | 28 | II       | EC.F.EXT |          |
|            |    |    |    |     |                                       |      | 9  | 23 | 58 | III      | PA.F.INT |      | 23 | 29 | 10 | II       | EC.F.PEN |          |
| 20         | 0  | 28 | 43 | II  | PA.F.INT                              |      | 9  | 33 | 18 | III      | PA.F.EXT |      |    |    |    |          |          |          |



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



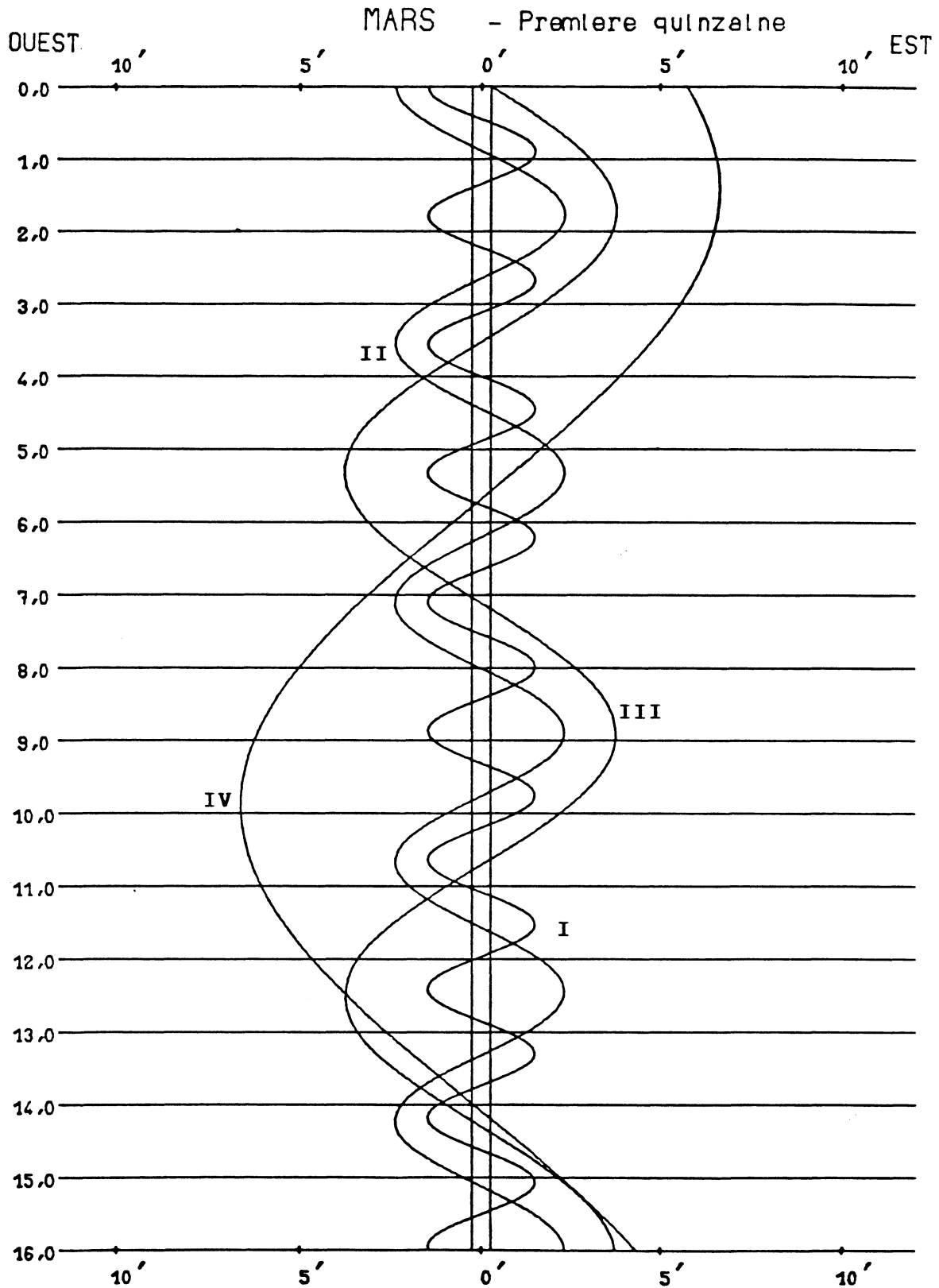
ORBITES APPARENTES

1987 - SATELLITES DE JUPITER -

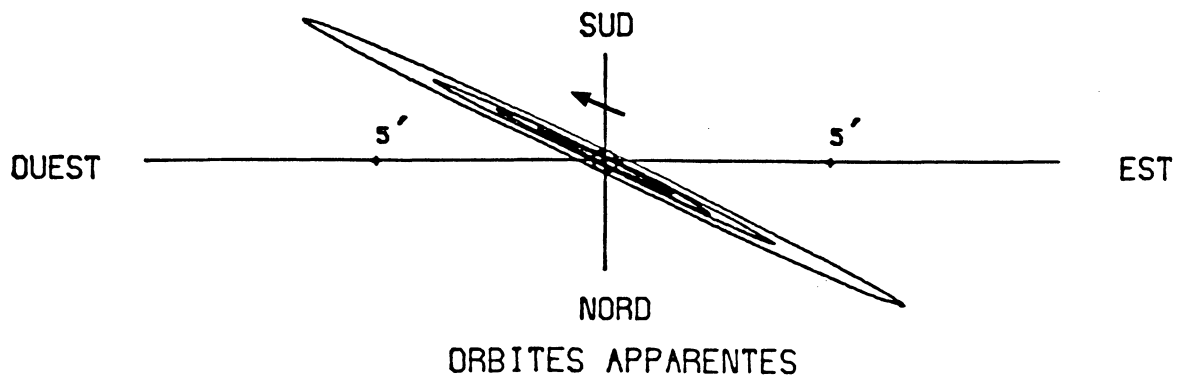
| PHENOMENES |    |    |     |          |          | MOIS : MARS - PREMIERE QUINZAINE - |          |    |     |          |          |          |          |          |    |          |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|------------|----|----|-----|----------|----------|------------------------------------|----------|----|-----|----------|----------|----------|----------|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----|----------|----|----------|----|----------|----|----------|----|----------|----|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                               | H        | M  | S   | SAT      | TYPE     | JOUR     | H        | M        | S  | SAT      | TYPE     |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 1          | 7  | 9  | 29  | I        | PA.D.EXT | 7                                  | 4        | 14 | 31  | II       | OM.D.EXT | 11       | 0        | 51       | 1  | I        | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 7  | 13 | 10  | I        | PA.D.INT |                                    | 4        | 18 | 46  | II       | OM.D.INT |          | 0        | 54       | 42 | I        | OC.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 7  | 36 | 34  | I        | OM.D.EXT |                                    | 6        | 10 | 19  | II       | PA.F.INT |          | 3        | 21       | 53 | I        | EC.F.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 7  | 40 | 17  | I        | OM.D.INT |                                    | 6        | 14 | 27  | II       | PA.F.EXT |          | 3        | 25       | 37 | I        | EC.F.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 24 | 23  | I        | PA.F.INT |                                    | 6        | 52 | 48  | II       | OM.F.INT |          | 3        | 26       | 24 | I        | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 28 | 4   | I        | PA.F.EXT |                                    | 6        | 57 | 2   | II       | OM.F.EXT |          | 12       | 7        | 29 | II       | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 50 | 57  | I        | OM.F.INT |                                    | 14       | 41 | 16  | I        | PA.D.EXT |          | 12       | 11       | 37 | II       | OC.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 54 | 40  | I        | OM.F.EXT |                                    | 14       | 44 | 58  | I        | PA.D.INT |          | 15       | 18       | 4  | II       | EC.F.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    | 15       | 2  | 54  | I        | OM.D.EXT |          | 15       | 22       | 20 | II       | EC.F.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 2          | 4  | 17 | 52  | I        | OC.D.EXT | 7                                  | 15       | 6  | 37  | I        | OM.D.INT | 12       | 15       | 24       | 2  | II       | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 4  | 21 | 33  | I        | OC.D.INT |                                    | 16       | 56 | 3   | I        | PA.F.INT |          | 22       | 13       | 10 | I        | PA.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 6  | 58 | 0   | I        | EC.F.INT |                                    | 16       | 59 | 45  | I        | PA.F.EXT |          | 22       | 16       | 52 | I        | PA.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 7  | 1  | 43  | I        | EC.F.EXT |                                    | 17       | 17 | 14  | I        | OM.F.INT |          | 22       | 29       | 14 | I        | OM.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 7  | 2  | 30  | I        | EC.F.PEN |                                    | 17       | 20 | 57  | I        | OM.F.EXT |          | 22       | 32       | 58 | I        | OM.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 14 | 3  | 19  | II       | PA.D.EXT |                                    | 8        | 0  | 47  | 9        | III      |          | OC.D.EXT | 13       | 0  | 27       | 49       | I        | PA.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 14 | 7  | 25  | II       | PA.D.INT |                                    |          | 0  | 56  | 39       | III      |          | OC.D.INT |          | 0  | 31       | 30       | I        | PA.F.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 14 | 56 | 8   | II       | OM.D.EXT |                                    |          | 5  | 16  | 41       | III      |          | EC.F.INT |          | 0  | 43       | 30       | I        | OM.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 15 | 0  | 21  | II       | OM.D.INT |                                    |          | 5  | 26  | 55       | III      |          | EC.F.EXT |          | 0  | 47       | 13       | I        | OM.F.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 16 | 44 | 52  | II       | PA.F.INT |                                    |          | 5  | 30  | 41       | III      |          | EC.F.PEN |          | 19 | 21       | 37       | I        | OC.D.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 16 | 48 | 59  | II       | PA.F.EXT |                                    |          | 11 | 49  | 44       | I        |          | OC.D.EXT |          | 19 | 25       | 19       | I        | OC.D.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 17 | 34 | 33  | II       | OM.F.INT |                                    |          | 11 | 53  | 26       | I        |          | OC.D.INT |          | 21 | 50       | 37       | I        | EC.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 17 | 38 | 47  | II       | OM.F.EXT |                                    |          | 14 | 24  | 21       | I        |          | EC.F.INT |          | 21 | 54       | 21       | I        | EC.F.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          | 14       | 28                                 |          | 5  | I   | EC.F.EXT | 21       | 55       | 8        |          | I  | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          | 14       | 28                                 |          | 52 | I   | EC.F.PEN | 14       | 6        | 21       |          | 11 | II       | PA.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 3          | 1  | 40 | 3   | I        | PA.D.EXT | 9                                  |          | 22 | 41  | 17       |          | II       | OC.D.EXT |          | 15 | 6        | 25       | 20       | II       | PA.D.INT |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 1  | 43 | 44  | I        | PA.D.INT |                                    |          | 22 | 45  | 24       |          | II       | OC.D.INT |          |    | 6        | 51       | 37       | II       | OM.D.EXT |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 2  | 5  | 20  | I        | OM.D.EXT |                                    |          | 10 | 1   | 59       |          | 48       | II       |          |    | EC.F.INT | 6        | 55       | 52       | II       | OM.D.INT |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 2  | 9  | 3   | I        | OM.D.INT |                                    | 2        |    | 4   | 4        |          | II       | EC.F.EXT | 9        |    | 1        | 46       | II       | PA.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 3  | 54 | 55  | I        | PA.F.INT |                                    | 2        |    | 5   | 46       |          | II       | EC.F.PEN | 9        |    | 5        | 56       | II       | PA.F.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 3  | 58 | 36  | I        | PA.F.EXT |                                    | 9        |    | 11  | 57       |          | I        | PA.D.EXT | 9        |    | 29       | 37       | II       | OM.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 4  | 19 | 42  | I        | OM.F.INT |                                    | 9        |    | 15  | 38       |          | I        | PA.D.INT | 9        |    | 33       | 53       | II       | OM.F.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 4  | 23 | 25  | I        | OM.F.EXT |                                    | 9        |    | 31  | 44       |          | I        | OM.D.EXT | 16       |    | 43       | 46       | I        | PA.D.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 10 | 41 | 25  | III      | PA.D.EXT |                                    | 9        |    | 35  | 27       |          | I        | OM.D.INT | 16       |    | 47       | 28       | I        | PA.D.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 10 | 50 | 51  | III      | PA.D.INT |                                    | 11       |    | 26  | 41       |          | I        | PA.F.INT | 16       |    | 57       | 58       | I        | OM.D.EXT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 12 | 25 | 40  | III      | OM.D.EXT |                                    | 11       |    | 30  | 22       |          | I        | PA.F.EXT | 17       |    | 1        | 42       | I        | OM.D.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 12 | 35 | 43  | III      | OM.D.INT |                                    | 11       |    | 46  | 2        |          | I        | OM.F.INT | 18       |    | 58       | 22       | I        | PA.F.INT |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 13 | 54 | 7   | III      | PA.F.INT |                                    | 11       |    | 49  | 45       | I        | OM.F.EXT | 19       | 2        |    | 3        | I        | PA.F.EXT |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 14         | 3  | 34 | III | PA.F.EXT | 11       | 6                                  | 20       |    | 20  | I        | OC.D.EXT | 19       | 12       | 12       | I  | OM.F.INT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 15         | 29 | 24 | III | OM.F.INT |          | 6                                  | 24       |    | 1   | I        | OC.D.INT | 19       | 15       | 56       | I  | OM.F.EXT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 15         | 39 | 25 | III | OM.F.EXT |          | 8                                  | 53       | 4  | I   | EC.F.INT | 12       | 0        | 15       | 33       | IV | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 22         | 48 | 31 | I   | OC.D.EXT |          | 8                                  | 56       | 48 | I   | EC.F.EXT |          | 0        | 46       | 18       | IV | OC.D.INT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 22         | 52 | 12 | I   | OC.D.INT |          | 8                                  | 57       | 35 | I   | EC.F.PEN |          | 1        | 55       | 2        | IV | OC.F.INT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 4          | 1  | 26 | 49  | I        |          | EC.F.INT                           | 16       | 55 | 13  | II       |          | PA.D.EXT | 2        | 25       | 46 | IV       | OC.F.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 1  | 30 | 32  | I        |          | EC.F.EXT                           | 16       | 59 | 21  | II       |          | PA.D.INT | 5        | 19       | 44 | III      | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 1  | 31 | 20  | I        |          | EC.F.PEN                           | 17       | 33 | 12  | II       |          | OM.D.EXT | 5        | 29       | 20 | III      | OC.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 15 | 19  | II       |          | OC.D.EXT                           | 17       | 37 | 27  | II       |          | OM.D.INT | 9        | 17       | 16 | III      | EC.F.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 9  | 19 | 26  | II       |          | OC.D.INT                           | 19       | 36 | 10  | II       |          | PA.F.INT | 9        | 27       | 34 | III      | EC.F.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 12 | 41 | 38  | II       |          | EC.F.INT                           | 19       | 40 | 18  | II       |          | PA.F.EXT | 9        | 31       | 21 | III      | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 12 | 45 | 53  | II       |          | EC.F.EXT                           | 20       | 11 | 23  | II       |          | OM.F.INT | 13       | 52       | 17 | I        | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 12 | 47 | 36  | II       |          | EC.F.PEN                           | 20       | 15 | 38  | II       |          | OM.F.EXT | 13       | 55       | 59 | I        | OC.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 20 | 10 | 41  | I        | PA.D.EXT | 13                                 | 3        | 42 | 31  | I        |          | PA.D.EXT | 16       | 19       | 24 | I        | EC.F.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 20 | 14 | 22  | I        | PA.D.INT |                                    | 3        | 46 | 13  | I        |          | PA.D.INT | 16       | 23       | 7  | I        | EC.F.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 20 | 34 | 9   | I        | OM.D.EXT |                                    | 4        | 0  | 28  | I        | OM.D.EXT | 16       | 23       | 55       | I  | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 20 | 37 | 52  | I        | OM.D.INT |                                    | 4        | 4  | 11  | I        | OM.D.INT | 14       | 1        | 33       | 26 | II       | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 22 | 25 | 30  | I        | PA.F.INT |                                    | 5        | 57 | 13  | I        | PA.F.INT |          | 1        | 37       | 34 | II       | OC.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 22         | 29 | 12 | I   | PA.F.EXT | 6        |                                    | 0        | 55 | I   | PA.F.EXT | 4        |          | 36       | 6        | II | EC.F.INT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 22         | 48 | 29 | I   | OM.F.INT | 6        |                                    | 14       | 45 | I   | OM.F.INT | 4        |          | 40       | 23       | II | EC.F.EXT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 22         | 52 | 12 | I   | OM.F.EXT | 6        |                                    | 18       | 28 | I   | OM.F.EXT | 4        |          | 42       | 5        | II | EC.F.PEN |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
| 5          | 14 | 14 | 25  | IV       | PA.D.EXT |                                    | 15       | 13 | 57  | III      | PA.D.EXT |          | 11       | 14       | 26 | I        | PA.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 14 | 42 | 24  | IV       | PA.D.INT |                                    | 15       | 23 | 30  | III      | PA.D.INT |          | 11       | 18       | 8  | I        | PA.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 16 | 5  | 56  | IV       | PA.F.INT |                                    | 16       | 27 | 40  | III      | OM.D.EXT |          | 11       | 26       | 46 | I        | OM.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 16 | 33 | 56  | IV       | PA.F.EXT |                                    | 16       | 37 | 47  | III      | OM.D.INT |          | 11       | 30       | 29 | I        | OM.D.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 17 | 19 | 6   | I        | OC.D.EXT |                                    | 18       | 24 | 55  | III      | PA.F.INT |          | 13       | 28       | 58 | I        | PA.F.INT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 17 | 22 | 47  | I        | OC.D.INT | 18                                 | 34       | 28 | III | PA.F.EXT | 13       |          | 32       | 40       | I  | PA.F.EXT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 19 | 55 | 34  | I        | EC.F.INT | 19                                 | 30       | 29 | III | OM.F.INT | 13       |          | 40       | 58       | I  | OM.F.INT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 19 | 59 | 17  | I        | EC.F.EXT | 19                                 | 40       | 34 | III | OM.F.EXT | 13       |          | 44       | 42       | I  | OM.F.EXT |          |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 20 | 0  | 4   | I        | EC.F.PEN | 15                                 | 6        | 0  | 55  | I        | PA.F.EXT | 15       | 1        | 33       | 26 | II       | OC.D.EXT |          |          |          |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            | 6  | 3  | 29  | 5        | II       |                                    | PA.D.EXT | 16 | 6   | 14       | 45       |          | I        | OM.F.INT | 16 | 1        | 37       | 34       | II       | OC.D.INT |          |          |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    | 3  | 33  | 12       | II       |                                    | PA.D.INT |    | 17  | 6        | 18       |          | 28       | I        |    | OM.F.EXT | 17       | 4        | 36       | 6        | II       | EC.F.INT |          |          |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     | 18       | 15       |          | 13       | 57       |    | III      |          | PA.D.EXT | 18       | 4        | 40       | 23       | II       | EC.F.EXT |          |          |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          | 19       |          | 15       | 23       |    | 30       |          | III      |          | PA.D.INT | 19       | 4        | 42       | 5        | II       | EC.F.PEN |          |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    | 20       |    |     |          |          |          | 16       | 27       |    | 40       |          | III      |          | OM.D.EXT |          | 20       | 11       | 14       | 26       | I        | PA.D.EXT |    |          |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          | 21       | 16       |    | 37       |          | 47       |          | III      |          |          | OM.D.INT | 21       | 11       | 18       | 8        | I  | PA.D.INT |    |          |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          | 22       |    | 16       |          | 47       |          | 55       |          |          | III      |          | PA.F.INT | 22       | 11       | 26 | 46       | I  | OM.D.EXT |    |          |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          |          |    | 23       |          | 18       |          | 24       |          |          | 55       |          | III      |          | PA.F.EXT | 23 | 11       | 30 | 29       | I  | OM.D.INT |    |          |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          |          |    |          |          | 24       |          | 18       |          |          | 34       |          | 28       |          | III      |    | PA.F.INT | 24 | 13       | 28 | 58       | I  | PA.F.INT |    |          |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          |          |    |          |          |          |          | 25       |          |          | 18       |          | 34       |          | 28       |    | III      |    | PA.F.EXT | 25 | 13       | 32 | 40       | I  | PA.F.EXT |    |          |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          |          |    |          |          |          |          |          |          |          | 26       |          | 19       |          | 30       |    | 29       |    | III      |    | OM.F.INT | 26 | 13       | 40 | 58       | I  | OM.F.INT |
|            |    |    |     |          |          |                                    |          |    |     |          |          |          |          |          |    |          |          |          |          |          |          |          |          |          | 27       |          | 19       |    | 40       |    | 34       |    | III      |    | OM.F.EXT | 27 | 13       | 44 | 42       |
|            |    |    |     |          |          | 28                                 |          |    |     |          |          | 19       |          |          |    |          |          |          |          |          |          |          |          |          |          |          | 40       |    | 34       |    | III      |    | OM.F.EXT |    | 28       |    | 13       | 44 | 42       |



1987<sub>a</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



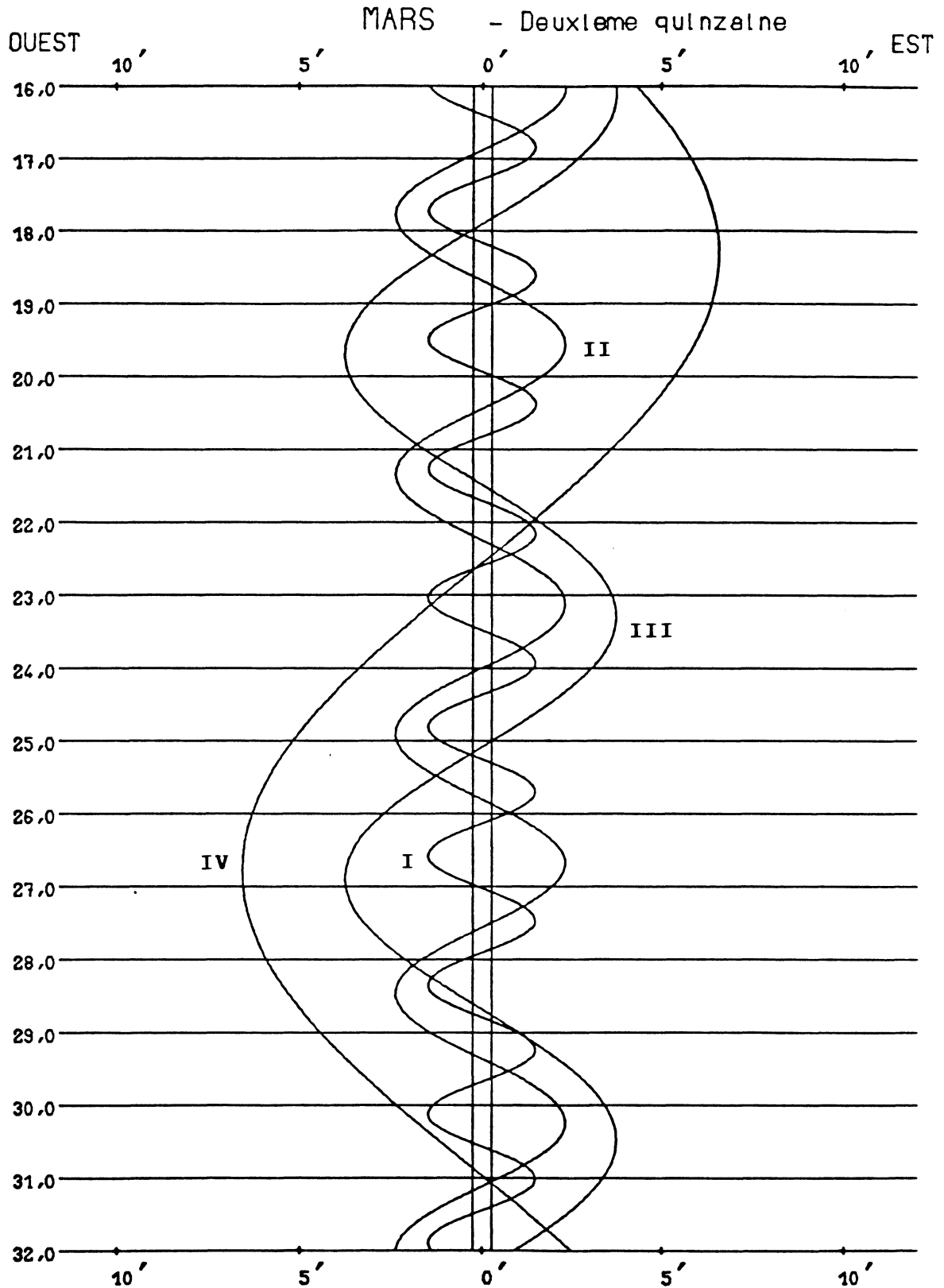
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



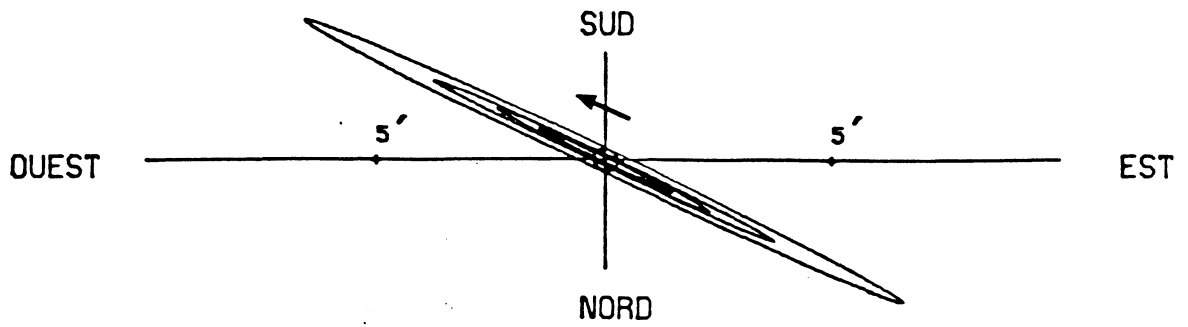
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS :   | MARS - DEUXIEME QUINZAINE - |    |    |          |          |          |    |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|----------|-----------------------------|----|----|----------|----------|----------|----|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR     | H                           | M  | S  | SAT      | TYPE     | JOUR     | H  | M        | S        | SAT      | TYPE     |          |          |
| 16         | 8  | 22 | 53  | I        | OC.D.EXT | 22       | 10                          | 2  | 21 | III      | OC.D.INT | 27       | 4  | 35       | 58       | I        | PA.F.EXT |          |          |
|            | 8  | 26 | 35  | I        | OC.D.INT |          | 13                          | 17 | 45 | III      | EC.F.INT |          | 4  | 36       | 50       | I        | OM.F.EXT |          |          |
|            | 10 | 48 | 6   | I        | EC.F.INT |          | 13                          | 28 | 7  | III      | EC.F.EXT |          | 23 | 26       | 49       | I        | OC.D.EXT |          |          |
|            | 10 | 51 | 50  | I        | EC.F.EXT |          | 13                          | 31 | 56 | III      | EC.F.PEN |          | 23 | 30       | 32       | I        | OC.D.INT |          |          |
|            | 10 | 52 | 37  | I        | EC.F.PEN |          | 15                          | 54 | 53 | I        | OC.D.EXT |          | 28 | 1        | 41       | 27       | I        | OC.F.INT |          |
|            | 19 | 47 | 35  | II       | PA.D.EXT |          | 15                          | 58 | 35 | I        | OC.D.INT |          |    | 1        | 45       | 10       | I        | OC.F.EXT |          |
|            | 19 | 51 | 46  | II       | PA.D.INT |          | 18                          | 14 | 23 | I        | EC.F.INT |          |    | 12       | 6        | 2        | II       | OM.D.EXT |          |
|            | 20 | 10 | 24  | II       | OM.D.EXT |          | 18                          | 18 | 7  | I        | EC.F.EXT |          |    | 12       | 6        | 27       | II       | PA.D.EXT |          |
|            | 20 | 14 | 40  | II       | OM.D.INT |          | 18                          | 18 | 55 | I        | EC.F.PEN |          |    | 12       | 10       | 19       | II       | OM.D.INT |          |
|            | 22 | 27 | 51  | II       | PA.F.INT |          | 23                          | 4  | 25 | 28       | II       |          |    | OC.D.EXT | 12       | 10       | 40       | II       | PA.D.INT |
|            | 22 | 32 | 1   | II       | PA.F.EXT |          |                             | 4  | 29 | 38       | II       |          |    | OC.D.INT | 14       | 43       | 24       | II       | OM.F.INT |
|            | 22 | 48 | 17  | II       | OM.F.INT |          |                             | 7  | 12 | 11       | II       |          |    | EC.F.INT | 14       | 45       | 28       | II       | PA.F.INT |
|            | 22 | 52 | 34  | II       | OM.F.EXT |          |                             | 7  | 16 | 28       | II       |          |    | EC.F.EXT | 14       | 47       | 42       | II       | OM.F.EXT |
| 17         | 5  | 45 | 1   | I        | PA.D.EXT | 7        |                             | 18 | 10 | II       | EC.F.PEN | 14       |    | 49       | 42       | II       | PA.F.EXT |          |          |
|            | 5  | 48 | 43  | I        | PA.D.INT | 11       |                             | 43 | 10 | IV       | PA.D.EXT | 20       |    | 47       | 45       | I        | OM.D.EXT |          |          |
|            | 5  | 55 | 28  | I        | OM.D.EXT | 13       |                             | 16 | 54 | I        | PA.D.EXT | 20       |    | 48       | 40       | I        | PA.D.EXT |          |          |
|            | 5  | 59 | 12  | I        | OM.D.INT | 13       |                             | 18 | 12 | IV       | PA.F.EXT | 20       |    | 51       | 28       | I        | OM.D.INT |          |          |
|            | 7  | 59 | 31  | I        | PA.F.INT | 13       |                             | 20 | 36 | I        | PA.D.INT | 20       | 52 | 22       | I        | PA.D.INT |          |          |          |
|            | 8  | 3  | 12  | I        | PA.F.EXT | 13       |                             | 21 | 41 | I        | OM.D.EXT | 23       | 1  | 45       | I        | OM.F.INT |          |          |          |
|            | 8  | 9  | 40  | I        | OM.F.INT | 13       |                             | 25 | 24 | I        | OM.D.INT | 23       | 2  | 47       | I        | PA.F.INT |          |          |          |
|            | 8  | 13 | 23  | I        | OM.F.EXT | 15       |                             | 31 | 13 | I        | PA.F.INT | 23       | 5  | 28       | I        | OM.F.EXT |          |          |          |
|            | 19 | 47 | 50  | III      | PA.D.EXT | 15       |                             | 34 | 55 | I        | PA.F.EXT | 23       | 6  | 29       | I        | PA.F.EXT |          |          |          |
|            | 19 | 57 | 30  | III      | PA.D.INT | 15       | 35                          | 47 | I  | OM.F.INT | 28       | 14       | 21 | 29       | III      | EC.D.PEN |          |          |          |
|            | 20 | 30 | 27  | III      | OM.D.EXT | 15       | 39                          | 30 | I  | OM.F.EXT |          | 14       | 25 | 19       | III      | EC.D.EXT |          |          |          |
|            | 20 | 40 | 37  | III      | OM.D.INT | 23       | 10                          | 25 | 30 | I        |          | OC.D.EXT | 14 | 35       | 46       | III      | EC.D.INT |          |          |
|            | 22 | 56 | 52  | III      | PA.F.INT |          | 10                          | 29 | 12 | I        |          | OC.D.INT | 17 | 32       | 43       | III      | OC.F.INT |          |          |
| 23         | 6  | 32 | III | PA.F.EXT | 12       |          | 43                          | 5  | I  | EC.F.INT |          | 17       | 42 | 34       | III      | OC.F.EXT |          |          |          |
| 23         | 32 | 19 | III | OM.F.INT | 12       |          | 46                          | 49 | I  | EC.F.EXT |          | 17       | 55 | 37       | I        | EC.D.PEN |          |          |          |
| 23         | 42 | 28 | III | OM.F.EXT | 12       |          | 47                          | 36 | I  | EC.F.PEN |          | 17       | 56 | 24       | I        | EC.D.EXT |          |          |          |
| 18         | 2  | 53 | 35  | I        | OC.D.EXT |          | 22                          | 40 | 16 | II       |          | PA.D.EXT | 18 | 0        | 9        | I        | EC.D.INT |          |          |
|            | 2  | 57 | 17  | I        | OC.D.INT |          | 22                          | 44 | 28 | II       |          | PA.D.INT | 20 | 12       | 6        | I        | OC.F.INT |          |          |
|            | 5  | 16 | 54  | I        | EC.F.INT |          | 22                          | 47 | 37 | II       |          | OM.D.EXT | 20 | 15       | 49       | I        | OC.F.EXT |          |          |
|            | 5  | 20 | 38  | I        | EC.F.EXT |          | 22                          | 51 | 55 | II       |          | OM.D.INT | 29 | 7        | 12       | 56       | II       | EC.D.PEN |          |
|            | 5  | 21 | 25  | I        | EC.F.PEN |          | 24                          | 1  | 19 | 44       |          | II       |    | PA.F.INT | 7        | 14       | 39       | II       | EC.D.EXT |
|            | 14 | 59 | 33  | II       | OC.D.EXT |          |                             | 1  | 23 | 56       |          | II       |    | PA.F.EXT | 7        | 18       | 56       | II       | EC.D.INT |
|            | 15 | 3  | 42  | II       | OC.D.INT |          |                             | 1  | 25 | 12       | II       | OM.F.INT |    | 9        | 55       | 31       | II       | OC.F.INT |          |
|            | 17 | 54 | 14  | II       | EC.F.INT |          |                             | 1  | 29 | 29       | II       | OM.F.EXT |    | 9        | 59       | 42       | II       | OC.F.EXT |          |
|            | 17 | 58 | 30  | II       | EC.F.EXT | 7        |                             | 47 | 29 | I        | PA.D.EXT | 15       |    | 16       | 29       | I        | OM.D.EXT |          |          |
|            | 18 | 0  | 13  | II       | EC.F.PEN | 7        |                             | 50 | 22 | I        | OM.D.EXT | 15       |    | 19       | 18       | I        | PA.D.EXT |          |          |
|            | 19 | 0  | 15  | 39       | I        | PA.D.EXT |                             | 7  | 51 | 11       | I        | PA.D.INT |    | 15       | 20       | 12       | I        | OM.D.INT |          |
|            |    | 0  | 19  | 21       | I        | PA.D.INT |                             | 7  | 54 | 5        | I        | OM.D.INT |    | 15       | 23       | 0        | I        | PA.D.INT |          |
|            |    | 0  | 24  | 13       | I        | OM.D.EXT |                             | 10 | 1  | 44       | I        | PA.F.INT |    | 17       | 30       | 26       | I        | OM.F.INT |          |
| 0          |    | 27 | 57  | I        | OM.D.INT | 10       |                             | 4  | 26 | I        | OM.F.INT | 17       |    | 33       | 20       | I        | PA.F.INT |          |          |
| 2          |    | 30 | 5   | I        | PA.F.INT | 10       |                             | 5  | 26 | I        | PA.F.EXT | 17       |    | 34       | 10       | I        | OM.F.EXT |          |          |
| 2          |    | 33 | 47  | I        | PA.F.EXT | 10       |                             | 8  | 9  | I        | OM.F.EXT | 17       |    | 37       | 2        | I        | PA.F.EXT |          |          |
| 2          |    | 38 | 23  | I        | OM.F.INT | 25       |                             | 0  | 21 | 9        | III      | PA.D.EXT | 30 | 12       | 24       | 18       | I        | EC.D.PEN |          |
| 2          |    | 42 | 6   | I        | OM.F.EXT |          | 0                           | 30 | 56 | III      | PA.D.INT | 12       |    | 25       | 6        | I        | EC.D.EXT |          |          |
| 21         |    | 24 | 12  | I        | OC.D.EXT |          | 0                           | 32 | 18 | III      | OM.D.EXT | 12       |    | 28       | 50       | I        | EC.D.INT |          |          |
| 21         |    | 27 | 55  | I        | OC.D.INT |          | 0                           | 42 | 31 | III      | OM.D.INT | 14       |    | 42       | 39       | I        | OC.F.INT |          |          |
| 23         |    | 45 | 37  | I        | EC.F.INT |          | 3                           | 28 | 4  | III      | PA.F.INT | 14       |    | 46       | 22       | I        | OC.F.EXT |          |          |
| 23         |    | 49 | 21  | I        | EC.F.EXT |          | 3                           | 33 | 10 | III      | OM.F.INT | 21       |    | 41       | 6        | IV       | OC.D.EXT |          |          |
| 23         |    | 50 | 8   | I        | EC.F.PEN |          | 3                           | 37 | 50 | III      | PA.F.EXT | 23       |    | 2        | 1        | IV       | OC.F.EXT |          |          |
| 20         | 9  | 13 | 41  | II       | PA.D.EXT |          | 3                           | 43 | 22 | III      | OM.F.EXT | 31       |    | 1        | 24       | 56       | II       | OM.D.EXT |          |
|            | 9  | 17 | 53  | II       | PA.D.INT |          | 4                           | 56 | 12 | I        | OC.D.EXT |          |    | 1        | 29       | 14       | II       | OM.D.INT |          |
|            | 9  | 28 | 48  | II       | OM.D.EXT |          | 4                           | 59 | 54 | I        | OC.D.INT |          |    | 1        | 33       | 10       | II       | PA.D.EXT |          |
|            | 9  | 33 | 4   | II       | OM.D.INT |          | 7                           | 11 | 52 | I        | EC.F.INT |          |    | 1        | 37       | 25       | II       | PA.D.INT |          |
|            | 11 | 53 | 32  | II       | PA.F.INT |          | 7                           | 15 | 36 | I        | EC.F.EXT |          |    | 4        | 2        | 10       | II       | OM.F.INT |          |
|            | 11 | 57 | 43  | II       | PA.F.EXT |          | 7                           | 16 | 24 | I        | EC.F.PEN |          |    | 4        | 6        | 28       | II       | OM.F.EXT |          |
|            | 12 | 6  | 31  | II       | OM.F.INT | 17       | 51                          | 30 | II | OC.D.EXT | 4        |          | 11 | 46       | II       | PA.F.INT |          |          |          |
|            | 12 | 10 | 47  | II       | OM.F.EXT | 17       | 55                          | 41 | II | OC.D.INT | 4        |          | 16 | 0        | II       | PA.F.EXT |          |          |          |
|            | 18 | 46 | 15  | I        | PA.D.EXT | 20       | 30                          | 15 | II | OC.F.INT | 9        |          | 45 | 9        | I        | OM.D.EXT |          |          |          |
|            | 18 | 49 | 57  | I        | PA.D.INT | 20       | 34                          | 29 | II | EC.F.EXT | 9        |          | 48 | 52       | I        | OM.D.INT |          |          |          |
|            | 18 | 52 | 55  | I        | OM.D.EXT | 20       | 36                          | 12 | II | EC.F.PEN | 9        |          | 49 | 51       | I        | PA.D.EXT |          |          |          |
|            | 18 | 56 | 39  | I        | OM.D.INT | 26       | 2                           | 18 | 5  | I        | PA.D.EXT |          | 9  | 53       | 33       | I        | PA.D.INT |          |          |
|            | 21 | 0  | 37  | I        | PA.F.INT |          | 2                           | 19 | 5  | I        | OM.D.EXT |          | 11 | 59       | 4        | I        | OM.F.INT |          |          |
| 21         | 4  | 19 | I   | PA.F.EXT | 2        |          | 21                          | 48 | I  | PA.D.INT | 12       | 2        | 47 | I        | OM.F.EXT |          |          |          |          |
| 21         | 7  | 3  | I   | OM.F.INT | 2        |          | 22                          | 48 | I  | OM.D.INT | 12       | 3        | 49 | I        | PA.F.INT |          |          |          |          |
| 21         | 10 | 46 | I   | OM.F.EXT | 4        |          | 32                          | 16 | I  | PA.F.INT | 12       | 7        | 32 | I        | PA.F.EXT |          |          |          |          |
| 21         | 9  | 52 | 38  | III      | OC.D.EXT |          | 4                           | 33 | 7  | I        | OM.F.INT |          |    |          |          |          |          |          |          |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



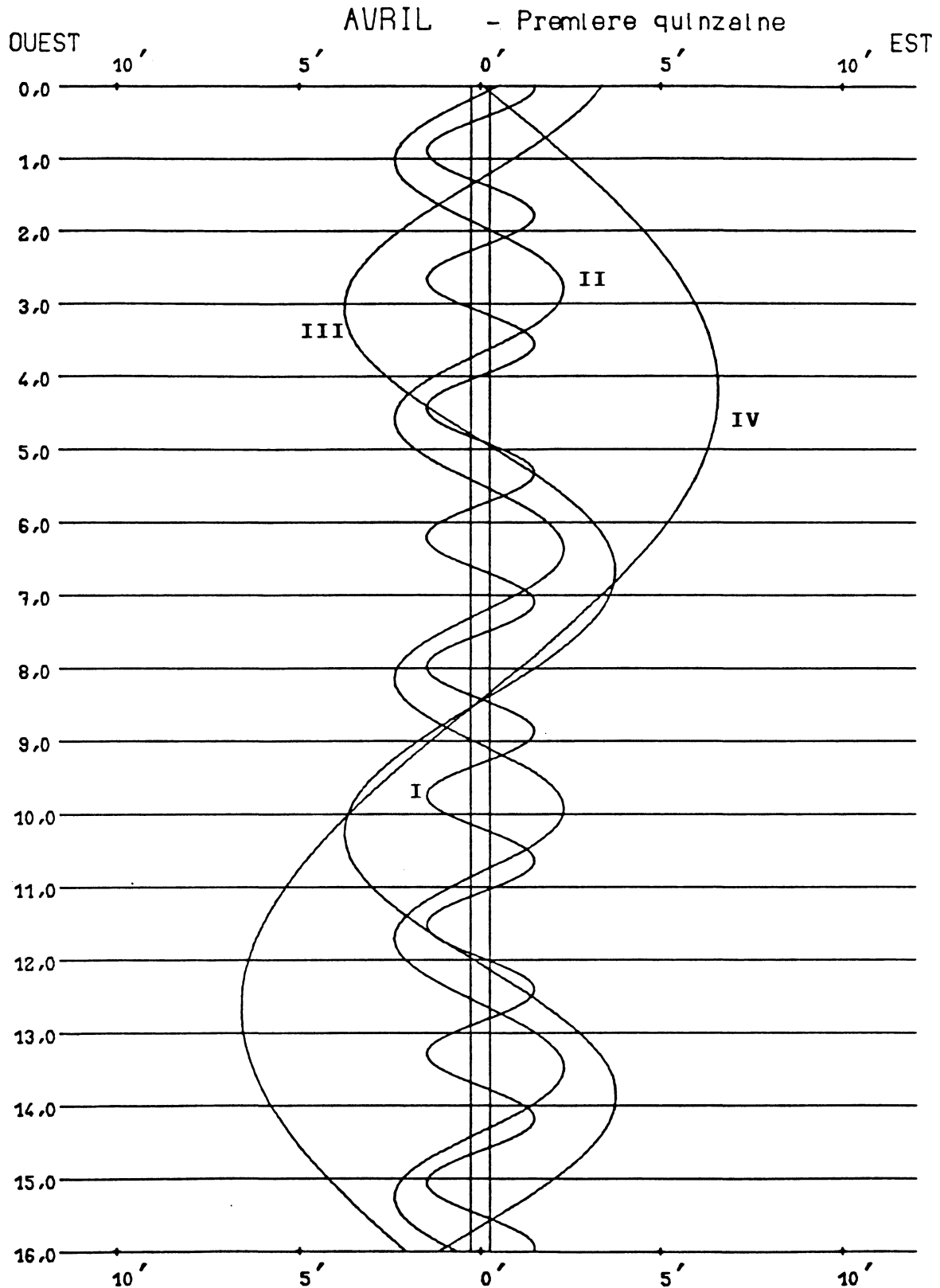
Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter



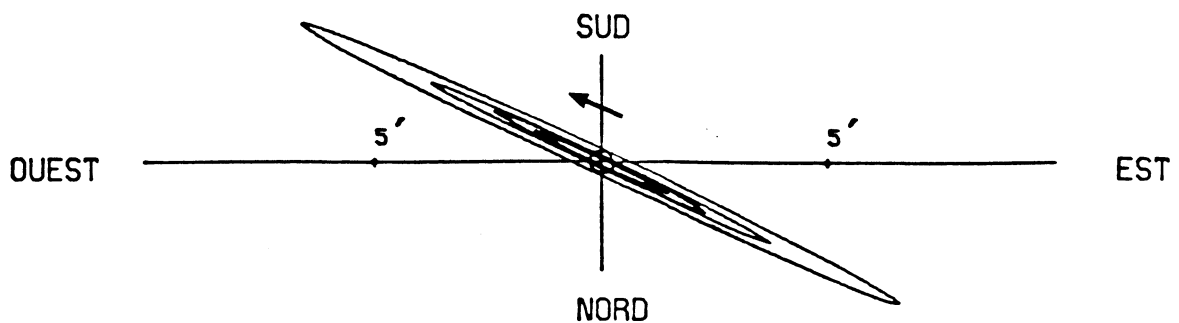
ORBITES APPARENTES



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

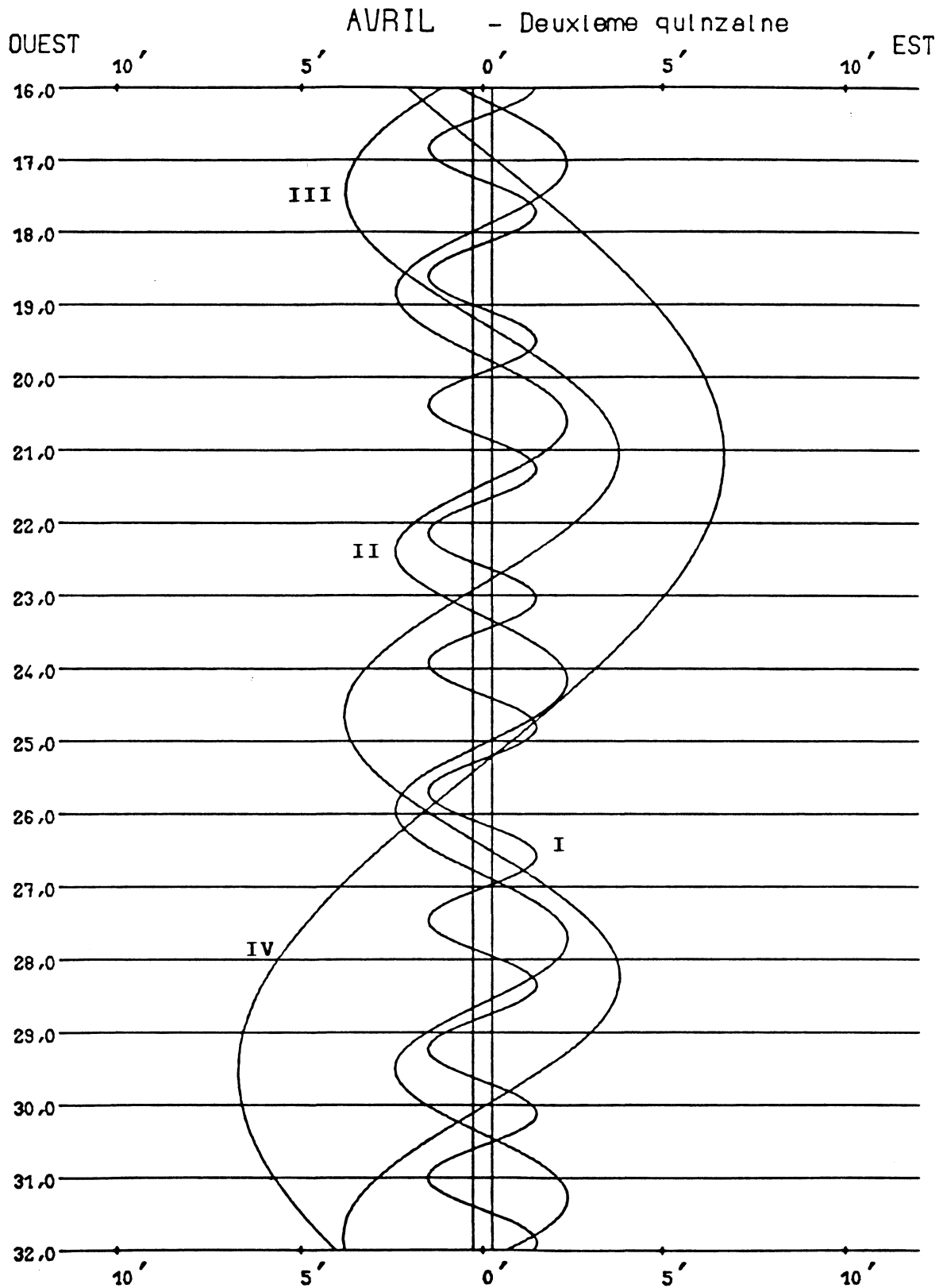


ORBITES APPARENTES

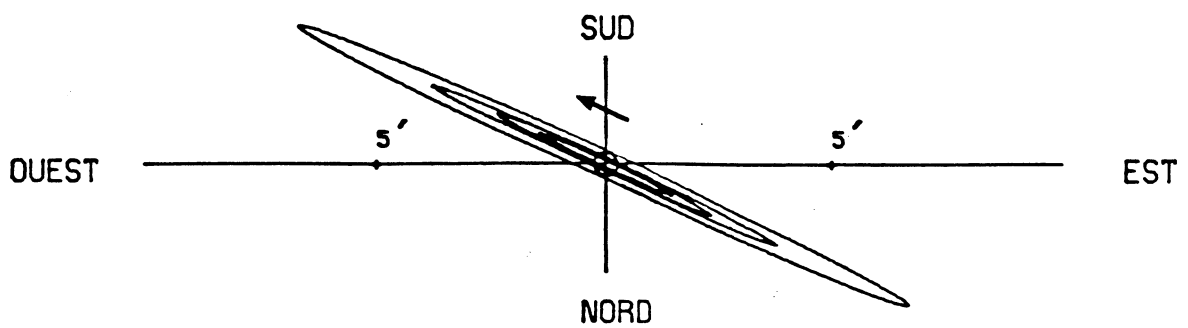
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |    |          |          | MOIS : AVRIL - DEUXIEME QUINZAINES - |    |    |          |          |          |      |    |          |          |          |          |  |
|------------|----|----|----|----------|----------|--------------------------------------|----|----|----------|----------|----------|------|----|----------|----------|----------|----------|--|
| JOUR       | H  | M  | S  | SAT      | TYPE     | JOUR                                 | H  | M  | S        | SAT      | TYPE     | JOUR | H  | M        | S        | SAT      | TYPE     |  |
| 16         | 1  | 42 | 55 | II       | EC.D.PEN | 10                                   | 16 | 14 | II       | PA.D.INT | 6        | 29   | 24 | III      | EC.D.PEN |          |          |  |
|            | 1  | 44 | 38 | II       | EC.D.EXT | 11                                   | 53 | 24 | II       | OM.F.INT | 6        | 33   | 20 | III      | EC.D.EXT |          |          |  |
|            | 1  | 48 | 56 | II       | EC.D.INT | 11                                   | 57 | 46 | II       | OM.F.EXT | 6        | 44   | 4  | III      | EC.D.INT |          |          |  |
|            | 5  | 0  | 32 | II       | OC.F.INT | 12                                   | 47 | 20 | II       | PA.F.INT | 11       | 34   | 43 | III      | OC.F.INT |          |          |  |
|            | 5  | 4  | 47 | II       | OC.F.EXT | 12                                   | 51 | 41 | II       | PA.F.EXT | 11       | 45   | 11 | III      | OC.F.EXT |          |          |  |
|            | 8  | 3  | 3  | I        | OM.D.EXT | 15                                   | 28 | 55 | I        | OM.D.EXT | 17       | 36   | 16 | II       | EC.D.PEN |          |          |  |
|            | 8  | 6  | 47 | I        | OM.D.INT | 15                                   | 32 | 39 | I        | OM.D.INT | 17       | 37   | 59 | II       | EC.D.EXT |          |          |  |
|            | 8  | 24 | 29 | I        | PA.D.EXT | 15                                   | 55 | 46 | I        | PA.D.EXT | 17       | 42   | 18 | II       | EC.D.INT |          |          |  |
|            | 8  | 28 | 12 | I        | PA.D.INT | 15                                   | 59 | 29 | I        | PA.D.INT | 21       | 13   | 58 | II       | OC.F.INT |          |          |  |
|            | 10 | 16 | 35 | I        | OM.F.INT | 17                                   | 42 | 18 | I        | OM.F.INT | 21       | 18   | 16 | II       | OC.F.EXT |          |          |  |
|            | 10 | 20 | 19 | I        | OM.F.EXT | 17                                   | 46 | 2  | I        | OM.F.EXT | 22       | 54   | 45 | I        | OM.D.EXT |          |          |  |
| 10         | 37 | 46 | I  | PA.F.INT | 18       | 8                                    | 46 | I  | PA.F.INT | 22       | 58       | 29   | I  | OM.D.INT |          |          |          |  |
| 10         | 41 | 28 | I  | PA.F.EXT | 18       | 12                                   | 29 | I  | PA.F.EXT | 23       | 26       | 52   | I  | OM.D.EXT |          |          |          |  |
|            |    |    |    |          |          |                                      |    |    |          |          |          | 23   | 30 | 36       | I        | PA.D.INT |          |  |
| 17         | 5  | 11 | 32 | I        | EC.D.PEN | 22                                   | 12 | 37 | 40       | I        | EC.D.PEN | 27   | 1  | 7        | 58       | I        | OM.F.INT |  |
|            | 5  | 12 | 19 | I        | EC.D.EXT | 22                                   | 12 | 38 | 27       | I        | EC.D.EXT | 27   | 1  | 11       | 42       | I        | OM.F.EXT |  |
|            | 5  | 16 | 4  | I        | EC.D.INT | 22                                   | 12 | 42 | 13       | I        | EC.D.INT | 27   | 1  | 39       | 36       | I        | PA.F.INT |  |
|            | 7  | 48 | 20 | I        | OC.F.INT | 22                                   | 15 | 19 | 51       | I        | OC.F.INT | 27   | 1  | 43       | 20       | I        | PA.F.EXT |  |
|            | 7  | 52 | 4  | I        | OC.F.EXT | 22                                   | 15 | 23 | 35       | I        | OC.F.EXT | 27   | 1  | 43       | 20       | I        | PA.F.EXT |  |
|            | 19 | 58 | 19 | II       | OM.D.EXT | 22                                   | 16 | 37 | 56       | III      | OM.D.EXT | 27   | 20 | 3        | 41       | I        | EC.D.PEN |  |
|            | 20 | 2  | 39 | II       | OM.D.INT | 22                                   | 16 | 48 | 23       | III      | OM.D.INT | 27   | 20 | 4        | 29       | I        | EC.D.EXT |  |
|            | 20 | 45 | 11 | II       | PA.D.EXT | 22                                   | 18 | 31 | 15       | III      | PA.D.EXT | 27   | 20 | 8        | 14       | I        | EC.D.INT |  |
|            | 20 | 49 | 31 | II       | PA.D.INT | 22                                   | 18 | 41 | 36       | III      | PA.D.INT | 27   | 22 | 51       | 8        | I        | OC.F.INT |  |
|            | 22 | 34 | 30 | II       | OM.F.INT | 22                                   | 19 | 34 | 30       | III      | OM.F.INT | 27   | 22 | 54       | 53       | I        | OC.F.EXT |  |
|            | 22 | 38 | 51 | II       | OM.F.EXT | 22                                   | 19 | 44 | 58       | III      | OM.F.EXT | 27   | 22 | 54       | 53       | I        | OC.F.EXT |  |
| 23         | 21 | 12 | II | PA.F.INT | 22       | 21                                   | 27 | 59 | III      | PA.F.INT | 28       | 11   | 55 | 3        | II       | OM.D.EXT |          |  |
| 23         | 25 | 32 | II | PA.F.EXT | 22       | 21                                   | 38 | 20 | III      | PA.F.EXT | 28       | 11   | 59 | 25       | II       | OM.D.INT |          |  |
| 18         | 2  | 31 | 40 | I        | OM.D.EXT | 23                                   | 4  | 18 | 30       | II       | EC.D.PEN | 28   | 13 | 4        | 22       | II       | PA.D.EXT |  |
|            | 2  | 35 | 23 | I        | OM.D.INT | 23                                   | 4  | 20 | 13       | II       | EC.D.EXT | 28   | 13 | 8        | 45       | II       | PA.D.INT |  |
|            | 2  | 54 | 55 | I        | PA.D.EXT | 23                                   | 4  | 24 | 32       | II       | EC.D.INT | 28   | 14 | 30       | 33       | II       | OM.F.INT |  |
|            | 2  | 58 | 38 | I        | PA.D.INT | 23                                   | 7  | 49 | 36       | II       | OC.F.INT | 28   | 14 | 34       | 56       | II       | OM.F.EXT |  |
|            | 4  | 45 | 9  | I        | OM.F.INT | 23                                   | 7  | 53 | 53       | II       | OC.F.EXT | 28   | 15 | 38       | 38       | II       | PA.F.INT |  |
|            | 4  | 48 | 52 | I        | OM.F.EXT | 23                                   | 9  | 57 | 32       | I        | OM.D.EXT | 28   | 15 | 43       | 1        | II       | PA.F.EXT |  |
|            | 5  | 8  | 6  | I        | PA.F.INT | 23                                   | 10 | 1  | 16       | I        | OM.D.INT | 28   | 17 | 23       | 20       | I        | OM.D.EXT |  |
|            | 5  | 11 | 49 | I        | PA.F.EXT | 23                                   | 10 | 26 | 9        | I        | PA.D.EXT | 28   | 17 | 27       | 3        | I        | OM.D.INT |  |
|            | 23 | 40 | 16 | I        | EC.D.PEN | 23                                   | 10 | 29 | 52       | I        | PA.D.INT | 28   | 17 | 57       | 11       | I        | PA.D.EXT |  |
|            | 23 | 41 | 4  | I        | EC.D.EXT | 23                                   | 12 | 10 | 52       | I        | OM.F.INT | 28   | 18 | 0        | 55       | I        | PA.D.INT |  |
|            | 23 | 44 | 49 | I        | EC.D.INT | 23                                   | 12 | 14 | 35       | I        | OM.F.EXT | 28   | 19 | 36       | 30       | I        | OM.F.INT |  |
| 19         | 2  | 18 | 52 | I        | OC.F.INT | 23                                   | 12 | 39 | 4        | I        | PA.F.INT | 28   | 19 | 40       | 14       | I        | OM.F.EXT |  |
|            | 2  | 22 | 37 | I        | OC.F.EXT | 23                                   | 12 | 42 | 47       | I        | PA.F.EXT | 28   | 20 | 9        | 50       | I        | PA.F.INT |  |
|            | 2  | 27 | 36 | III      | EC.D.PEN | 23                                   | 12 | 42 | 47       | I        | PA.F.EXT | 28   | 20 | 13       | 33       | I        | PA.F.EXT |  |
|            | 2  | 31 | 30 | III      | EC.D.EXT | 24                                   | 7  | 6  | 19       | I        | EC.D.PEN | 29   | 14 | 32       | 25       | I        | EC.D.PEN |  |
|            | 2  | 42 | 10 | III      | EC.D.INT | 24                                   | 7  | 7  | 7        | I        | EC.D.EXT | 29   | 14 | 33       | 13       | I        | EC.D.EXT |  |
|            | 7  | 5  | 25 | III      | OC.F.INT | 24                                   | 7  | 10 | 52       | III      | EC.D.INT | 29   | 14 | 36       | 59       | I        | EC.D.INT |  |
|            | 7  | 15 | 42 | III      | OC.F.EXT | 24                                   | 9  | 50 | 16       | I        | OC.F.INT | 29   | 17 | 21       | 36       | I        | OC.F.INT |  |
|            | 15 | 0  | 44 | II       | EC.D.PEN | 24                                   | 9  | 54 | 1        | I        | OC.F.EXT | 29   | 17 | 25       | 21       | I        | OC.F.EXT |  |
|            | 15 | 2  | 27 | II       | EC.D.EXT | 24                                   | 22 | 35 | 53       | II       | OM.D.EXT | 29   | 20 | 39       | 25       | III      | OM.D.EXT |  |
|            | 15 | 6  | 46 | II       | EC.D.INT | 24                                   | 22 | 40 | 15       | II       | OM.D.INT | 29   | 20 | 39       | 25       | III      | OM.D.EXT |  |
|            | 18 | 25 | 9  | II       | OC.F.INT | 24                                   | 22 | 40 | 15       | II       | OM.D.INT | 29   | 20 | 49       | 55       | III      | OM.D.INT |  |
| 18         | 29 | 26 | II | OC.F.EXT | 24       | 23                                   | 37 | 48 | II       | PA.D.EXT | 29       | 23   | 2  | 22       | III      | PA.D.EXT |          |  |
| 21         | 0  | 19 | I  | OM.D.EXT | 24       | 23                                   | 42 | 11 | II       | PA.D.INT | 29       | 23   | 12 | 55       | III      | PA.D.INT |          |  |
| 21         | 4  | 3  | I  | OM.D.INT | 25       | 1                                    | 11 | 37 | II       | OM.F.INT | 29       | 23   | 34 | 50       | III      | OM.F.INT |          |  |
| 21         | 25 | 22 | I  | PA.D.EXT | 25       | 1                                    | 15 | 59 | II       | OM.F.EXT | 29       | 23   | 45 | 22       | III      | OM.F.EXT |          |  |
| 21         | 29 | 5  | I  | PA.D.INT | 25       | 2                                    | 12 | 39 | II       | PA.F.INT | 30       | 1    | 56 | 11       | III      | PA.F.INT |          |  |
| 23         | 13 | 45 | I  | OM.F.INT | 25       | 2                                    | 17 | 2  | II       | PA.F.EXT | 30       | 2    | 6  | 43       | III      | PA.F.EXT |          |  |
| 23         | 17 | 28 | I  | OM.F.EXT | 25       | 4                                    | 26 | 7  | I        | OM.D.EXT | 30       | 6    | 53 | 55       | II       | EC.D.PEN |          |  |
| 23         | 38 | 28 | I  | PA.F.INT | 25       | 4                                    | 29 | 51 | I        | OM.D.INT | 30       | 6    | 55 | 38       | II       | EC.D.EXT |          |  |
| 23         | 42 | 11 | I  | PA.F.EXT | 25       | 4                                    | 56 | 30 | I        | PA.D.EXT | 30       | 6    | 59 | 58       | II       | EC.D.INT |          |  |
| 20         | 18 | 8  | 55 | I        | EC.D.PEN | 25                                   | 5  | 0  | 13       | I        | PA.D.INT | 30   | 10 | 38       | 5        | II       | OC.F.INT |  |
|            | 18 | 9  | 42 | I        | EC.D.EXT | 25                                   | 6  | 39 | 23       | I        | OM.F.INT | 30   | 10 | 42       | 24       | II       | OC.F.EXT |  |
|            | 18 | 13 | 27 | I        | EC.D.INT | 25                                   | 6  | 43 | 7        | I        | OM.F.EXT | 30   | 11 | 51       | 55       | I        | OM.D.EXT |  |
|            | 20 | 49 | 18 | I        | OC.F.INT | 25                                   | 7  | 9  | 19       | I        | PA.F.INT | 30   | 11 | 55       | 39       | I        | OM.D.INT |  |
|            | 20 | 53 | 3  | I        | OC.F.EXT | 25                                   | 7  | 13 | 3        | I        | PA.F.EXT | 30   | 12 | 27       | 30       | I        | PA.D.EXT |  |
| 21         | 9  | 17 | 25 | II       | OM.D.EXT | 26                                   | 1  | 35 | 3        | I        | EC.D.PEN | 30   | 12 | 31       | 13       | I        | PA.D.INT |  |
|            | 9  | 21 | 46 | II       | OM.D.INT | 26                                   | 1  | 35 | 51       | I        | EC.D.EXT | 30   | 14 | 5        | 2        | I        | OM.F.INT |  |
|            | 10 | 11 | 53 | II       | PA.D.EXT | 26                                   | 1  | 39 | 36       | I        | EC.D.INT | 30   | 14 | 8        | 46       | I        | OM.F.EXT |  |
|            |    |    |    |          |          | 26                                   | 4  | 20 | 46       | I        | OC.F.INT | 30   | 14 | 40       | 2        | I        | PA.F.INT |  |
|            |    |    |    |          | 26       | 4                                    | 24 | 31 | I        | OC.F.EXT | 30       | 14   | 43 | 46       | I        | PA.F.EXT |          |  |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter



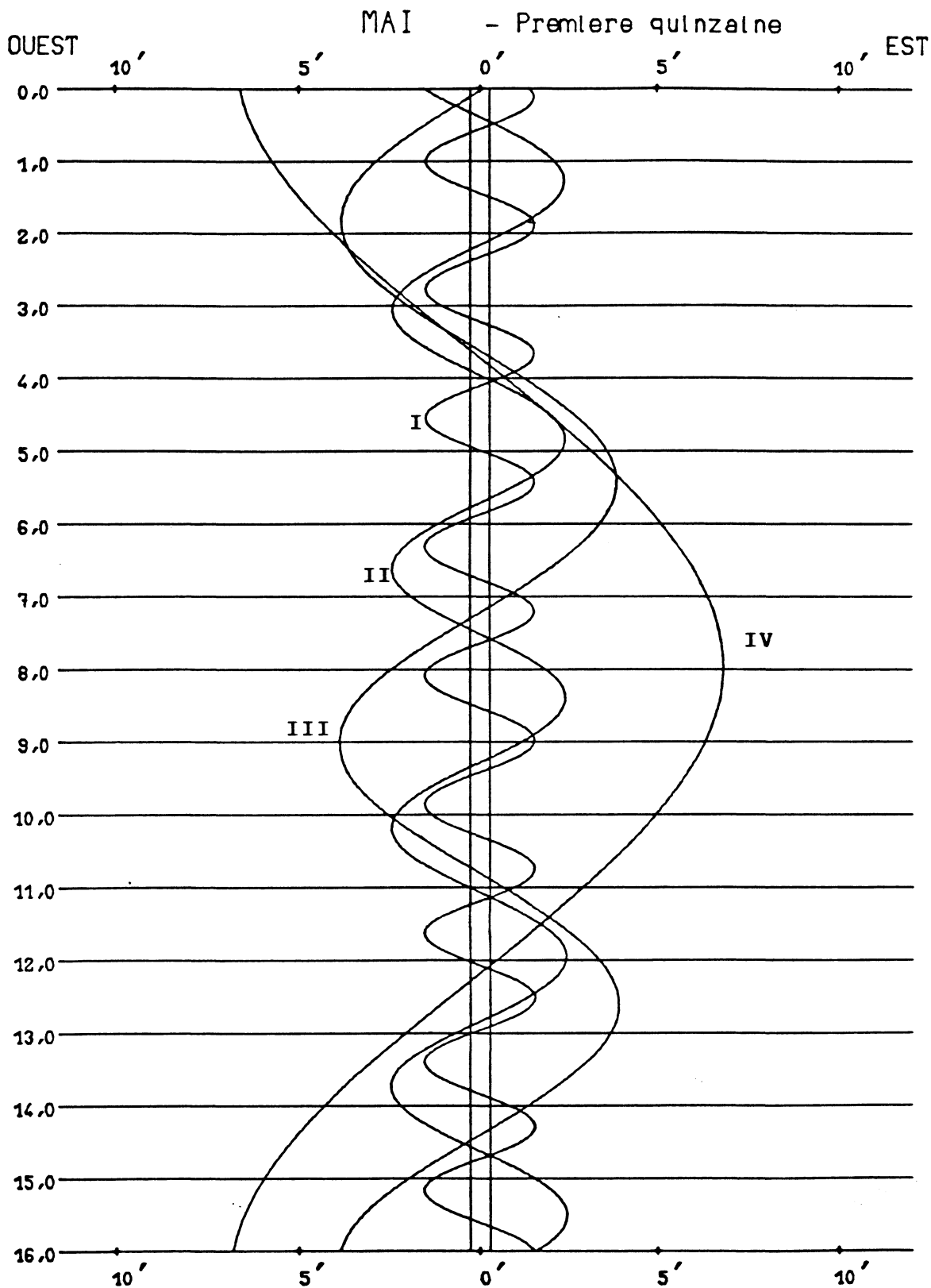
ORBITES APPARENTES

1987 - SATELLITES DE JUPITER -

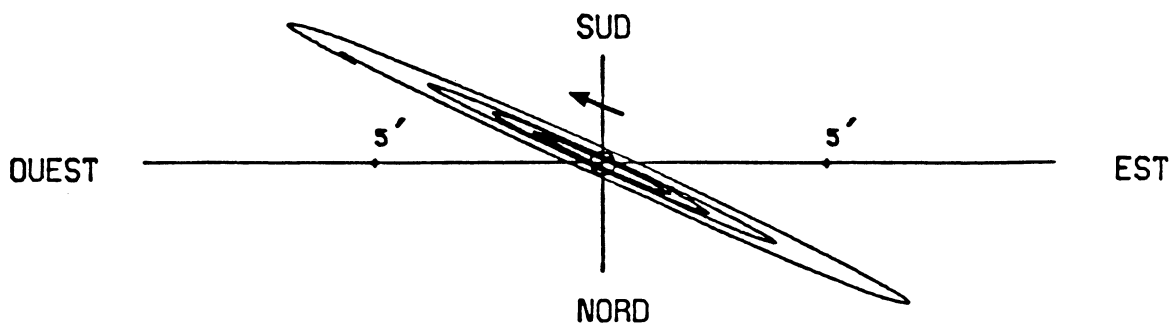
| PHENOMENES |    |    |    |     |          | MOIS : MAI - PREMIERE QUINZAINE - |    |    |    |     |          |      |    |    |    |     |          |
|------------|----|----|----|-----|----------|-----------------------------------|----|----|----|-----|----------|------|----|----|----|-----|----------|
| JOUR       | H  | M  | S  | SAT | TYPE     | JOUR                              | H  | M  | S  | SAT | TYPE     | JOUR | H  | M  | S  | SAT | TYPE     |
| 1          | 9  | 1  | 4  | I   | EC.D.PEN |                                   |    |    |    |     |          | 22   | 52 | 45 |    | II  | EC.D.INT |
|            | 9  | 1  | 52 | I   | EC.D.EXT | 6                                 | 16 | 27 | 7  | I   | EC.D.PEN | 11   | 2  | 43 | 21 | I   | OM.D.EXT |
|            | 9  | 5  | 37 | I   | EC.D.INT |                                   | 16 | 27 | 55 | I   | EC.D.EXT |      | 2  | 47 | 5  | I   | OM.D.INT |
|            | 11 | 51 | 58 | I   | OC.F.INT |                                   | 16 | 31 | 41 | I   | EC.D.INT |      | 2  | 49 | 24 | II  | OC.F.INT |
|            | 11 | 55 | 43 | I   | OC.F.EXT |                                   | 19 | 23 | 3  | I   | OC.F.INT |      | 2  | 53 | 46 | II  | OC.F.EXT |
|            |    |    |    |     |          |                                   | 19 | 26 | 49 | I   | OC.F.EXT |      | 3  | 28 | 50 | I   | PA.D.EXT |
| 2          | 1  | 13 | 31 | II  | OM.D.EXT | 7                                 | 0  | 41 | 41 | III | OM.D.EXT |      | 3  | 32 | 34 | I   | PA.D.INT |
|            | 1  | 17 | 54 | II  | OM.D.INT |                                   | 0  | 52 | 15 | III | OM.D.INT |      | 4  | 56 | 7  | I   | OM.F.INT |
|            | 2  | 30 | 4  | II  | PA.D.EXT |                                   | 3  | 33 | 15 | III | PA.D.EXT |      | 4  | 59 | 51 | I   | OM.F.EXT |
|            | 2  | 34 | 29 | II  | PA.D.INT |                                   | 3  | 35 | 56 | III | OM.F.INT |      | 5  | 40 | 48 | I   | PA.F.INT |
|            | 3  | 48 | 46 | II  | OM.F.INT |                                   | 3  | 35 | 56 | III | OM.F.INT |      | 5  | 44 | 32 | I   | PA.F.EXT |
|            | 3  | 53 | 9  | II  | OM.F.EXT |                                   | 3  | 43 | 58 | III | PA.D.INT |      | 5  | 44 | 32 | I   | PA.F.EXT |
|            | 5  | 3  | 43 | II  | PA.F.INT |                                   | 3  | 46 | 32 | III | OM.F.EXT |      | 23 | 53 | 4  | I   | EC.D.PEN |
|            | 5  | 8  | 7  | II  | PA.F.EXT |                                   | 6  | 24 | 0  | III | PA.F.INT |      | 23 | 53 | 52 | I   | EC.D.EXT |
|            | 6  | 20 | 29 | I   | OM.D.EXT |                                   | 6  | 34 | 43 | III | PA.F.EXT |      | 23 | 57 | 38 | I   | EC.D.INT |
|            | 6  | 24 | 13 | I   | OM.D.INT |                                   | 9  | 29 | 7  | II  | EC.D.PEN |      |    |    |    |     |          |
|            | 6  | 57 | 45 | I   | PA.D.EXT |                                   | 9  | 30 | 50 | II  | EC.D.EXT | 12   | 2  | 53 | 51 | I   | OC.F.INT |
|            | 7  | 1  | 29 | I   | PA.D.INT |                                   | 9  | 35 | 10 | II  | EC.D.INT |      | 2  | 57 | 37 | I   | OC.F.EXT |
|            | 8  | 33 | 32 | I   | OM.F.INT |                                   | 13 | 25 | 48 | II  | OC.F.INT |      | 17 | 10 | 30 | II  | OM.D.EXT |
|            | 8  | 37 | 16 | I   | OM.F.EXT |                                   | 13 | 30 | 9  | II  | OC.F.EXT |      | 17 | 14 | 55 | II  | OM.D.INT |
|            | 9  | 10 | 13 | I   | PA.F.INT |                                   | 13 | 46 | 13 | I   | OM.D.EXT |      | 18 | 47 | 59 | II  | PA.D.EXT |
|            | 9  | 13 | 56 | I   | PA.F.EXT |                                   | 13 | 49 | 57 | I   | OM.D.INT |      | 18 | 52 | 28 | II  | PA.D.INT |
|            |    |    |    |     |          |                                   | 14 | 28 | 29 | I   | PA.D.EXT |      | 19 | 44 | 58 | II  | OM.F.INT |
| 3          | 3  | 29 | 47 | I   | EC.D.PEN |                                   | 14 | 32 | 13 | I   | PA.D.INT |      | 19 | 49 | 23 | II  | OM.F.EXT |
|            | 3  | 30 | 35 | I   | EC.D.EXT |                                   | 15 | 59 | 6  | I   | OM.F.INT |      | 21 | 11 | 54 | I   | OM.D.EXT |
|            | 3  | 34 | 20 | I   | EC.D.INT |                                   | 16 | 2  | 50 | I   | OM.F.EXT |      | 21 | 15 | 38 | I   | OM.D.INT |
|            | 6  | 22 | 23 | I   | OC.F.INT |                                   | 16 | 40 | 39 | I   | PA.F.INT |      | 21 | 19 | 42 | II  | PA.F.INT |
|            | 6  | 26 | 8  | I   | OC.F.EXT |                                   | 16 | 44 | 22 | I   | PA.F.EXT |      | 21 | 24 | 10 | II  | PA.F.EXT |
|            | 10 | 30 | 35 | III | EC.D.PEN |                                   |    |    |    |     |          |      | 21 | 58 | 58 | I   | PA.D.EXT |
|            | 10 | 34 | 32 | III | EC.D.EXT | 8                                 | 10 | 55 | 46 | I   | EC.D.PEN |      | 22 | 2  | 42 | I   | PA.D.INT |
|            | 10 | 45 | 20 | III | EC.D.INT |                                   | 10 | 56 | 33 | I   | EC.D.EXT |      | 23 | 24 | 37 | I   | OM.F.INT |
|            | 16 | 2  | 26 | III | OC.F.INT |                                   | 11 | 0  | 19 | I   | EC.D.INT |      | 23 | 28 | 20 | I   | OM.F.EXT |
|            | 16 | 13 | 6  | III | OC.F.EXT |                                   | 13 | 53 | 19 | I   | OC.F.INT |      |    |    |    |     |          |
|            | 20 | 11 | 33 | II  | EC.D.PEN |                                   | 13 | 57 | 5  | I   | OC.F.EXT | 13   | 0  | 10 | 50 | I   | PA.F.INT |
|            | 20 | 13 | 17 | II  | EC.D.EXT |                                   |    |    |    |     |          |      | 0  | 14 | 34 | I   | PA.F.EXT |
|            | 20 | 17 | 36 | II  | EC.D.INT | 9                                 | 3  | 51 | 15 | II  | OM.D.EXT |      | 18 | 21 | 47 | I   | EC.D.PEN |
|            |    |    |    |     |          |                                   | 3  | 55 | 39 | II  | OM.D.INT |      | 18 | 22 | 35 | I   | EC.D.EXT |
| 4          | 0  | 2  | 3  | II  | OC.F.INT |                                   | 5  | 21 | 53 | II  | PA.D.EXT |      | 18 | 26 | 21 | I   | EC.D.INT |
|            | 0  | 6  | 23 | II  | OC.F.EXT |                                   | 5  | 26 | 21 | II  | PA.D.INT |      | 21 | 24 | 9  | I   | OC.F.INT |
|            | 0  | 49 | 6  | I   | OM.D.EXT |                                   | 6  | 25 | 58 | II  | OM.F.INT |      | 21 | 27 | 55 | I   | OC.F.EXT |
|            | 0  | 52 | 49 | I   | OM.D.INT |                                   | 6  | 30 | 22 | II  | OM.F.EXT |      |    |    |    |     |          |
|            | 1  | 28 | 3  | I   | PA.D.EXT |                                   | 7  | 54 | 15 | II  | PA.F.INT | 14   | 4  | 43 | 2  | III | OM.D.EXT |
|            | 1  | 31 | 47 | I   | PA.D.INT |                                   | 7  | 58 | 42 | II  | PA.F.EXT |      | 4  | 53 | 39 | III | OM.D.INT |
|            | 3  | 2  | 5  | I   | OM.F.INT |                                   | 8  | 14 | 46 | I   | OM.D.EXT |      | 7  | 36 | 5  | III | OM.F.INT |
|            | 3  | 5  | 49 | I   | OM.F.EXT |                                   | 8  | 18 | 30 | I   | OM.D.INT |      | 7  | 46 | 45 | III | OM.F.EXT |
|            | 3  | 40 | 24 | I   | PA.F.INT |                                   | 8  | 58 | 39 | I   | PA.D.EXT |      | 8  | 1  | 54 | III | PA.D.EXT |
|            | 3  | 44 | 8  | I   | PA.F.EXT |                                   | 9  | 2  | 23 | I   | PA.D.INT |      | 8  | 12 | 50 | III | PA.D.INT |
|            | 21 | 58 | 24 | I   | EC.D.PEN |                                   | 10 | 27 | 36 | I   | OM.F.INT |      | 10 | 49 | 29 | III | PA.F.INT |
|            | 21 | 59 | 12 | I   | EC.D.EXT |                                   | 10 | 31 | 20 | I   | OM.F.EXT |      | 11 | 0  | 23 | III | PA.F.EXT |
|            | 22 | 2  | 57 | I   | EC.D.INT |                                   | 11 | 10 | 43 | I   | PA.F.INT |      | 12 | 4  | 11 | II  | EC.D.PEN |
|            |    |    |    |     |          |                                   | 11 | 14 | 27 | I   | PA.F.EXT |      | 12 | 5  | 54 | II  | EC.D.EXT |
| 5          | 0  | 52 | 40 | I   | OC.F.INT |                                   |    |    |    |     |          |      | 12 | 10 | 15 | II  | EC.D.INT |
|            | 0  | 56 | 25 | I   | OC.F.EXT | 10                                | 5  | 24 | 28 | I   | EC.D.PEN |      | 15 | 40 | 27 | I   | OM.D.EXT |
|            | 14 | 32 | 46 | II  | OM.D.EXT |                                   | 5  | 25 | 16 | I   | EC.D.EXT |      | 15 | 44 | 11 | I   | OM.D.INT |
|            | 14 | 37 | 10 | II  | OM.D.INT |                                   | 5  | 29 | 2  | I   | EC.D.INT |      | 16 | 12 | 46 | II  | OC.F.INT |
|            | 15 | 56 | 28 | II  | PA.D.EXT |                                   | 8  | 23 | 39 | I   | OC.F.INT |      | 16 | 17 | 9  | II  | OC.F.EXT |
|            | 16 | 0  | 54 | II  | PA.D.INT |                                   | 8  | 27 | 25 | I   | OC.F.EXT |      | 16 | 29 | 4  | I   | PA.D.EXT |
|            | 17 | 7  | 46 | II  | OM.F.INT |                                   | 14 | 31 | 41 | III | EC.D.PEN |      | 16 | 32 | 48 | I   | PA.D.INT |
|            | 17 | 12 | 10 | II  | OM.F.EXT |                                   | 14 | 35 | 40 | III | EC.D.EXT |      | 17 | 53 | 6  | I   | OM.F.INT |
|            | 18 | 29 | 29 | II  | PA.F.INT |                                   | 14 | 46 | 33 | III | EC.D.INT |      | 17 | 56 | 50 | I   | OM.F.EXT |
|            | 18 | 33 | 55 | II  | PA.F.EXT |                                   | 17 | 22 | 33 | III | EC.F.INT |      | 18 | 40 | 50 | I   | PA.F.INT |
|            | 19 | 17 | 39 | I   | OM.D.EXT |                                   | 17 | 33 | 26 | III | EC.F.EXT |      | 18 | 44 | 34 | I   | PA.F.EXT |
|            | 19 | 21 | 23 | I   | OM.D.INT |                                   | 17 | 37 | 25 | III | EC.F.PEN |      |    |    |    |     |          |
|            | 19 | 58 | 16 | I   | PA.D.EXT |                                   | 17 | 38 | 22 | III | OC.D.EXT | 15   | 12 | 50 | 24 | I   | EC.D.PEN |
|            | 20 | 2  | 0  | I   | PA.D.INT |                                   | 17 | 49 | 13 | III | OC.D.INT |      | 12 | 51 | 12 | I   | EC.D.EXT |
|            | 21 | 30 | 36 | I   | OM.F.INT |                                   | 20 | 28 | 54 | III | OC.F.INT |      | 12 | 54 | 58 | I   | EC.D.INT |
|            | 21 | 34 | 20 | I   | OM.F.EXT |                                   | 20 | 39 | 45 | III | OC.F.EXT |      | 15 | 54 | 19 | I   | OC.F.INT |
|            | 22 | 10 | 32 | I   | PA.F.INT |                                   | 22 | 46 | 40 | II  | EC.D.PEN |      | 15 | 58 | 5  | I   | OC.F.EXT |
|            | 22 | 14 | 16 | I   | PA.F.EXT |                                   | 22 | 48 | 24 | II  | EC.D.EXT |      |    |    |    |     |          |



1987<sub>a</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



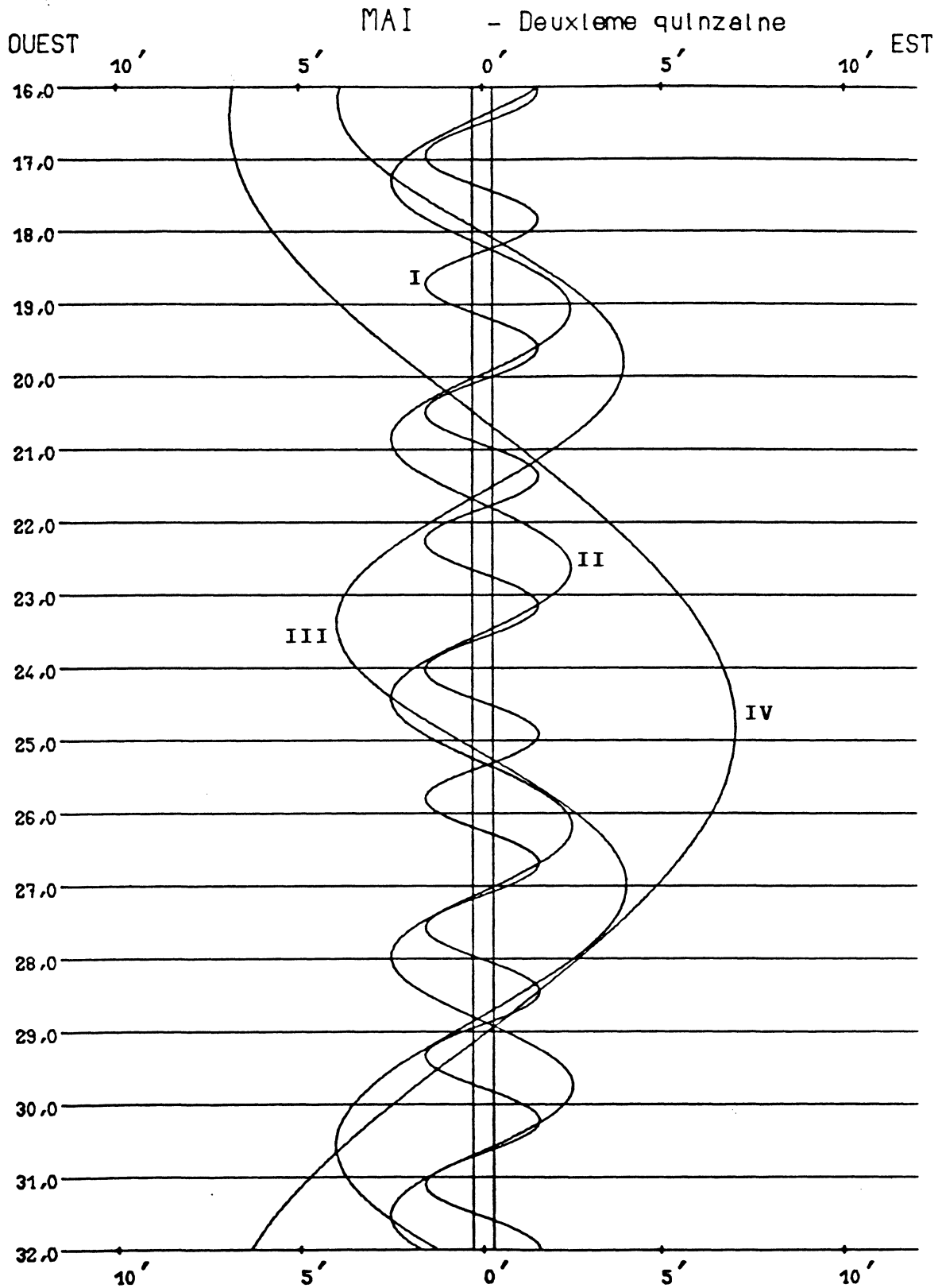
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



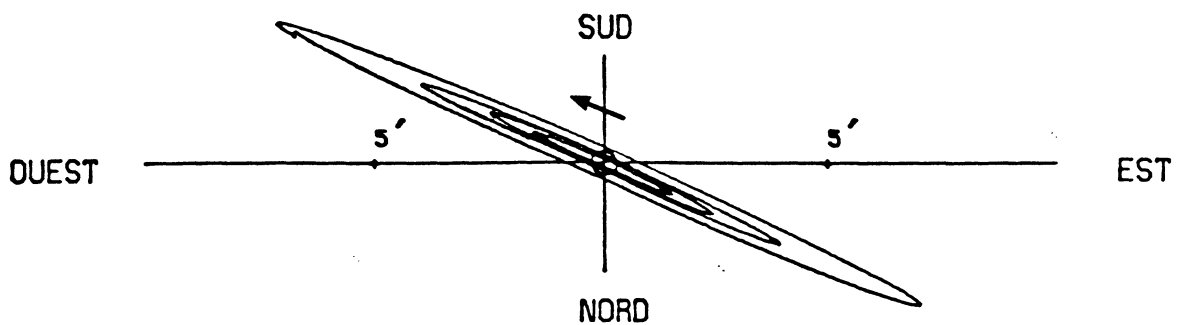
ORBITES APPARENTES

| PHENOMENES |    |    |    |          |          | MOIS :   | MAI - DEUXIEME QUINZAINE - |    |    |          |          |          |    |    |    |          |          |          |
|------------|----|----|----|----------|----------|----------|----------------------------|----|----|----------|----------|----------|----|----|----|----------|----------|----------|
| JOUR       | H  | M  | S  | SAT      | TYPE     | JOUR     | H                          | M  | S  | SAT      | TYPE     | JOUR     | H  | M  | S  | SAT      | TYPE     |          |
| 16         | 6  | 28 | 59 | II       | OM.D.EXT |          | 8                          | 55 | 1  | III      | OM.D.INT |          | 3  | 46 | 50 | I        | EC.D.INT |          |
|            | 6  | 33 | 24 | II       | OM.D.INT |          | 11                         | 36 | 10 | III      | OM.F.INT |          | 6  | 54 | 59 | I        | OC.F.INT |          |
|            | 8  | 13 | 4  | II       | PA.D.EXT |          | 11                         | 46 | 54 | III      | OM.F.EXT |          | 6  | 58 | 46 | I        | OC.F.EXT |          |
|            | 8  | 17 | 34 | II       | PA.D.INT |          | 12                         | 29 | 0  | III      | PA.D.EXT |          | 22 | 26 | 5  | II       | OM.D.EXT |          |
|            | 9  | 3  | 9  | II       | OM.F.INT |          | 12                         | 40 | 9  | III      | PA.D.INT |          | 22 | 30 | 32 | II       | OM.D.INT |          |
|            | 9  | 7  | 35 | II       | OM.F.EXT |          | 14                         | 39 | 3  | II       | EC.D.PEN |          |    |    |    |          |          |          |
|            | 10 | 8  | 58 | I        | OM.D.EXT |          | 14                         | 40 | 47 | II       | EC.D.EXT | 27       | 0  | 28 | 54 | II       | PA.D.EXT |          |
|            | 10 | 12 | 42 | I        | OM.D.INT |          | 14                         | 45 | 9  | II       | EC.D.INT |          | 0  | 33 | 27 | II       | PA.D.INT |          |
|            | 10 | 44 | 7  | II       | PA.F.INT |          | 15                         | 13 | 17 | III      | PA.F.INT |          | 0  | 59 | 25 | II       | OM.F.INT |          |
|            | 10 | 48 | 36 | II       | PA.F.EXT |          | 15                         | 24 | 24 | III      | PA.F.EXT |          | 1  | 0  | 9  | I        | OM.D.EXT |          |
|            | 10 | 59 | 7  | I        | PA.D.EXT |          | 17                         | 34 | 35 | I        | OM.D.EXT |          | 1  | 3  | 53 | II       | OM.F.EXT |          |
|            | 11 | 2  | 52 | I        | PA.D.INT |          | 17                         | 38 | 19 | I        | OM.D.INT |          | 1  | 3  | 53 | I        | OM.D.INT |          |
|            | 12 | 21 | 34 | I        | OM.F.INT |          | 18                         | 29 | 12 | I        | PA.D.EXT |          | 1  | 59 | 0  | I        | PA.D.EXT |          |
|            | 12 | 25 | 18 | I        | OM.F.EXT |          | 18                         | 32 | 57 | I        | PA.D.INT |          | 2  | 2  | 45 | I        | PA.D.INT |          |
| 13         | 10 | 48 | I  | PA.F.INT |          | 18       | 58                         | 51 | II | OC.F.INT |          | 2        | 57 | 54 | II | PA.F.INT |          |          |
| 13         | 14 | 32 | I  | PA.F.EXT |          | 19       | 3                          | 16 | II | OC.F.EXT |          | 3        | 2  | 27 | II | PA.F.EXT |          |          |
| 17         | 7  | 19 | 6  | I        | EC.D.PEN |          | 19                         | 47 | 0  | I        | OM.F.INT |          | 3  | 12 | 23 | I        | OM.F.INT |          |
|            | 7  | 19 | 54 | I        | EC.D.EXT |          | 19                         | 50 | 44 | I        | OM.F.EXT |          | 3  | 16 | 7  | I        | OM.F.EXT |          |
|            | 7  | 23 | 40 | I        | EC.D.INT |          | 20                         | 40 | 34 | I        | PA.F.INT |          | 4  | 10 | 4  | I        | PA.F.INT |          |
|            | 10 | 24 | 33 | I        | OC.F.INT |          | 20                         | 44 | 19 | I        | PA.F.EXT |          | 4  | 13 | 49 | I        | PA.F.EXT |          |
|            | 10 | 28 | 20 | I        | OC.F.EXT | 22       | 14                         | 45 | 0  | I        | EC.D.PEN |          | 22 | 10 | 57 | I        | EC.D.PEN |          |
|            | 18 | 33 | 15 | III      | EC.D.PEN |          | 14                         | 45 | 48 | I        | EC.D.EXT |          | 22 | 11 | 46 | I        | EC.D.EXT |          |
|            | 18 | 37 | 15 | III      | EC.D.EXT |          | 14                         | 49 | 34 | I        | EC.D.INT |          | 22 | 15 | 32 | I        | EC.D.INT |          |
|            | 18 | 48 | 13 | III      | EC.D.INT |          | 17                         | 54 | 53 | I        | OC.F.INT | 28       | 1  | 25 | 2  | I        | OC.F.INT |          |
|            | 21 | 23 | 5  | III      | EC.F.INT |          | 17                         | 58 | 40 | I        | OC.F.EXT |          | 1  | 28 | 50 | I        | OC.F.EXT |          |
|            | 21 | 34 | 3  | III      | EC.F.EXT |          |                            |    |    |          |          |          | 12 | 45 | 5  | III      | OM.D.EXT |          |
|            | 21 | 38 | 3  | III      | EC.F.PEN | 23       | 9                          | 6  | 47 | II       | OM.D.EXT |          | 12 | 55 | 49 | III      | OM.D.INT |          |
|            | 22 | 7  | 0  | III      | OC.D.EXT |          | 9                          | 11 | 13 | II       | OM.D.INT |          | 15 | 35 | 41 | III      | OM.F.INT |          |
|            | 22 | 18 | 4  | III      | OC.D.INT |          | 11                         | 3  | 34 | II       | PA.D.EXT |          | 15 | 46 | 29 | III      | OM.F.EXT |          |
|            | 18 | 0  | 54 | 27       | III      | OC.F.INT |                            | 11 | 8  | 6        | II       | PA.D.INT |    | 16 | 53 | 55       | III      | PA.D.EXT |
| 1          |    | 5  | 32 | III      | OC.F.EXT |          | 11                         | 40 | 24 | II       | OM.F.INT |          | 17 | 5  | 18 | III      | PA.D.INT |          |
| 1          |    | 21 | 39 | II       | EC.D.PEN |          | 11                         | 44 | 51 | II       | OM.F.EXT |          | 17 | 13 | 49 | II       | EC.D.PEN |          |
| 1          |    | 23 | 23 | II       | EC.D.EXT |          | 12                         | 3  | 6  | I        | OM.D.EXT |          | 17 | 15 | 33 | II       | EC.D.EXT |          |
| 1          |    | 27 | 44 | II       | EC.D.INT |          | 12                         | 6  | 50 | I        | OM.D.INT |          | 17 | 19 | 55 | II       | EC.D.INT |          |
| 4          |    | 37 | 32 | I        | OM.D.EXT |          | 12                         | 59 | 9  | I        | PA.D.EXT |          | 19 | 28 | 40 | I        | OM.D.EXT |          |
| 4          |    | 41 | 16 | I        | OM.D.INT |          | 13                         | 2  | 54 | I        | PA.D.INT |          | 19 | 32 | 24 | I        | OM.D.INT |          |
| 5          |    | 29 | 12 | I        | PA.D.EXT |          | 13                         | 33 | 15 | II       | PA.F.INT |          | 19 | 34 | 49 | III      | PA.F.INT |          |
| 5          |    | 32 | 56 | I        | PA.D.INT |          | 13                         | 37 | 47 | II       | PA.F.EXT |          | 19 | 46 | 9  | III      | PA.F.EXT |          |
| 5          |    | 35 | 55 | II       | OC.F.INT |          | 14                         | 15 | 27 | I        | OM.F.INT |          | 20 | 28 | 51 | I        | PA.D.EXT |          |
| 5          |    | 40 | 20 | II       | OC.F.EXT |          | 14                         | 19 | 11 | I        | OM.F.EXT |          | 20 | 32 | 36 | I        | PA.D.INT |          |
| 6          |    | 50 | 4  | I        | OM.F.INT |          | 15                         | 10 | 25 | I        | PA.F.INT |          | 21 | 40 | 50 | I        | OM.F.INT |          |
| 6          |    | 53 | 48 | I        | OM.F.EXT |          | 15                         | 14 | 10 | I        | PA.F.EXT |          | 21 | 43 | 59 | II       | OC.F.INT |          |
| 7          |    | 40 | 46 | I        | PA.F.INT | 24       | 9                          | 13 | 41 | I        | EC.D.PEN |          | 21 | 44 | 34 | I        | OM.F.EXT |          |
| 7          | 44 | 30 | I  | PA.F.EXT |          | 9        | 14                         | 29 | I  | EC.D.EXT |          | 22       | 39 | 49 | I  | PA.F.INT |          |          |
| 19         | 1  | 47 | 41 | I        | EC.D.PEN |          | 9                          | 18 | 16 | I        | EC.D.INT |          | 22 | 43 | 34 | I        | PA.F.EXT |          |
|            | 1  | 48 | 29 | I        | EC.D.EXT |          | 12                         | 25 | 0  | I        | OC.F.INT |          |    |    |    |          |          |          |
|            | 1  | 52 | 15 | I        | EC.D.INT |          | 12                         | 28 | 47 | I        | OC.F.EXT | 29       | 16 | 39 | 33 | I        | EC.D.PEN |          |
|            | 4  | 54 | 38 | I        | OC.F.INT |          | 22                         | 34 | 42 | III      | EC.D.PEN |          | 16 | 40 | 21 | I        | EC.D.EXT |          |
|            | 4  | 58 | 25 | I        | OC.F.EXT |          | 22                         | 38 | 44 | III      | EC.D.EXT |          | 16 | 44 | 8  | I        | EC.D.INT |          |
|            | 19 | 48 | 17 | II       | OM.D.EXT |          | 22                         | 49 | 47 | III      | EC.D.INT |          | 19 | 54 | 59 | I        | OC.F.INT |          |
|            | 19 | 52 | 43 | II       | OM.D.INT | 25       | 1                          | 23 | 28 | III      | EC.F.INT |          | 19 | 58 | 46 | I        | OC.F.EXT |          |
|            | 21 | 38 | 50 | II       | PA.D.EXT |          | 1                          | 34 | 31 | III      | EC.F.EXT | 30       | 11 | 44 | 34 | II       | OM.D.EXT |          |
|            | 21 | 43 | 21 | II       | PA.D.INT |          | 1                          | 38 | 33 | III      | EC.F.PEN |          | 11 | 49 | 0  | II       | OM.D.INT |          |
|            | 22 | 22 | 11 | II       | OM.F.INT |          | 2                          | 33 | 54 | III      | OC.D.EXT |          | 13 | 53 | 7  | II       | PA.D.EXT |          |
|            | 22 | 26 | 38 | II       | OM.F.EXT |          | 2                          | 45 | 12 | III      | OC.D.INT |          | 13 | 57 | 9  | I        | OM.D.EXT |          |
|            | 23 | 6  | 4  | I        | OM.D.EXT |          | 3                          | 56 | 27 | II       | EC.D.PEN |          | 13 | 57 | 42 | II       | PA.D.INT |          |
|            | 23 | 9  | 48 | I        | OM.D.INT |          | 3                          | 58 | 11 | II       | EC.D.EXT |          | 14 | 0  | 53 | I        | OM.D.INT |          |
|            | 23 | 59 | 13 | I        | PA.D.EXT |          | 4                          | 2  | 33 | II       | EC.D.INT |          | 14 | 17 | 36 | II       | OM.F.INT |          |
| 20         | 0  | 2  | 58 | I        | PA.D.INT |          | 5                          | 18 | 10 | III      | OC.F.INT |          | 14 | 22 | 4  | II       | OM.F.EXT |          |
|            | 0  | 9  | 13 | II       | PA.F.INT |          | 5                          | 29 | 29 | III      | OC.F.EXT |          | 14 | 58 | 40 | I        | PA.D.EXT |          |
|            | 0  | 13 | 43 | II       | PA.F.EXT |          | 6                          | 31 | 39 | I        | OM.D.EXT |          | 15 | 2  | 25 | I        | PA.D.INT |          |
|            | 1  | 18 | 32 | I        | OM.F.INT |          | 6                          | 35 | 23 | I        | OM.D.INT |          | 16 | 9  | 16 | I        | OM.F.INT |          |
|            | 1  | 22 | 16 | I        | OM.F.EXT |          | 7                          | 29 | 6  | I        | PA.D.EXT |          | 16 | 13 | 0  | I        | OM.F.EXT |          |
|            | 2  | 10 | 41 | I        | PA.F.INT |          | 7                          | 32 | 51 | I        | PA.D.INT |          | 16 | 21 | 26 | II       | PA.F.INT |          |
|            | 2  | 14 | 26 | I        | PA.F.EXT |          | 8                          | 21 | 32 | II       | OC.F.INT |          | 16 | 26 | 0  | II       | PA.F.EXT |          |
|            | 20 | 16 | 24 | I        | EC.D.PEN |          | 8                          | 25 | 58 | II       | OC.F.EXT |          | 17 | 9  | 32 | I        | PA.F.INT |          |
|            | 20 | 17 | 12 | I        | EC.D.EXT |          | 8                          | 43 | 56 | I        | OM.F.INT |          | 17 | 13 | 17 | I        | PA.F.EXT |          |
|            | 20 | 20 | 58 | I        | EC.D.INT |          | 8                          | 47 | 40 | I        | OM.F.EXT |          |    |    |    |          |          |          |
|            | 23 | 24 | 50 | I        | OC.F.INT |          | 9                          | 40 | 16 | I        | PA.F.INT | 31       | 11 | 8  | 14 | I        | EC.D.PEN |          |
|            | 23 | 28 | 36 | I        | OC.F.EXT |          | 9                          | 44 | 1  | I        | PA.F.EXT |          | 11 | 9  | 2  | I        | EC.D.EXT |          |
|            | 21 | 8  | 44 | 20       | III      | OM.D.EXT | 26                         | 3  | 42 | 16       | I        | EC.D.PEN |    | 11 | 12 | 49       | I        | EC.D.INT |
|            |    |    |    |          |          |          | 3                          | 43 | 4  | I        | EC.D.EXT |          | 14 | 24 | 58 | I        | OC.F.INT |          |
|            |    |    |    |          |          |          |                            |    |    |          |          | 14       | 28 | 46 | I  | OC.F.EXT |          |          |

1987<sub>b</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

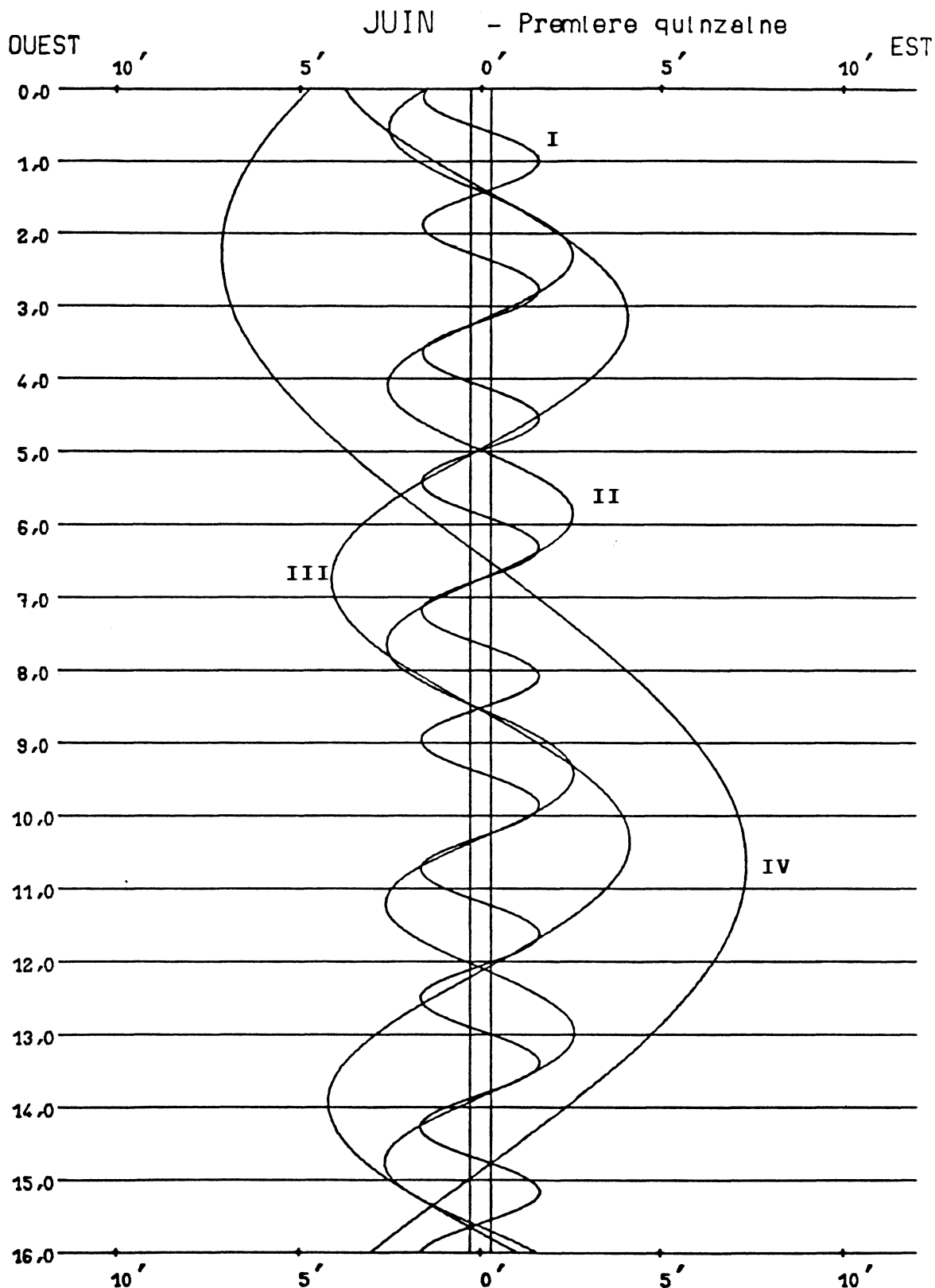


ORBITES APPARENTES

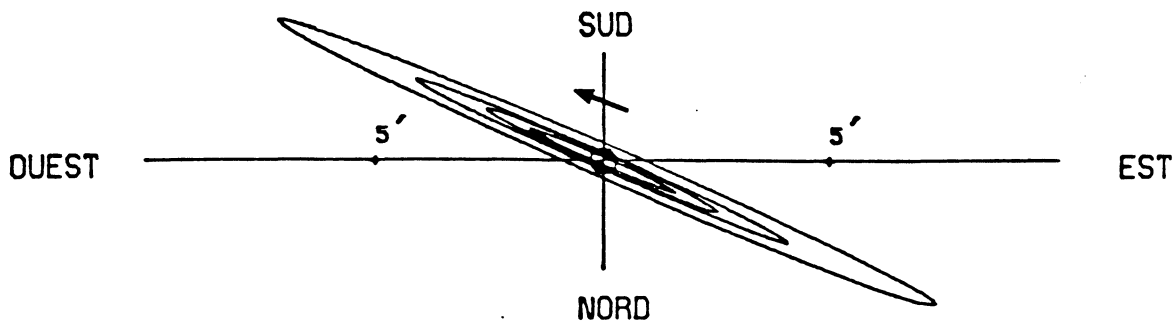
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : JUIN - PREMIERE QUINZAINE - |    |    |     |          |          |          |    |          |     |          |          |          |          |
|------------|----|----|-----|----------|----------|------------------------------------|----|----|-----|----------|----------|----------|----|----------|-----|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                               | H  | M  | S   | SAT      | TYPE     | JOUR     | H  | M        | S   | SAT      | TYPE     |          |          |
| 1          | 2  | 36 | 52  | III      | EC.D.PEN | 6                                  | 21 | 54 | 31  | I        | OC.F.INT | 12       | 5  | 27       | 37  | I        | OC.F.EXT |          |          |
|            | 2  | 40 | 55  | III      | EC.D.EXT |                                    | 21 | 58 | 19  | I        | OC.F.EXT |          | 20 | 46       | 48  | III      | OM.D.EXT |          |          |
|            | 2  | 52 | 3   | III      | EC.D.INT |                                    | 14 | 22 | 22  | II       | OM.D.EXT |          | 20 | 57       | 40  | III      | OM.D.INT |          |          |
|            | 5  | 24 | 34  | III      | EC.F.INT |                                    | 14 | 26 | 49  | II       | OM.D.INT |          | 22 | 23       | 0   | II       | EC.D.PEN |          |          |
|            | 5  | 35 | 42  | III      | EC.F.EXT |                                    | 15 | 51 | 8   | I        | OM.D.EXT |          | 22 | 24       | 45  | II       | EC.D.EXT |          |          |
|            | 5  | 39 | 45  | III      | EC.F.PEN |                                    | 15 | 54 | 52  | I        | OM.D.INT |          | 22 | 29       | 9   | II       | EC.D.INT |          |          |
|            | 6  | 31 | 11  | II       | EC.D.PEN |                                    | 16 | 41 | 40  | II       | PA.D.EXT |          | 23 | 16       | 35  | I        | OM.D.EXT |          |          |
|            | 6  | 32 | 55  | II       | EC.D.EXT |                                    | 16 | 46 | 18  | II       | PA.D.INT |          | 23 | 20       | 19  | I        | OM.D.INT |          |          |
|            | 6  | 37 | 18  | II       | EC.D.INT |                                    | 16 | 54 | 49  | II       | OM.F.INT |          | 23 | 35       | 1   | III      | OM.F.INT |          |          |
|            | 6  | 59 | 40  | III      | OC.D.EXT |                                    | 16 | 57 | 38  | I        | PA.D.EXT |          | 23 | 45       | 58  | III      | OM.F.EXT |          |          |
|            | 7  | 11 | 13  | III      | OC.D.INT |                                    | 16 | 59 | 17  | II       | OM.F.EXT |          | 13 | 0        | 26  | 28       | I        | PA.D.EXT |          |
|            | 8  | 25 | 40  | I        | OM.D.EXT |                                    | 17 | 1  | 23  | I        | PA.D.INT |          |    | 0        | 30  | 14       | I        | PA.D.INT |          |
|            | 8  | 29 | 24  | I        | OM.D.INT |                                    | 18 | 3  | 1   | I        | OM.F.INT |          |    | 1        | 28  | 18       | I        | OM.F.INT |          |
|            | 9  | 28 | 28  | I        | PA.D.EXT |                                    | 18 | 6  | 45  | I        | OM.F.EXT |          |    | 1        | 32  | 2        | I        | OM.F.EXT |          |
|            | 9  | 32 | 14  | I        | PA.D.INT |                                    | 19 | 8  | 7   | I        | PA.F.INT |          |    | 1        | 38  | 5        | III      | PA.D.EXT |          |
|            | 9  | 40 | 39  | III      | OC.F.INT |                                    | 19 | 8  | 34  | II       | PA.F.INT |          |    | 1        | 50  | 0        | III      | PA.D.INT |          |
|            | 9  | 52 | 11  | III      | OC.F.EXT |                                    | 19 | 11 | 52  | I        | PA.F.EXT |          |    | 2        | 36  | 40       | I        | PA.F.INT |          |
|            | 10 | 37 | 43  | I        | OM.F.INT |                                    | 19 | 13 | 11  | II       | PA.F.EXT |          |    | 2        | 40  | 26       | I        | PA.F.EXT |          |
| 10         | 41 | 27 | I   | OM.F.EXT | 7        | 13                                 | 2  | 44 | I   | EC.D.PEN | 3        | 11       |    | 3        | II  | OC.F.INT |          |          |          |
| 11         | 6  | 11 | II  | OC.F.INT |          | 13                                 | 3  | 32 | I   | EC.D.EXT | 3        | 15       |    | 35       | II  | OC.F.EXT |          |          |          |
| 11         | 10 | 40 | II  | OC.F.EXT |          | 13                                 | 7  | 19 | I   | EC.D.INT | 4        | 12       |    | 1        | III | PA.F.INT |          |          |          |
| 11         | 39 | 15 | I   | PA.F.INT |          | 16                                 | 24 | 22 | I   | OC.F.INT | 4        | 23       |    | 50       | III | PA.F.EXT |          |          |          |
| 11         | 43 | 0  | I   | PA.F.EXT |          | 16                                 | 28 | 10 | I   | OC.F.EXT | 20       | 28       |    | 31       | I   | EC.D.PEN |          |          |          |
| 2          | 5  | 36 | 48  | I        |          | EC.D.PEN                           | 8  | 6  | 38  | 15       | III      | EC.D.PEN |    | 20       | 29  | 20       | I        | EC.D.EXT |          |
|            | 5  | 37 | 36  | I        |          | EC.D.EXT                           |    | 6  | 42  | 20       | III      | EC.D.EXT |    | 20       | 33  | 6        | I        | EC.D.INT |          |
|            | 5  | 41 | 22  | I        |          | EC.D.INT                           |    | 6  | 53  | 32       | III      | EC.D.INT |    | 23       | 53  | 27       | I        | OC.F.INT |          |
|            | 8  | 54 | 48  | I        |          | OC.F.INT                           |    | 9  | 5   | 46       | II       | EC.D.PEN |    | 23       | 57  | 16       | I        | OC.F.EXT |          |
|            | 8  | 58 | 36  | I        |          | OC.F.EXT                           |    | 9  | 7   | 30       | II       | EC.D.EXT |    | 14       | 17  | 0        | 7        | II       | OM.D.EXT |
| 3          | 1  | 3  | 53  | II       |          | OM.D.EXT                           | 9  | 11 | 54  | II       | EC.D.INT | 17       | 4  |          | 36  | II       | OM.D.INT |          |          |
|            | 1  | 8  | 20  | II       |          | OM.D.INT                           | 9  | 24 | 53  | III      | EC.F.INT | 17       | 45 |          | 3   | I        | OM.D.EXT |          |          |
|            | 2  | 54 | 10  | I        |          | OM.D.EXT                           | 9  | 36 | 6   | III      | EC.F.EXT | 17       | 48 |          | 47  | I        | OM.D.INT |          |          |
|            | 2  | 57 | 54  | I        |          | OM.D.INT                           | 9  | 40 | 10  | III      | EC.F.PEN | 18       | 55 |          | 59  | I        | PA.D.EXT |          |          |
|            | 3  | 17 | 58  | II       |          | PA.D.EXT                           | 10 | 19 | 38  | I        | OM.D.EXT | 18       | 59 |          | 45  | I        | PA.D.INT |          |          |
|            | 3  | 22 | 34  | II       |          | PA.D.INT                           | 10 | 23 | 22  | I        | OM.D.INT | 19       | 29 |          | 1   | II       | PA.D.EXT |          |          |
|            | 3  | 36 | 38  | II       |          | OM.F.INT                           | 11 | 22 | 31  | III      | OC.D.EXT | 19       | 31 |          | 59  | II       | OM.F.INT |          |          |
|            | 3  | 41 | 6   | II       |          | OM.F.EXT                           | 11 | 27 | 17  | I        | PA.D.EXT | 19       | 33 |          | 41  | II       | PA.D.INT |          |          |
|            | 3  | 58 | 14  | I        | PA.D.EXT | 11                                 | 27 | 17 | I   | PA.D.EXT | 19       | 36       | 29 |          | II  | OM.F.EXT |          |          |          |
|            | 4  | 2  | 0   | I        | PA.D.INT | 11                                 | 31 | 3  | I   | PA.D.INT | 19       | 56       | 42 |          | I   | OM.F.INT |          |          |          |
|            | 5  | 6  | 10  | I        | OM.F.INT | 11                                 | 34 | 19 | III | OC.D.INT | 20       | 0        | 27 |          | I   | OM.F.EXT |          |          |          |
|            | 5  | 9  | 54  | I        | OM.F.EXT | 12                                 | 31 | 27 | I   | OM.F.INT | 21       | 6        | 5  |          | I   | PA.F.INT |          |          |          |
|            | 5  | 45 | 34  | II       | PA.F.INT | 12                                 | 35 | 12 | I   | OM.F.EXT | 21       | 9        | 51 |          | I   | PA.F.EXT |          |          |          |
|            | 5  | 50 | 10  | II       | PA.F.EXT | 13                                 | 37 | 40 | I   | PA.F.INT | 21       | 54       | 32 |          | II  | PA.F.INT |          |          |          |
|            | 6  | 8  | 55  | I        | PA.F.INT | 13                                 | 41 | 26 | I   | PA.F.EXT | 21       | 59       | 11 |          | II  | PA.F.EXT |          |          |          |
|            | 6  | 12 | 40  | I        | PA.F.EXT | 13                                 | 49 | 43 | II  | OC.F.INT | 15       | 14       | 57 |          | 11  | I        | EC.D.PEN |          |          |
|            | 4  | 0  | 5   | 29       | I        | EC.D.PEN                           | 13 | 54 | 13  | II       |          | OC.F.EXT | 14 |          | 57  | 59       | I        | EC.D.EXT |          |
|            |    | 0  | 6   | 17       | I        | EC.D.EXT                           | 14 | 0  | 6   | III      |          | OC.F.INT | 14 | 57       | 59  | I        | EC.D.EXT |          |          |
| 0          |    | 10 | 3   | I        | EC.D.INT | 14                                 | 11 | 54 | III | OC.F.EXT |          | 15       | 1  | 46       | I   | EC.D.INT |          |          |          |
| 3          |    | 24 | 44  | I        | OC.F.INT | 9                                  | 7  | 31 | 17  | I        |          | EC.D.PEN | 18 | 23       | 9   | I        | OC.F.INT |          |          |
| 3          |    | 28 | 31  | I        | OC.F.EXT |                                    | 7  | 32 | 5   | I        |          | EC.D.EXT | 18 | 26       | 57  | I        | OC.F.EXT |          |          |
| 16         |    | 45 | 44  | III      | OM.D.EXT |                                    | 7  | 35 | 52  | I        |          | EC.D.INT | 10 | 10       | 39  | 40       | III      | EC.D.PEN |          |
| 16         |    | 56 | 32  | III      | OM.D.INT |                                    | 10 | 54 | 3   | I        |          | OC.F.INT |    | 10       | 43  | 46       | III      | EC.D.EXT |          |
| 19         |    | 35 | 9   | III      | OM.F.INT |                                    | 10 | 57 | 51  | I        |          | OC.F.EXT |    | 10       | 55  | 3        | III      | EC.D.INT |          |
| 19         |    | 46 | 1   | III      | OM.F.EXT |                                    | 10 | 3  | 41  | 42       |          | II       |    | OM.D.EXT | 11  | 40       | 17       | II       | EC.D.PEN |
| 19         |    | 48 | 28  | II       | EC.D.PEN |                                    |    | 3  | 46  | 10       |          | II       |    | OM.D.INT | 11  | 42       | 2        | II       | EC.D.EXT |
| 19         |    | 50 | 12  | II       | EC.D.EXT |                                    |    | 4  | 48  | 7        |          | I        |    | OM.D.EXT | 11  | 46       | 26       | II       | EC.D.INT |
| 19         |    | 54 | 35  | II       | EC.D.INT |                                    |    | 4  | 48  | 7        |          | I        |    | OM.D.EXT | 12  | 13       | 32       | I        | OM.D.EXT |
| 21         |    | 16 | 51  | III      | PA.D.EXT |                                    |    | 4  | 51  | 51       |          | I        |    | OM.D.INT | 12  | 17       | 16       | I        | OM.D.INT |
| 21         |    | 22 | 39  | I        | OM.D.EXT |                                    |    | 5  | 56  | 54       |          | I        |    | PA.D.EXT | 13  | 25       | 13       | III      | EC.F.INT |
| 21         |    | 26 | 24  | I        | OM.D.INT |                                    |    | 6  | 0   | 40       |          | I        |    | PA.D.INT | 13  | 25       | 29       | I        | PA.D.EXT |
| 21         |    | 28 | 29  | III      | PA.D.INT |                                    |    | 6  | 5   | 58       |          | II       |    | PA.D.EXT | 13  | 29       | 15       | I        | PA.D.INT |
| 22         |    | 27 | 57  | I        | PA.D.EXT |                                    |    | 6  | 10  | 36       |          | II       |    | PA.D.INT | 13  | 36       | 30       | III      | EC.F.EXT |
| 22         |    | 31 | 43  | I        | PA.D.INT |                                    |    | 6  | 13  | 52       | II       | OM.F.INT |    | 13       | 40  | 36       | III      | EC.F.PEN |          |
| 23         | 34 | 35 | I   | OM.F.INT | 6        |                                    |    | 18 | 21  | II       | OM.F.EXT | 14       |    | 25       | 8   | I        | OM.F.INT |          |          |
| 23         | 38 | 20 | I   | OM.F.EXT | 6        |                                    |    | 59 | 53  | I        | OM.F.INT | 14       |    | 28       | 53  | I        | OM.F.EXT |          |          |
| 23         | 54 | 18 | III | PA.F.INT | 7        |                                    |    | 3  | 38  | I        | OM.F.EXT | 15       |    | 35       | 30  | I        | PA.F.INT |          |          |
| 5          | 0  | 5  | 52  | III      | PA.F.EXT | 8                                  |    | 7  | 12  | I        | PA.F.INT | 15       |    | 39       | 16  | I        | PA.F.EXT |          |          |
|            | 0  | 28 | 5   | II       | OC.F.INT | 8                                  |    | 10 | 58  | I        | PA.F.EXT | 15       |    | 42       | 56  | III      | OC.D.EXT |          |          |
|            | 0  | 32 | 35  | II       | OC.F.EXT | 8                                  |    | 32 | 10  | II       | PA.F.INT | 15       | 55 | 1        | III | OC.D.INT |          |          |          |
|            | 0  | 38 | 32  | I        | PA.F.INT | 8                                  |    | 36 | 48  | II       | PA.F.EXT | 16       | 32 | 5        | II  | OC.F.INT |          |          |          |
|            | 0  | 42 | 17  | I        | PA.F.EXT | 11                                 |    | 1  | 59  | 57       | I        | EC.D.PEN | 16 | 36       | 38  | II       | OC.F.EXT |          |          |
|            | 18 | 34 | 4   | I        | EC.D.PEN |                                    | 2  | 0  | 45  | I        | EC.D.EXT | 18       | 17 | 4        | III | OC.F.INT |          |          |          |
|            | 18 | 34 | 52  | I        | EC.D.EXT |                                    | 2  | 4  | 32  | I        | EC.D.INT | 18       | 29 | 9        | III | OC.F.EXT |          |          |          |
|            | 18 | 38 | 38  | I        | EC.D.INT |                                    | 5  | 23 | 49  | I        | OC.F.INT |          |    |          |     |          |          |          |          |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

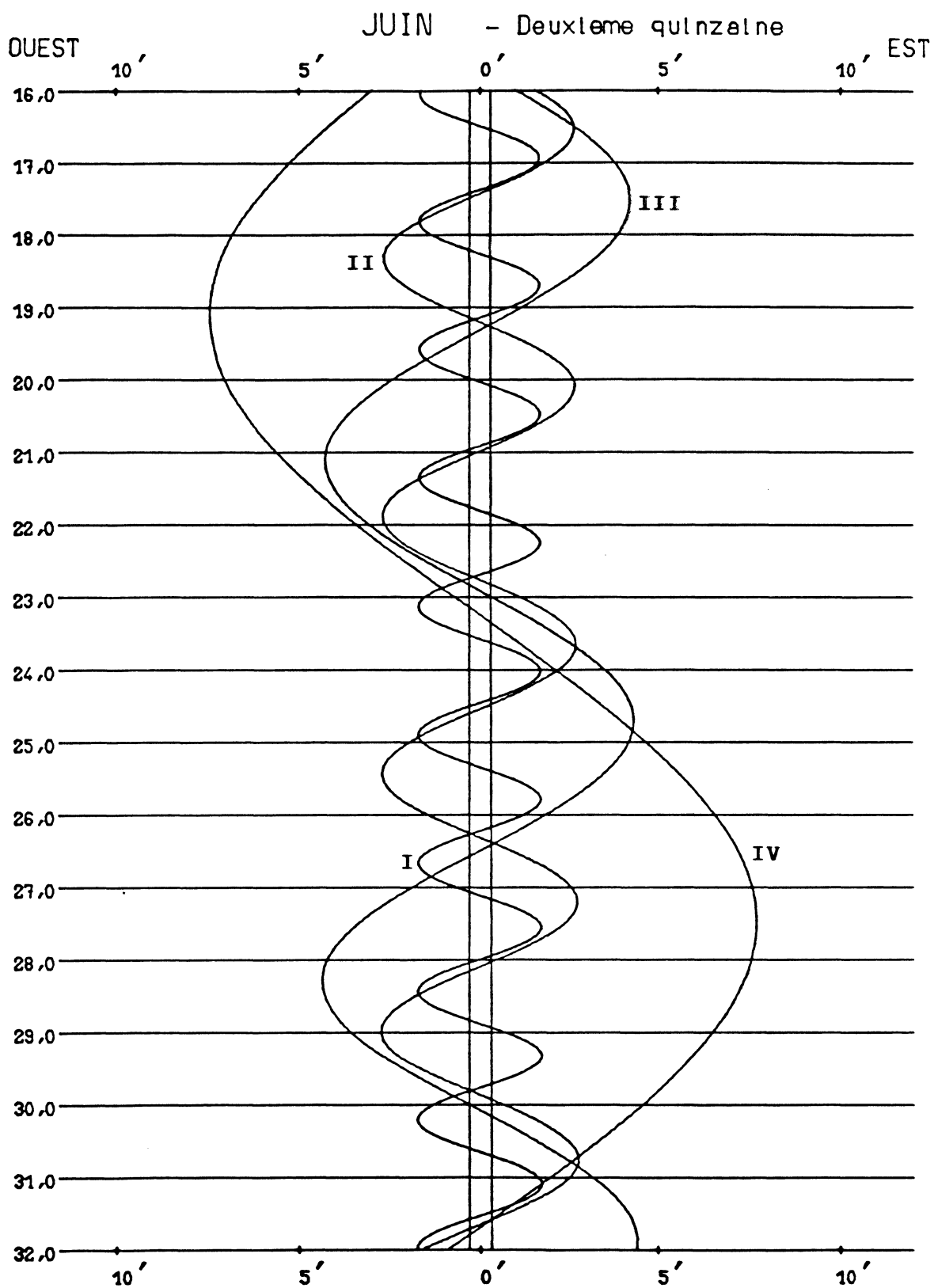


ORBITES APPARENTES

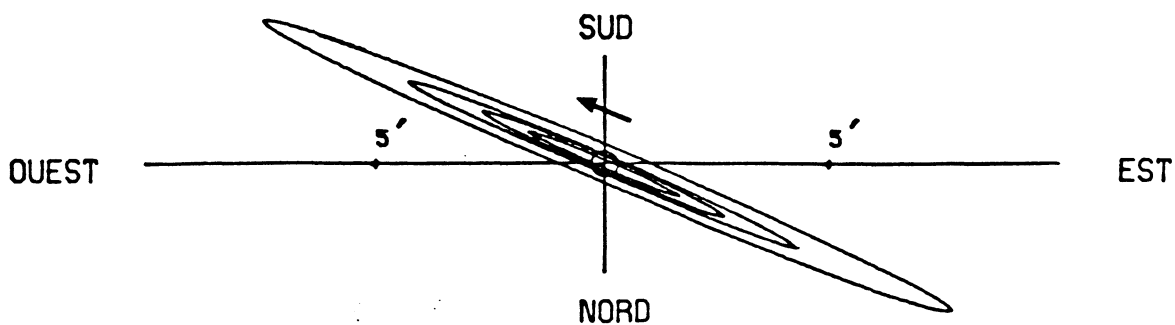
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : JUIN - DEUXIEME QUINZAINE - |    |    |          |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|------------------------------------|----|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                               | H  | M  | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |          |
| 16         | 9  | 25 | 44  | I        | EC.D.PEN | 16                                 | 16 | 51 | 36       | I        | EC.D.PEN | 6        | 7        | 8        | II       | EC.F.PEN |          |          |          |
|            | 9  | 26 | 32  | I        | EC.D.EXT |                                    | 16 | 52 | 24       | I        | EC.D.EXT |          | 6        | 9        | 53       | II       | OC.D.EXT |          |          |
|            | 9  | 30 | 19  | I        | EC.D.INT |                                    | 16 | 56 | 11       | I        | EC.D.INT |          | 6        | 14       | 30       | II       | OC.D.INT |          |          |
|            | 12 | 52 | 40  | I        | OC.F.INT |                                    | 20 | 21 | 15       | I        | OC.F.INT |          | 6        | 31       | 0        | I        | PA.F.INT |          |          |
|            | 12 | 56 | 29  | I        | OC.F.EXT |                                    | 20 | 25 | 4        | I        | OC.F.EXT |          | 6        | 34       | 47       | I        | PA.F.EXT |          |          |
| 17         | 6  | 19 | 26  | II       | OM.D.EXT | 22                                 | 14 | 7  | 22       | I        | OM.D.EXT | 27       | 0        | 17       | 20       | I        | EC.D.PEN |          |          |
|            | 6  | 23 | 55  | II       | OM.D.INT |                                    | 14 | 11 | 6        | I        | OM.D.INT |          | 0        | 18       | 8        | I        | EC.D.EXT |          |          |
|            | 6  | 42 | 0   | I        | OM.D.EXT |                                    | 14 | 14 | 44       | II       | EC.D.PEN |          | 0        | 21       | 55       | I        | EC.D.INT |          |          |
|            | 6  | 45 | 44  | I        | OM.D.INT |                                    | 14 | 16 | 29       | II       | EC.D.EXT |          | 3        | 49       | 16       | I        | OC.F.INT |          |          |
|            | 7  | 54 | 57  | I        | PA.D.EXT |                                    | 14 | 20 | 54       | II       | EC.D.INT |          | 3        | 53       | 6        | I        | OC.F.EXT |          |          |
|            | 7  | 58 | 43  | I        | PA.D.INT |                                    | 14 | 40 | 30       | III      | EC.D.PEN |          | 21       | 32       | 42       | I        | OM.D.EXT |          |          |
|            | 8  | 51 | 1   | II       | OM.F.INT |                                    | 14 | 44 | 37       | III      | EC.D.EXT |          | 21       | 36       | 26       | I        | OM.D.INT |          |          |
|            | 8  | 52 | 40  | II       | PA.D.EXT |                                    | 14 | 56 | 0        | III      | EC.D.INT |          | 22       | 15       | 33       | II       | OM.D.EXT |          |          |
|            | 8  | 53 | 33  | I        | OM.F.INT |                                    | 15 | 23 | 1        | I        | PA.D.EXT |          | 22       | 20       | 2        | II       | OM.D.INT |          |          |
|            | 8  | 55 | 31  | II       | OM.F.EXT |                                    | 15 | 26 | 48       | I        | PA.D.INT |          | 22       | 50       | 41       | I        | PA.D.EXT |          |          |
|            | 8  | 57 | 18  | I        | OM.F.EXT |                                    | 16 | 18 | 46       | I        | OM.F.INT |          | 22       | 54       | 29       | I        | PA.D.INT |          |          |
|            | 8  | 57 | 21  | II       | PA.D.INT |                                    | 16 | 22 | 31       | I        | OM.F.EXT |          | 23       | 43       | 58       | I        | OM.F.INT |          |          |
|            | 10 | 4  | 52  | I        | PA.F.INT |                                    | 16 | 43 | 56       | II       | EC.F.INT |          | 23       | 47       | 43       | I        | OM.F.EXT |          |          |
|            | 10 | 8  | 38  | I        | PA.F.EXT |                                    | 16 | 48 | 21       | II       | EC.F.EXT |          | 28       | 0        | 46       | 16       | II       | OM.F.INT |          |
| 11         | 17 | 28 | II  | PA.F.INT | 16       | 49                                 | 15 | II | OC.D.EXT | 0        | 50       | 47       |          | II       | OM.F.EXT |          |          |          |          |
| 11         | 22 | 8  | II  | PA.F.EXT | 16       | 50                                 | 6  | II | EC.F.PEN | 0        | 59       | 37       |          | II       | PA.D.EXT |          |          |          |          |
| 18         | 3  | 54 | 23  | I        | EC.D.PEN | 16                                 | 53 | 51 | II       | OC.D.INT | 1        | 0        |          | 6        | I        | PA.F.INT |          |          |          |
|            | 3  | 55 | 11  | I        | EC.D.EXT | 17                                 | 24 | 58 | III      | EC.F.INT | 1        | 3        |          | 53       | I        | PA.F.EXT |          |          |          |
|            | 3  | 58 | 58  | I        | EC.D.INT | 17                                 | 32 | 40 | I        | PA.F.INT | 1        | 4        |          | 22       | II       | PA.D.INT |          |          |          |
|            | 7  | 22 | 16  | I        | OC.F.INT | 17                                 | 36 | 20 | III      | EC.F.EXT | 3        | 22       |          | 22       | II       | PA.F.INT |          |          |          |
|            | 7  | 26 | 5   | I        | OC.F.EXT | 17                                 | 40 | 28 | III      | EC.F.PEN | 3        | 27       |          | 5        | II       | PA.F.EXT |          |          |          |
| 19         | 0  | 47 | 49  | III      | OM.D.EXT | 19                                 | 13 | 11 | II       | OC.F.INT | 29       | 16       |          | 1        | 9        | I        | OM.D.EXT |          |          |
|            | 0  | 57 | 31  | II       | EC.D.PEN | 19                                 | 17 | 47 | II       | OC.F.EXT |          | 16       |          | 4        | 53       | I        | OM.D.INT |          |          |
|            | 0  | 58 | 46  | III      | OM.D.INT | 20                                 | 0  | 17 | III      | OC.D.EXT |          | 16       |          | 49       | 9        | II       | EC.D.PEN |          |          |
|            | 0  | 59 | 16  | II       | EC.D.EXT | 20                                 | 12 | 39 | III      | OC.D.INT |          | 16       |          | 50       | 54       | II       | EC.D.EXT |          |          |
|            | 1  | 3  | 41  | II       | EC.D.INT | 22                                 | 30 | 53 | III      | OC.F.INT |          | 16       |          | 55       | 20       | II       | EC.D.INT |          |          |
|            | 1  | 10 | 27  | I        | OM.D.EXT | 22                                 | 43 | 15 | III      | OC.F.EXT |          | 17       |          | 19       | 49       | I        | PA.D.EXT |          |          |
|            | 1  | 14 | 12  | I        | OM.D.INT | 23                                 | 11 | 20 | 8        | I        |          | EC.D.PEN | 17       | 23       | 37       | I        | PA.D.INT |          |          |
|            | 2  | 24 | 20  | I        | PA.D.EXT |                                    | 11 | 20 | 56       | I        |          | EC.D.EXT | 18       | 12       | 23       | I        | OM.F.INT |          |          |
|            | 2  | 28 | 7   | I        | PA.D.INT |                                    | 11 | 24 | 43       | I        |          | EC.D.INT | 18       | 16       | 8        | I        | OM.F.EXT |          |          |
|            | 3  | 21 | 57  | I        | OM.F.INT |                                    | 14 | 50 | 35       | I        |          | OC.F.INT | 18       | 41       | 19       | III      | EC.D.PEN |          |          |
|            | 3  | 25 | 42  | I        | OM.F.EXT |                                    | 14 | 54 | 24       | I        |          | OC.F.EXT | 18       | 45       | 28       | III      | EC.D.EXT |          |          |
|            | 3  | 26 | 56  | II       | EC.F.INT | 24                                 | 8  | 35 | 50       | I        |          | OM.D.EXT | 18       | 56       | 55       | III      | EC.D.INT |          |          |
|            | 3  | 28 | 18  | II       | OC.D.EXT |                                    | 8  | 39 | 34       | I        |          | OM.D.INT | 19       | 17       | 56       | II       | EC.F.INT |          |          |
|            | 3  | 31 | 21  | II       | EC.F.EXT |                                    | 8  | 57 | 10       | II       |          | OM.D.EXT | 19       | 22       | 22       | II       | EC.F.EXT |          |          |
|            | 3  | 32 | 52  | II       | OC.D.INT |                                    | 9  | 1  | 40       | II       |          | OM.D.INT | 19       | 24       | 8        | II       | EC.F.PEN |          |          |
|            | 3  | 34 | 51  | III      | OM.F.INT |                                    | 9  | 52 | 18       | I        |          | PA.D.EXT | 19       | 29       | 9        | I        | PA.F.INT |          |          |
|            | 3  | 45 | 53  | III      | OM.F.EXT |                                    | 9  | 56 | 5        | I        |          | PA.D.INT | 19       | 30       | 6        | II       | OC.D.EXT |          |          |
|            | 4  | 34 | 10  | I        | PA.F.INT |                                    | 10 | 47 | 11       | I        |          | OM.F.INT | 19       | 32       | 56       | I        | PA.F.EXT |          |          |
|            | 4  | 37 | 56  | I        | PA.F.EXT |                                    | 10 | 50 | 56       | I        |          | OM.F.EXT | 19       | 34       | 44       | II       | OC.D.INT |          |          |
|            | 5  | 52 | 50  | II       | OC.F.INT |                                    | 11 | 28 | 10       | II       |          | OM.F.INT | 21       | 24       | 43       | III      | EC.F.INT |          |          |
|            | 5  | 56 | 46  | III      | PA.D.EXT |                                    | 11 | 32 | 41       | II       |          | OM.F.EXT | 21       | 26       | 10       | III      | EC.F.EXT |          |          |
|            | 5  | 57 | 24  | II       | OC.F.EXT |                                    | 11 | 37 | 59       | II       |          | PA.D.EXT | 21       | 40       | 19       | III      | EC.F.PEN |          |          |
| 6          | 8  | 57 | III | PA.D.INT | 11       |                                    | 42 | 43 | II       | PA.D.INT | 21       | 52       | 54       | II       | OC.F.INT |          |          |          |          |
| 8          | 27 | 7  | III | PA.F.INT | 12       | 1                                  | 53 | I  | PA.F.INT | 21       | 57       | 32       | II       | OC.F.EXT |          |          |          |          |          |
| 8          | 39 | 12 | III | PA.F.EXT | 12       | 5                                  | 39 | I  | PA.F.EXT | 30       | 0        | 14       | 44       | III      | OC.D.EXT |          |          |          |          |
| 22         | 22 | 57 | I   | EC.D.PEN | 14       | 1                                  | 25 | II | PA.F.INT |          | 0        | 27       | 26       | III      | OC.D.INT |          |          |          |          |
| 22         | 23 | 45 | I   | EC.D.EXT | 14       | 6                                  | 7  | II | PA.F.EXT |          | 2        | 41       | 44       | III      | OC.F.INT |          |          |          |          |
| 22         | 27 | 32 | I   | EC.D.INT | 25       | 5                                  | 48 | 47 | I        |          | EC.D.PEN | 2        | 54       | 26       | III      | OC.F.EXT |          |          |          |
| 20         | 1  | 51 | 44  | I        |          | OC.F.INT                           | 5  | 49 | 35       |          | I        | EC.D.EXT | 13       | 14       | 30       | I        | EC.D.PEN |          |          |
|            | 1  | 55 | 33  | I        |          | OC.F.EXT                           | 5  | 53 | 22       |          | I        | EC.D.INT | 13       | 15       | 18       | I        | EC.D.EXT |          |          |
|            | 19 | 37 | 51  | II       |          | OM.D.EXT                           | 9  | 20 | 0        |          | I        | OC.F.INT | 13       | 19       | 6        | I        | EC.D.INT |          |          |
|            | 19 | 38 | 54  | I        |          | OM.D.EXT                           | 9  | 23 | 49       |          | I        | OC.F.EXT | 16       | 47       | 45       | I        | OC.F.INT |          |          |
|            | 19 | 42 | 20  | II       |          | OM.D.INT                           | 26 | 3  | 4        |          | 16       | I        | OM.D.EXT | 16       | 51       | 34       | I        | OC.F.EXT |          |
|            | 19 | 42 | 38  | I        |          | OM.D.INT                           |    | 3  | 8        |          | 0        | I        | OM.D.INT | 20       | 19       | 30       | 6        | II       | OC.D.EXT |
|            | 20 | 53 | 41  | I        |          | PA.D.EXT                           |    | 3  | 31       |          | 57       | II       | EC.D.PEN |          | 19       | 32       | 56       | I        | PA.F.EXT |
|            | 20 | 57 | 28  | I        |          | PA.D.INT                           |    | 3  | 33       |          | 42       | II       | EC.D.EXT |          | 19       | 34       | 44       | II       | OC.D.INT |
|            | 21 | 50 | 21  | I        |          | OM.F.INT                           |    | 3  | 38       |          | 8        | II       | EC.D.INT |          | 21       | 24       | 43       | III      | EC.F.INT |
|            | 21 | 54 | 6   | I        |          | OM.F.EXT                           |    | 4  | 21       |          | 31       | I        | PA.D.EXT |          | 21       | 26       | 10       | III      | EC.F.EXT |
|            | 22 | 9  | 8   | II       |          | OM.F.INT                           |    | 4  | 25       | 18       | I        | PA.D.INT | 21       |          | 40       | 19       | III      | EC.F.PEN |          |
|            | 22 | 13 | 38  | II       |          | OM.F.EXT                           |    | 4  | 49       | 38       | III      | OM.D.EXT | 21       |          | 52       | 54       | II       | OC.F.INT |          |
|            | 22 | 15 | 3   | II       |          | PA.D.EXT                           |    | 5  | 0        | 38       | I        | OM.F.INT | 21       |          | 57       | 32       | II       | OC.F.EXT |          |
|            | 22 | 19 | 45  | II       | PA.D.INT | 5                                  |    | 15 | 35       | I        | OM.F.EXT | 21       | 0        |          | 39       | 10       | II       | PA.F.INT |          |
| 22         | 19 | 45 | II  | PA.D.INT | 5        | 19                                 |    | 20 | I        | OM.F.EXT | 0        |          | 43       |          | 51       | II       | PA.F.EXT |          |          |
| 23         | 3  | 26 | I   | PA.F.INT | 6        | 0                                  |    | 57 | II       | EC.F.INT | 17       |          | 6        |          | 19       | 26       | III      | OM.F.EXT |          |
| 23         | 7  | 13 | I   | PA.F.EXT | 6        | 5                                  |    | 23 | II       | EC.F.EXT |          |          | 6        |          | 23       | 55       | III      | OM.F.INT |          |

1987<sub>a</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER<sub>a</sub>



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



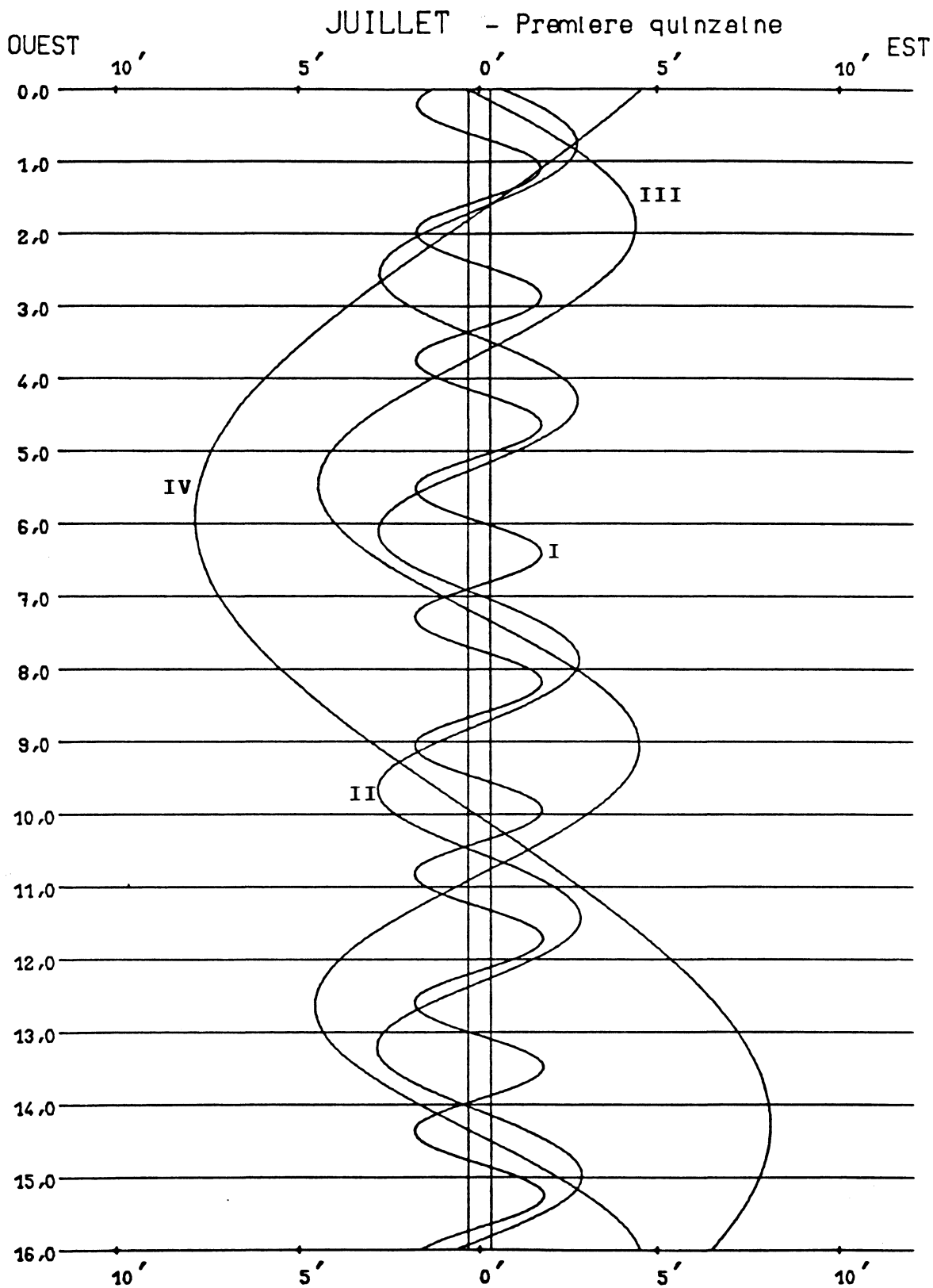
ORBITES APPARENTES

1987 - SATELLITES DE JUPITER -

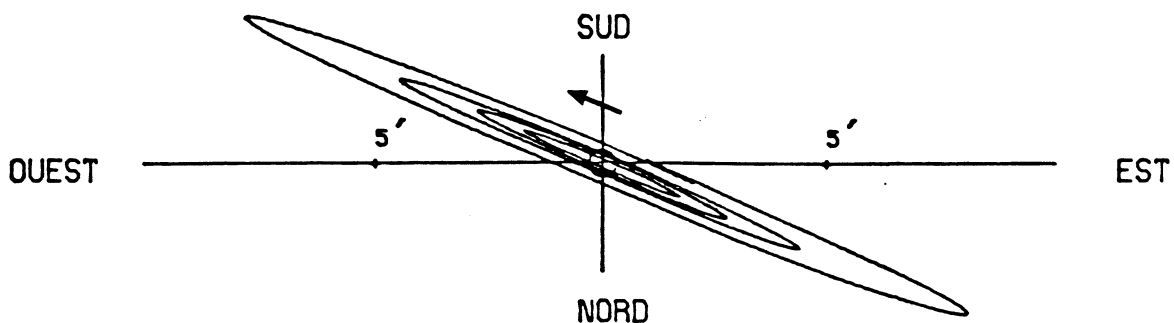
| PHENOMENES |    |    |    |     |          | MOIS : JUILLET - PREMIERE QUINZAINES - |    |    |     |          |          |      |    |    |     |          |          |  |  |
|------------|----|----|----|-----|----------|--|----|----|-----|----------|----------|------|----|----|-----|----------|----------|--|--|
| JOUR       | H  | M  | S  | SAT | TYPE     | JOUR                                   | H  | M  | S   | SAT      | TYPE     | JOUR | H  | M  | S   | SAT      | TYPE     |  |  |
| 1          | 10 | 29 | 36 | I   | OM.D.EXT | 19                                     | 19 | 38 | I   | PA.D.INT |          |      |    |    |     |          |          |  |  |
|            | 10 | 33 | 21 | I   | OM.D.INT | 19                                     | 23 | 34 | II  | EC.D.PEN | 11       | 4    | 6  | 1  | I   | EC.D.PEN |          |  |  |
|            | 11 | 34 | 48 | II  | OM.D.EXT | 19                                     | 25 | 20 | II  | EC.D.EXT |          | 4    | 6  | 49 | I   | EC.D.EXT |          |  |  |
|            | 11 | 39 | 18 | II  | OM.D.INT | 19                                     | 29 | 47 | II  | EC.D.INT |          | 4    | 10 | 37 | I   | EC.D.INT |          |  |  |
|            | 11 | 48 | 55 | I   | PA.D.EXT | 20                                     | 5  | 58 | I   | OM.F.INT |          | 7    | 41 | 54 | I   | OC.F.INT |          |  |  |
|            | 11 | 52 | 43 | I   | PA.D.INT | 20                                     | 9  | 43 | I   | OM.F.EXT |          | 7    | 45 | 44 | I   | OC.F.EXT |          |  |  |
|            | 12 | 40 | 47 | I   | OM.F.INT | 21                                     | 24 | 51 | I   | PA.F.INT |          |      |    |    |     |          |          |  |  |
|            | 12 | 44 | 32 | I   | OM.F.EXT | 21                                     | 28 | 39 | I   | PA.F.EXT | 12       | 1    | 20 | 9  | I   | OM.D.EXT |          |  |  |
|            | 13 | 58 | 10 | I   | PA.F.INT | 21                                     | 51 | 58 | II  | EC.F.INT |          | 1    | 23 | 54 | I   | OM.D.INT |          |  |  |
|            | 14 | 1  | 57 | I   | PA.F.EXT | 21                                     | 56 | 25 | II  | EC.F.EXT |          | 2    | 42 | 18 | I   | PA.D.EXT |          |  |  |
|            | 14 | 5  | 15 | II  | OM.F.INT | 21                                     | 58 | 11 | II  | EC.F.PEN |          | 2    | 46 | 6  | I   | PA.D.INT |          |  |  |
|            | 14 | 9  | 46 | II  | OM.F.EXT | 22                                     | 9  | 28 | II  | OC.D.EXT |          | 3    | 30 | 42 | II  | OM.D.EXT |          |  |  |
|            | 14 | 21 | 42 | II  | PA.D.EXT | 22                                     | 14 | 9  | II  | OC.D.INT |          | 3    | 31 | 9  | I   | OM.F.INT |          |  |  |
|            | 14 | 26 | 28 | II  | PA.D.INT | 22                                     | 42 | 38 | III | EC.D.PEN |          | 3    | 34 | 54 | I   | OM.F.EXT |          |  |  |
|            | 16 | 43 | 47 | II  | PA.F.INT | 22                                     | 46 | 49 | III | EC.D.EXT |          | 3    | 35 | 14 | II  | OM.D.INT |          |  |  |
|            | 16 | 48 | 31 | II  | PA.F.EXT | 22                                     | 58 | 22 | III | EC.D.INT |          | 4    | 51 | 7  | I   | PA.F.INT |          |  |  |
|            |    |    |    |     |          |  |    |    |     |          |          | 4    | 54 | 55 | I   | PA.F.EXT |          |  |  |
| 2          | 7  | 43 | 9  | I   | EC.D.PEN | 7                                      | 0  | 31 | 9   | II       | OC.F.INT | 6    | 0  | 21 | II  | OM.F.INT |          |  |  |
|            | 7  | 43 | 57 | I   | EC.D.EXT |  | 0  | 35 | 50  | II       | OC.F.EXT | 6    | 4  | 54 | II  | OM.F.EXT |          |  |  |
|            | 7  | 47 | 44 | I   | EC.D.INT |  | 1  | 24 | 58  | III      | EC.F.INT | 6    | 23 | 35 | II  | PA.D.EXT |          |  |  |
|            | 11 | 16 | 57 | I   | OC.F.INT |  | 1  | 36 | 31  | III      | EC.F.EXT | 6    | 28 | 25 | II  | PA.D.INT |          |  |  |
|            | 11 | 20 | 47 | I   | OC.F.EXT |  | 1  | 40 | 42  | III      | EC.F.PEN | 8    | 43 | 44 | II  | PA.F.INT |          |  |  |
|            |    |    |    |     |          |  | 4  | 26 | 35  | III      | OC.D.EXT | 8    | 48 | 32 | II  | PA.F.EXT |          |  |  |
| 3          | 4  | 58 | 1  | I   | OM.D.EXT |  | 4  | 39 | 37  | III      | OC.D.INT | 22   | 34 | 39 | I   | EC.D.PEN |          |  |  |
|            | 5  | 1  | 46 | I   | OM.D.INT |  | 6  | 49 | 57  | III      | OC.F.INT | 22   | 35 | 27 | I   | EC.D.EXT |          |  |  |
|            | 6  | 6  | 24 | II  | EC.D.PEN |  | 7  | 2  | 59  | III      | OC.F.EXT | 22   | 39 | 15 | I   | EC.D.INT |          |  |  |
|            | 6  | 8  | 9  | II  | EC.D.EXT |  | 15 | 8  | 51  | I        | EC.D.PEN |      |    |    |     |          |          |  |  |
|            | 6  | 12 | 36 | II  | EC.D.INT |  | 15 | 9  | 39  | I        | EC.D.EXT | 13   | 2  | 10 | 47  | I        | OC.F.INT |  |  |
|            | 6  | 17 | 56 | I   | PA.D.EXT |  | 15 | 13 | 26  | I        | EC.D.INT |      | 2  | 14 | 38  | I        | OC.F.EXT |  |  |
|            | 6  | 21 | 44 | I   | PA.D.INT |  | 18 | 44 | 4   | I        | OC.F.INT |      | 19 | 48 | 34  | I        | OM.D.EXT |  |  |
|            | 7  | 9  | 10 | I   | OM.F.INT |  | 18 | 47 | 54  | I        | OC.F.EXT |      | 19 | 52 | 19  | I        | OM.D.INT |  |  |
|            | 7  | 12 | 55 | I   | OM.F.EXT |  |    |    |     |          |          | 21   | 11 | 1  | I   | PA.D.EXT |          |  |  |
|            | 8  | 27 | 6  | I   | PA.F.INT | 8                                      | 12 | 23 | 19  | I        | OM.D.EXT |      | 21 | 14 | 49  | I        | PA.D.INT |  |  |
|            | 8  | 30 | 53 | I   | PA.F.EXT |  | 12 | 27 | 4   | I        | OM.D.INT |      | 21 | 57 | 59  | II       | EC.D.PEN |  |  |
|            | 8  | 34 | 59 | II  | EC.F.INT |  | 13 | 44 | 44  | I        | PA.D.EXT |      | 21 | 59 | 32  | I        | OM.F.INT |  |  |
|            | 8  | 39 | 26 | II  | EC.F.EXT |  | 13 | 48 | 32  | I        | PA.D.INT |      | 21 | 59 | 45  | II       | EC.D.EXT |  |  |
|            | 8  | 41 | 11 | II  | EC.F.PEN |  | 14 | 12 | 22  | II       | OM.D.EXT |      | 22 | 3  | 18  | I        | OM.F.EXT |  |  |
|            | 8  | 50 | 2  | II  | OC.D.EXT |  | 14 | 16 | 53  | II       | OM.D.INT |      | 22 | 4  | 13  | II       | EC.D.INT |  |  |
|            | 8  | 50 | 30 | III | OM.D.EXT |  | 14 | 34 | 23  | I        | OM.F.INT |      | 23 | 19 | 46  | I        | PA.F.INT |  |  |
|            | 8  | 54 | 41 | II  | OC.D.INT |  | 14 | 38 | 8   | I        | OM.F.EXT |      | 23 | 23 | 34  | I        | PA.F.EXT |  |  |
|            | 9  | 1  | 34 | III | OM.D.INT |  | 15 | 53 | 41  | I        | PA.F.INT |      |    |    |     |          |          |  |  |
|            | 11 | 12 | 16 | II  | OC.F.INT |  | 15 | 57 | 29  | I        | PA.F.EXT | 14   | 0  | 25 | 59  | II       | EC.F.INT |  |  |
|            | 11 | 16 | 55 | II  | OC.F.EXT |  | 16 | 42 | 16  | II       | OM.F.INT |      | 0  | 30 | 27  | II       | EC.F.EXT |  |  |
|            | 11 | 35 | 14 | III | OM.F.INT |  | 16 | 46 | 48  | II       | OM.F.EXT |      | 0  | 32 | 14  | II       | EC.F.PEN |  |  |
|            | 11 | 46 | 24 | III | OM.F.EXT |  | 17 | 3  | 40  | II       | PA.D.EXT |      | 0  | 47 | 10  | II       | OC.D.EXT |  |  |
|            | 14 | 26 | 8  | III | PA.D.EXT |  | 17 | 8  | 29  | II       | PA.D.INT |      | 0  | 51 | 53  | II       | OC.D.INT |  |  |
|            | 14 | 38 | 58 | III | PA.D.INT |  | 19 | 24 | 27  | II       | PA.F.INT |      | 2  | 43 | 50  | III      | EC.D.PEN |  |  |
|            | 16 | 49 | 14 | III | PA.F.INT |  | 19 | 29 | 13  | II       | PA.F.EXT |      | 2  | 48 | 2   | III      | EC.D.EXT |  |  |
|            | 17 | 1  | 54 | III | PA.F.EXT |  |    |    |     |          |          | 2    | 59 | 40 | III | EC.D.INT |          |  |  |
|            |    |    |    |     |          | 9                                      | 9  | 37 | 28  | I        | EC.D.PEN | 3    | 7  | 46 | II  | OC.F.INT |          |  |  |
| 4          | 2  | 11 | 41 | I   | EC.D.PEN |  | 9  | 38 | 17  | I        | EC.D.EXT | 3    | 12 | 29 | II  | OC.F.EXT |          |  |  |
|            | 2  | 12 | 30 | I   | EC.D.EXT |  | 9  | 42 | 4   | I        | EC.D.INT | 5    | 25 | 6  | III | EC.F.INT |          |  |  |
|            | 2  | 16 | 17 | I   | EC.D.INT |  | 13 | 13 | 3   | I        | OC.F.INT | 5    | 36 | 44 | III | EC.F.EXT |          |  |  |
|            | 5  | 46 | 1  | I   | OC.F.INT |  | 13 | 16 | 53  | I        | OC.F.EXT | 5    | 40 | 56 | III | EC.F.PEN |          |  |  |
|            | 5  | 49 | 51 | I   | OC.F.EXT |  |    |    |     |          |          | 8    | 34 | 39 | III | OC.D.EXT |          |  |  |
|            | 23 | 26 | 27 | I   | OM.D.EXT | 10                                     | 6  | 51 | 44  | I        | OM.D.EXT | 8    | 48 | 2  | III | OC.D.INT |          |  |  |
|            | 23 | 30 | 11 | I   | OM.D.INT |  | 6  | 55 | 29  | I        | OM.D.INT | 10   | 54 | 23 | III | OC.F.INT |          |  |  |
|            |    |    |    |     |          |  | 8  | 13 | 32  | I        | PA.D.EXT | 11   | 7  | 46 | III | OC.F.EXT |          |  |  |
| 5          | 0  | 46 | 54 | I   | PA.D.EXT |  | 8  | 17 | 21  | I        | PA.D.INT | 17   | 3  | 9  | I   | EC.D.PEN |          |  |  |
|            | 0  | 50 | 42 | I   | PA.D.INT |  | 8  | 40 | 48  | II       | EC.D.PEN | 17   | 3  | 58 | I   | EC.D.EXT |          |  |  |
|            | 0  | 53 | 9  | II  | OM.D.EXT |  | 8  | 42 | 34  | II       | EC.D.EXT | 17   | 7  | 45 | I   | EC.D.INT |          |  |  |
|            | 0  | 57 | 39 | II  | OM.D.INT |  | 8  | 47 | 1   | II       | EC.D.INT | 20   | 39 | 30 | I   | OC.F.INT |          |  |  |
|            | 1  | 37 | 34 | I   | OM.F.INT |  | 9  | 2  | 45  | I        | OM.F.INT | 20   | 43 | 20 | I   | OC.F.EXT |          |  |  |
|            | 1  | 41 | 19 | I   | OM.F.EXT |  | 9  | 6  | 31  | I        | OM.F.EXT |      |    |    |     |          |          |  |  |
|            | 2  | 56 | 0  | I   | PA.F.INT |  | 10 | 22 | 25  | I        | PA.F.INT | 15   | 14 | 17 | 1   | I        | OM.D.EXT |  |  |
|            | 2  | 59 | 47 | I   | PA.F.EXT |  | 10 | 26 | 13  | I        | PA.F.EXT | 14   | 20 | 46 | I   | OM.D.INT |          |  |  |
|            | 3  | 23 | 19 | II  | OM.F.INT |  | 11 | 9  | 0   | II       | EC.F.INT | 15   | 39 | 41 | I   | PA.D.EXT |          |  |  |
|            | 3  | 27 | 51 | II  | OM.F.EXT |  | 11 | 13 | 28  | II       | EC.F.EXT | 15   | 43 | 30 | I   | PA.D.INT |          |  |  |
|            | 3  | 42 | 29 | II  | PA.D.EXT |  | 11 | 15 | 14  | II       | EC.F.PEN | 16   | 27 | 57 | I   | OM.F.INT |          |  |  |
|            | 3  | 47 | 16 | II  | PA.D.INT |  | 11 | 28 | 33  | II       | OC.D.EXT | 16   | 31 | 43 | I   | OM.F.EXT |          |  |  |
|            | 6  | 3  | 55 | II  | PA.F.INT |  | 11 | 33 | 15  | II       | OC.D.INT | 16   | 49 | 51 | II  | OM.D.EXT |          |  |  |
|            | 6  | 8  | 40 | II  | PA.F.EXT |  | 12 | 51 | 19  | III      | OM.D.EXT | 16   | 54 | 23 | II  | OM.D.INT |          |  |  |
|            | 20 | 40 | 20 | I   | EC.D.PEN |  | 13 | 2  | 27  | III      | OM.D.INT | 17   | 48 | 23 | I   | PA.F.INT |          |  |  |
|            | 20 | 41 | 8  | I   | EC.D.EXT |  | 13 | 49 | 42  | II       | OC.F.INT | 17   | 52 | 11 | I   | PA.F.EXT |          |  |  |
|            | 20 | 44 | 55 | I   | EC.D.INT |  | 13 | 54 | 24  | II       | OC.F.EXT | 19   | 19 | 14 | II  | OM.F.INT |          |  |  |
|            |    |    |    |     |          |  | 15 | 34 | 56  | III      | OM.F.INT | 19   | 23 | 47 | II  | OM.F.EXT |          |  |  |
| 6          | 0  | 15 | 8  | I   | OC.F.INT |  | 15 | 46 | 10  | III      | OM.F.EXT | 19   | 43 | 47 | II  | PA.D.EXT |          |  |  |
|            | 0  | 18 | 58 | I   | OC.F.EXT |  | 18 | 35 | 20  | III      | PA.D.EXT | 19   | 48 | 38 | II  | PA.D.INT |          |  |  |
|            | 17 | 54 | 53 | I   | OM.D.EXT |  | 18 | 48 | 30  | III      | PA.D.INT | 22   | 3  | 19 | II  | PA.F.INT |          |  |  |
|            | 17 | 58 | 37 | I   | OM.D.INT |  | 20 | 54 | 48  | III      | PA.F.INT | 22   | 8  | 8  | II  | PA.F.EXT |          |  |  |
|            | 19 | 15 | 50 | I   | PA.D.EXT |  | 21 | 7  | 48  | III      | PA.F.EXT |      |    |    |     |          |          |  |  |



1987<sub>a</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



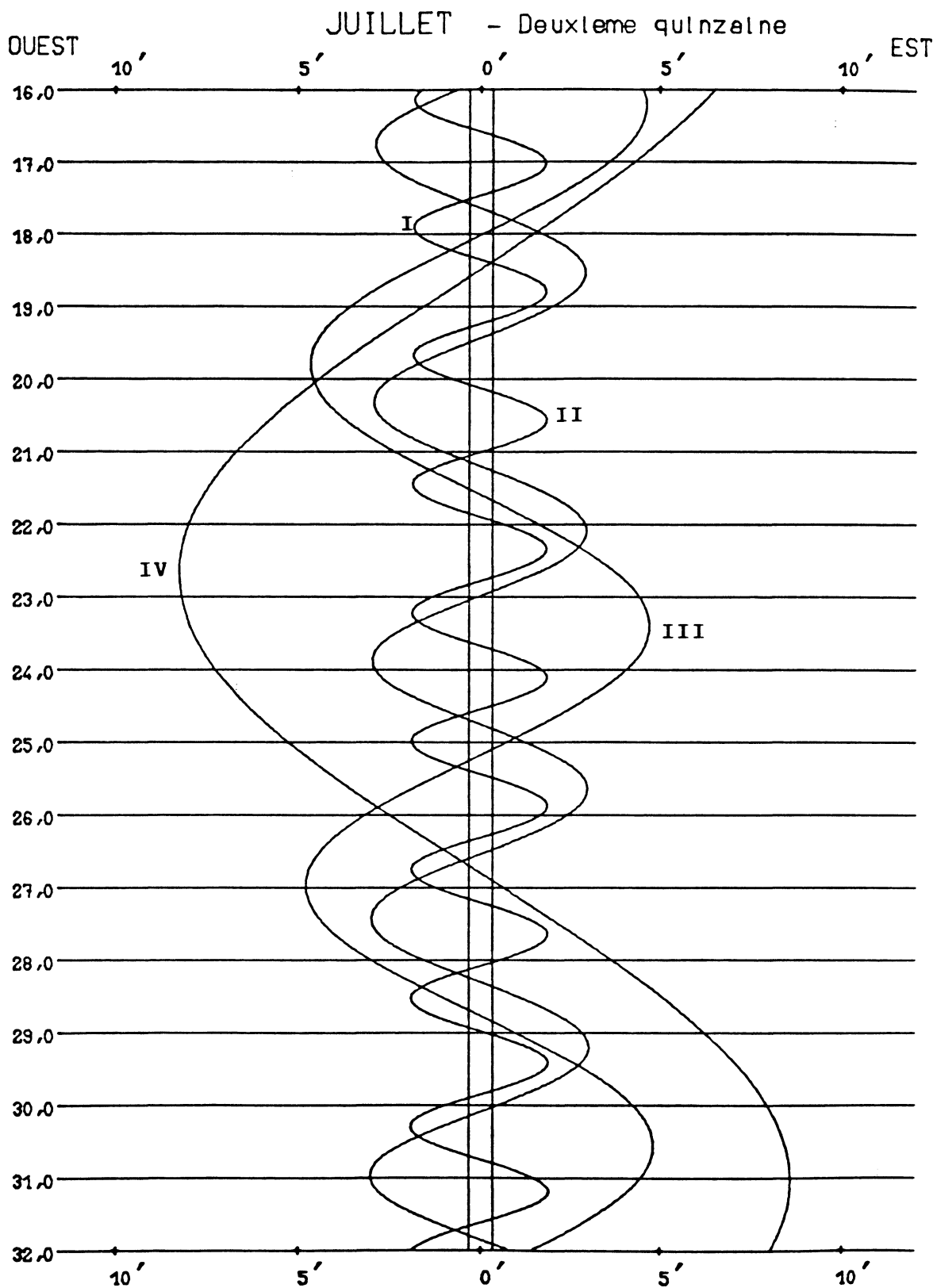
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



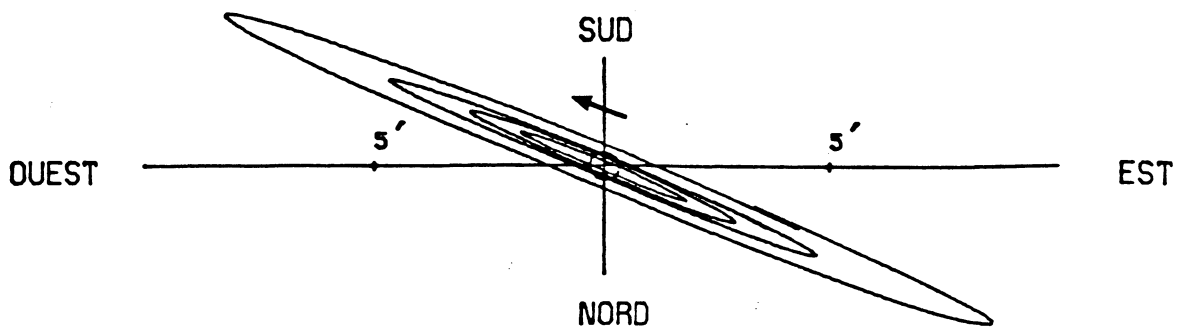
ORBITES APPARENTES



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



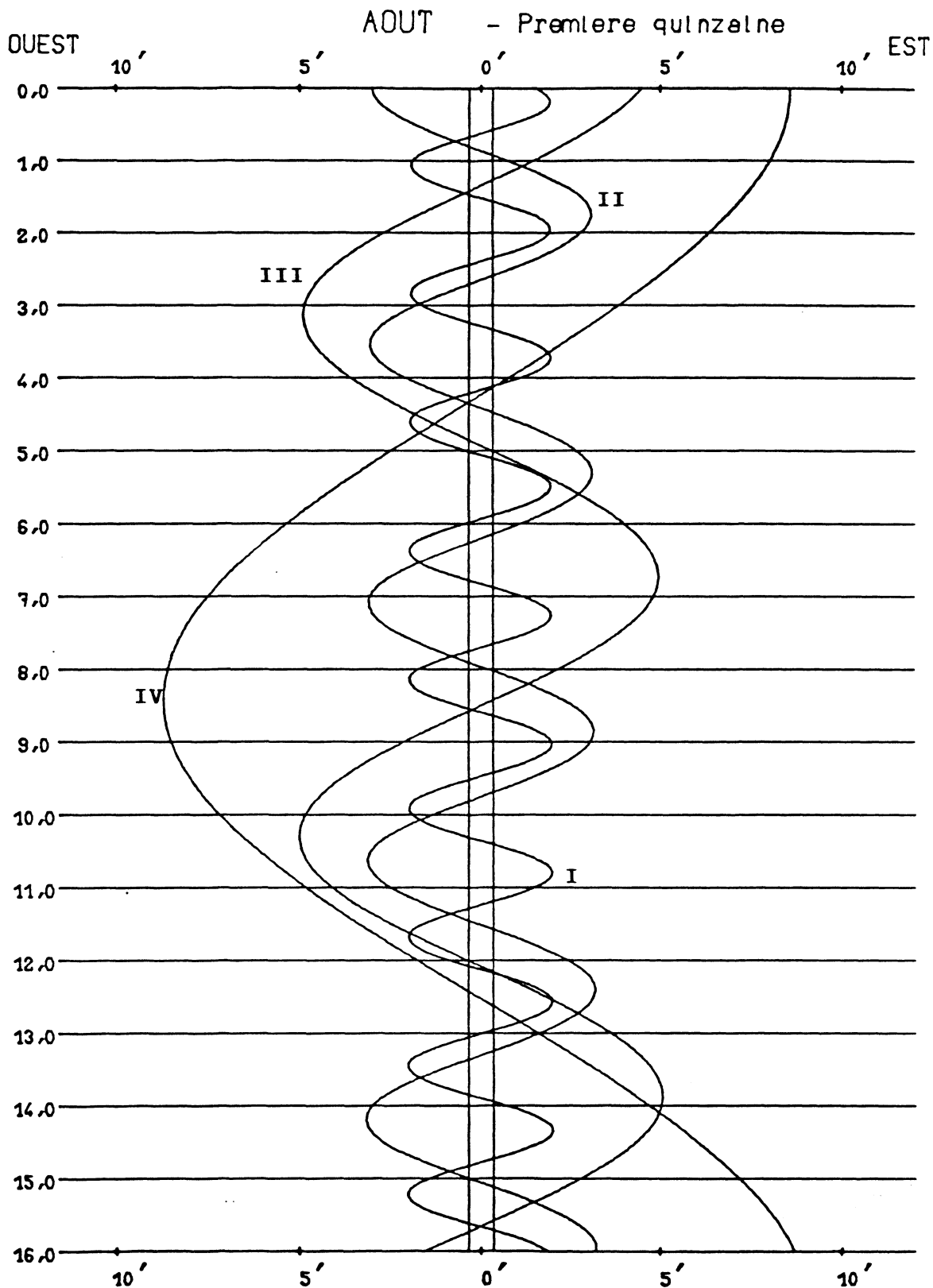
Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter



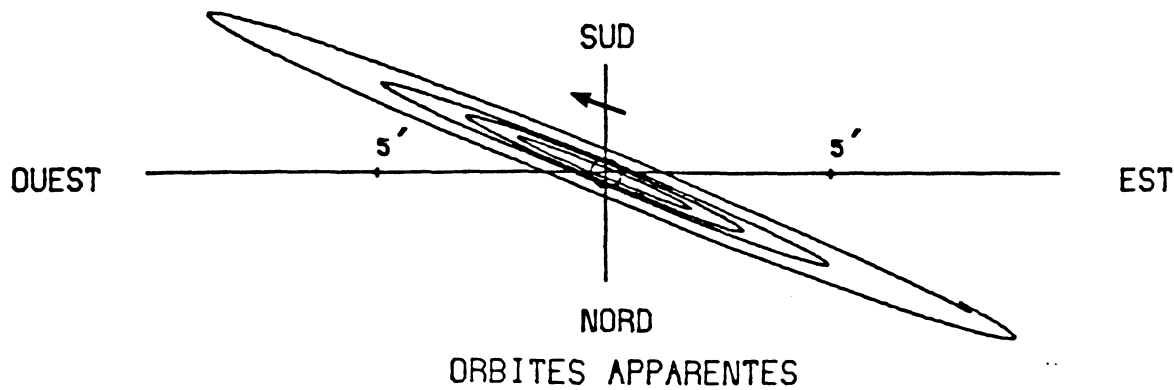
ORBITES APPARENTES



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



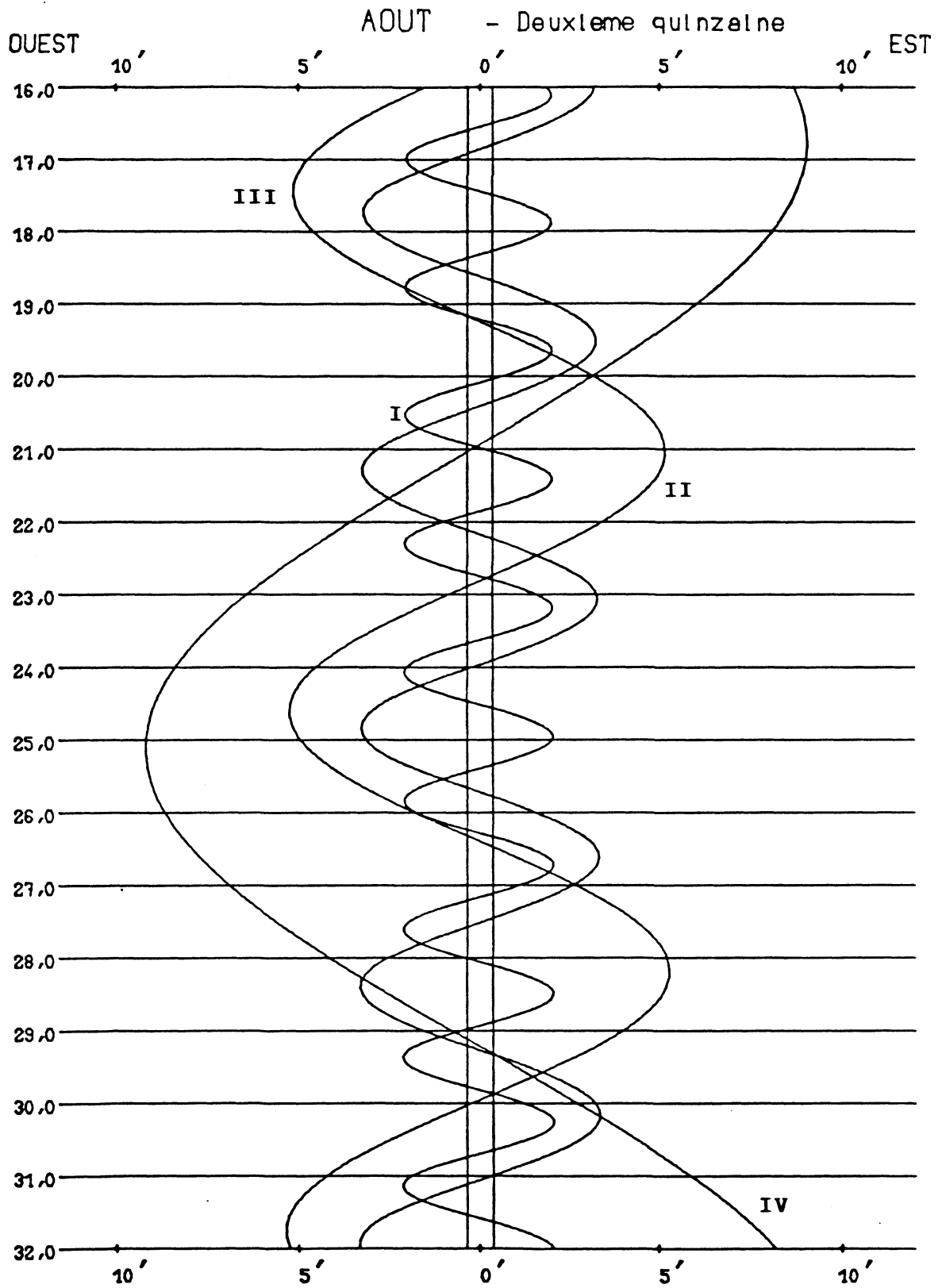
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



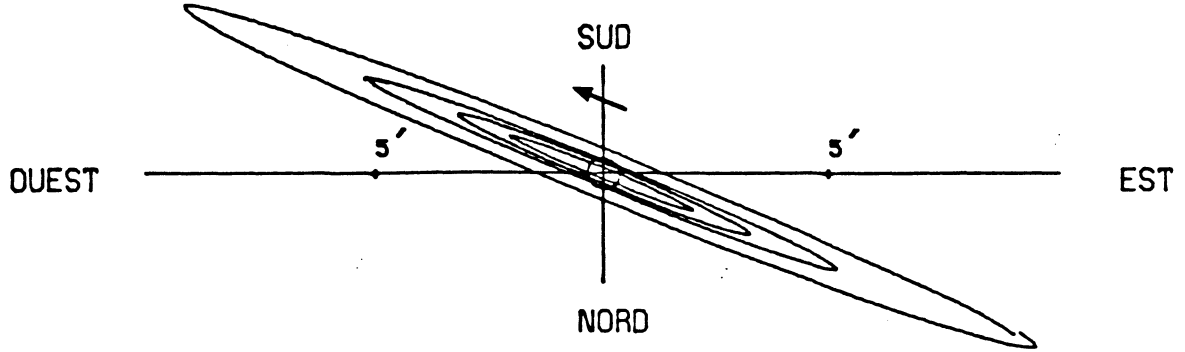
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : AOUT - DEUXIEME QUINZAINE - |    |     |          |          |          |      |    |          |          |          |          |  |  |  |
|------------|----|----|-----|----------|----------|------------------------------------|----|-----|----------|----------|----------|------|----|----------|----------|----------|----------|--|--|--|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                               | H  | M   | S        | SAT      | TYPE     | JOUR | H  | M        | S        | SAT      | TYPE     |  |  |  |
| 16         | 10 | 48 | 23  | I        | OM.D.EXT | 22                                 | 18 | 17  | 25       | I        | OM.D.INT | 27   | 5  | 42       | 12       | III      | EC.F.PEN |  |  |  |
|            | 10 | 52 | 9   | I        | OM.D.INT |                                    | 19 | 26  | 56       | I        | PA.D.EXT |      | 7  | 50       | 15       | I        | OC.F.INT |  |  |  |
|            | 12 | 4  | 51  | I        | PA.D.EXT |                                    | 19 | 30  | 47       | I        | PA.D.INT |      | 7  | 52       | 5        | III      | OC.D.EXT |  |  |  |
|            | 12 | 8  | 42  | I        | PA.D.INT |                                    | 20 | 24  | 40       | I        | OM.F.INT |      | 7  | 54       | 7        | I        | OC.F.EXT |  |  |  |
|            | 12 | 59 | 20  | I        | OM.F.INT |                                    | 20 | 28  | 26       | I        | OM.F.EXT |      | 8  | 7        | 37       | III      | OC.D.INT |  |  |  |
|            | 13 | 3  | 6   | I        | OM.F.EXT |                                    | 21 | 35  | 0        | I        | PA.F.INT |      | 9  | 52       | 27       | III      | OC.F.INT |  |  |  |
|            | 14 | 12 | 56  | I        | PA.F.INT |                                    | 21 | 38  | 51       | I        | PA.F.EXT |      | 10 | 7        | 59       | III      | OC.F.EXT |  |  |  |
|            | 14 | 16 | 46  | I        | PA.F.EXT |                                    |    |     |          |          |          |      |    |          |          |          |          |  |  |  |
|            | 16 | 36 | 49  | II       | OM.D.EXT |                                    | 0  | 8   | 49       | II       | EC.D.PEN |      | 1  | 38       | 57       | I        | OM.D.EXT |  |  |  |
|            | 16 | 41 | 23  | II       | OM.D.INT |                                    | 0  | 10  | 38       | II       | EC.D.EXT |      | 1  | 42       | 43       | I        | OM.D.INT |  |  |  |
|            | 19 | 4  | 20  | II       | OM.F.INT |                                    | 0  | 15  | 12       | II       | EC.D.INT |      | 2  | 48       | 25       | I        | PA.D.EXT |  |  |  |
|            | 19 | 8  | 56  | II       | OM.F.EXT |                                    | 2  | 34  | 52       | II       | EC.F.INT |      | 2  | 52       | 17       | I        | PA.D.INT |  |  |  |
|            | 19 | 16 | 50  | II       | PA.D.EXT |                                    | 2  | 39  | 26       | II       | EC.F.EXT |      | 3  | 50       | 4        | I        | OM.F.INT |  |  |  |
|            | 19 | 21 | 49  | II       | PA.D.INT |                                    | 2  | 40  | 0        | II       | OC.D.EXT |      | 3  | 53       | 50       | I        | OM.F.EXT |  |  |  |
| 21         | 31 | 53 | II  | PA.F.INT | 2        | 41                                 | 15 | II  | EC.F.PEN | 4        | 56       | 31   | I  | PA.F.INT |          |          |          |  |  |  |
| 21         | 36 | 51 | II  | PA.F.EXT | 2        | 44                                 | 56 | II  | OC.D.INT | 5        | 0        | 21   | I  | PA.F.EXT |          |          |          |  |  |  |
| 17         | 8  | 6  | 3   | I        | EC.D.PEN | 4                                  | 55 | 37  | II       | OC.F.INT | 8        | 32   | 25 | II       | OM.D.EXT |          |          |  |  |  |
|            | 8  | 6  | 52  | I        | EC.D.EXT | 5                                  | 0  | 33  | II       | OC.F.EXT | 8        | 37   | 0  | II       | OM.D.INT |          |          |  |  |  |
|            | 8  | 10 | 39  | I        | EC.D.INT | 12                                 | 55 | 36  | III      | OM.D.EXT | 10       | 57   | 16 | II       | PA.D.EXT |          |          |  |  |  |
|            | 11 | 33 | 53  | I        | OC.F.INT | 13                                 | 7  | 12  | III      | OM.D.INT | 10       | 59   | 26 | II       | OM.F.INT |          |          |  |  |  |
|            | 11 | 37 | 45  | I        | OC.F.EXT | 15                                 | 31 | 43  | I        | EC.D.PEN | 11       | 2    | 17 | II       | PA.D.INT |          |          |  |  |  |
|            | 18 | 5  | 16  | 47       | I        | OM.D.EXT                           | 15 | 32  | 32       | I        | EC.D.EXT | 11   | 4  | 3        | II       | OM.F.EXT |          |  |  |  |
|            |    | 5  | 20  | 33       | I        | OM.D.INT                           | 15 | 33  | 32       | III      | OM.F.INT | 13   | 11 | 24       | II       | PA.F.INT |          |  |  |  |
|            |    | 6  | 32  | 16       | I        | PA.D.EXT                           | 15 | 36  | 20       | I        | EC.D.INT | 13   | 16 | 23       | II       | PA.F.EXT |          |  |  |  |
|            |    | 6  | 36  | 7        | I        | PA.D.INT                           | 15 | 45  | 14       | III      | OM.F.EXT | 22   | 57 | 29       | I        | EC.D.PEN |          |  |  |  |
|            |    | 7  | 27  | 45       | I        | OM.F.INT                           | 18 | 4   | 57       | III      | PA.D.EXT | 22   | 58 | 18       | I        | EC.D.EXT |          |  |  |  |
| 7          |    | 31 | 31  | I        | OM.F.EXT | 18                                 | 20 | 20  | III      | PA.D.INT | 23       | 2    | 6  | I        | EC.D.INT |          |          |  |  |  |
| 8          |    | 40 | 20  | I        | PA.F.INT | 18                                 | 55 | 54  | I        | OC.F.INT |          |      |    |          |          |          |          |  |  |  |
| 8          |    | 44 | 11  | I        | PA.F.EXT | 18                                 | 59 | 46  | I        | OC.F.EXT | 28       | 2    | 17 | 21       | I        | OC.F.INT |          |  |  |  |
| 10         |    | 51 | 17  | II       | EC.D.PEN | 20                                 | 4  | 54  | III      | PA.F.INT | 2        | 21   | 13 | I        | OC.F.EXT |          |          |  |  |  |
| 10         |    | 53 | 5   | II       | EC.D.EXT | 20                                 | 20 | 7   | III      | PA.F.EXT | 20       | 7    | 22 | I        | OM.D.EXT |          |          |  |  |  |
| 10         |    | 57 | 38  | II       | EC.D.INT | 23                                 | 12 | 42  | 4        | I        | OM.D.EXT | 20   | 11 | 9        | I        | OM.D.INT |          |  |  |  |
| 13         |    | 17 | 30  | II       | EC.F.INT | 12                                 | 45 | 50  | I        | OM.D.INT | 21       | 15   | 25 | I        | PA.D.EXT |          |          |  |  |  |
| 13         |    | 22 | 3   | II       | EC.F.EXT | 13                                 | 54 | 10  | I        | PA.D.EXT | 21       | 19   | 16 | I        | PA.D.INT |          |          |  |  |  |
| 13         |    | 23 | 52  | II       | EC.F.PEN | 13                                 | 58 | 1   | I        | PA.D.INT | 22       | 18   | 31 | I        | OM.F.INT |          |          |  |  |  |
| 13         | 26 | 57 | II  | OC.D.EXT | 13       | 58                                 | 1  | I   | PA.D.INT | 22       | 22       | 17   | I  | OM.F.EXT |          |          |          |  |  |  |
| 13         | 31 | 52 | II  | OC.D.INT | 14       | 53                                 | 7  | I   | OM.F.INT | 23       | 23       | 31   | I  | PA.F.INT |          |          |          |  |  |  |
| 15         | 42 | 55 | II  | OC.F.INT | 14       | 56                                 | 54 | I   | OM.F.EXT | 23       | 27       | 22   | I  | PA.F.EXT |          |          |          |  |  |  |
| 15         | 47 | 51 | II  | OC.F.EXT | 16       | 2                                  | 15 | I   | PA.F.INT |          |          |      |    |          |          |          |          |  |  |  |
| 22         | 49 | 28 | III | EC.D.PEN | 16       | 6                                  | 5  | I   | PA.F.EXT | 29       | 2        | 43   | 57 | II       | EC.D.PEN |          |          |  |  |  |
| 22         | 53 | 47 | III | EC.D.EXT | 19       | 13                                 | 41 | II  | OM.D.EXT | 2        | 45       | 46   | II | EC.D.EXT |          |          |          |  |  |  |
| 23         | 5  | 51 | III | EC.D.INT | 19       | 18                                 | 17 | II  | OM.D.INT | 2        | 50       | 21   | II | EC.D.INT |          |          |          |  |  |  |
| 19         | 1  | 25 | 23  | III      | EC.F.INT | 21                                 | 40 | 53  | II       | OM.F.INT | 7        | 19   | 22 | II       | OC.F.INT |          |          |  |  |  |
|            | 1  | 37 | 27  | III      | EC.F.EXT | 21                                 | 44 | 15  | II       | PA.D.EXT | 7        | 24   | 20 | II       | OC.F.EXT |          |          |  |  |  |
|            | 1  | 41 | 47  | III      | EC.F.PEN | 21                                 | 45 | 30  | II       | OM.F.EXT | 16       | 56   | 16 | III      | OM.D.EXT |          |          |  |  |  |
|            | 2  | 34 | 34  | I        | EC.D.PEN | 21                                 | 49 | 16  | II       | PA.D.INT | 17       | 7    | 57 | III      | OM.D.INT |          |          |  |  |  |
|            | 2  | 35 | 22  | I        | EC.D.EXT | 23                                 | 58 | 39  | II       | PA.F.INT | 17       | 26   | 2  | I        | EC.D.PEN |          |          |  |  |  |
|            | 2  | 39 | 10  | I        | EC.D.INT | 24                                 | 0  | 3   | 38       | II       | PA.F.EXT | 17   | 26 | 51       | I        | EC.D.EXT |          |  |  |  |
|            | 4  | 10 | 50  | III      | OC.D.EXT | 10                                 | 0  | 21  | I        | EC.D.PEN | 17       | 30   | 39 | I        | EC.D.INT |          |          |  |  |  |
|            | 4  | 26 | 2   | III      | OC.D.INT | 10                                 | 1  | 10  | I        | EC.D.EXT | 19       | 33   | 24 | III      | OM.F.INT |          |          |  |  |  |
|            | 6  | 1  | 15  | I        | OC.F.INT | 10                                 | 4  | 58  | I        | EC.D.INT | 19       | 45   | 11 | III      | OM.F.EXT |          |          |  |  |  |
|            | 6  | 5  | 7   | I        | OC.F.EXT | 13                                 | 23 | 10  | I        | OC.F.INT | 20       | 44   | 19 | I        | OC.F.INT |          |          |  |  |  |
|            | 6  | 13 | 48  | III      | OC.F.INT | 13                                 | 27 | 2   | I        | OC.F.EXT | 20       | 48   | 12 | I        | OC.F.EXT |          |          |  |  |  |
|            | 6  | 29 | 1   | III      | OC.F.EXT | 25                                 | 7  | 10  | 29       | I        | OM.D.EXT | 21   | 43 | 5        | III      | PA.D.EXT |          |  |  |  |
|            | 23 | 45 | 14  | I        | OM.D.EXT | 7                                  | 14 | 15  | I        | OM.D.INT | 21       | 58   | 46 | III      | PA.D.INT |          |          |  |  |  |
|            | 23 | 49 | 0   | I        | OM.D.INT | 8                                  | 21 | 18  | I        | PA.D.EXT | 23       | 40   | 49 | III      | PA.F.INT |          |          |  |  |  |
| 20         | 0  | 59 | 40  | I        | PA.D.EXT | 8                                  | 25 | 9   | I        | PA.D.INT | 30       | 14   | 35 | 49       | I        | OM.D.EXT |          |  |  |  |
|            | 1  | 3  | 31  | I        | PA.D.INT | 9                                  | 21 | 33  | I        | OM.F.INT | 14       | 39   | 36 | I        | OM.D.INT |          |          |  |  |  |
|            | 1  | 56 | 14  | I        | OM.F.INT | 9                                  | 25 | 20  | I        | OM.F.EXT | 14       | 39   | 36 | I        | OM.D.INT |          |          |  |  |  |
|            | 2  | 0  | 0   | I        | OM.F.EXT | 10                                 | 29 | 23  | I        | PA.F.INT | 15       | 42   | 22 | I        | PA.D.EXT |          |          |  |  |  |
|            | 3  | 7  | 44  | I        | PA.F.INT | 10                                 | 33 | 13  | I        | PA.F.EXT | 15       | 46   | 14 | I        | PA.D.INT |          |          |  |  |  |
|            | 3  | 11 | 35  | I        | PA.F.EXT | 13                                 | 26 | 22  | II       | EC.D.PEN | 16       | 47   | 0  | I        | OM.F.INT |          |          |  |  |  |
|            | 5  | 55 | 36  | II       | OM.D.EXT | 13                                 | 28 | 11  | II       | EC.D.EXT | 16       | 50   | 46 | I        | OM.F.EXT |          |          |  |  |  |
|            | 6  | 0  | 11  | II       | OM.D.INT | 13                                 | 32 | 45  | II       | EC.D.INT | 17       | 50   | 29 | I        | PA.F.INT |          |          |  |  |  |
|            | 8  | 22 | 56  | II       | OM.F.INT | 15                                 | 52 | 15  | II       | EC.F.INT | 17       | 54   | 20 | I        | PA.F.EXT |          |          |  |  |  |
|            | 8  | 27 | 33  | II       | OM.F.EXT | 15                                 | 52 | 29  | II       | OC.D.EXT | 21       | 50   | 30 | II       | OM.D.EXT |          |          |  |  |  |
|            | 8  | 31 | 9   | II       | PA.D.EXT | 15                                 | 56 | 50  | II       | EC.F.EXT | 21       | 55   | 6  | II       | OM.D.INT |          |          |  |  |  |
|            | 8  | 36 | 9   | II       | PA.D.INT | 15                                 | 57 | 26  | II       | OC.D.INT |          |      |    |          |          |          |          |  |  |  |
|            | 10 | 45 | 51  | II       | PA.F.INT | 18                                 | 7  | 48  | II       | OC.F.INT | 31       | 0    | 9  | 10       | II       | PA.D.EXT |          |  |  |  |
|            | 10 | 50 | 49  | II       | PA.F.EXT | 18                                 | 12 | 45  | II       | OC.F.EXT | 0        | 14   | 12 | II       | PA.D.INT |          |          |  |  |  |
| 21         | 3  | 11 | I   | EC.D.PEN | 26       | 2                                  | 50 | 48  | III      | EC.D.PEN | 0        | 17   | 25 | II       | OM.F.INT |          |          |  |  |  |
| 21         | 3  | 59 | I   | EC.D.EXT | 2        | 55                                 | 10 | III | EC.D.EXT | 0        | 22       | 2    | II | OM.F.EXT |          |          |          |  |  |  |
| 21         | 7  | 47 | I   | EC.D.INT | 3        | 7                                  | 19 | III | EC.D.INT | 2        | 23       | 5    | II | PA.F.INT |          |          |          |  |  |  |
| 21         | 0  | 28 | 39  | I        | OC.F.INT | 4                                  | 28 | 52  | I        | EC.D.PEN | 2        | 28   | 5  | II       | PA.F.EXT |          |          |  |  |  |
|            | 0  | 32 | 31  | I        | OC.F.EXT | 4                                  | 29 | 41  | I        | EC.D.EXT | 11       | 54   | 41 | I        | EC.D.PEN |          |          |  |  |  |
|            | 18 | 13 | 39  | I        | OM.D.EXT | 4                                  | 33 | 29  | I        | EC.D.INT | 11       | 55   | 29 | I        | EC.D.EXT |          |          |  |  |  |
|            |    |    |     |          |          | 5                                  | 25 | 41  | III      | EC.F.INT | 11       | 59   | 17 | I        | EC.D.INT |          |          |  |  |  |
|            |    |    |     |          |          | 5                                  | 37 | 51  | III      | EC.F.EXT | 15       | 11   | 18 | I        | OC.F.INT |          |          |  |  |  |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter

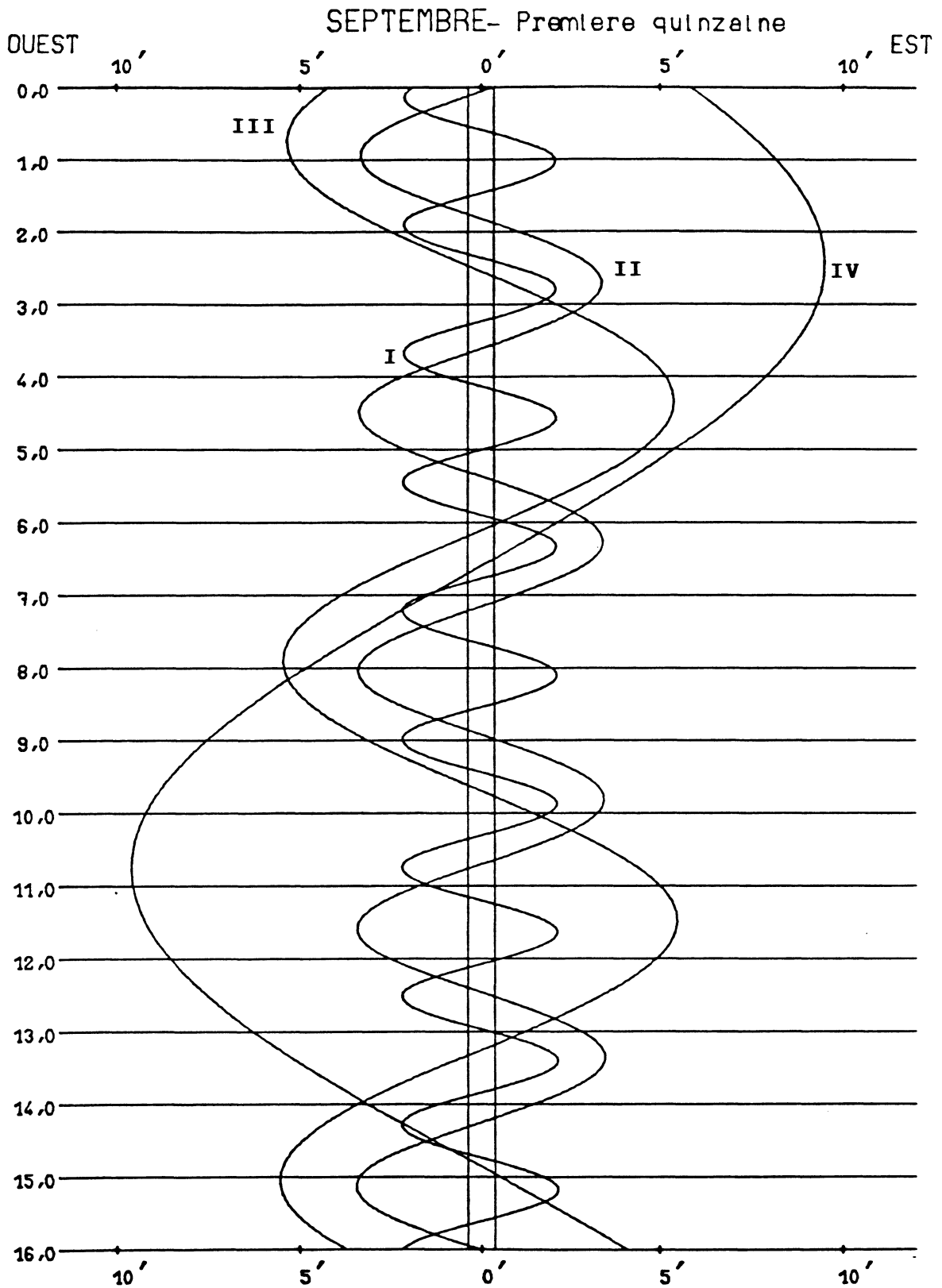


1987 - SATELLITES DE JUPITER -

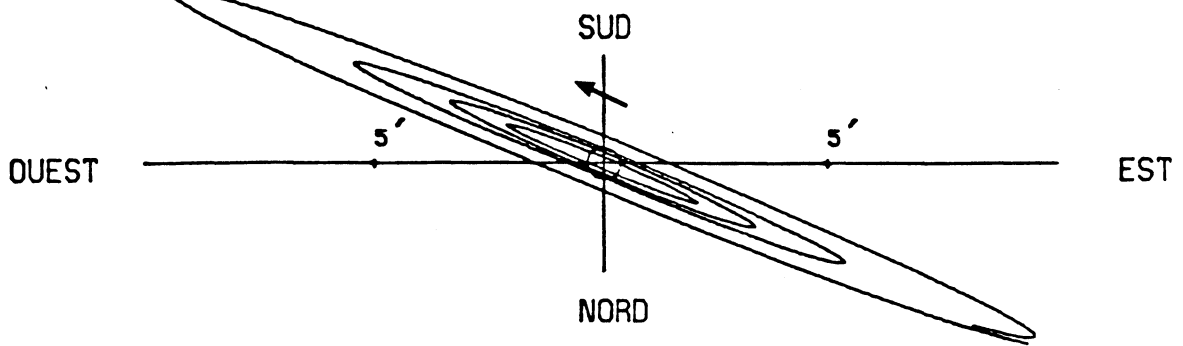
| PHENOMENES |    |    |     |          |          | MOIS : SEPTEMBRE - PREMIERE QUINZAINE - |          |    |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|---|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                                    | H        | M  | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |
| 1          | 9  | 4  | 15  | I        | OM.D.EXT | 6                                       | 23       | 32 | 57       | III      | OM.F.INT | 11       | 16       | 16       | 54       | II       | OM.F.EXT |          |
|            | 9  | 8  | 1   | I        | OM.D.INT |   | 23       | 44 | 48       | III      | OM.F.EXT |          | 17       | 55       | 39       | II       | PA.F.INT |          |
|            | 10 | 9  | 13  | I        | PA.D.EXT |   | 7        | 1  | 16       | 0        | III      |          | PA.D.EXT | 18       | 0        | 40       | II       | PA.F.EXT |
|            | 10 | 13 | 5   | I        | PA.D.INT |   |          | 1  | 31       | 56       | III      |          | PA.D.INT | 2        | 46       | 14       | I        | EC.D.PEN |
|            | 11 | 15 | 27  | I        | OM.F.INT |   |          | 3  | 12       | 1        | III      |          | PA.F.INT | 2        | 47       | 2        | I        | EC.D.EXT |
|            | 11 | 19 | 14  | I        | OM.F.EXT |   |          | 3  | 27       | 49       | III      |          | PA.F.EXT | 2        | 50       | 50       | I        | EC.D.INT |
|            | 12 | 17 | 21  | I        | PA.F.INT |   |          | 16 | 29       | 39       | I        |          | OM.D.EXT | 5        | 51       | 29       | I        | OC.F.INT |
|            | 12 | 21 | 13  | I        | PA.F.EXT |   |          | 16 | 33       | 25       | I        |          | OM.D.INT | 5        | 55       | 21       | I        | OC.F.EXT |
|            | 16 | 1  | 37  | II       | EC.D.PEN |   |          | 17 | 29       | 29       | I        |          | PA.D.EXT | 23       | 55       | 4        | I        | OM.D.EXT |
|            | 16 | 3  | 26  | II       | EC.D.EXT |   |          | 17 | 33       | 21       | I        |          | PA.D.INT | 23       | 58       | 51       | I        | OM.D.INT |
| 16         | 8  | 2  | II  | EC.D.INT | 18       | 40                                      |          | 58 | I        | OM.F.INT | 12       | 0        | 49       | 9        | I        | PA.D.EXT |          |          |
| 20         | 30 | 30 | II  | OC.F.INT | 18       | 44                                      |          | 45 | I        | OM.F.EXT |          | 0        | 53       | 1        | I        | PA.D.INT |          |          |
| 20         | 35 | 29 | II  | OC.F.EXT | 19       | 37                                      | 42       | I  | PA.F.INT | 2        |          | 6        | 31       | I        | OM.F.INT |          |          |          |
| 2          | 6  | 23 | 13  | I        | EC.D.PEN | 19                                      | 41       | 34 | I        | PA.F.EXT |          | 2        | 10       | 18       | I        | OM.F.EXT |          |          |
|            | 6  | 24 | 1   | I        | EC.D.EXT | 8                                       | 0        | 27 | 12       | II       |          | OM.D.EXT | 2        | 57       | 28       | I        | PA.F.INT |          |
|            | 6  | 27 | 49  | I        | EC.D.INT |   | 0        | 31 | 49       | II       |          | OM.D.INT | 3        | 1        | 19       | I        | PA.F.EXT |          |
|            | 6  | 52 | 3   | III      | EC.D.PEN |   | 0        | 31 | 36       | II       |          | PA.D.EXT | 7        | 54       | 53       | II       | EC.D.PEN |          |
|            | 6  | 56 | 25  | III      | EC.D.EXT |   | 2        | 36 | 39       | II       |          | PA.D.INT | 7        | 56       | 43       | II       | EC.D.EXT |          |
|            | 7  | 8  | 41  | III      | EC.D.INT |   | 2        | 53 | 51       | II       |          | OM.F.INT | 8        | 1        | 20       | II       | EC.D.INT |          |
|            | 9  | 25 | 53  | III      | EC.F.INT |   | 2        | 58 | 28       | II       |          | OM.F.EXT | 12       | 0        | 47       | II       | OC.F.INT |          |
|            | 9  | 38 | 7   | I        | OC.F.INT |   | 4        | 45 | 12       | II       | PA.F.INT | 12       | 5        | 47       | II       | OC.F.EXT |          |          |
|            | 9  | 38 | 8   | III      | EC.F.EXT |   | 4        | 50 | 13       | II       | PA.F.EXT | 21       | 14       | 48       | I        | EC.D.PEN |          |          |
|            | 9  | 41 | 59  | I        | OC.F.EXT |   | 13       | 49 | 3        | I        | EC.D.PEN | 21       | 15       | 36       | I        | EC.D.EXT |          |          |
| 9          | 42 | 31 | III | EC.F.PEN | 13       |   | 49       | 51 | I        | EC.D.EXT | 21       | 19       | 25       | I        | EC.D.INT |          |          |          |
| 11         | 28 | 2  | III | OC.D.EXT | 13       | 53                                      | 39       | I  | EC.D.INT | 13       | 0        | 17       | 56       | I        | OC.F.INT |          |          |          |
| 11         | 43 | 51 | III | OC.D.INT | 16       | 58                                      | 22       | I  | OC.F.INT |          | 0        | 21       | 48       | I        | OC.F.EXT |          |          |          |
| 13         | 26 | 17 | III | OC.F.INT | 17       | 2                                       | 14       | I  | OC.F.EXT |          | 0        | 57       | 0        | III      | OM.D.EXT |          |          |          |
| 13         | 42 | 6  | III | OC.F.EXT | 9        | 10                                      | 58       | 5  | I        |          | OM.D.EXT | 1        | 8        | 53       | III      | OM.D.INT |          |          |
| 3          | 3  | 32 | 44  | I        |          | OM.D.EXT                                | 11       | 1  | 52       |          | I        | OM.D.INT | 3        | 32       | 37       | III      | OM.F.INT |          |
|            | 3  | 36 | 31  | I        |          | OM.D.INT                                | 11       | 56 | 5        |          | I        | PA.D.EXT | 3        | 44       | 34       | III      | OM.F.EXT |          |
|            | 4  | 36 | 5   | I        |          | PA.D.EXT                                | 11       | 59 | 57       |          | I        | PA.D.INT | 4        | 44       | 16       | III      | PA.D.EXT |          |
|            | 4  | 39 | 56  | I        |          | PA.D.INT                                | 13       | 9  | 27       |          | I        | OM.F.INT | 5        | 0        | 22       | III      | PA.D.INT |          |
|            | 5  | 43 | 59  | I        |          | OM.F.INT                                | 13       | 13 | 14       |          | I        | OM.F.EXT | 6        | 39       | 13       | III      | PA.F.INT |          |
|            | 5  | 47 | 46  | I        |          | OM.F.EXT                                | 14       | 4  | 19       |          | I        | PA.F.INT | 6        | 55       | 13       | III      | PA.F.EXT |          |
|            | 6  | 44 | 14  | I        |          | PA.F.INT                                | 14       | 8  | 11       | I        | PA.F.EXT | 18       | 23       | 35       | I        | OM.D.EXT |          |          |
|            | 6  | 48 | 5   | I        |          | PA.F.EXT                                | 18       | 37 | 7        | II       | EC.D.PEN | 18       | 27       | 22       | I        | OM.D.INT |          |          |
|            | 11 | 9  | 9   | II       |          | OM.D.EXT                                | 18       | 38 | 57       | II       | EC.D.EXT | 19       | 15       | 36       | I        | PA.D.EXT |          |          |
|            | 11 | 13 | 45  | II       | OM.D.INT | 18                                      | 43       | 33 | II       | EC.D.INT | 19       | 19       | 28       | I        | PA.D.INT |          |          |          |
| 13         | 20 | 55 | II  | PA.D.EXT | 22       | 51                                      | 14       | II | OC.F.INT | 20       | 35       | 4        | I        | OM.F.INT |          |          |          |          |
| 13         | 25 | 57 | II  | PA.D.INT | 22       | 56                                      | 14       | II | OC.F.EXT | 20       | 38       | 51       | I        | OM.F.EXT |          |          |          |          |
| 13         | 35 | 54 | II  | OM.F.INT | 10       | 8                                       | 17       | 36 | I        | EC.D.PEN | 21       | 23       | 57       | I        | PA.F.INT |          |          |          |
| 13         | 40 | 31 | II  | OM.F.EXT |          | 8                                       | 18       | 24 | I        | EC.D.EXT | 21       | 27       | 49       | I        | PA.F.EXT |          |          |          |
| 15         | 34 | 39 | II  | PA.F.INT |          | 8                                       | 22       | 12 | I        | EC.D.INT | 14       | 3        | 3        | 51       | II       | OM.D.EXT |          |          |
| 15         | 39 | 40 | II  | PA.F.EXT |          | 10                                      | 54       | 3  | III      | EC.D.PEN |          | 3        | 8        | 28       | II       | OM.D.INT |          |          |
| 4          | 0  | 51 | 50  | I        |          | EC.D.PEN                                | 10       | 58 | 27       | III      |          | EC.D.EXT | 4        | 51       | 43       | II       | PA.D.EXT |          |
|            | 0  | 52 | 38  | I        |          | EC.D.EXT                                | 11       | 10 | 48       | III      |          | EC.D.INT | 4        | 56       | 45       | II       | PA.D.INT |          |
|            | 0  | 56 | 27  | I        |          | EC.D.INT                                | 11       | 24 | 55       | I        |          | OC.F.INT | 5        | 30       | 13       | II       | OM.F.INT |          |
|            | 4  | 4  | 57  | I        |          | OC.F.INT                                | 11       | 28 | 47       | I        |          | OC.F.EXT | 5        | 34       | 51       | II       | OM.F.EXT |          |
|            | 4  | 8  | 49  | I        |          | OC.F.EXT                                | 13       | 26 | 52       | III      |          | EC.F.INT | 7        | 5        | 11       | II       | PA.F.INT |          |
|            | 22 | 1  | 10  | I        |          | OM.D.EXT                                | 13       | 39 | 13       | III      |          | EC.F.EXT | 7        | 10       | 13       | II       | PA.F.EXT |          |
|            | 22 | 4  | 57  | III      | OM.D.INT | 13                                      | 43       | 37 | III      | EC.F.PEN |          | 15       | 43       | 28       | I        | EC.D.PEN |          |          |
|            | 23 | 2  | 48  | I        | PA.D.EXT | 14                                      | 59       | 44 | III      | OC.D.EXT |          | 15       | 44       | 16       | I        | EC.D.EXT |          |          |
|            | 23 | 6  | 40  | I        | PA.D.INT | 15                                      | 15       | 45 | III      | OC.D.INT | 15       | 48       | 4        | I        | EC.D.INT |          |          |          |
|            | 5  | 0  | 12  | 27       | I        | OM.F.INT                                | 16       | 56 | 31       | III      | OC.F.INT | 18       | 44       | 24       | I        | OC.F.INT |          |          |
| 0          |    | 16 | 14  | I        | OM.F.EXT | 17                                      | 12       | 32 | III      | OC.F.EXT | 18       | 48       | 17       | I        | OC.F.EXT |          |          |          |
| 1          |    | 10 | 59  | I        | PA.F.INT | 15                                      | 5        | 26 | 36       | I        | OM.D.EXT | 12       | 52       | 3        | I        | OM.D.EXT |          |          |
| 1          |    | 14 | 50  | I        | PA.F.EXT |   | 5        | 30 | 23       | I        | OM.D.INT | 12       | 55       | 50       | I        | OM.D.INT |          |          |
| 5          |    | 19 | 18  | II       | EC.D.PEN |   | 6        | 22 | 41       | I        | PA.D.EXT | 13       | 41       | 57       | I        | PA.D.EXT |          |          |
| 5          |    | 21 | 7   | II       | EC.D.EXT |   | 6        | 26 | 33       | I        | PA.D.INT | 13       | 45       | 49       | I        | PA.D.INT |          |          |
| 5          |    | 25 | 43  | II       | EC.D.INT |   | 7        | 38 | 1        | I        | OM.F.INT | 15       | 3        | 34       | I        | OM.F.INT |          |          |
| 9          |    | 41 | 2   | II       | OC.F.INT |   | 7        | 41 | 48       | I        | OM.F.EXT | 15       | 7        | 22       | I        | OM.F.EXT |          |          |
| 9          |    | 46 | 1   | II       | OC.F.EXT |   | 8        | 30 | 57       | I        | PA.F.INT | 15       | 50       | 20       | I        | PA.F.INT |          |          |
| 19         |    | 20 | 24  | I        | EC.D.PEN |   | 8        | 34 | 49       | I        | PA.F.EXT | 15       | 54       | 12       | I        | PA.F.EXT |          |          |
| 19         | 21 | 12 | I   | EC.D.EXT | 13       |   | 45       | 47 | II       | OM.D.EXT | 21       | 12       | 49       | II       | EC.D.PEN |          |          |          |
| 19         | 25 | 0  | I   | EC.D.INT | 13       |   | 50       | 23 | II       | OM.D.INT | 21       | 14       | 39       | II       | EC.D.EXT |          |          |          |
| 20         | 56 | 35 | III | OM.D.EXT | 15       | 42                                      | 9        | II | PA.D.EXT | 21       | 19       | 17       | II       | EC.D.INT |          |          |          |          |
| 21         | 8  | 22 | III | OM.D.INT | 15       | 47                                      | 11       | II | PA.D.INT | 15       | 12       | 52       | 3        | I        | OM.D.EXT |          |          |          |
| 22         | 31 | 39 | I   | OC.F.INT | 16       | 12                                      | 16       | II | OM.F.INT |          | 12       | 55       | 50       | I        | OM.D.INT |          |          |          |
| 22         | 35 | 31 | I   | OC.F.EXT | 15       | 5                                       | 26       | 36 | I        |          | OM.D.EXT | 13       | 41       | 57       | I        | PA.D.EXT |          |          |
| 6          | 23 | 32 | 57  | III      |          | OM.F.INT                                | 5        | 30 | 23       |          | I        | OM.D.INT | 13       | 45       | 49       | I        | PA.D.INT |          |
|            | 23 | 44 | 48  | III      |          | OM.F.EXT                                | 6        | 22 | 41       |          | I        | PA.D.EXT | 15       | 3        | 34       | I        | OM.F.INT |          |
|            | 7  | 1  | 16  | 0        |          | III                                     | PA.D.EXT | 6  | 26       |          | 33       | I        | PA.D.INT | 15       | 7        | 22       | I        | OM.F.EXT |
|            |    | 1  | 31  | 56       |          | III                                     | PA.D.INT | 7  | 38       |          | 1        | I        | OM.F.INT | 15       | 7        | 22       | I        | OM.F.EXT |
|            |    | 3  | 12  | 1        |          | III                                     | PA.F.INT | 7  | 41       |          | 48       | I        | OM.F.EXT | 15       | 50       | 20       | I        | PA.F.INT |
|            |    | 3  | 27  | 49       |          | III                                     | PA.F.EXT | 8  | 30       |          | 57       | I        | PA.F.INT | 15       | 54       | 12       | I        | PA.F.EXT |
|            |    | 16 | 29  | 39       |          | I                                       | OM.D.EXT | 8  | 34       |          | 49       | I        | PA.F.EXT | 21       | 12       | 49       | II       | EC.D.PEN |
|            |    | 16 | 33  | 25       |          | I                                       | OM.D.INT | 13 | 45       | 47       | II       | OM.D.EXT | 21       | 14       | 39       | II       | EC.D.EXT |          |
|            |    | 17 | 29  | 29       |          | I                                       | PA.D.EXT | 13 | 50       | 23       | II       | OM.D.INT | 21       | 19       | 17       | II       | EC.D.INT |          |
|            |    | 17 | 33  | 21       | I        | PA.D.INT                                | 15       | 42 | 9        | II       | PA.D.EXT | 15       | 12       | 52       | 3        | I        | OM.D.EXT |          |
| 18         |    | 40 | 58  | I        | OM.F.INT | 15                                      | 47       | 11 | II       | PA.D.INT | 12       |          | 55       | 50       | I        | OM.D.INT |          |          |
| 18         |    | 44 | 45  | I        | OM.F.EXT | 16                                      | 12       | 16 | II       | OM.F.INT | 13       |          | 41       | 57       | I        | PA.D.EXT |          |          |
| 19         | 37 | 42 | I   | PA.F.INT | 8        | 10                                      | 58       | 5  | I        | OM.D.EXT | 13       |          | 45       | 49       | I        | PA.D.INT |          |          |
| 19         | 41 | 34 | I   | PA.F.EXT |          | 11                                      | 1        | 52 | I        | OM.D.INT | 15       |          | 3        | 34       | I        | OM.F.INT |          |          |
| 8          | 0  | 27 | 12  | II       |          | OM.D.EXT                                | 11       | 56 | 5        | I        | PA.D.EXT |          | 15       | 7        | 22       | I        | OM.F.EXT |          |
|            | 0  | 31 | 49  | II       |          | OM.D.INT                                | 11       | 59 | 57       | I        | PA.D.INT |          | 15       | 7        | 22       | I        | OM.F.EXT |          |
|            | 0  | 31 | 36  | II       |          | PA.D.EXT                                | 13       | 9  | 27       | I        | OM.F.INT |          | 15       | 50       | 20       | I        | PA.F.INT |          |
|            | 2  | 36 | 39  | II       |          | PA.D.INT                                | 13       | 13 | 14       | I        | OM.F.EXT |          | 15       | 54       | 12       | I        | PA.F.EXT |          |
|            | 2  | 53 | 51  | II       |          | OM.F.INT                                | 14       | 4  | 19       | I        | PA.F.INT |          | 15       | 54       | 12       | I        | PA.F.EXT |          |
|            | 2  | 58 | 28  | II       |          | OM.F.EXT                                | 14       | 8  | 11       | I        | PA.F.EXT | 18       | 23       | 35       | I        | OM.D.EXT |          |          |
|            | 4  | 45 | 12  | II       |          | PA.F.INT                                | 18       | 37 | 7        | II       | EC.D.PEN | 18       | 27       | 22       | I        | OM.D.INT |          |          |
|            | 4  | 50 | 13  | II       |          | PA.F.EXT                                | 18       | 38 | 57       | II       | EC.D.EXT | 19       | 15       | 36       | I        | PA.D.EXT |          |          |
|            | 13 | 49 | 3   | I        | EC.D.PEN | 18                                      | 43       | 33 | II       | EC.D.INT | 19       | 19       | 28       | I        | PA.D.INT |          |          |          |
|            | 13 | 49 | 51  | I        | EC.D.EXT | 22                                      | 51       | 14 | II       | OC.F.INT | 20       | 35       | 4        | I        | OM.F.INT |          |          |          |
| 13         | 53 | 39 | I   | EC.D.INT | 22       | 56                                      | 14       | II | OC.F.EXT | 20       | 38       | 51       | I        | OM.F.EXT |          |          |          |          |
| 16         | 58 | 22 | I   | OC.F.INT | 9        | 8                                       | 17       | 36 | I        | EC.D.PEN | 21</     |          |          |          |          |          |          |          |



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

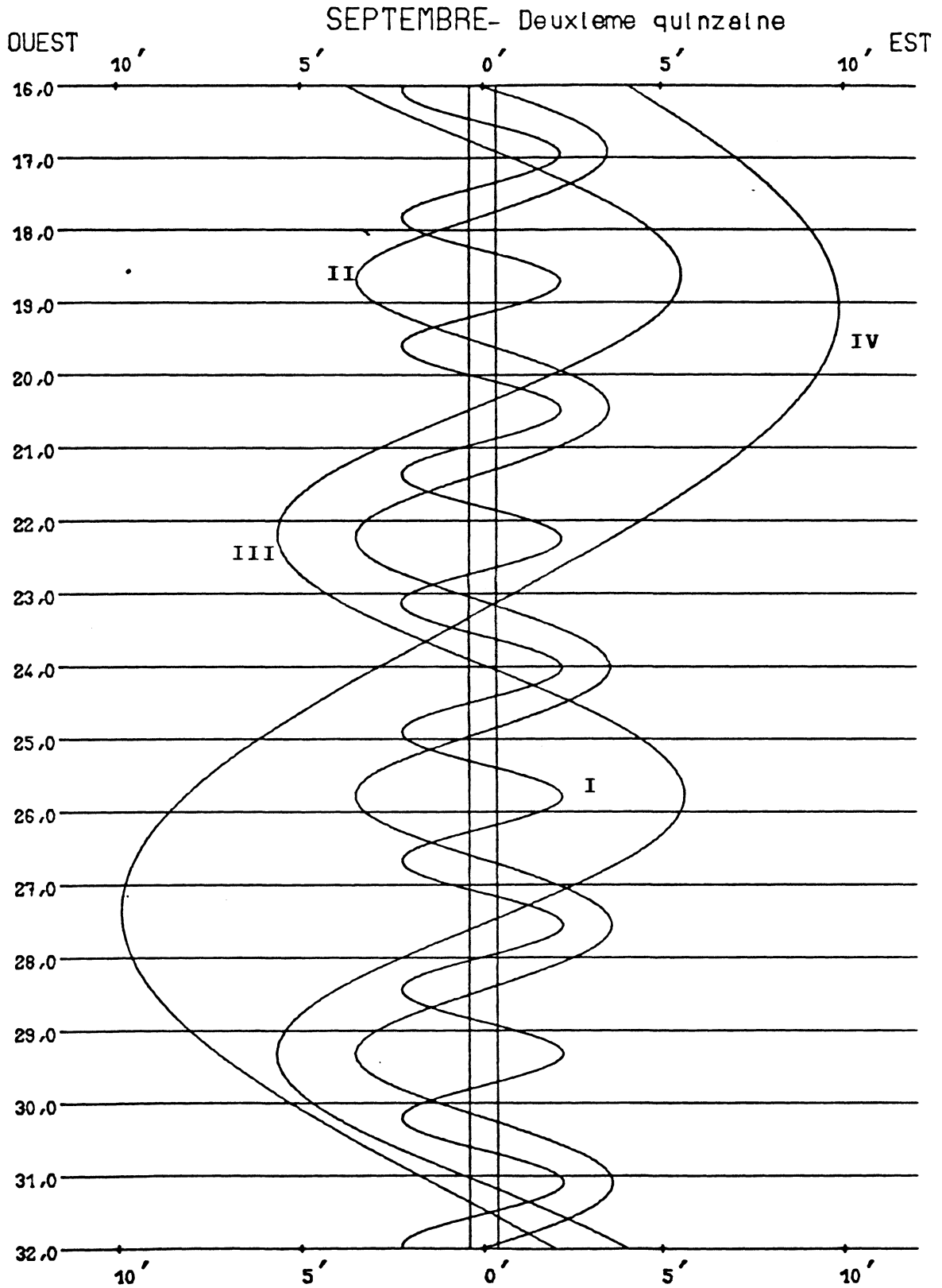


ORBITES APPARENTES

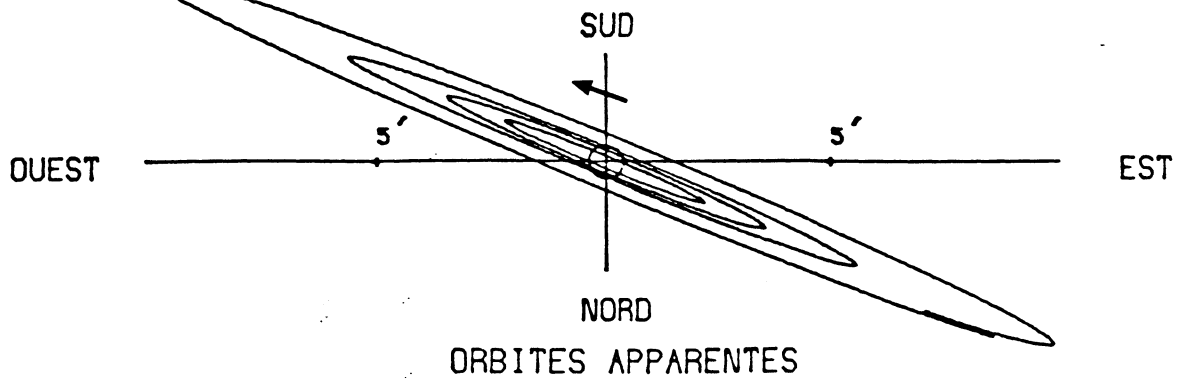
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : SEPTEMBRE - DEUXIEME QUINZAINE - |    |    |          |          |          |          |          |    |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|---|----|----|----------|----------|----------|----------|----------|----|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                                    | H  | M  | S        | SAT      | TYPE     | JOUR     | H        | M  | S        | SAT      | TYPE     |          |          |          |
| 16         | 1  | 10 | 3   | II       | OC.F.INT | 21                                      | 22 | 29 | 17       | I        | OM.F.INT | 26       | 3        | 43 | 17       | I        | OM.D.EXT |          |          |          |
|            | 1  | 15 | 4   | II       | OC.F.EXT |   | 22 | 33 | 4        | I        | OM.F.EXT |          | 3        | 47 | 4        | I        | OM.D.INT |          |          |          |
|            | 10 | 12 | 2   | I        | EC.D.PEN |   | 23 | 9  | 19       | I        | PA.F.INT |          | 4        | 19 | 10       | I        | PA.D.EXT |          |          |          |
|            | 10 | 12 | 50  | I        | EC.D.EXT |   | 23 | 13 | 11       | I        | PA.F.EXT |          | 4        | 23 | 2        | I        | PA.D.INT |          |          |          |
|            | 10 | 16 | 38  | I        | EC.D.INT |   | 5  | 40 | 27       | II       | OM.D.EXT |          | 5        | 55 | 1        | I        | OM.F.INT |          |          |          |
|            | 13 | 10 | 44  | I        | OC.F.INT |   | 5  | 45 | 4        | II       | OM.D.INT |          | 5        | 58 | 49       | I        | OM.F.EXT |          |          |          |
|            | 13 | 14 | 36  | I        | OC.F.EXT |   | 7  | 9  | 43       | II       | PA.D.EXT |          | 6        | 27 | 49       | I        | PA.F.INT |          |          |          |
|            | 14 | 55 | 20  | III      | EC.D.PEN |   | 7  | 14 | 45       | II       | PA.D.INT |          | 6        | 31 | 41       | I        | PA.F.EXT |          |          |          |
|            | 14 | 59 | 46  | III      | EC.D.EXT |   | 8  | 6  | 33       | II       | OM.F.INT |          | 13       | 6  | 47       | II       | EC.D.PEN |          |          |          |
|            | 15 | 12 | 13  | III      | EC.D.INT |   | 8  | 11 | 12       | II       | OM.F.EXT |          | 13       | 8  | 38       | II       | EC.D.EXT |          |          |          |
|            | 17 | 27 | 8   | III      | EC.F.INT |   | 9  | 23 | 14       | II       | PA.F.INT |          | 13       | 13 | 18       | II       | EC.D.INT |          |          |          |
|            | 17 | 39 | 35  | III      | EC.F.EXT |   | 9  | 28 | 16       | II       | PA.F.EXT |          | 16       | 35 | 11       | II       | OC.F.INT |          |          |          |
|            | 17 | 44 | 1   | III      | EC.F.PEN |   | 17 | 37 | 56       | I        | EC.D.PEN |          | 16       | 40 | 12       | II       | OC.F.EXT |          |          |          |
|            | 18 | 26 | 2   | III      | OC.D.EXT |   | 17 | 38 | 45       | I        | EC.D.EXT |          | 27       | 1  | 3        | 48       | I        | EC.D.PEN |          |          |
| 18         | 42 | 8  | III | OC.D.INT | 17       | 42                                      | 33 | I  | EC.D.INT | 1        | 4        | 36       |          | I  | EC.D.EXT |          |          |          |          |          |
| 20         | 22 | 3  | III | OC.F.INT | 20       | 29                                      | 33 | I  | OC.F.INT | 1        | 8        | 24       |          | I  | EC.D.INT |          |          |          |          |          |
| 20         | 38 | 9  | III | OC.F.EXT | 20       | 33                                      | 25 | I  | OC.F.EXT | 3        | 47       | 51       |          | I  | OC.F.INT |          |          |          |          |          |
| 17         | 7  | 20 | 36  | I        | OM.D.EXT | 22                                      | 14 | 46 | 9        | I        | OM.D.EXT | 28       |          | 3  | 47       | 44       | I        | OC.F.EXT |          |          |
|            | 7  | 24 | 23  | I        | OM.D.INT |   | 8  | 59 | 16       | III      | OM.D.EXT |          |          | 3  | 51       | 44       | I        | OC.F.EXT |          |          |
|            | 8  | 8  | 19  | I        | PA.D.EXT |   | 14 | 49 | 56       | I        | OM.D.INT |          |          | 8  | 59       | 16       | III      | OM.D.EXT |          |          |
|            | 8  | 12 | 12  | I        | PA.D.INT |   | 15 | 26 | 57       | I        | PA.D.EXT |          |          | 9  | 11       | 20       | III      | OM.D.INT |          |          |
|            | 9  | 32 | 10  | I        | OM.F.INT |   | 15 | 30 | 49       | I        | PA.D.INT |          |          | 11 | 29       | 9        | III      | PA.D.EXT |          |          |
|            | 9  | 35 | 57  | I        | OM.F.EXT |   | 16 | 57 | 49       | I        | OM.F.INT |          |          | 11 | 33       | 21       | III      | OM.F.INT |          |          |
|            | 10 | 16 | 45  | I        | PA.F.INT |   | 17 | 1  | 37       | I        | OM.F.EXT |          |          | 11 | 45       | 15       | III      | PA.D.INT |          |          |
|            | 10 | 20 | 36  | I        | PA.F.EXT |   | 17 | 35 | 30       | I        | PA.F.INT |          |          | 11 | 45       | 28       | III      | OM.F.EXT |          |          |
|            | 16 | 22 | 24  | II       | OM.D.EXT |   | 17 | 39 | 22       | I        | PA.F.EXT |          |          | 13 | 24       | 10       | III      | PA.F.INT |          |          |
|            | 16 | 27 | 1   | II       | OM.D.INT |   | 23 | 48 | 47       | II       | EC.D.PEN |          |          | 13 | 40       | 14       | III      | PA.F.EXT |          |          |
|            | 18 | 1  | 10  | II       | PA.D.EXT |   | 23 | 50 | 38       | II       | EC.D.EXT |          | 22       | 11 | 52       | I        | OM.D.EXT |          |          |          |
|            | 18 | 6  | 13  | II       | PA.D.INT |   | 23 | 55 | 17       | II       | EC.D.INT |          | 22       | 15 | 39       | I        | OM.D.INT |          |          |          |
|            | 18 | 48 | 37  | II       | OM.F.INT |   | 23 | 3  | 27       | 14       | II       |          | OC.F.INT | 22 | 45       | 14       | I        | PA.D.EXT |          |          |
|            | 18 | 53 | 15  | II       | OM.F.EXT |   |    | 3  | 32       | 15       | II       |          | OC.F.EXT | 22 | 49       | 6        | I        | PA.D.INT |          |          |
| 20         | 14 | 39 | II  | PA.F.INT | 12       | 6                                       |    | 31 | I        | EC.D.PEN | 28       | 0        | 23       | 38 | I        | OM.F.INT |          |          |          |          |
| 20         | 19 | 40 | II  | PA.F.EXT | 12       | 7                                       |    | 20 | I        | EC.D.EXT |          | 0        | 27       | 26 | I        | OM.F.EXT |          |          |          |          |
| 18         | 4  | 40 | 40  | I        | EC.D.PEN | 12                                      |    | 11 | 8        | I        |          | EC.D.INT | 0        | 53 | 56       | I        | PA.F.INT |          |          |          |
|            | 4  | 41 | 29  | I        | EC.D.EXT | 14                                      |    | 55 | 40       | I        |          | OC.F.INT | 0        | 57 | 48       | I        | PA.F.EXT |          |          |          |
|            | 4  | 45 | 17  | I        | EC.D.INT | 14                                      |    | 59 | 32       | I        |          | OC.F.EXT | 8        | 17 | 0        | II       | OM.D.EXT |          |          |          |
|            | 7  | 37 | 3   | I        | OC.F.INT | 18                                      |    | 56 | 42       | III      |          | EC.D.PEN | 8        | 21 | 39       | II       | OM.D.INT |          |          |          |
|            | 7  | 40 | 56  | I        | OC.F.EXT | 19                                      |    | 1  | 9        | III      |          | EC.D.EXT | 9        | 25 | 51       | II       | PA.D.EXT |          |          |          |
|            | 19 | 1  | 49  | 6        | I        | OM.D.EXT                                |    | 19 | 13       | 41       |          | III      | EC.D.INT | 9  | 30       | 52       | II       | PA.D.INT |          |          |
| 1          |    | 52 | 53  | I        | OM.D.INT | 19                                      |    | 27 | 30       | III      |          | EC.F.INT | 10       | 42 | 50       | II       | OM.F.INT |          |          |          |
| 2          |    | 34 | 34  | I        | PA.D.EXT | 21                                      |    | 40 | 1        | III      |          | EC.F.EXT | 10       | 47 | 28       | II       | OM.F.EXT |          |          |          |
| 2          |    | 38 | 26  | I        | PA.D.INT | 21                                      |    | 44 | 28       | III      |          | EC.F.PEN | 11       | 39 | 38       | II       | PA.F.INT |          |          |          |
| 4          |    | 0  | 42  | I        | OM.F.INT | 21                                      |    | 48 | 5        | III      |          | OC.D.EXT | 11       | 44 | 39       | II       | PA.F.EXT |          |          |          |
| 4          |    | 4  | 29  | I        | OM.F.EXT | 22                                      | 4  | 10 | III      | OC.D.INT |          | 19       | 32       | 29 | I        | EC.D.PEN |          |          |          |          |
| 4          |    | 43 | 2   | I        | PA.F.INT | 23                                      | 44 | 8  | III      | OC.F.INT |          | 19       | 33       | 18 | I        | EC.D.EXT |          |          |          |          |
| 4          |    | 46 | 54  | I        | PA.F.EXT | 24                                      | 0  | 0  | 13       | III      | OC.F.EXT | 19       | 37       | 6  | I        | EC.D.INT |          |          |          |          |
| 10         |    | 30 | 41  | II       | EC.D.PEN |   | 9  | 14 | 45       | I        | OM.D.EXT | 22       | 13       | 57 | I        | OC.F.INT |          |          |          |          |
| 10         |    | 32 | 31  | II       | EC.D.EXT |   | 9  | 18 | 32       | I        | OM.D.INT | 22       | 17       | 49 | I        | OC.F.EXT |          |          |          |          |
| 10         |    | 37 | 10  | II       | EC.D.INT |   | 9  | 53 | 7        | I        | PA.D.EXT | 29       | 16       | 40 | 25       | I        | OM.D.EXT |          |          |          |
| 14         |    | 18 | 43  | II       | OC.F.INT |   | 9  | 56 | 59       | I        | PA.D.INT |          | 16       | 44 | 12       | I        | OM.D.INT |          |          |          |
| 14         |    | 23 | 43  | II       | OC.F.EXT |   | 11 | 26 | 27       | I        | OM.F.INT |          | 17       | 11 | 12       | I        | PA.D.EXT |          |          |          |
| 23         |    | 9  | 16  | I        | EC.D.PEN |   | 11 | 30 | 15       | I        | OM.F.EXT |          | 17       | 15 | 4        | I        | PA.D.INT |          |          |          |
| 23         | 10 | 4  | I   | EC.D.EXT | 12       |   | 1  | 43 | I        | PA.F.INT | 18       |          | 52       | 13 | I        | OM.F.INT |          |          |          |          |
| 23         | 13 | 52 | I   | EC.D.INT | 12       |   | 5  | 35 | I        | PA.F.EXT | 18       |          | 56       | 1  | I        | OM.F.EXT |          |          |          |          |
| 20         | 2  | 3  | 17  | I        | OC.F.INT |   | 18 | 58 | 56       | II       | OM.D.EXT |          | 19       | 19 | 57       | I        | PA.F.INT |          |          |          |
|            | 2  | 7  | 10  | I        | OC.F.EXT |   | 19 | 3  | 34       | II       | OM.D.INT |          | 19       | 23 | 49       | I        | PA.F.EXT |          |          |          |
|            | 4  | 58 | 6   | III      | OM.D.EXT |   | 20 | 18 | 10       | II       | PA.D.EXT |          | 30       | 2  | 25       | 1        | II       | EC.D.PEN |          |          |
|            | 5  | 10 | 5   | III      | OM.D.INT |   | 20 | 23 | 12       | II       | PA.D.INT |          |          | 2  | 26       | 53       | II       | EC.D.EXT |          |          |
|            | 7  | 32 | 58  | III      | OM.F.INT |   | 21 | 24 | 53       | II       | OM.F.INT |          |          | 2  | 31       | 33       | II       | EC.D.INT |          |          |
|            | 7  | 44 | 59  | III      | OM.F.EXT | 21                                      | 29 | 32 | II       | OM.F.EXT | 5        |          |          | 43 | 4        | II       | OC.F.INT |          |          |          |
|            | 8  | 8  | 43  | III      | PA.D.EXT | 22                                      | 31 | 47 | II       | PA.F.INT | 5        |          |          | 48 | 5        | II       | OC.F.EXT |          |          |          |
|            | 8  | 24 | 53  | III      | PA.D.INT | 22                                      | 36 | 49 | II       | PA.F.EXT | 14       |          |          | 1  | 6        | I        | EC.D.PEN |          |          |          |
|            | 10 | 3  | 18  | III      | PA.F.INT | 25                                      | 6  | 35 | 11       | I        | EC.D.PEN | 14       |          | 1  | 54       | I        | EC.D.EXT |          |          |          |
|            | 10 | 19 | 23  | III      | PA.F.EXT |   | 6  | 35 | 59       | I        | EC.D.EXT | 14       |          | 5  | 42       | I        | EC.D.INT |          |          |          |
|            | 20 | 17 | 38  | I        | OM.D.EXT |   | 6  | 39 | 48       | I        | EC.D.INT | 16       |          | 39 | 55       | I        | OC.F.INT |          |          |          |
|            | 20 | 21 | 26  | I        | OM.D.INT |   | 9  | 21 | 48       | I        | OC.F.INT | 16       |          | 43 | 47       | I        | OC.F.EXT |          |          |          |
|            | 21 | 0  | 48  | I        | PA.D.EXT |   | 9  | 25 | 41       | I        | OC.F.EXT | 22       |          | 57 | 42       | III      | EC.D.PEN |          |          |          |
|            | 21 | 4  | 40  | I        | PA.D.INT |   | 26 | 2  | 25       | 1        | II       | EC.D.PEN |          | 23 | 2        | 11       | III      | EC.D.EXT |          |          |
| 18         | 4  | 40 | 40  | I        | EC.D.PEN |   |    | 23 | 14       | 48       | III      | EC.D.INT |          | 27 | 1        | 3        | 48       | I        | EC.D.PEN |          |
|            | 4  | 41 | 29  | I        | EC.D.EXT |   |    | 28 | 0        | 23       | 38       | I        |          |    | OM.F.INT | 1        | 4        | 36       | I        | EC.D.EXT |
|            | 4  | 45 | 17  | I        | EC.D.INT |   |    |    | 0        | 27       | 26       | I        | OM.F.EXT |    | 1        | 8        | 24       | I        | EC.D.INT |          |
|            | 7  | 37 | 3   | I        | OC.F.INT |   |    |    | 0        | 53       | 56       | I        | PA.F.INT |    | 3        | 47       | 51       | I        | OC.F.INT |          |
|            | 7  | 40 | 56  | I        | OC.F.EXT |   |    |    | 0        | 57       | 48       | I        | PA.F.EXT |    | 3        | 51       | 44       | I        | OC.F.EXT |          |
|            | 19 | 1  | 49  | 6        | I        |   |    |    | OM.D.EXT | 12       | 11       | 8        | I        |    | EC.D.INT | 8        | 59       | 16       | III      | OM.D.EXT |
|            |    | 1  | 52  | 53       | I        |   |    |    | OM.D.INT | 14       | 55       | 40       | I        |    | OC.F.INT | 9        | 11       | 20       | III      | OM.D.INT |
|            |    | 2  | 34  | 34       | I        |   |    |    | PA.D.EXT | 14       | 59       | 32       | I        |    | OC.F.EXT | 11       | 29       | 9        | III      | PA.D.EXT |
|            |    | 2  | 38  | 26       | I        | PA.D.INT                                |    |    | 18       | 56       | 42       | III      | EC.D.PEN |    | 11       | 33       | 21       | III      | OM.F.INT |          |
|            |    | 4  | 0   | 42       | I        | OM.F.INT                                |    |    | 19       | 1        | 9        | III      | EC.D.EXT |    | 11       | 45       | 15       | III      | PA.D.INT |          |
|            |    | 4  | 4   | 29       | I        | OM.F.EXT                                |    |    | 19       | 13       | 41       | III      | EC.D.INT |    | 11       | 45       | 28       | III      | OM.F.EXT |          |
|            |    | 4  | 43  | 2        | I        | PA.F.INT                                |    |    | 19       | 27       | 30       | III      | EC.F.INT |    | 13       | 24       | 10       | III      | PA.F.INT |          |
|            |    | 4  | 46  | 54       | I        | PA.F.EXT                                |    |    | 21       | 40       | 1        | III      | EC.F.EXT |    | 13       | 40       | 14       | III      | PA.F.EXT |          |
|            |    | 10 | 30  | 41       | II       | EC.D.PEN                                | 21 |    | 44       | 28       | III      | EC.F.PEN | 22       |    | 11       | 52       | I        | OM.D.EXT |          |          |
| 10         |    | 32 | 31  | II       | EC.D.EXT | 21                                      | 48 |    | 5        | III      | OC.D.EXT | 22       | 15       | 39 | I        | OM.D.INT |          |          |          |          |
| 10         |    | 37 | 10  | II       | EC.D.INT | 22                                      | 4  | 10 | III      | OC.D.INT | 22       | 45       | 14       | I  | PA.D.EXT |          |          |          |          |          |
| 14         |    | 18 | 43  | II       | OC.F.INT | 23                                      | 44 | 8  | III      | OC.F.INT | 22       | 49       | 6        | I  | PA.D.INT |          |          |          |          |          |
| 14         |    | 23 | 43  | II       | OC.F.EXT | 24                                      | 0  | 0  | 13       | III      | OC.F.EXT | 28       | 0        | 23 | 38       | I        | OM.F.INT |          |          |          |
| 23         |    | 9  | 16  | I        | EC.D.PEN |   | 9  | 14 | 45       | I        | OM.D.EXT |          | 0        | 27 | 26       | I        | OM.F.EXT |          |          |          |
| 23         | 10 | 4  | I   | EC.D.EXT | 9        |   | 18 | 32 | I        | OM.D.INT | 0        |          | 53       | 56 | I        | PA.F.INT |          |          |          |          |
| 23         | 13 | 52 | I   | EC.D.INT | 9        |   | 53 | 7  | I        | PA.D.EXT | 0        |          | 57       | 48 | I        | PA.F.EXT |          |          |          |          |
| 20         | 2  | 3  | 17  | I        | OC.F.INT |   | 11 | 26 | 27       | I        | OM.F.INT |          | 8        | 21 | 39       | II       | OM.D.INT |          |          |          |
|            | 2  | 7  | 10  | I        | OC.F.EXT |   | 11 | 30 | 15       | I        | OM.F.EXT |          | 9        | 25 | 51       | II       | PA.D.EXT |          |          |          |
|            | 4  | 58 | 6   | III      | OM.D.EXT |   | 12 | 1  | 43       | I        | PA.F.INT |          | 9        | 30 | 52       | II       | PA.D.INT |          |          |          |
|            | 5  | 10 | 5   | III      | OM.D.INT |   | 12 | 5  | 35       | I        | PA.F.EXT |          | 10       | 42 | 50       | II       | OM.F.INT |          |          |          |
|            | 7  | 32 | 58  | III      | OM.F.INT |   | 18 | 58 | 56       | II       | OM.D.EXT |          | 10       | 47 | 28       | II       | OM.F.EXT |          |          |          |
|            | 7  | 44 | 59  | III      | OM.F.EXT |   | 19 | 3  | 34</     |          |          |          |          |    |          |          |          |          |          |          |

1987<sub>a</sub>-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.

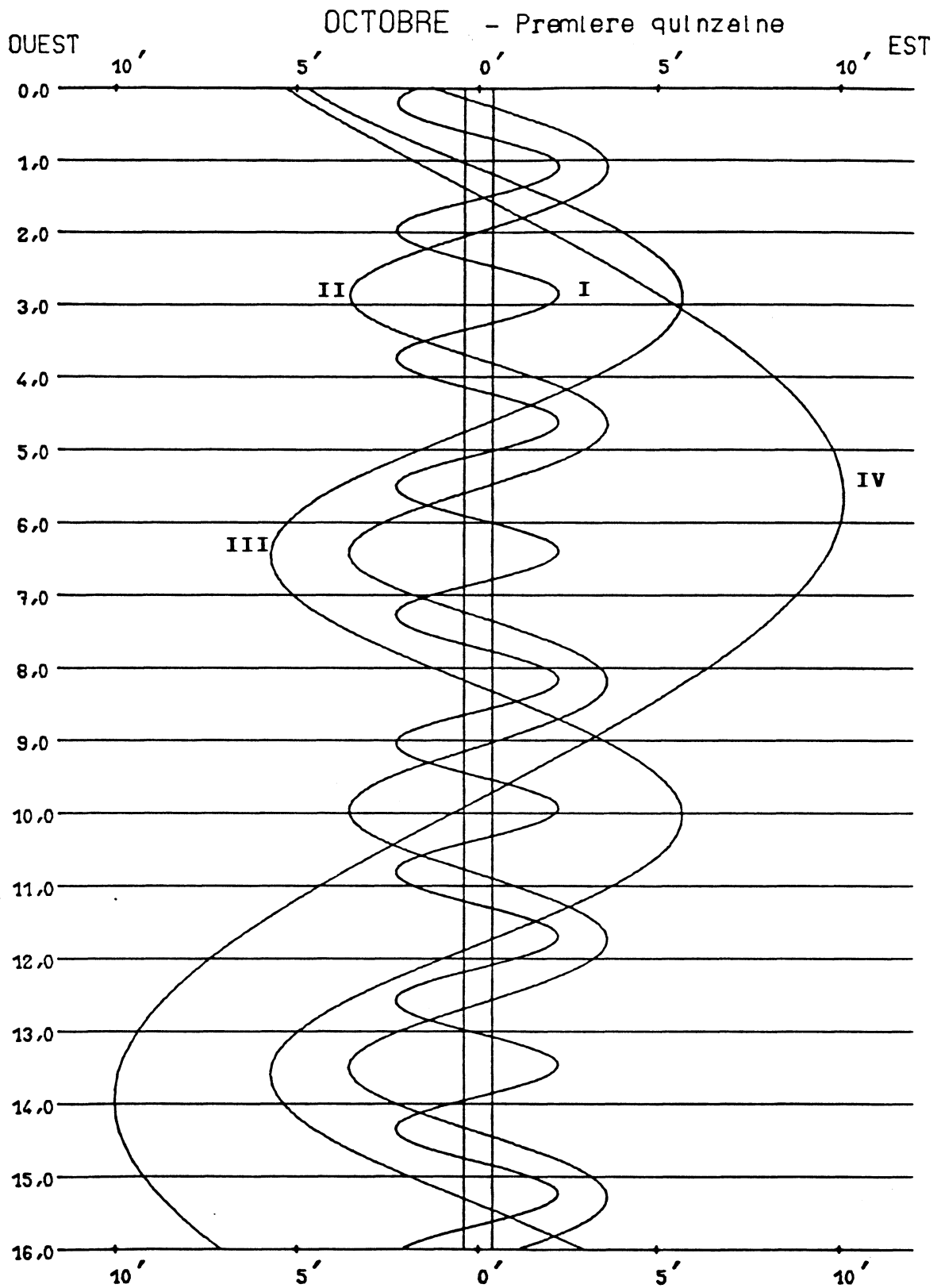


Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

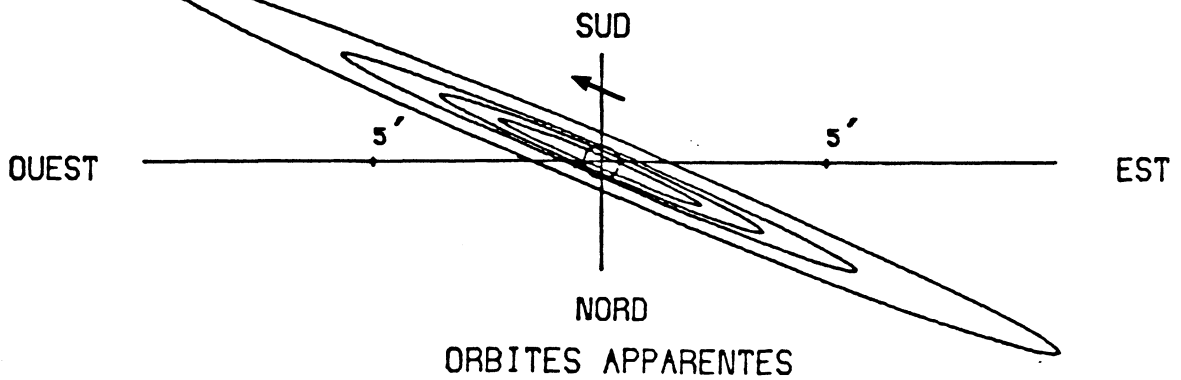


1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : OCTOBRE - PREMIERE QUINZAINE - |          |    |          |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|---------------------------------------|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                                  | H        | M  | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |          |
| 1          | 3  | 3  | 6   | III      | OC.F.INT | 6                                     | 21       | 27 | 7        | I        | EC.D.PEN | 12       | 4        | 53       | 54       | I        | EC.D.EXT |          |          |
|            | 3  | 19 | 4   | III      | OC.F.EXT |                                       | 21       | 27 | 55       | I        | EC.D.EXT |          | 4        | 57       | 42       | I        | EC.D.INT |          |          |
|            | 11 | 9  | 3   | I        | OM.D.EXT |                                       | 21       | 31 | 43       | I        | EC.D.INT |          | 7        | 15       | 26       | I        | OC.F.INT |          |          |
|            | 11 | 12 | 51  | I        | OM.D.INT |                                       | 23       | 57 | 48       | I        | OC.F.INT |          | 7        | 19       | 18       | I        | OC.F.EXT |          |          |
|            | 11 | 37 | 14  | I        | PA.D.EXT |                                       | 7        | 0  | 1        | 40       | I        |          | OC.F.EXT | 17       | 2        | 51       | III      | OM.D.EXT |          |
|            | 11 | 41 | 6   | I        | PA.D.INT |                                       |          | 18 | 34       | 52       | I        |          | OM.D.EXT | 17       | 15       | 6        | III      | OM.D.INT |          |
|            | 13 | 20 | 53  | I        | OM.F.INT |                                       |          | 18 | 38       | 40       | I        |          | OM.D.INT | 18       | 2        | 16       | III      | PA.D.EXT |          |
|            | 13 | 24 | 41  | I        | OM.F.EXT |                                       |          | 18 | 54       | 57       | I        |          | PA.D.EXT | 18       | 17       | 54       | III      | PA.D.INT |          |
|            | 13 | 46 | 2   | I        | PA.F.INT |                                       |          | 18 | 58       | 49       | I        |          | PA.D.INT | 19       | 35       | 18       | III      | OM.F.INT |          |
|            | 13 | 49 | 53  | I        | PA.F.EXT |                                       |          | 20 | 46       | 45       | I        |          | OM.F.INT | 19       | 47       | 35       | III      | OM.F.EXT |          |
|            | 21 | 35 | 29  | II       | OM.D.EXT |                                       |          | 20 | 50       | 33       | I        |          | OM.F.EXT | 20       | 0        | 36       | III      | PA.F.INT |          |
|            | 21 | 40 | 7   | II       | OM.D.INT |                                       |          | 21 | 3        | 54       | I        |          | PA.F.INT | 20       | 16       | 14       | III      | PA.F.EXT |          |
| 22         | 33 | 32 | II  | PA.D.EXT | 8        | 2                                     |          | 58 | 51       | III      | EC.D.PEN | 13       | 2        | 0        | 52       | I        | OM.D.EXT |          |          |
| 22         | 38 | 32 | II  | PA.D.INT |          | 21                                    |          | 7  | 46       | I        | PA.F.EXT |          | 2        | 4        | 40       | I        | OM.D.INT |          |          |
| 2          | 0  | 1  | 8   | II       |          | OM.F.INT                              |          | 7  | 5        | 1        | 31       |          | II       | EC.D.PEN | 2        | 12       | 36       | I        | PA.D.EXT |
|            | 0  | 5  | 47  | II       |          | OM.F.EXT                              |          |    | 5        | 3        | 23       |          | II       | EC.D.EXT | 2        | 16       | 27       | I        | PA.D.INT |
|            | 0  | 47 | 30  | II       |          | PA.F.INT                              | 5        |    | 8        | 5        | II       |          | EC.D.INT | 4        | 12       | 49       | I        | OM.F.INT |          |
|            | 0  | 52 | 30  | II       |          | PA.F.EXT                              | 7        |    | 57       | 58       | II       |          | OC.F.INT | 4        | 16       | 37       | I        | OM.F.EXT |          |
|            | 8  | 29 | 46  | I        |          | EC.D.PEN                              | 8        |    | 2        | 58       | II       |          | OC.F.EXT | 4        | 21       | 42       | I        | PA.F.INT |          |
|            | 8  | 30 | 34  | I        |          | EC.D.EXT                              | 15       |    | 55       | 45       | I        |          | EC.D.PEN | 4        | 25       | 34       | I        | PA.F.EXT |          |
|            | 8  | 34 | 23  | I        |          | EC.D.INT                              | 15       |    | 56       | 33       | I        |          | EC.D.EXT | 13       | 30       | 10       | II       | OM.D.EXT |          |
|            | 11 | 5  | 54  | I        |          | OC.F.INT                              | 16       |    | 0        | 21       | I        |          | EC.D.INT | 13       | 34       | 50       | II       | OM.D.INT |          |
|            | 11 | 9  | 46  | I        |          | OC.F.EXT                              | 18       |    | 23       | 41       | I        |          | OC.F.INT | 13       | 54       | 20       | II       | PA.D.EXT |          |
|            | 3  | 5  | 37  | 38       |          | I                                     | OM.D.EXT |    | 8        | 3        | 3        |          | 22       | III      | EC.D.EXT | 14       | 13       | 59       | 18       |
|            |    | 5  | 41  | 26       | I        | OM.D.INT                              | 15       |    |          | 55       | 19       | II       | OM.F.INT | 15       | 55       |          | 19       | II       | OM.F.INT |
|            |    | 6  | 3   | 9        | I        | PA.D.EXT                              | 15       |    |          | 59       | 58       | II       | OM.F.EXT | 16       | 9        |          | 9        | II       | PA.F.INT |
| 6          |    | 7  | 1   | I        | PA.D.INT | 16                                    | 9        | 9  |          | II       | PA.F.INT | 16       | 14       | 8        | II       |          | PA.F.EXT |          |          |
| 7          |    | 49 | 29  | I        | OM.F.INT | 6                                     | 20       | 17 |          | III      | OC.F.INT | 23       | 21       | 50       | I        |          | EC.D.PEN |          |          |
| 7          |    | 53 | 17  | I        | OM.F.EXT | 6                                     | 36       | 1  |          | III      | OC.F.EXT | 23       | 22       | 38       | I        |          | EC.D.EXT |          |          |
| 8          |    | 12 | 0   | I        | PA.F.INT | 13                                    | 3        | 33 |          | I        | OM.D.EXT | 23       | 26       | 26       | I        |          | EC.D.INT |          |          |
| 8          |    | 15 | 52  | I        | PA.F.EXT | 13                                    | 7        | 21 |          | I        | OM.D.INT | 15       | 1        | 41       | 21       |          | I        | OC.F.INT |          |
| 15         |    | 43 | 7   | II       | EC.D.PEN | 13                                    | 20       | 53 |          | I        | PA.D.EXT |          | 1        | 45       | 13       |          | I        | OC.F.EXT |          |
| 15         |    | 44 | 59  | II       | EC.D.EXT | 13                                    | 24       | 45 |          | I        | PA.D.INT |          | 20       | 29       | 31       |          | I        | OM.D.EXT |          |
| 15         |    | 49 | 40  | II       | EC.D.INT | 15                                    | 15       | 28 |          | I        | OM.F.INT |          | 20       | 33       | 19       |          | I        | OM.D.INT |          |
| 18         |    | 50 | 28  | II       | OC.F.INT | 15                                    | 19       | 16 |          | I        | OM.F.EXT |          | 20       | 38       | 24       |          | I        | PA.D.EXT |          |
| 18         | 55 | 28 | II  | OC.F.EXT | 15       | 29                                    | 53       | I  | PA.F.INT | 20       | 38       |          | 24       | I        | PA.D.EXT |          |          |          |          |
| 4          | 2  | 58 | 24  | I        | EC.D.PEN | 9                                     | 15       | 33 | 45       | I        | PA.F.EXT |          | 20       | 42       | 16       | I        | PA.D.INT |          |          |
|            | 2  | 59 | 12  | I        | EC.D.EXT |                                       | 10       | 0  | 12       | 1        | II       |          | OM.D.EXT | 22       | 41       | 27       | I        | OM.F.INT |          |
|            | 3  | 3  | 0   | I        | EC.D.INT |                                       |          | 0  | 16       | 40       | II       |          | OM.D.INT | 22       | 45       | 16       | I        | OM.F.EXT |          |
|            | 5  | 31 | 50  | I        | OC.F.INT |                                       |          | 0  | 47       | 41       | II       |          | PA.D.EXT | 22       | 47       | 33       | I        | PA.F.INT |          |
|            | 5  | 35 | 42  | I        | OC.F.EXT |                                       |          | 0  | 52       | 40       | II       |          | PA.D.INT | 22       | 51       | 25       | I        | PA.F.EXT |          |
|            | 13 | 1  | 24  | III      | OM.D.EXT |                                       |          | 2  | 37       | 20       | II       |          | OM.F.INT | 15       | 7        | 38       | 21       | II       | EC.D.PEN |
|            | 13 | 13 | 34  | III      | OM.D.INT |                                       |          | 2  | 41       | 59       | II       | OM.F.EXT | 7        |          | 40       | 14       | II       | EC.D.EXT |          |
|            | 14 | 47 | 14  | III      | PA.D.EXT |                                       |          | 3  | 2        | 10       | II       | PA.F.INT | 7        |          | 44       | 57       | II       | EC.D.INT |          |
|            | 15 | 3  | 10  | III      | PA.D.INT |                                       |          | 3  | 7        | 9        | II       | PA.F.EXT | 10       |          | 12       | 26       | II       | OC.F.INT |          |
|            | 15 | 34 | 42  | III      | OM.F.INT |                                       |          | 10 | 24       | 26       | I        | EC.D.PEN | 10       |          | 17       | 25       | II       | OC.F.EXT |          |
|            | 15 | 46 | 54  | III      | OM.F.EXT |                                       |          | 10 | 25       | 15       | I        | EC.D.EXT | 17       |          | 50       | 29       | I        | EC.D.PEN |          |
|            | 16 | 43 | 33  | III      | PA.F.INT |                                       |          | 10 | 29       | 3        | I        | EC.D.INT | 17       |          | 51       | 17       | I        | EC.D.EXT |          |
| 16         | 59 | 27 | III | PA.F.EXT | 12       | 49                                    |          | 35 | I        | OC.F.INT | 17       | 55       | 5        |          | I        | EC.D.INT |          |          |          |
| 5          | 0  | 6  | 16  | I        | OM.D.EXT | 11                                    | 12       | 53 | 27       | I        | OC.F.EXT | 20       | 7        |          | 11       | I        | OC.F.INT |          |          |
|            | 0  | 10 | 4   | I        | OM.D.INT |                                       | 10       | 7  | 32       | 11       | I        | OM.D.EXT | 20       |          | 11       | 2        | I        | OC.F.EXT |          |
|            | 0  | 29 | 5   | I        | PA.D.EXT |                                       |          | 7  | 35       | 59       | I        | OM.D.INT | 15       |          | 7        | 0        | 45       | III      | EC.D.PEN |
|            | 0  | 32 | 57  | I        | PA.D.INT |                                       |          | 7  | 46       | 43       | I        | PA.D.EXT |          |          | 7        | 5        | 17       | III      | EC.D.EXT |
|            | 2  | 18 | 9   | I        | OM.F.INT |                                       |          | 7  | 50       | 35       | I        | PA.D.INT |          | 7        | 18       | 6        | III      | EC.D.INT |          |
|            | 2  | 21 | 57  | I        | OM.F.EXT |                                       |          | 9  | 44       | 6        | I        | OM.F.INT |          | 9        | 37       | 6        | III      | OC.F.INT |          |
|            | 2  | 38 | 0   | I        | PA.F.INT |                                       |          | 9  | 47       | 55       | I        | OM.F.EXT |          | 9        | 52       | 31       | III      | OC.F.EXT |          |
|            | 2  | 41 | 51  | I        | PA.F.EXT |                                       |          | 9  | 55       | 46       | I        | PA.F.INT |          | 14       | 58       | 15       | I        | OM.D.EXT |          |
|            | 10 | 53 | 36  | II       | OM.D.EXT |                                       |          | 9  | 59       | 38       | I        | PA.F.EXT |          | 15       | 2        | 4        | I        | OM.D.INT |          |
|            | 10 | 58 | 15  | II       | OM.D.INT |                                       |          | 18 | 19       | 46       | II       | EC.D.PEN |          | 15       | 4        | 18       | I        | PA.D.EXT |          |
|            | 11 | 40 | 36  | II       | PA.D.EXT |                                       |          | 18 | 21       | 38       | II       | EC.D.EXT |          | 15       | 8        | 9        | I        | PA.D.INT |          |
|            | 11 | 45 | 36  | II       | PA.D.INT |                                       |          | 18 | 26       | 21       | II       | EC.D.INT |          | 17       | 10       | 13       | I        | OM.F.INT |          |
| 13         | 19 | 6  | II  | OM.F.INT | 21       | 5                                     |          | 5  | II       | OC.F.INT | 17       | 13       |          | 30       | I        | PA.F.INT |          |          |          |
| 13         | 23 | 45 | II  | OM.F.EXT | 21       | 10                                    | 4        | II | OC.F.EXT | 17       | 14       | 1        |          | I        | OM.F.EXT |          |          |          |          |
| 13         | 54 | 49 | II  | PA.F.INT | 11       | 4                                     | 53       | 6  | I        | EC.D.PEN | 17       | 17       | 22       | I        | PA.F.EXT |          |          |          |          |
| 13         | 59 | 49 | II  | PA.F.EXT |          | 15                                    | 7        | 32 | 11       | I        | OM.D.EXT | 15       | 7        | 17       | 22       | I        | PA.F.EXT |          |          |
|            |    |    |     |          |          |                                       | 7        | 35 | 59       | I        | OM.D.INT |          | 7        | 0        | 45       | III      | EC.D.PEN |          |          |
|            |    |    |     |          |          |                                       | 7        | 46 | 43       | I        | PA.D.EXT |          | 7        | 5        | 17       | III      | EC.D.EXT |          |          |
|            |    |    |     |          |          |                                       | 7        | 50 | 35       | I        | PA.D.INT |          | 7        | 18       | 6        | III      | EC.D.INT |          |          |
|            |    |    |     |          |          |                                       | 9        | 44 | 6        | I        | OM.F.INT |          | 9        | 37       | 6        | III      | OC.F.INT |          |          |
|            |    |    |     |          |          |                                       | 9        | 47 | 55       | I        | OM.F.EXT |          | 9        | 52       | 31       | III      | OC.F.EXT |          |          |
|            |    |    |     |          |          |                                       | 9        | 55 | 46       | I        | PA.F.INT |          | 14       | 58       | 15       | I        | OM.D.EXT |          |          |
|            |    |    |     |          |          |                                       | 9        | 59 | 38       | I        | PA.F.EXT |          | 15       | 2        | 4        | I        | OM.D.INT |          |          |
|            |    |    |     |          |          |                                       | 18       | 19 | 46       | II       | EC.D.PEN |          | 15       | 4        | 18       | I        | PA.D.EXT |          |          |
|            |    |    |     |          |          |                                       | 18       | 21 | 38       | II       | EC.D.EXT |          | 15       | 8        | 9        | I        | PA.D.INT |          |          |
|            |    |    |     |          |          |                                       | 18       | 26 | 21       | II       | EC.D.INT |          | 17       | 10       | 13       | I        | OM.F.INT |          |          |
|            |    |    |     |          | 21       |                                       | 5        | 5  | II       | OC.F.INT | 17       |          | 13       | 30       | I        | PA.F.INT |          |          |          |
|            |    |    |     |          | 21       | 10                                    | 4        | II | OC.F.EXT | 17       | 14       | 1        | I        | OM.F.EXT |          |          |          |          |          |

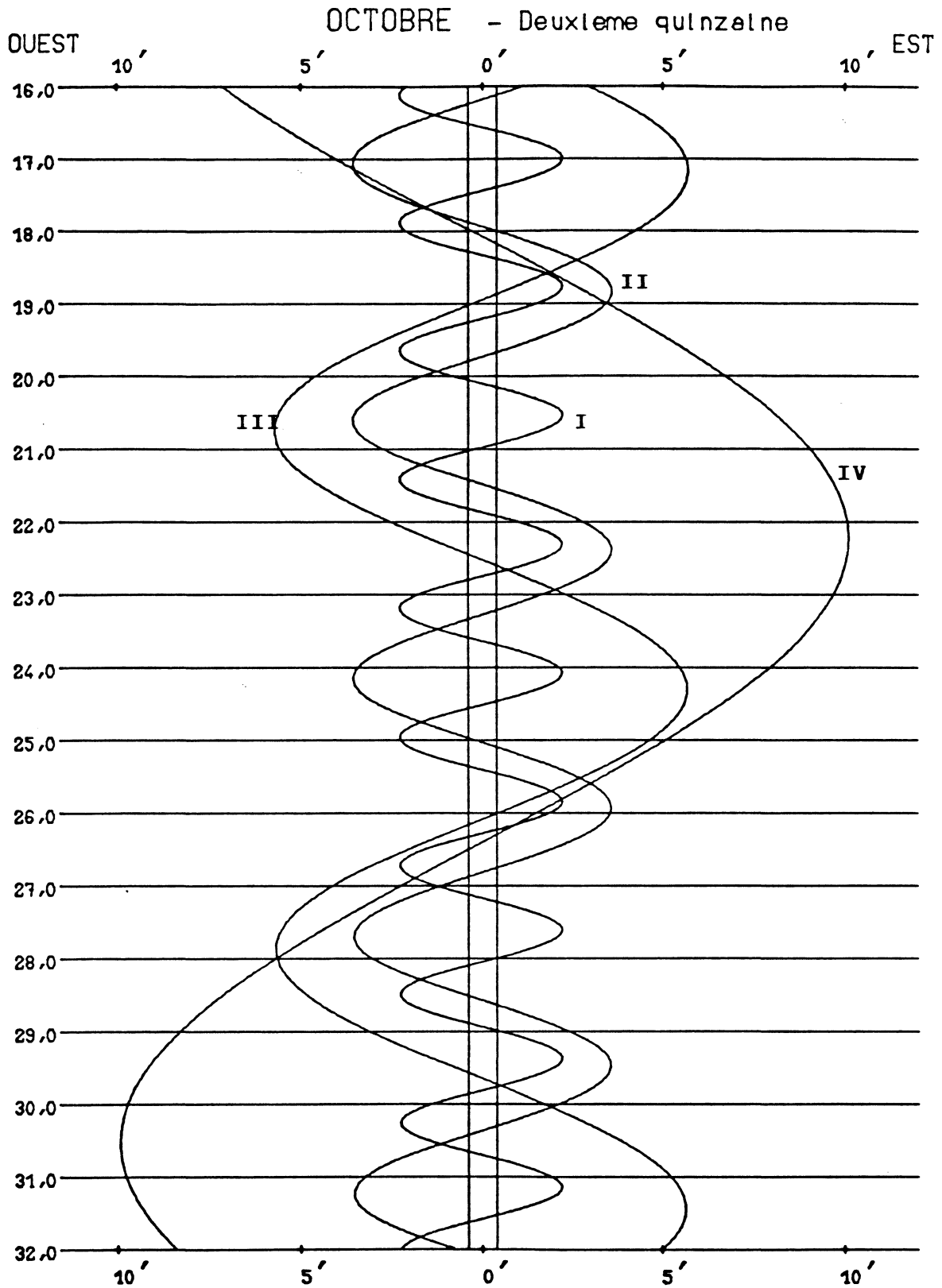


Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

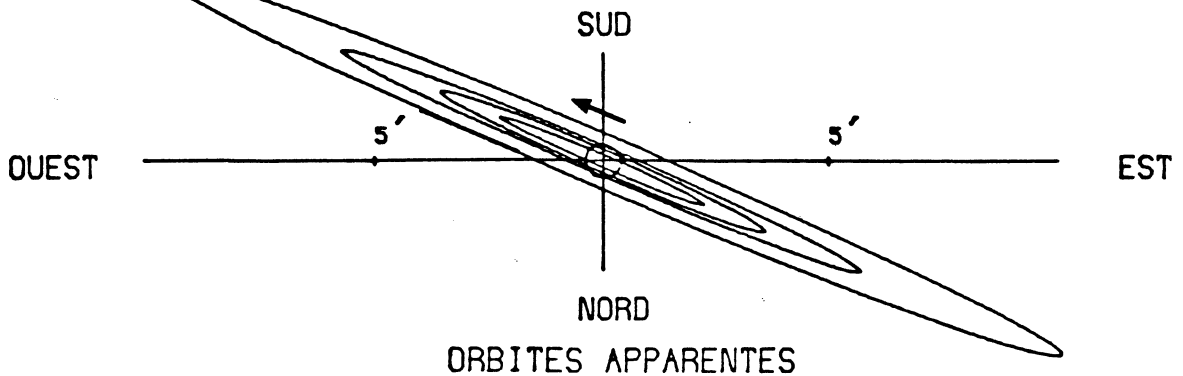




1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter

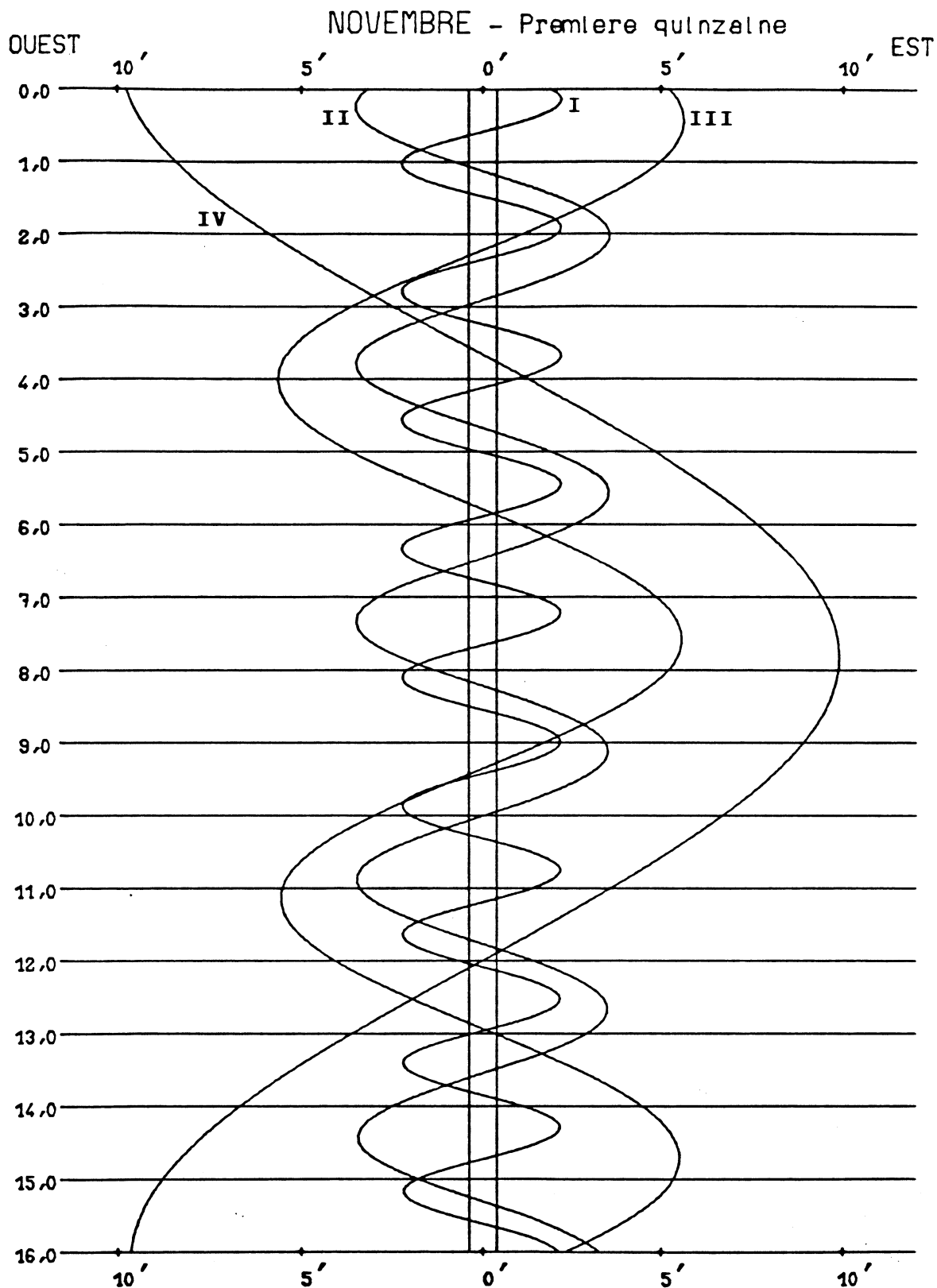


1987 - SATELLITES DE JUPITER -

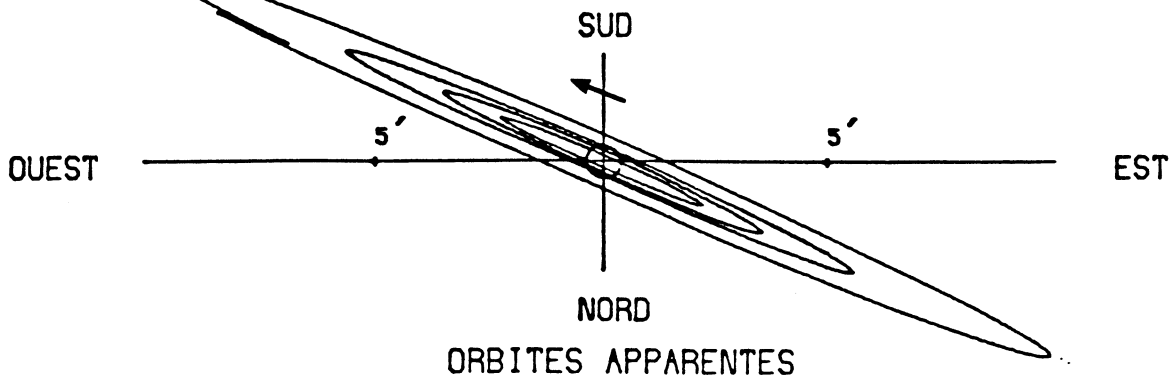
| PHENOMENES |    |    |     |          |          | MOIS : NOVEMBRE - PREMIERE QUINZAINE - |          |    |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|--|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                                   | H        | M  | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |          |          |          |          |          |
| 1          | 1  | 31 | 28  | II       | OC.D.EXT | 6                                      | 22       | 29 | 32       | I        | PA.F.EXT | 12       | 4        | 9        | 58       | I        | OM.D.EXT |          |          |          |          |          |          |
|            | 1  | 36 | 22  | II       | OC.D.INT |  | 22       | 55 | 14       | I        | OM.F.INT |          | 4        | 13       | 47       | I        | OM.D.INT |          |          |          |          |          |          |
|            | 4  | 34 | 20  | II       | EC.F.INT |  | 22       | 59 | 3        | I        | OM.F.EXT |          | 5        | 44       | 33       | I        | PA.F.INT |          |          |          |          |          |          |
|            | 4  | 39 | 6   | II       | EC.F.EXT |  | 7        | 9  | 42       | 35       | II       |          | PA.D.EXT | 5        | 48       | 24       | I        | PA.F.EXT |          |          |          |          |          |
|            | 4  | 41 | 0   | II       | EC.F.PEN |  |          | 9  | 47       | 24       | II       |          | PA.D.INT | 6        | 21       | 35       | I        | OM.F.INT |          |          |          |          |          |
|            | 10 | 16 | 49  | I        | OC.D.EXT |  |          | 9  | 47       | 24       | II       |          | PA.D.INT | 6        | 25       | 24       | I        | OM.F.EXT |          |          |          |          |          |
|            | 10 | 20 | 39  | I        | OC.D.INT |  |          | 10 | 38       | 20       | II       |          | OM.D.EXT | 16       | 55       | 39       | II       | OC.D.EXT |          |          |          |          |          |
|            | 12 | 48 | 37  | I        | EC.F.INT |  |          | 10 | 43       | 1        | II       |          | OM.D.INT | 17       | 0        | 30       | II       | OC.D.INT |          |          |          |          |          |
|            | 12 | 52 | 25  | I        | EC.F.EXT |  |          | 12 | 0        | 19       | II       |          | PA.F.INT | 20       | 30       | 58       | II       | EC.F.INT |          |          |          |          |          |
|            | 12 | 53 | 13  | I        | EC.F.PEN |  |          | 12 | 5        | 9        | II       |          | PA.F.EXT | 20       | 35       | 46       | II       | EC.F.EXT |          |          |          |          |          |
| 2          | 3  | 44 | 13  | III      | PA.D.EXT | 13                                     |          | 1  | 48       | II       | OM.F.INT | 20       | 37       | 41       | II       | EC.F.PEN | 13       | 0        | 53       | 43       | I        | OC.D.EXT |          |
|            | 3  | 58 | 39  | III      | PA.D.INT | 13                                     |          | 6  | 28       | II       | OM.F.EXT | 0        | 57       | 33       | I        | OC.D.INT |          | 0        | 57       | 33       | I        | OC.D.INT |          |
|            | 5  | 7  | 27  | III      | OM.D.EXT | 17                                     |          | 35 | 4        | I        | OC.D.EXT | 3        | 41       | 5        | I        | EC.F.INT |          | 3        | 41       | 5        | I        | EC.F.INT |          |
|            | 5  | 19 | 58  | III      | OM.D.INT | 17                                     | 38       | 54 | I        | OC.D.INT | 3        | 44       | 53       | I        | EC.F.EXT | 3        |          | 44       | 53       | I        | EC.F.EXT |          |          |
|            | 5  | 51 | 52  | III      | PA.F.INT | 20                                     | 14       | 50 | I        | EC.F.INT | 3        | 45       | 41       | I        | EC.F.PEN | 3        |          | 45       | 41       | I        | EC.F.PEN |          |          |
|            | 6  | 6  | 19  | III      | PA.F.EXT | 20                                     | 18       | 38 | I        | EC.F.EXT | 7        | 23       | 37       | I        | PA.D.EXT | 20       |          | 39       | 8        | III      | OC.D.EXT |          |          |
|            | 7  | 23 | 37  | I        | PA.D.EXT | 20                                     | 19       | 27 | I        | EC.F.PEN | 7        | 23       | 37       | I        | PA.D.EXT | 20       |          | 52       | 54       | III      | OC.D.INT |          |          |
|            | 7  | 27 | 28  | I        | PA.D.INT | 8                                      | 14       | 42 | 5        | I        | PA.D.EXT | 20       | 52       | 54       | III      | OC.D.INT |          | 22       | 1        | 6        | I        | PA.D.EXT |          |
|            | 7  | 37 | 4   | III      | OM.F.INT |  | 14       | 45 | 55       | I        | PA.D.INT | 22       | 1        | 6        | I        | PA.D.EXT |          | 22       | 4        | 56       | I        | PA.D.INT |          |
|            | 7  | 45 | 51  | I        | OM.D.EXT |  | 15       | 12 | 18       | I        | OM.D.EXT | 22       | 4        | 56       | I        | PA.D.INT |          | 22       | 38       | 53       | I        | OM.D.EXT |          |
| 7          | 49 | 33 | III | OM.F.EXT | 15       |  | 16       | 7  | I        | OM.D.INT | 22       | 38       | 53       | I        | OM.D.EXT | 22       | 42       | 42       | I        | OM.D.INT |          |          |          |
| 7          | 49 | 40 | I   | OM.D.INT | 16       |  | 51       | 54 | I        | PA.F.INT | 22       | 42       | 42       | I        | OM.D.INT | 22       | 42       | 42       | I        | OM.D.INT |          |          |          |
| 9          | 33 | 19 | I   | PA.F.INT | 16       |  | 55       | 45 | I        | PA.F.EXT | 22       | 53       | 44       | III      | OC.F.INT | 22       | 53       | 44       | III      | OC.F.INT |          |          |          |
| 9          | 37 | 10 | I   | PA.F.EXT | 17       |  | 24       | 0  | I        | OM.F.INT | 23       | 7        | 30       | III      | OC.F.EXT | 23       | 7        | 30       | III      | OC.F.EXT |          |          |          |
| 9          | 57 | 39 | I   | OM.F.INT | 17       |  | 27       | 49 | I        | OM.F.EXT | 23       | 9        | 4        | III      | EC.D.PEN | 23       | 9        | 4        | III      | EC.D.PEN |          |          |          |
| 10         | 1  | 28 | I   | OM.F.EXT | 9        |  | 17       | 27 | 49       | I        | OM.F.EXT | 23       | 13       | 42       | III      | EC.D.EXT | 23       | 13       | 42       | III      | EC.D.EXT |          |          |
| 20         | 35 | 3  | II  | PA.D.EXT |          |  | 3        | 47 | 0        | II       | OC.D.EXT | 23       | 26       | 53       | III      | EC.D.INT | 23       | 26       | 53       | III      | EC.D.INT |          |          |
| 20         | 39 | 54 | II  | PA.D.INT |          | 3                                      | 51       | 52 | II       | OC.D.INT | 14       | 0        | 11       | 2        | I        | PA.F.INT | 11       | 58       | 33       | II       | PA.D.EXT |          |          |
| 21         | 19 | 59 | II  | OM.D.EXT |          | 7                                      | 11       | 48 | II       | EC.F.INT |          | 12       | 3        | 20       | II       | PA.D.INT | 12       | 3        | 20       | II       | PA.D.INT |          |          |
| 21         | 24 | 40 | II  | OM.D.INT |          | 7                                      | 16       | 36 | II       | EC.F.EXT |          | 13       | 14       | 51       | II       | OM.D.EXT | 13       | 14       | 51       | II       | OM.D.EXT |          |          |
| 22         | 52 | 21 | II  | PA.F.INT |          | 7                                      | 18       | 31 | II       | EC.F.PEN |          | 13       | 19       | 32       | II       | OM.D.INT | 14       | 17       | 12       | II       | PA.F.INT |          |          |
| 22         | 57 | 12 | II  | PA.F.EXT |          | 12                                     | 1        | 13 | I        | OC.D.EXT |          | 14       | 21       | 59       | II       | PA.F.EXT | 14       | 21       | 59       | II       | PA.F.EXT |          |          |
| 23         | 43 | 43 | II  | OM.F.INT |          | 12                                     | 5        | 2  | I        | OC.D.INT |          | 15       | 37       | 45       | II       | OM.F.INT | 15       | 37       | 45       | II       | OM.F.INT |          |          |
| 23         | 48 | 24 | II  | OM.F.EXT |          | 12                                     | 5        | 2  | I        | OC.D.INT |          | 15       | 42       | 26       | II       | OM.F.EXT | 15       | 42       | 26       | II       | OM.F.EXT |          |          |
| 3          | 4  | 42 | 53  | I        |          | OC.D.EXT                               | 14       | 43 | 33       | I        |          | EC.F.INT | 19       | 20       | 4        | I        | OC.D.EXT | 19       | 20       | 4        | I        | OC.D.EXT |          |
|            | 4  | 46 | 43  | I        | OC.D.INT | 14                                     | 47       | 22 | I        | EC.F.EXT |          | 19       | 23       | 53       | I        | OC.D.INT | 19       | 23       | 53       | I        | OC.D.INT |          |          |
|            | 7  | 17 | 23  | I        | EC.F.INT | 14                                     | 48       | 10 | I        | EC.F.PEN |          | 1        | 50       | 57       | III      | EC.F.PEN | 22       | 9        | 51       | I        | EC.F.INT |          |          |
|            | 7  | 21 | 11  | I        | EC.F.EXT | 10                                     | 7        | 1  | 44       | III      | PA.D.EXT | 1        | 46       | 19       | III      | EC.F.EXT | 22       | 13       | 39       | I        | EC.F.EXT |          |          |
|            | 7  | 21 | 59  | I        | EC.F.PEN |  | 7        | 15 | 44       | III      | PA.D.INT | 1        | 50       | 57       | III      | EC.F.PEN | 22       | 14       | 27       | I        | EC.F.PEN |          |          |
|            | 4  | 1  | 49  | 41       | I        |  | PA.D.EXT | 9  | 8        | 23       | I        | PA.D.EXT | 11       | 18       | 15       | I        | PA.F.INT | 14       | 21       | 59       | II       | PA.F.EXT |          |
|            |    | 1  | 53  | 32       | I        |  | PA.D.INT | 9  | 9        | 44       | III      | OM.D.EXT | 11       | 18       | 15       | I        | PA.F.INT | 14       | 21       | 59       | II       | PA.F.EXT |          |
|            |    | 2  | 14  | 37       | I        |  | OM.D.EXT | 9  | 12       | 13       | I        | PA.D.INT | 11       | 22       | 5        | I        | PA.F.EXT | 15       | 37       | 45       | II       | OM.F.INT |          |
|            |    | 2  | 18  | 26       | I        |  | OM.D.INT | 9  | 12       | 59       | III      | PA.F.INT | 11       | 22       | 5        | I        | PA.F.EXT | 15       | 42       | 26       | II       | OM.F.EXT |          |
|            |    | 3  | 59  | 25       | I        |  | PA.F.INT | 9  | 22       | 20       | III      | OM.D.INT | 11       | 38       | 20       | III      | OM.F.INT | 19       | 20       | 4        | I        | OC.D.EXT |          |
| 4          |    | 3  | 16  | I        | PA.F.EXT |  | 9        | 27 | 1        | III      | PA.F.EXT | 11       | 50       | 53       | III      | OM.F.EXT | 19       | 23       | 53       | I        | OC.D.INT |          |          |
| 4          |    | 26 | 23  | I        | OM.F.INT |  | 9        | 41 | 10       | I        | OM.D.EXT | 11       | 52       | 50       | I        | OM.F.INT | 19       | 23       | 53       | I        | OC.D.INT |          |          |
| 4          |    | 30 | 12  | I        | OM.F.EXT |  | 9        | 44 | 59       | I        | OM.D.INT | 11       | 56       | 39       | I        | OM.F.EXT | 22       | 9        | 51       | I        | EC.F.INT |          |          |
| 14         |    | 39 | 18  | II       | OC.D.EXT | 11                                     | 18       | 15 | I        | PA.F.INT | 22       | 13       | 39       | I        | EC.F.EXT | 22       | 13       | 39       | I        | EC.F.EXT |          |          |          |
| 14         |    | 44 | 11  | II       | OC.D.INT | 11                                     | 22       | 5  | I        | PA.F.EXT | 22       | 14       | 27       | I        | EC.F.PEN | 22       | 14       | 27       | I        | EC.F.PEN |          |          |          |
| 5          | 17 | 53 | 19  | II       | EC.F.INT | 11                                     | 38       | 20 | III      | OM.F.INT | 15       | 16       | 27       | 31       | I        | PA.D.EXT | 16       | 27       | 31       | I        | PA.D.EXT |          |          |
|            | 17 | 58 | 6   | II       | EC.F.EXT | 11                                     | 50       | 53 | III      | OM.F.EXT |          | 16       | 31       | 21       | I        | PA.D.INT | 16       | 31       | 21       | I        | PA.D.INT |          |          |
|            | 18 | 0  | 0   | II       | EC.F.PEN | 11                                     | 52       | 50 | I        | OM.F.INT |          | 17       | 7        | 43       | I        | OM.D.EXT | 17       | 7        | 43       | I        | OM.D.EXT |          |          |
|            | 23 | 8  | 56  | I        | OC.D.EXT | 11                                     | 56       | 39 | I        | OM.F.EXT |          | 17       | 11       | 32       | I        | OM.D.INT | 17       | 11       | 32       | I        | OM.D.INT |          |          |
|            | 23 | 12 | 46  | I        | OC.D.INT | 22                                     | 50       | 19 | II       | PA.D.EXT |          | 18       | 37       | 29       | I        | PA.F.INT | 18       | 37       | 29       | I        | PA.F.INT |          |          |
|            | 6  | 1  | 46  | 5        | I        | EC.F.INT                               | 22       | 55 | 7        | II       |          | PA.D.INT | 18       | 41       | 19       | I        | PA.F.EXT | 18       | 41       | 19       | I        | PA.F.EXT |          |
|            |    | 1  | 49  | 54       | I        | EC.F.EXT                               | 23       | 56 | 33       | II       |          | OM.D.EXT | 19       | 19       | 15       | I        | OM.F.INT | 19       | 19       | 15       | I        | OM.F.INT |          |
|            |    | 1  | 50  | 42       | I        | EC.F.PEN                               | 11       | 0  | 1        | 14       |          | II       | OM.D.INT | 19       | 23       | 4        | I        | OM.F.EXT | 19       | 23       | 4        | I        | OM.F.EXT |
|            |    | 17 | 20  | 36       | III      | OC.D.EXT                               |          | 1  | 8        | 31       |          | II       | PA.F.INT | 6        | 4        | 14       | II       | OC.D.EXT | 6        | 4        | 14       | II       | OC.D.EXT |
|            |    | 17 | 34  | 47       | III      | OC.D.INT                               |          | 1  | 13       | 19       |          | II       | PA.F.EXT | 6        | 9        | 4        | II       | OC.D.INT | 6        | 9        | 4        | II       | OC.D.INT |
| 20         |    | 15 | 54  | I        | PA.D.EXT | 2                                      |          | 19 | 45       | II       | OM.F.INT | 9        | 49       | 35       | II       | EC.F.INT | 9        | 49       | 35       | II       | EC.F.INT |          |          |
| 20         |    | 19 | 44  | I        | PA.D.INT | 2                                      |          | 24 | 25       | II       | OM.F.EXT | 9        | 54       | 24       | II       | EC.F.EXT | 9        | 54       | 24       | II       | EC.F.EXT |          |          |
| 20         |    | 43 | 29  | I        | OM.D.EXT | 6                                      |          | 27 | 28       | I        | OC.D.EXT | 9        | 56       | 19       | II       | EC.F.PEN | 9        | 56       | 19       | II       | EC.F.PEN |          |          |
| 20         |    | 47 | 18  | I        | OM.D.INT | 6                                      |          | 31 | 18       | I        | OC.D.INT | 13       | 46       | 26       | I        | OC.D.EXT | 13       | 46       | 26       | I        | OC.D.EXT |          |          |
| 21         |    | 32 | 5   | III      | EC.F.INT | 9                                      |          | 12 | 21       | I        | EC.F.INT | 13       | 50       | 15       | I        | OC.D.INT | 13       | 50       | 15       | I        | OC.D.INT |          |          |
| 21         | 45 | 10 | III | EC.F.EXT | 9        | 16                                     |          | 9  | I        | EC.F.EXT | 16       | 38       | 35       | I        | EC.F.INT | 16       | 38       | 35       | I        | EC.F.INT |          |          |          |
| 21         | 49 | 47 | III | EC.F.PEN | 9        | 16                                     |          | 57 | I        | EC.F.PEN | 16       | 42       | 24       | I        | EC.F.EXT | 16       | 42       | 24       | I        | EC.F.EXT |          |          |          |
| 22         | 25 | 41 | I   | PA.F.INT | 3        | 34                                     | 39       | I  | PA.D.EXT | 16       | 43       | 12       | I        | EC.F.PEN | 16       | 43       | 12       | I        | EC.F.PEN |          |          |          |          |



1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



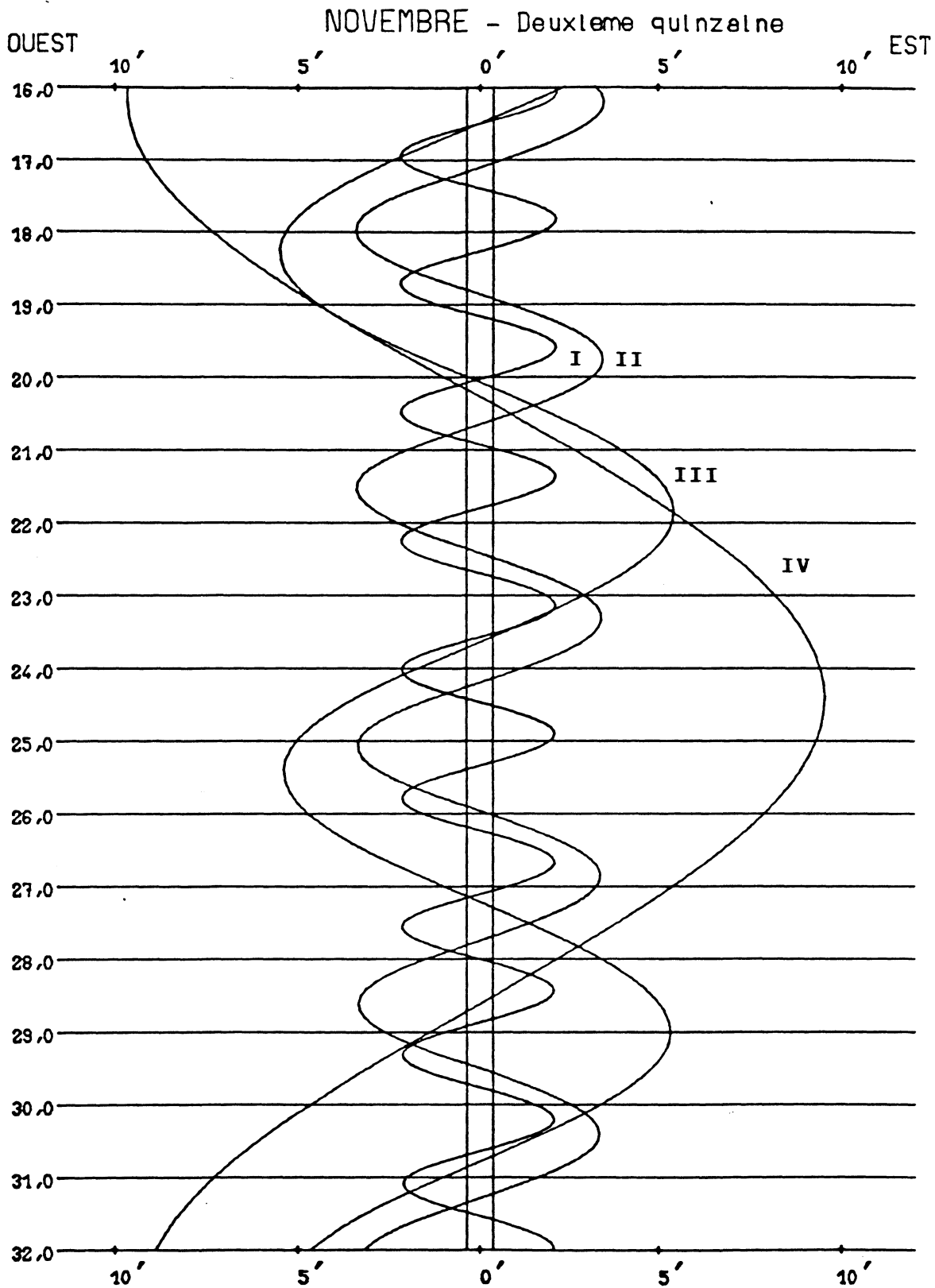
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



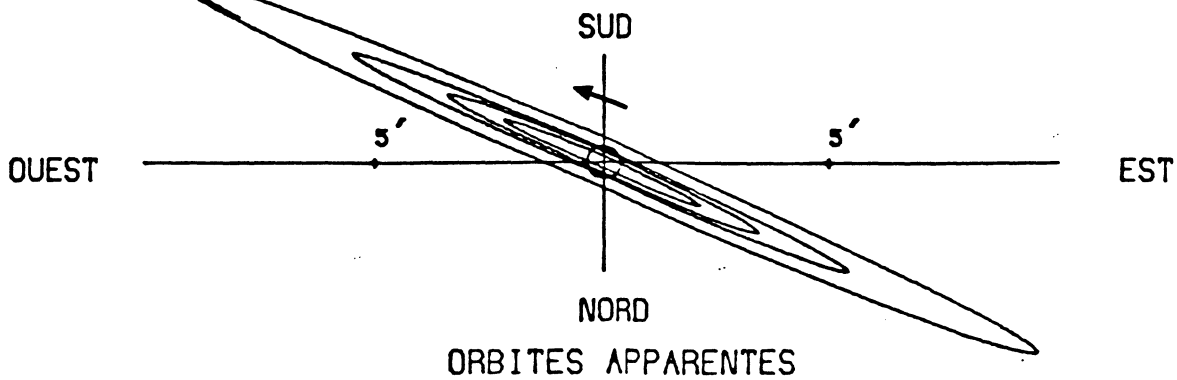
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |    |          |          | MOIS : NOVEMBRE - DEUXIEME QUINZAINE - |          |    |     |          |          |          |          |    |     |          |          |          |          |          |
|------------|----|----|----|----------|----------|--|----------|----|-----|----------|----------|----------|----------|----|-----|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S  | SAT      | TYPE     | JOUR                                   | H        | M  | S   | SAT      | TYPE     | JOUR     | H        | M  | S   | SAT      | TYPE     |          |          |          |
| 16         | 10 | 22 | 23 | III      | PA.D.EXT | 21                                     | 16       | 40 | 35  | II       | PA.F.EXT | 27       | 4        | 26 | 11  | I        | OC.D.EXT |          |          |          |
|            | 10 | 35 | 58 | III      | PA.D.INT |  | 18       | 13 | 42  | II       | OM.F.INT |          | 4        | 29 | 59  | I        | OC.D.INT |          |          |          |
|            | 10 | 54 | 3  | I        | PA.D.EXT |  | 18       | 18 | 22  | II       | OM.F.EXT |          | 7        | 31 | 18  | I        | EC.F.INT |          |          |          |
|            | 10 | 57 | 53 | I        | PA.D.INT |  | 21       | 6  | 0   | I        | OC.D.EXT |          | 7        | 35 | 6   | I        | EC.F.EXT |          |          |          |
|            | 11 | 36 | 37 | I        | OM.D.EXT |  | 21       | 9  | 49  | I        | OC.D.INT |          | 7        | 35 | 54  | I        | EC.F.PEN |          |          |          |
|            | 11 | 40 | 27 | I        | OM.D.INT |  | 21       | 0  | 4   | 56       | I        |          | EC.F.INT | 27 | 1   | 34       | 39       | I        | PA.D.EXT |          |
|            | 12 | 37 | 13 | III      | PA.F.INT |  |          | 0  | 8   | 44       | I        |          | EC.F.EXT |    | 1   | 38       | 28       | I        | PA.D.INT |          |
|            | 12 | 50 | 51 | III      | PA.F.EXT |  |          | 0  | 9   | 33       | I        |          | EC.F.PEN |    | 2   | 30       | 4        | I        | OM.D.EXT |          |
|            | 13 | 4  | 4  | I        | PA.F.INT |  |          | 18 | 13  | 59       | I        |          | PA.D.EXT |    | 2   | 33       | 53       | I        | OM.D.INT |          |
|            | 13 | 7  | 54 | I        | PA.F.EXT |  |          | 18 | 17  | 49       | I        |          | PA.D.INT |    | 3   | 26       | 53       | III      | OC.D.EXT |          |
|            | 13 | 12 | 2  | III      | OM.D.EXT |  |          | 19 | 3   | 17       | I        |          | OM.D.EXT |    | 3   | 39       | 57       | III      | OC.D.INT |          |
|            | 13 | 24 | 43 | III      | OM.D.INT |  |          | 19 | 7   | 6        | I        |          | OM.D.INT |    | 3   | 44       | 49       | I        | PA.F.INT |          |
|            | 13 | 48 | 8  | I        | OM.F.INT |  |          | 20 | 24  | 5        | I        |          | PA.F.INT |    | 3   | 48       | 39       | I        | PA.F.EXT |          |
|            | 13 | 51 | 57 | I        | OM.F.EXT |  |          | 20 | 27  | 55       | I        |          | PA.F.EXT |    | 4   | 41       | 17       | I        | OM.F.INT |          |
|            | 15 | 39 | 36 | III      | OM.F.INT |  |          | 21 | 14  | 38       | I        |          | OM.F.INT |    | 4   | 45       | 6        | I        | OM.F.EXT |          |
|            | 15 | 52 | 13 | III      | OM.F.EXT |  |          | 21 | 18  | 27       | I        |          | OM.F.EXT |    | 5   | 48       | 42       | III      | OC.F.INT |          |
| 17         | 1  | 7  | 9  | II       | PA.D.EXT | 22                                     |          | 8  | 23  | 28       | II       | OC.D.EXT | 28       |    | 6   | 1        | 46       | III      | OC.F.EXT |          |
|            | 1  | 11 | 54 | II       | PA.D.INT |  |          | 8  | 28  | 15       | II       | OC.D.INT |          |    | 7   | 12       | 33       | III      | EC.D.PEN |          |
|            | 2  | 33 | 4  | II       | OM.D.EXT |  |          | 12 | 27  | 35       | II       | EC.F.INT |          |    | 7   | 17       | 14       | III      | EC.D.EXT |          |
|            | 2  | 37 | 45 | II       | OM.D.INT |  |          | 12 | 32  | 25       | II       | EC.F.EXT |          |    | 7   | 30       | 36       | III      | EC.D.INT |          |
|            | 3  | 26 | 14 | II       | PA.F.INT |  |          | 12 | 34  | 20       | II       | EC.F.PEN |          |    | 9   | 34       | 49       | III      | EC.F.INT |          |
|            | 3  | 31 | 0  | II       | PA.F.EXT |  | 15       | 32 | 38  | I        | OC.D.EXT | 9        |          | 48 | 11  | III      | EC.F.EXT |          |          |          |
|            | 4  | 55 | 42 | II       | OM.F.INT |  | 15       | 36 | 27  | I        | OC.D.INT | 9        |          | 52 | 52  | III      | EC.F.PEN |          |          |          |
|            | 5  | 0  | 23 | II       | OM.F.EXT |  | 18       | 33 | 42  | I        | EC.F.INT | 16       |          | 36 | 13  | II       | PA.D.EXT |          |          |          |
|            | 8  | 12 | 55 | I        | OC.D.EXT |  | 18       | 37 | 30  | I        | EC.F.EXT | 16       |          | 40 | 54  | II       | PA.D.INT |          |          |          |
|            | 8  | 16 | 44 | I        | OC.D.INT |  | 18       | 38 | 18  | I        | EC.F.PEN | 18       |          | 27 | 48  | II       | OM.D.EXT |          |          |          |
|            | 11 | 7  | 24 | I        | EC.F.INT |  | 23       | 12 | 40  | 49       | I        | PA.D.EXT |          | 28 | 18  | 32       | 30       | II       | OM.D.INT |          |
|            | 11 | 11 | 12 | I        | EC.F.EXT |  |          | 12 | 44  | 39       | I        | PA.D.INT |          |    | 18  | 56       | 31       | II       | PA.F.INT |          |
| 11         | 12 | 0  | I  | EC.F.PEN | 13       | 32                                     |          | 13 | I   | OM.D.EXT | 19       | 1        | 13       |    | II  | PA.F.EXT |          |          |          |          |
| 18         | 5  | 20 | 35 | I        | PA.D.EXT | 13                                     |          | 36 | 3   | I        | OM.D.INT | 20       | 49       |    | 37  | II       | OM.F.INT |          |          |          |
|            | 5  | 24 | 25 | I        | PA.D.INT | 13                                     |          | 47 | 52  | III      | PA.D.EXT | 20       | 54       |    | 18  | II       | OM.F.EXT |          |          |          |
|            | 6  | 5  | 27 | I        | OM.D.EXT | 14                                     |          | 1  | 4   | III      | PA.D.INT | 22       | 53       |    | 4   | I        | OC.D.EXT |          |          |          |
|            | 6  | 9  | 17 | I        | OM.D.INT | 14                                     |          | 50 | 57  | I        | PA.F.INT | 22       | 56       |    | 52  | I        | OC.D.INT |          |          |          |
|            | 7  | 30 | 37 | I        | PA.F.INT | 14                                     |          | 54 | 46  | I        | PA.F.EXT | 28       | 2        |    | 0   | 6        | I        | EC.F.INT |          |          |
|            | 7  | 34 | 27 | I        | PA.F.EXT | 15                                     |          | 43 | 32  | I        | OM.F.INT |          | 2        |    | 3   | 54       | I        | EC.F.EXT |          |          |
|            | 8  | 16 | 55 | I        | OM.F.INT | 15                                     |          | 47 | 22  | I        | OM.F.EXT |          | 2        |    | 4   | 42       | I        | EC.F.PEN |          |          |
|            | 8  | 20 | 44 | I        | OM.F.EXT | 16                                     |          | 6  | 10  | III      | PA.F.INT |          | 20       |    | 1   | 39       | I        | PA.D.EXT |          |          |
|            | 19 | 13 | 51 | II       | OC.D.EXT | 16                                     |          | 19 | 26  | III      | PA.F.EXT |          | 20       |    | 5   | 28       | I        | PA.D.INT |          |          |
|            | 19 | 18 | 40 | II       | OC.D.INT | 17                                     | 15       | 15 | III | OM.D.EXT | 20       |          | 58       | 58 | I   | OM.D.EXT |          |          |          |          |
|            | 23 | 8  | 53 | II       | EC.F.INT | 17                                     | 15       | 15 | III | OM.D.EXT | 21       |          | 2        | 47 | I   | OM.D.INT |          |          |          |          |
|            | 23 | 13 | 42 | II       | EC.F.EXT | 17                                     | 28       | 1  | III | OM.D.INT | 22       |          | 11       | 51 | I   | PA.F.INT |          |          |          |          |
|            | 23 | 15 | 37 | II       | EC.F.PEN | 19                                     | 41       | 47 | III | OM.F.INT | 22       |          | 15       | 40 | I   | PA.F.EXT |          |          |          |          |
|            | 19 | 2  | 39 | 25       | I        | OC.D.EXT                               | 19       | 54 | 28  | III      | OM.F.EXT |          | 29       | 23 | 10  | 8        | I        | OM.F.INT |          |          |
| 2          |    | 43 | 14 | I        | OC.D.INT | 24                                     | 3        | 25 | 59  | II       | PA.D.EXT |          |          | 23 | 13  | 57       | I        | OM.F.EXT |          |          |
| 5          |    | 36 | 9  | I        | EC.F.INT |  | 3        | 30 | 42  | II       | PA.D.INT |          |          | 29 | 10  | 45       | 5        | II       | OC.D.EXT |          |
| 5          |    | 39 | 58 | I        | EC.F.EXT |  | 5        | 9  | 35  | II       | OM.D.EXT |          |          |    | 10  | 49       | 51       | II       | OC.D.INT |          |
| 5          |    | 40 | 46 | I        | EC.F.PEN |  | 5        | 14 | 17  | II       | OM.D.INT |          |          |    | 15  | 5        | 49       | II       | EC.F.INT |          |
| 23         |    | 47 | 18 | I        | PA.D.EXT |  | 5        | 45 | 54  | II       | PA.F.INT | 15       |          |    | 10  | 40       | II       | EC.F.EXT |          |          |
| 23         |    | 51 | 7  | I        | PA.D.INT |  | 5        | 50 | 38  | II       | PA.F.EXT | 15       |          |    | 12  | 36       | II       | EC.F.PEN |          |          |
| 20         |    | 0  | 0  | 49       | III      |  | OC.D.EXT | 7  | 31  | 40       | II       | OM.F.INT |          |    | 30  | 17       | 20       | 0        | I        | OC.D.EXT |
|            |    | 0  | 14 | 13       | III      |  | OC.D.INT | 7  | 36  | 21       | II       | OM.F.EXT |          |    |     | 17       | 23       | 48       | I        | OC.D.INT |
|            |    | 0  | 34 | 24       | I        |  | OM.D.EXT | 9  | 59  | 24       | I        | OC.D.EXT |          |    |     | 20       | 28       | 53       | I        | EC.F.INT |
|            | 0  | 38 | 14 | I        | OM.D.INT |  | 10       | 3  | 13  | I        | OC.D.INT | 20       | 32       |    |     | 41       | I        | EC.F.EXT |          |          |
|            | 1  | 57 | 21 | I        | PA.F.INT | 13                                     | 2        | 31 | I   | EC.F.INT | 20       | 33       | 29       |    |     | I        | EC.F.PEN |          |          |          |
|            | 2  | 1  | 11 | I        | PA.F.EXT | 13                                     | 6        | 20 | I   | EC.F.EXT | 30       | 14       | 28       | 47 |     | I        | PA.D.EXT |          |          |          |
|            | 2  | 19 | 7  | III      | OC.F.INT | 13                                     | 7        | 8  | I   | EC.F.PEN |          | 14       | 32       | 36 |     | I        | PA.D.INT |          |          |          |
|            | 2  | 32 | 30 | III      | OC.F.EXT | 25                                     | 7        | 7  | 38  | I        |          | PA.D.EXT | 15       | 27 |     | 56       | I        | OM.D.EXT |          |          |
|            | 2  | 45 | 49 | I        | OM.F.INT |  | 7        | 11 | 28  | I        |          | PA.D.INT | 15       | 31 |     | 46       | I        | OM.D.INT |          |          |
|            | 2  | 49 | 38 | I        | OM.F.EXT |  | 8        | 1  | 5   | I        |          | OM.D.EXT | 16       | 39 |     | 1        | I        | PA.F.INT |          |          |
|            | 3  | 10 | 44 | III      | EC.D.PEN |  | 8        | 4  | 55  | I        |          | OM.D.INT | 16       | 42 |     | 50       | I        | PA.F.EXT |          |          |
|            | 3  | 15 | 23 | III      | EC.D.EXT |  | 9        | 17 | 47  | I        |          | PA.F.INT | 17       | 17 |     | 9        | III      | PA.D.EXT |          |          |
|            | 3  | 28 | 39 | III      | EC.D.INT |  | 9        | 21 | 37  | I        |          | PA.F.EXT | 17       | 30 |     | 1        | III      | PA.D.INT |          |          |
|            | 5  | 33 | 54 | III      | EC.F.INT |  | 10       | 12 | 21  | I        |          | OM.F.INT | 17       | 39 |     | 4        | I        | OM.F.INT |          |          |
|            | 5  | 47 | 10 | III      | EC.F.EXT |  | 10       | 16 | 10  | I        |          | OM.F.EXT | 17       | 42 |     | 53       | I        | OM.F.EXT |          |          |
|            | 5  | 51 | 49 | III      | EC.F.PEN |  | 21       | 34 | 15  | II       |          | OC.D.EXT | 19       | 38 |     | 40       | III      | PA.F.INT |          |          |
| 14         | 16 | 20 | II | PA.D.EXT | 21       |  | 39       | 2  | II  | OC.D.INT |          | 19       | 51       | 36 | III | PA.F.EXT |          |          |          |          |
| 14         | 21 | 4  | II | PA.D.INT | 26       |  | 1        | 47 | 1   | II       |          | EC.F.INT | 21       | 17 | 40  | III      | OM.D.EXT |          |          |          |
| 15         | 51 | 20 | II | OM.D.EXT |          |  | 1        | 51 | 51  | II       |          | EC.F.EXT | 21       | 30 | 30  | III      | OM.D.INT |          |          |          |
| 15         | 56 | 2  | II | OM.D.INT |          |  | 1        | 53 | 47  | II       |          | EC.F.PEN | 23       | 43 | 12  | III      | OM.F.INT |          |          |          |
| 16         | 35 | 50 | II | PA.F.INT |          |  |          |    |     |          |          |          | 23       | 55 | 56  | III      | OM.F.EXT |          |          |          |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



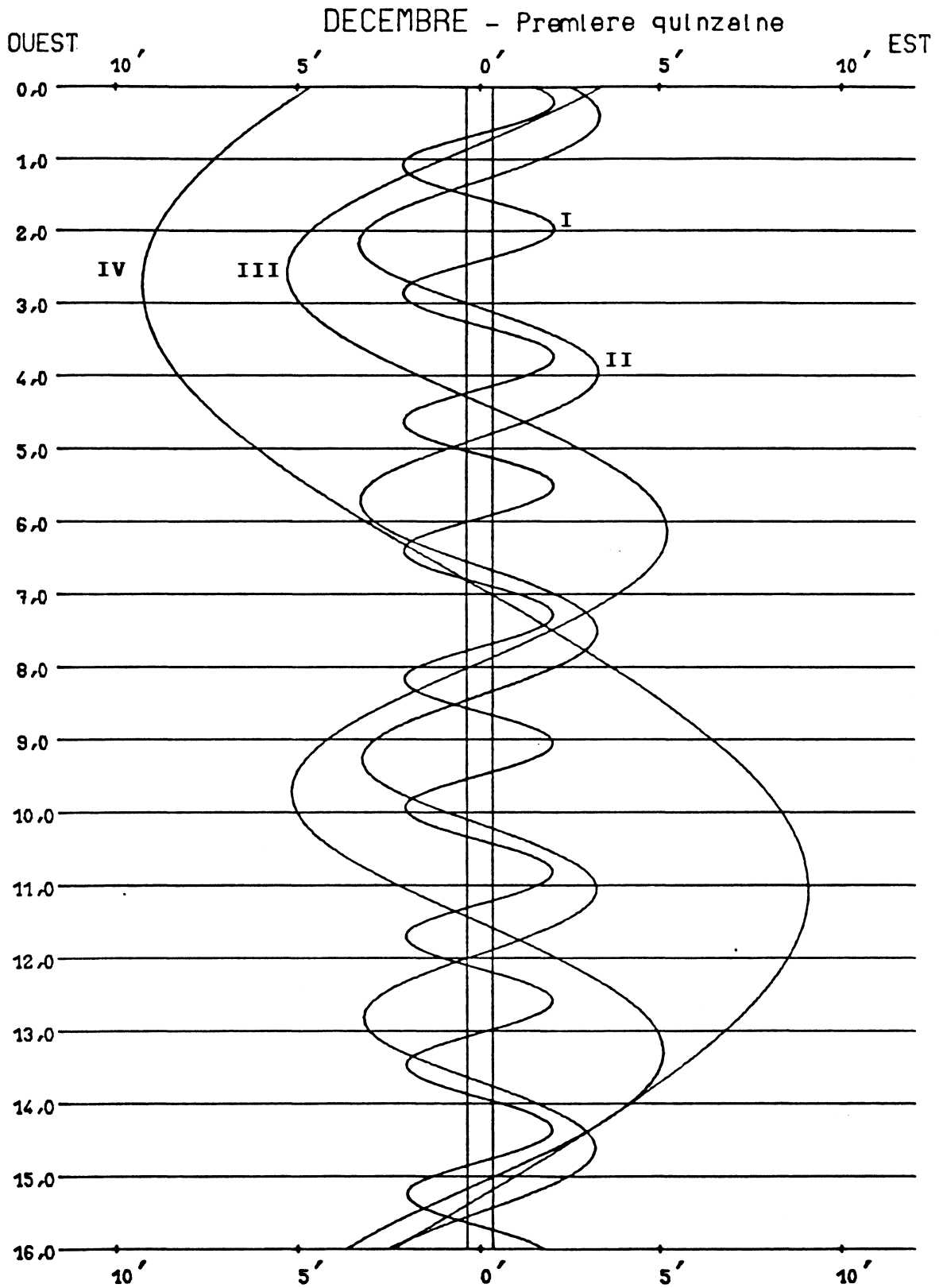
Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter



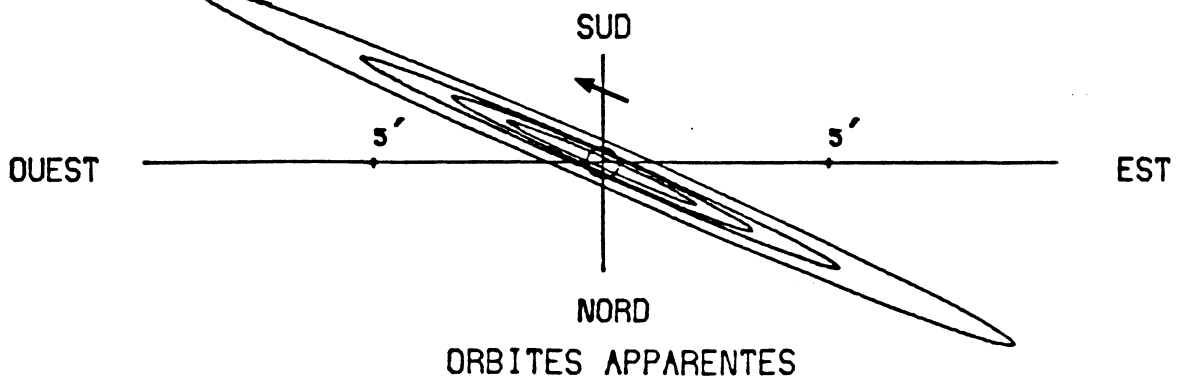
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |    |          |          | MOIS : DECEMBRE - PREMIERE QUINZAINE - |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
|------------|----|----|----|----------|----------|--|----------|----|-----|----------|----------|----------|----------|----|-----|----------|----------|----------|----------|--|
| JOUR       | H  | M  | S  | SAT      | TYPE     | JOUR                                   | H        | M  | S   | SAT      | TYPE     | JOUR     | H        | M  | S   | SAT      | TYPE     |          |          |  |
| 1          | 5  | 47 | 1  | II       | PA.D.EXT | 7                                      | 13       | 9  | 17  | II       | OC.D.EXT | 12       | 15       | 22 | 13  | III      | EC.D.EXT |          |          |  |
|            | 5  | 51 | 41 | II       | PA.D.INT |  | 13       | 14 | 1   | II       | OC.D.INT |          | 15       | 35 | 47  | III      | EC.D.INT |          |          |  |
|            | 7  | 46 | 2  | II       | OM.D.EXT |  | 17       | 44 | 15  | II       | EC.F.INT |          | 17       | 38 | 0   | III      | EC.F.INT |          |          |  |
|            | 7  | 50 | 44 | II       | OM.D.INT |  | 17       | 49 | 7   | II       | EC.F.EXT |          | 17       | 51 | 33  | III      | EC.F.EXT |          |          |  |
|            | 8  | 7  | 41 | II       | PA.F.INT |  | 17       | 51 | 4   | II       | EC.F.PEN |          | 17       | 56 | 17  | III      | EC.F.PEN |          |          |  |
|            | 8  | 12 | 22 | II       | PA.F.EXT |  | 19       | 8  | 34  | I        | OC.D.EXT |          | 21       | 23 | 3   | II       | PA.D.EXT |          |          |  |
|            | 10 | 7  | 35 | II       | OM.F.INT |  | 19       | 12 | 22  | I        | OC.D.INT |          | 21       | 27 | 40  | II       | PA.D.INT |          |          |  |
|            | 10 | 12 | 15 | II       | OM.F.EXT |  | 22       | 24 | 7   | I        | EC.F.INT |          | 23       | 40 | 40  | II       | OM.D.EXT |          |          |  |
|            | 11 | 47 | 3  | I        | OC.D.EXT |  | 22       | 27 | 56  | I        | EC.F.EXT |          | 23       | 44 | 43  | II       | PA.F.INT |          |          |  |
|            | 11 | 50 | 51 | I        | OC.D.INT |  | 22       | 28 | 44  | I        | EC.F.PEN |          | 23       | 45 | 22  | II       | OM.D.INT |          |          |  |
|            | 14 | 57 | 43 | I        | EC.F.INT |  |          |    |     |          |          |          | 23       | 49 | 21  | II       | PA.F.EXT |          |          |  |
|            | 15 | 1  | 31 | I        | EC.F.EXT |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
|            | 15 | 2  | 19 | I        | EC.F.PEN |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
|            | 2  | 8  | 55 | 55       | I        |  | PA.D.EXT | 16 | 18  | 2        | I        |          | PA.D.EXT | 13 | 2   | 1        | 26       | II       | OM.F.INT |  |
|            |    | 8  | 59 | 44       | I        |  | PA.D.INT | 16 | 21  | 51       | I        |          | PA.D.INT |    | 2   | 6        | 7        | II       | OM.F.EXT |  |
| 9          |    | 56 | 49 | I        | OM.D.EXT | 17                                     | 23       | 46 | I   | OM.D.EXT | 2        | 30       | 51       |    | I   | OC.D.EXT |          |          |          |  |
| 10         |    | 0  | 39 | I        | OM.D.INT | 17                                     | 27       | 36 | I   | OM.D.INT | 2        | 34       | 39       |    | I   | OC.D.INT |          |          |          |  |
| 11         |    | 6  | 10 | I        | PA.F.INT | 18                                     | 28       | 22 | I   | PA.F.INT | 5        | 50       | 36       |    | I   | EC.F.INT |          |          |          |  |
| 11         |    | 10 | 0  | I        | PA.F.EXT | 18                                     | 32       | 11 | I   | PA.F.EXT | 5        | 54       | 24       |    | I   | EC.F.EXT |          |          |          |  |
| 12         |    | 7  | 54 | I        | OM.F.INT | 19                                     | 34       | 42 | I   | OM.F.INT | 5        | 55       | 13       |    | I   | EC.F.PEN |          |          |          |  |
| 12         |    | 11 | 43 | I        | OM.F.EXT | 19                                     | 38       | 32 | I   | OM.F.EXT | 23       | 40       | 47       |    | I   | PA.D.EXT |          |          |          |  |
| 23         |    | 57 | 11 | II       | OC.D.EXT | 20                                     | 51       | 27 | III | PA.D.EXT | 23       | 44       | 36       |    | I   | PA.D.INT |          |          |          |  |
|            |    |    |    |          |          | 21                                     | 4        | 1  | III | PA.D.INT |          |          |          |    |     |          |          |          |          |  |
|            |    |    |    |          |          | 23                                     | 15       | 53 | III | PA.F.INT |          |          |          |    |     |          |          |          |          |  |
|            |    |    |    |          |          | 23                                     | 28       | 32 | III | PA.F.EXT |          |          |          |    |     |          |          |          |          |  |
| 3          |    | 0  | 1  | 57       | II       | OC.D.INT                               | 8        | 1  | 20  | 4        | III      | OM.D.EXT | 14       |    | 0   | 50       | 39       | I        | OM.D.EXT |  |
|            | 4  | 25 | 24 | II       | EC.F.INT | 1                                      |          | 32 | 59  | III      | OM.D.INT | 0        |          | 54 | 29  | I        | OM.D.INT |          |          |  |
|            | 4  | 30 | 16 | II       | EC.F.EXT | 3                                      |          | 44 | 37  | III      | OM.F.INT | 1        |          | 51 | 11  | I        | PA.F.INT |          |          |  |
|            | 4  | 32 | 12 | II       | EC.F.PEN | 3                                      |          | 57 | 25  | III      | OM.F.EXT | 1        |          | 54 | 59  | I        | PA.F.EXT |          |          |  |
|            | 6  | 14 | 9  | I        | OC.D.EXT | 8                                      |          | 10 | 27  | II       | PA.D.EXT | 3        |          | 1  | 28  | I        | OM.F.INT |          |          |  |
|            | 6  | 17 | 57 | I        | OC.D.INT | 8                                      |          | 15 | 5   | II       | PA.D.INT | 3        |          | 5  | 17  | I        | OM.F.EXT |          |          |  |
|            | 9  | 26 | 31 | I        | EC.F.INT | 10                                     |          | 22 | 29  | II       | OM.D.EXT | 15       |          | 36 | 10  | II       | OC.D.EXT |          |          |  |
|            | 9  | 30 | 19 | I        | EC.F.EXT | 10                                     |          | 27 | 11  | II       | OM.D.INT | 15       |          | 40 | 53  | II       | OC.D.INT |          |          |  |
|            | 9  | 31 | 7  | I        | EC.F.PEN | 10                                     |          | 31 | 48  | II       | PA.F.INT | 18       |          | 0  | 35  | II       | OC.F.INT |          |          |  |
|            |    |    |    |          |          | 10                                     |          | 36 | 27  | II       | PA.F.EXT | 18       |          | 1  | 40  | II       | EC.D.PEN |          |          |  |
| 4          | 3  | 23 | 15 | I        | PA.D.EXT | 12                                     | 43       | 30 | II  | OM.F.INT | 9        | 10       | 45       | 30 | I   | PA.D.EXT |          |          |          |  |
|            | 3  | 27 | 4  | I        | PA.D.INT | 12                                     | 48       | 11 | II  | OM.F.EXT |          | 10       | 49       | 18 | I   | PA.D.INT |          |          |          |  |
|            | 4  | 25 | 50 | I        | OM.D.EXT | 13                                     | 35       | 57 | I   | OC.D.EXT |          | 11       | 52       | 40 | I   | OM.D.EXT |          |          |          |  |
|            | 4  | 29 | 40 | I        | OM.D.INT | 13                                     | 39       | 44 | I   | OC.D.INT |          | 11       | 56       | 30 | I   | OM.D.INT |          |          |          |  |
|            | 5  | 33 | 31 | I        | PA.F.INT | 16                                     | 52       | 58 | I   | EC.F.INT |          | 12       | 55       | 50 | I   | PA.F.INT |          |          |          |  |
|            | 5  | 37 | 21 | I        | PA.F.EXT | 16                                     | 56       | 46 | I   | EC.F.EXT |          | 12       | 59       | 39 | I   | PA.F.EXT |          |          |          |  |
|            | 6  | 36 | 52 | I        | OM.F.INT | 16                                     | 57       | 34 | I   | EC.F.PEN |          | 14       | 3        | 34 | I   | OM.F.INT |          |          |          |  |
|            | 6  | 40 | 41 | I        | OM.F.EXT |  |          |    |     |          |          | 14       | 7        | 23 | I   | OM.F.EXT |          |          |          |  |
|            | 6  | 58 | 24 | III      | OC.D.EXT |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
|            | 7  | 11 | 10 | III      | OC.D.INT | 10                                     | 2        | 22 | 44  | II       |          | OC.D.EXT | 15       | 0  | 19  | 25       | I        | EC.F.INT |          |  |
|            | 9  | 23 | 28 | III      | OC.F.INT |  | 2        | 27 | 28  | II       |          | OC.D.INT |          | 0  | 23  | 13       | I        | EC.F.EXT |          |  |
|            | 9  | 36 | 14 | III      | OC.F.EXT |  | 7        | 3  | 56  | II       |          | EC.F.INT |          | 0  | 24  | 1        | I        | EC.F.PEN |          |  |
|            | 11 | 15 | 6  | III      | EC.D.PEN |  | 7        | 8  | 49  | II       |          | EC.F.EXT |          | 18 | 8   | 35       | I        | PA.D.EXT |          |  |
|            | 11 | 19 | 49 | III      | EC.D.EXT |  | 7        | 10 | 46  | II       |          | EC.F.PEN |          | 18 | 12  | 23       | I        | PA.D.INT |          |  |
|            | 11 | 33 | 17 | III      | EC.D.INT |  | 8        | 3  | 21  | I        |          | OC.D.EXT |          | 19 | 19  | 41       | I        | OM.D.EXT |          |  |
|            | 13 | 36 | 29 | III      | EC.F.INT |  | 8        | 7  | 9   | I        |          | OC.D.INT |          | 19 | 23  | 31       | I        | OM.D.INT |          |  |
|            | 13 | 49 | 57 | III      | EC.F.EXT |  | 11       | 21 | 47  | I        |          | EC.F.INT |          | 20 | 19  | 0        | I        | PA.F.INT |          |  |
|            | 13 | 54 | 40 | III      | EC.F.PEN |  | 11       | 25 | 35  | I        |          | EC.F.EXT |          | 20 | 22  | 49       | I        | PA.F.EXT |          |  |
|            | 18 | 58 | 24 | II       | PA.D.EXT |  | 11       | 26 | 23  | I        |          | EC.F.PEN |          | 21 | 30  | 27       | I        | OM.F.INT |          |  |
|            | 19 | 3  | 3  | II       | PA.D.INT |  |          |    |     |          |          | 21       | 34       | 16 | I   | OM.F.EXT |          |          |          |  |
| 21         | 4  | 14 | II | OM.D.EXT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 21         | 8  | 56 | II | OM.D.INT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 21         | 19 | 26 | II | PA.F.INT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 21         | 24 | 6  | II | PA.F.EXT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 23         | 25 | 30 | II | OM.F.INT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 23         | 30 | 11 | II | OM.F.EXT |          |  |          |    |     |          |          |          |          |    |     |          |          |          |          |  |
| 5          | 0  | 41 | 20 | I        | OC.D.EXT | 11                                     | 5        | 13 | 9   | I        | PA.D.EXT | 15       | 0        | 30 | 36  | III      | PA.D.EXT |          |          |  |
|            | 0  | 45 | 8  | I        | OC.D.INT |  | 5        | 16 | 57  | I        | PA.D.INT |          | 0        | 42 | 55  | III      | PA.D.INT |          |          |  |
|            | 3  | 55 | 19 | I        | EC.F.INT |  | 6        | 21 | 42  | I        | OM.D.EXT |          | 2        | 57 | 35  | III      | PA.F.INT |          |          |  |
|            | 3  | 59 | 8  | I        | EC.F.EXT |  | 6        | 25 | 32  | I        | OM.D.INT |          | 3        | 10 | 0   | III      | PA.F.EXT |          |          |  |
|            | 3  | 59 | 56 | I        | EC.F.PEN |  | 7        | 23 | 31  | I        | PA.F.INT |          | 5        | 22 | 13  | III      | OM.D.EXT |          |          |  |
|            | 21 | 50 | 34 | I        | PA.D.EXT |  | 7        | 27 | 20  | I        | PA.F.EXT |          | 5        | 35 | 13  | III      | OM.D.INT |          |          |  |
|            | 21 | 54 | 23 | I        | PA.D.INT |  | 8        | 32 | 33  | I        | OM.F.INT |          | 7        | 45 | 50  | III      | OM.F.INT |          |          |  |
|            | 22 | 54 | 45 | I        | OM.D.EXT |  | 8        | 36 | 23  | I        | OM.F.EXT |          | 7        | 58 | 41  | III      | OM.F.EXT |          |          |  |
|            | 22 | 58 | 35 | I        | OM.D.INT |  | 10       | 34 | 55  | III      | OC.D.EXT |          | 10       | 36 | 18  | II       | PA.D.EXT |          |          |  |
|            |    |    |    |          |          |  | 10       | 47 | 26  | III      | OC.D.INT |          | 10       | 40 | 54  | II       | PA.D.INT |          |          |  |
| 6          | 0  | 0  | 52 | I        | PA.F.INT | 13                                     | 2        | 54 | III | OC.F.INT | 18       | 5        | 25       | 13 | III | OM.D.INT |          |          |          |  |
|            | 0  | 4  | 41 | I        | PA.F.EXT | 13                                     | 15       | 25 | III | OC.F.EXT |          | 5        | 32       | 13 | III | OM.D.EXT |          |          |          |  |
|            | 1  | 5  | 44 | I        | OM.F.INT | 15                                     | 17       | 29 | III | EC.D.PEN |          | 7        | 45       | 50 | III | OM.F.INT |          |          |          |  |
|            | 1  | 9  | 34 | I        | OM.F.EXT |  |          |    |     |          |          | 7        | 58       | 41 | III | OM.F.EXT |          |          |          |  |
|            |    |    |    |          |          |  |          |    |     |          |          | 10       | 36       | 18 | II  | PA.D.EXT |          |          |          |  |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



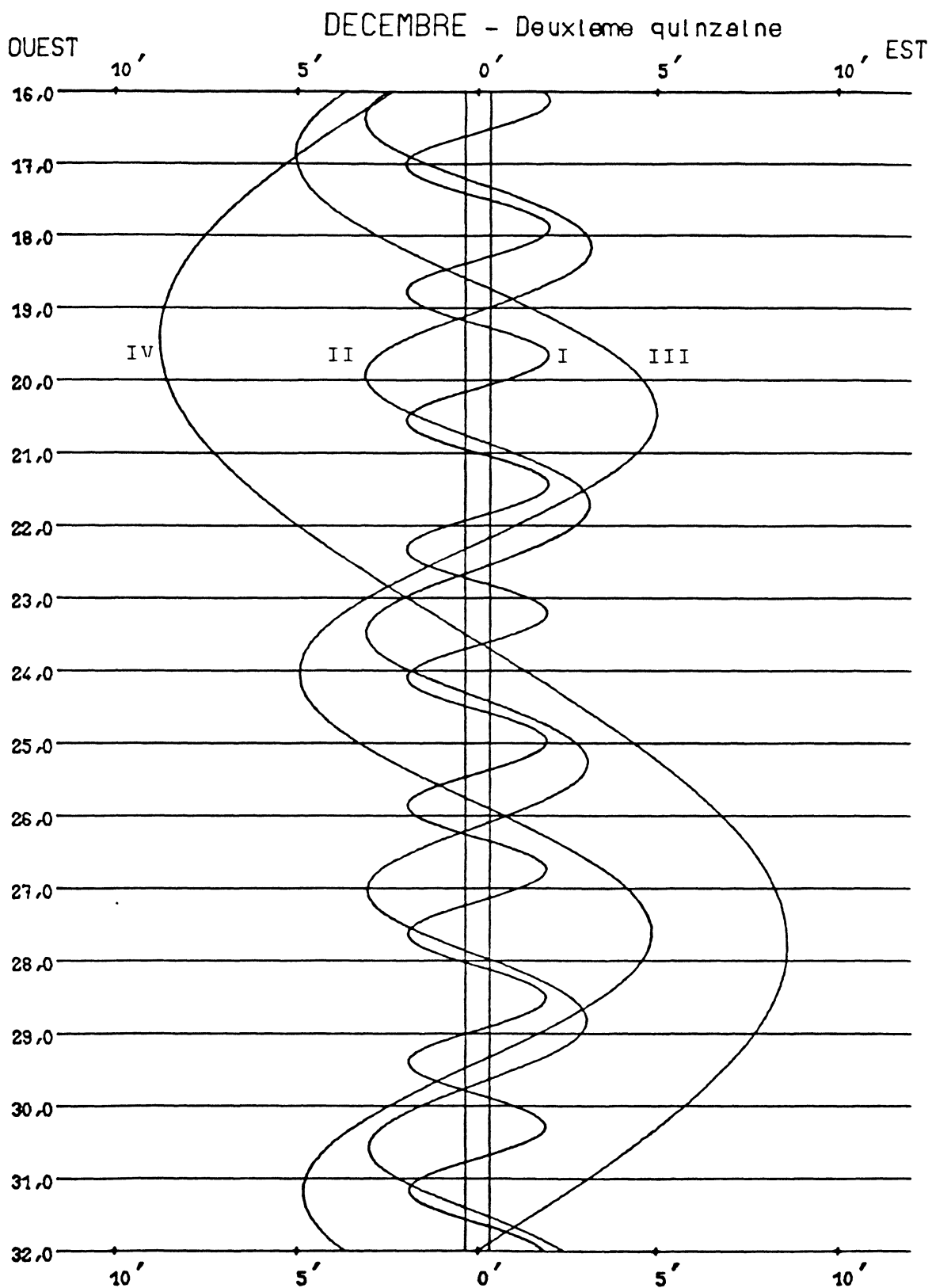
Dans le sens OUEST-EST, les satellites passent au-delà de Jupiter



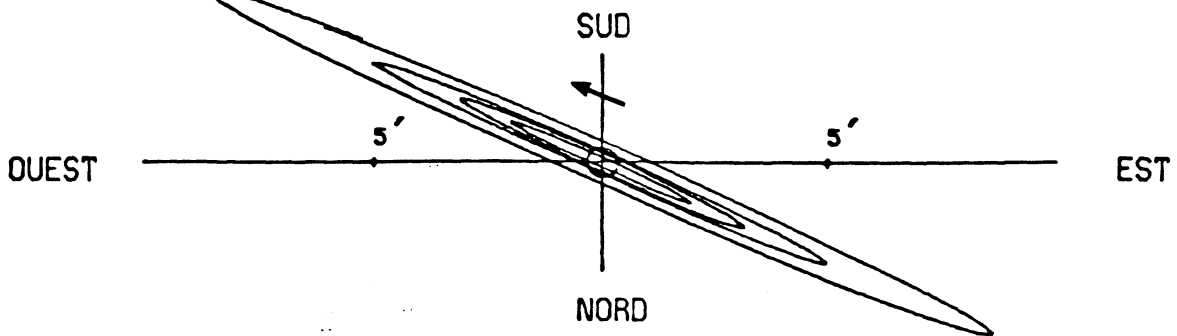
1987 - SATELLITES DE JUPITER -

| PHENOMENES |    |    |     |          |          | MOIS : DECEMBRE - DEUXIEME QUINZAINE - |    |          |          |          |          |          |          |          |          |          |          |          |          |
|------------|----|----|-----|----------|----------|--|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| JOUR       | H  | M  | S   | SAT      | TYPE     | JOUR                                   | H  | M        | S        | SAT      | TYPE     | JOUR     | H        | M        | S        | SAT      | TYPE     |          |          |
| 16         | 12 | 36 | 22  | I        | PA.D.EXT | 22                                     | 14 | 45       | I        | PA.F.EXT | 28       | 4        | 46       | 29       | I        | OM.D.INT |          |          |          |
|            | 12 | 40 | 10  | I        | PA.D.INT |  | 23 | 26       | 17       | I        |          | OM.F.INT | 5        | 35       | 42       | I        | PA.F.INT |          |          |
|            | 13 | 48 | 36  | I        | OM.D.EXT |  | 23 | 30       | 7        | I        |          | OM.F.EXT | 5        | 39       | 30       | I        | PA.F.EXT |          |          |
|            | 13 | 52 | 26  | I        | OM.D.INT |  | 22 | 4        | 15       | 4        |          | III      | PA.D.EXT | 6        | 53       | 11       | I        | OM.F.INT |          |
|            | 14 | 46 | 48  | I        | PA.F.INT |  |    | 4        | 27       | 11       |          | III      | PA.D.INT | 6        | 57       | 1        | I        | OM.F.EXT |          |
|            | 14 | 50 | 37  | I        | PA.F.EXT |  |    | 6        | 44       | 16       |          | III      | PA.F.INT | 20       | 38       | 9        | II       | OC.D.EXT |          |
|            | 15 | 59 | 20  | I        | OM.F.INT |  |    | 6        | 56       | 29       |          | III      | PA.F.EXT | 20       | 42       | 49       | II       | OC.D.INT |          |
|            | 16 | 3  | 10  | I        | OM.F.EXT |  |    | 9        | 24       | 31       |          | III      | OM.D.EXT | 23       | 4        | 1        | II       | OC.F.INT |          |
|            | 17 | 4  | 51  | 2        | II       |  |    | OC.D.EXT | 9        | 37       |          | 35       | III      | OM.D.INT | 23       | 8        | 42       | II       | OC.F.EXT |
|            |    | 4  | 55  | 45       | II       |  |    | OC.D.INT | 11       | 47       |          | 14       | III      | OM.F.INT | 23       | 19       | 54       | II       | EC.D.PEN |
| 7          |    | 15 | 53  | II       | OC.F.INT | 12                                     |    | 0        | 9        | III      | OM.F.EXT | 23       | 21       | 46       | II       | EC.D.EXT |          |          |          |
| 7          |    | 20 | 35  | II       | OC.F.EXT | 13                                     |    | 4        | 37       | II       | PA.D.EXT | 23       | 26       | 46       | II       | EC.D.INT |          |          |          |
| 7          |    | 21 | 37  | II       | EC.D.PEN | 13                                     |    | 9        | 11       | II       | PA.D.INT | 28       | 0        | 41       | 55       | I        | OC.D.EXT |          |          |
| 7          |    | 23 | 34  | II       | EC.D.EXT | 15                                     | 27 | 4        | II       | PA.F.INT | 0        |          | 45       | 41       | I        | OC.D.INT |          |          |          |
| 7          |    | 28 | 28  | II       | EC.D.INT | 15                                     | 31 | 39       | II       | PA.F.EXT | 1        |          | 40       | 31       | II       | EC.F.INT |          |          |          |
| 9          |    | 42 | 40  | II       | EC.F.INT | 15                                     | 35 | 12       | II       | OM.D.EXT | 1        |          | 45       | 26       | II       | EC.F.EXT |          |          |          |
| 9          |    | 47 | 34  | II       | EC.F.EXT | 15                                     | 39 | 55       | II       | OM.D.INT | 1        |          | 47       | 24       | II       | EC.F.PEN |          |          |          |
| 9          |    | 49 | 31  | II       | EC.F.PEN | 17                                     | 17 | 33       | I        | OC.D.EXT | 4        |          | 10       | 6        | I        | EC.F.INT |          |          |          |
| 9          | 53 | 50 | I   | OC.D.EXT | 17       | 21                                     | 19 | I        | OC.D.INT | 4        | 13       |          | 54       | I        | EC.F.EXT |          |          |          |          |
| 9          | 57 | 37 | I   | OC.D.INT | 17       | 55                                     | 19 | II       | OM.F.INT | 4        | 14       |          | 42       | I        | EC.F.PEN |          |          |          |          |
| 13         | 17 | 5  | I   | EC.F.INT | 18       | 0                                      | 0  | II       | OM.F.EXT | 21       | 53       |          | 34       | I        | PA.D.EXT |          |          |          |          |
| 13         | 20 | 54 | I   | EC.F.EXT | 20       | 43                                     | 36 | I        | EC.F.INT | 21       | 57       |          | 22       | I        | PA.D.INT |          |          |          |          |
| 13         | 21 | 42 | I   | EC.F.PEN | 20       | 47                                     | 24 | I        | EC.F.EXT | 23       | 11       | 42       | I        | OM.D.EXT |          |          |          |          |          |
| 18         | 7  | 4  | 20  | I        | PA.D.EXT | 23                                     | 20 | 48       | 13       | I        | EC.F.PEN | 29       | 23       | 15       | 33       | I        | OM.D.INT |          |          |
|            | 7  | 8  | 9   | I        | PA.D.INT |  | 14 | 28       | 32       | I        | PA.D.EXT |          | 0        | 4        | 10       | I        | PA.F.INT |          |          |
|            | 8  | 17 | 39  | I        | OM.D.EXT |  | 14 | 32       | 20       | I        | PA.D.INT |          | 0        | 7        | 58       | I        | PA.F.EXT |          |          |
|            | 8  | 21 | 29  | I        | OM.D.INT |  | 15 | 44       | 36       | I        | OM.D.EXT |          | 1        | 22       | 13       | I        | OM.F.INT |          |          |
|            | 9  | 14 | 48  | I        | PA.F.INT |  | 15 | 48       | 26       | I        | OM.D.INT |          | 1        | 26       | 3        | I        | OM.F.EXT |          |          |
|            | 9  | 18 | 37  | I        | PA.F.EXT |  | 16 | 39       | 4        | I        | PA.F.INT |          | 8        | 5        | 18       | III      | PA.D.EXT |          |          |
|            | 10 | 28 | 21  | I        | OM.F.INT |  | 16 | 42       | 52       | I        | PA.F.EXT |          | 8        | 17       | 16       | III      | PA.D.INT |          |          |
|            | 10 | 32 | 10  | I        | OM.F.EXT |  | 17 | 55       | 12       | I        | OM.F.INT |          | 10       | 36       | 22       | III      | PA.F.INT |          |          |
|            | 14 | 17 | 28  | III      | OC.D.EXT |  | 17 | 59       | 1        | I        | OM.F.EXT |          | 10       | 48       | 26       | III      | PA.F.EXT |          |          |
|            | 14 | 29 | 45  | III      | OC.D.INT |  | 24 | 7        | 22       | 3        | II       |          | OC.D.EXT | 13       | 27       | 27       | III      | OM.D.EXT |          |
| 16         | 47 | 59 | III | OC.F.INT | 7        | 26                                     |    | 44       | II       | OC.D.INT | 13       | 40       | 36       | III      | OM.D.INT |          |          |          |          |
| 17         | 0  | 17 | III | OC.F.EXT | 9        | 47                                     |    | 37       | II       | OC.F.INT | 15       | 35       | 22       | II       | PA.D.EXT |          |          |          |          |
| 19         | 20 | 34 | III | EC.D.PEN | 9        | 47                                     |    | 37       | II       | OC.F.INT | 15       | 39       | 55       | II       | PA.D.INT |          |          |          |          |
| 19         | 25 | 20 | III | EC.D.EXT | 9        | 52                                     |    | 18       | II       | OC.F.EXT | 15       | 49       | 20       | III      | OM.F.INT |          |          |          |          |
| 19         | 38 | 59 | III | EC.D.INT | 10       | 0                                      |    | 44       | II       | EC.D.PEN | 16       | 2        | 19       | III      | OM.F.EXT |          |          |          |          |
| 21         | 40 | 14 | III | EC.F.INT | 10       | 2                                      |    | 42       | II       | EC.D.EXT | 17       | 58       | 14       | II       | PA.F.INT |          |          |          |          |
| 21         | 53 | 53 | III | EC.F.EXT | 10       | 7                                      |    | 36       | II       | EC.D.INT | 18       | 2        | 48       | II       | PA.F.EXT |          |          |          |          |
| 21         | 58 | 39 | III | EC.F.PEN | 11       | 45                                     |    | 35       | I        | OC.D.EXT | 18       | 11       | 32       | II       | OM.D.EXT |          |          |          |          |
| 23         | 50 | 8  | II  | PA.D.EXT | 11       | 49                                     |    | 22       | I        | OC.D.INT | 18       | 16       | 15       | II       | OM.D.INT |          |          |          |          |
| 23         | 54 | 43 | II  | PA.D.INT | 12       | 21                                     | 30 | II       | EC.F.INT | 19       | 10       | 13       | I        | OC.D.EXT |          |          |          |          |          |
| 19         | 2  | 12 | 20  | II       | PA.F.INT | 12                                     | 26 | 25       | II       | EC.F.EXT | 19       | 14       | 0        | I        | OC.D.INT |          |          |          |          |
|            | 2  | 16 | 57  | II       | PA.F.EXT | 12                                     | 28 | 22       | II       | EC.F.PEN | 20       | 31       | 15       | II       | OM.F.INT |          |          |          |          |
|            | 2  | 17 | 1   | II       | OM.D.EXT | 15                                     | 12 | 26       | I        | EC.F.INT | 20       | 35       | 57       | II       | OM.F.EXT |          |          |          |          |
|            | 2  | 21 | 44  | II       | OM.D.INT | 15                                     | 16 | 15       | I        | EC.F.EXT | 22       | 38       | 57       | I        | EC.F.INT |          |          |          |          |
|            | 4  | 21 | 39  | I        | OC.D.EXT | 15                                     | 17 | 3        | I        | EC.F.PEN | 22       | 42       | 46       | I        | EC.F.EXT |          |          |          |          |
|            | 4  | 25 | 26  | I        | OC.D.INT | 25                                     | 8  | 56       | 50       | I        | PA.D.EXT | 22       | 43       | 34       | I        | EC.F.PEN |          |          |          |
|            | 4  | 37 | 20  | II       | OM.F.INT |  | 9  | 0        | 38       | I        | PA.D.INT | 30       | 16       | 21       | 58       | I        | PA.D.EXT |          |          |
|            | 4  | 42 | 2   | II       | OM.F.EXT |  | 10 | 13       | 40       | I        | OM.D.EXT |          | 16       | 25       | 46       | I        | PA.D.INT |          |          |
|            | 7  | 45 | 55  | I        | EC.F.INT |  | 10 | 17       | 30       | I        | OM.D.INT |          | 17       | 40       | 39       | I        | OM.D.EXT |          |          |
|            | 7  | 49 | 44  | I        | EC.F.EXT |  | 11 | 7        | 23       | I        | PA.F.INT |          | 17       | 44       | 30       | I        | OM.D.INT |          |          |
| 7          | 50 | 32 | I   | EC.F.PEN | 11       |  | 11 | 12       | I        | PA.F.EXT | 18       |          | 32       | 36       | I        | PA.F.INT |          |          |          |
| 20         | 1  | 32 | 19  | I        | PA.D.EXT |  | 12 | 24       | 14       | I        | OM.F.INT |          | 18       | 36       | 24       | I        | PA.F.EXT |          |          |
|            | 1  | 36 | 7   | I        | PA.D.INT |  | 12 | 28       | 4        | I        | OM.F.EXT |          | 19       | 51       | 9        | I        | OM.F.INT |          |          |
|            | 2  | 46 | 37  | I        | OM.D.EXT |  | 18 | 4        | 34       | III      | OC.D.EXT |          | 19       | 54       | 58       | I        | OM.F.EXT |          |          |
|            | 2  | 50 | 27  | I        | OM.D.INT |  | 18 | 16       | 41       | III      | OC.D.INT |          | 31       | 9        | 55       | 44       | II       | OC.D.EXT |          |
|            | 3  | 42 | 47  | I        | PA.F.INT | 20                                     | 37 | 15       | III      | OC.F.INT | 10       |          |          | 0        | 24       | II       | OC.D.INT |          |          |
|            | 3  | 46 | 36  | I        | PA.F.EXT | 20                                     | 49 | 21       | III      | OC.F.EXT | 12       | 21       |          | 53       | II       | OC.F.INT |          |          |          |
|            | 4  | 57 | 16  | I        | OM.F.INT | 23                                     | 22 | 54       | III      | EC.D.PEN | 12       | 26       |          | 34       | II       | OC.F.EXT |          |          |          |
|            | 5  | 1  | 6   | I        | OM.F.EXT | 23                                     | 27 | 40       | III      | EC.D.EXT | 12       | 26       |          | 34       | II       | OC.F.EXT |          |          |          |
|            | 18 | 5  | 49  | II       | OC.D.EXT | 23                                     | 41 | 24       | III      | EC.D.INT | 12       | 39       |          | 57       | II       | EC.D.PEN |          |          |          |
|            | 18 | 10 | 30  | II       | OC.D.INT | 26                                     | 1  | 41       | 44       | III      | EC.F.INT | 12       |          | 41       | 55       | II       | EC.D.EXT |          |          |
| 20         | 31 | 1  | II  | OC.F.INT | 1        |  | 55 | 28       | III      | EC.F.EXT | 12       | 46       |          | 50       | II       | EC.D.INT |          |          |          |
| 20         | 35 | 43 | II  | OC.F.EXT | 2        |  | 0  | 15       | III      | EC.F.PEN | 13       | 38       |          | 35       | I        | OC.D.EXT |          |          |          |
| 20         | 40 | 45 | II  | EC.D.PEN | 2        |  | 19 | 42       | II       | PA.D.EXT | 13       | 42       |          | 21       | I        | OC.D.INT |          |          |          |
| 20         | 42 | 42 | II  | EC.D.EXT | 2        |  | 24 | 15       | II       | PA.D.INT | 15       | 0        | 27       | II       | EC.F.INT |          |          |          |          |
| 20         | 47 | 36 | II  | EC.D.INT | 4        |  | 42 | 22       | II       | PA.F.INT | 15       | 5        | 22       | II       | EC.F.EXT |          |          |          |          |
| 22         | 49 | 32 | I   | OC.D.EXT | 4        |  | 46 | 57       | II       | PA.F.EXT | 15       | 7        | 20       | II       | EC.F.PEN |          |          |          |          |
| 22         | 53 | 19 | I   | OC.D.INT | 4        |  | 53 | 22       | II       | OM.D.EXT | 17       | 7        | 48       | I        | EC.F.INT |          |          |          |          |
| 23         | 1  | 39 | II  | EC.F.INT | 4        |  | 58 | 6        | II       | OM.D.INT | 17       | 11       | 37       | I        | EC.F.EXT |          |          |          |          |
| 23         | 6  | 33 | II  | EC.F.EXT | 6        |  | 13 | 43       | I        | OC.D.EXT | 17       | 12       | 25       | I        | EC.F.PEN |          |          |          |          |
| 23         | 8  | 30 | II  | EC.F.PEN | 6        | 17                                     | 30 | I        | OC.D.INT | 32       | 10       | 50       | 34       | I        | PA.D.EXT |          |          |          |          |
| 21         | 2  | 14 | 44  | I        | EC.F.INT | 7                                      | 13 | 17       | II       |          | OM.F.INT | 10       | 54       | 22       | I        | PA.D.INT |          |          |          |
|            | 2  | 18 | 33  | I        | EC.F.EXT | 7                                      | 17 | 59       | II       |          | OM.F.EXT | 12       | 9        | 44       | I        | OM.D.EXT |          |          |          |
|            | 2  | 19 | 21  | I        | EC.F.PEN | 9                                      | 41 | 16       | I        |          | EC.F.INT | 12       | 13       | 34       | I        | OM.D.INT |          |          |          |
|            | 20 | 0  | 26  | I        | PA.D.EXT | 9                                      | 45 | 5        | I        |          | EC.F.EXT | 13       | 1        | 13       | I        | PA.F.INT |          |          |          |
|            | 20 | 4  | 14  | I        | PA.D.INT | 9                                      | 45 | 53       | I        |          | EC.F.PEN | 13       | 5        | 2        | I        | PA.F.EXT |          |          |          |
|            | 21 | 15 | 40  | I        | OM.D.EXT | 27                                     | 3  | 25       | 7        |          | I        | PA.D.EXT | 14       | 20       | 12       | I        | OM.F.INT |          |          |
|            | 21 | 19 | 30  | I        | OM.D.INT |  | 3  | 28       | 55       |          | I        | PA.D.INT | 14       | 24       | 1        | I        | OM.F.EXT |          |          |
|            | 22 | 10 | 56  | I        | PA.F.INT |  | 4  | 42       | 39       |          | I        | OM.D.EXT | 21       | 56       | 53       | III      | OC.D.EXT |          |          |

1987.-CONFIGURATIONS DES SATELLITES GALILEENS DE JUPITER.



Dans le sens OUEST-EST, les satellites passent au-dela de Jupiter



ORBITES APPARENTES

PHENOMENES POUR 1988



## LES PHENOMENES POUR L'ANNEE 1988

Pour l'année 1988, les phénomènes sont donnés par l'intermédiaire de coefficients d'un polynôme. On a ainsi une représentation sous une forme très condensée. La précision est cependant moins bonne que celle des prédictions des phénomènes pour 1987. Cette précision et la méthode pour déterminer les phénomènes sont donnés ci-après.

### UTILISATION DES COEFFICIENTS:

P étant la période synodique moyenne d'un satellite, la date approchée  $t_1$  du phénomène proche de la date  $t$  est donnée par la relation:

$$t_1 = k P + \tau / 24 = T_0$$

où  $\tau$  est donné par un développement polynomial dans un intervalle de temps ( $T_0, T_0 + DT$ ) et où  $k$  représente la partie entière de la quantité  $(t - T_0) / P$ , c'est-à-dire que  $K$  est le rang de la révolution synodique de l'année qui contient  $t$ .

Les coefficients  $C_i$  de ce développement polynomial sont donnés en colonne, numérotés <sup>i</sup> de 0 à 14, pour les quatre satellites, ou seulement pour les trois premiers lorsqu'aucun phénomène du quatrième satellite n'est observable.

$DT$  désigne la longueur de l'intervalle de validité (en général 366 jours) commençant à la date  $T_0$  (en général le 0 janvier à 0h). La quantité  $\tau$  est calculable, exprimée en heures, par la formule suivante:

$$\tau = C_0 + C_1 X + C_2 X^2 + \dots + C_{14} X^{14}$$

$$\text{où } X = 2(t - T_0) / DT - 1$$

Une fois connu  $t_1$ , on peut réitérer le calcul en substituant  $t_1$  à  $t$  dans le formulaire précédent pour obtenir une date  $t_2$  plus proche du phénomène recherché que  $t_1$ . La précision de ce type de prédiction est alors meilleure que 60 secondes de temps.

**EXEMPLE D'UTILISATION:**

Déterminer les dates des phénomènes du satellite 1 voisins du 30 juin 1988. Voyons tout d'abord le calcul pour le début d'éclipse, pour lequel les tables donnent:

$$T_0 = 0 \qquad p = 1.7698605 \qquad \text{et} \qquad DT = 366$$

Du 0 janvier au 30 juin 1988, 182 jours se sont écoulés, on a donc  $t = 182$

On a donc :

$$X = 2 ( 182 - 0 ) / 366 - 1 = - 0.005464481$$

puis ensuite :

$$\begin{aligned} \tau = & 15.249878 - 0.003383 X_5^2 - 0.203159 X_6^2 + 0.077900 X_7^3 - 0.128832 X_8^4 \\ & + 0.342636 X_9^4 + 1.433298 X_{10}^4 - 0.836578 X_{11}^4 - 3.904316 X_{12}^4 \\ & + 1.260658 X_{13}^4 + 5.532708 X_{14}^4 - 1.013625 X_{11}^4 - 3.962632 X_{12}^4 \\ & + 0.318739 X_{13}^4 + 1.127073 X_{14}^4 \end{aligned}$$

$$D'où : \tau = 15.24989041$$

On a d'autre part:

$$k = \text{partie entière de } ((182 - 0) / 1.7698605) = 102$$

donc :

$$t_1 = 102 \times 1.7698605 + 15.24989041/24 + 0 = 181.1611831 \text{ jours écoulés depuis le 0 janvier}$$

soit EC.D le 29 juin 1988 à 3h 52m 06s. Le calcul réitéré donne

$$t_2 = 181.1611831 \text{ soit le 29 juin à 3h 52m 06s.}$$

On trouverait de même:

|      |                         |      |                         |
|------|-------------------------|------|-------------------------|
| EC.F | le 29 juin à 6h 02m 20s | PA.D | le 30 juin à 2h 07m 32s |
| OC.D | le 29 juin à 4h 47m 51s | PA.F | le 30 juin à 4h 16m 34s |
| OC.F | le 29 juin à 6h 58m 24s | OM.D | le 30 juin à 1h 12m 21s |
|      |                         | OM.F | le 30 juin à 3h 21m 09s |

#### CONDITIONS D'EXISTENCE DES PHENOMENES

Le recouvrement des cônes d'ombre et de visibilité rend inexistants certains phénomènes. Ainsi avant (ou après) l'opposition de Jupiter, les fins (respectivement débuts) d'éclipse et les débuts (respectivement fins) d'occultation sont inobservables. Ceci ne pouvant être pris en compte dans la représentation, il est nécessaire que l'utilisateur vérifie les conditions d'existence pour les éclipses et les occultations en calculant les quatre phases EC.D EC.F OC.D et OC.F. Par exemple d'après les calculs précédents, on a chronologiquement:

EC.D le 29 juin à 3h 52m 06s observable  
OC.D le 29 juin à 4h 47m 51s inobservable car déjà éclipsé  
EC.F le 29 juin à 6h 02m 20s inobservable car toujours occulté  
OC.F le 29 juin à 6h 58m 24s observable.

D'autre part, les caractéristiques de l'orbite du satellite 4 font qu'il n'existe pas toujours de phénomènes. Les coefficients relatifs à ce satellite ne sont donc donnés que sur l'intervalle où ils existent.

| AN 1988 SATELLITE 1 |           |      |           | P = 1.7698605 JOURS TO = O.O DT = 366.JOURS |           |      |           |
|---------------------|-----------|------|-----------|---|-----------|------|-----------|
| EC.D                |           | EC.F |           | OM.D  |           | OM.F |           |
| 0                   | 15.249878 | 0    | 17.420445 | 0   | 36.586629 | 0    | 38.733125 |
| 1                   | -0.003383 | 1    | 0.010469  | 1   | -0.138503 | 1    | -0.208496 |
| 2                   | -0.203159 | 2    | -0.210673 | 2   | -0.503445 | 2    | -0.493568 |
| 3                   | 0.077900  | 3    | 0.068481  | 3   | 0.106837  | 3    | 0.317429  |
| 4                   | -0.128832 | 4    | -0.121018 | 4   | 0.175792  | 4    | 0.322894  |
| 5                   | 0.342636  | 5    | 0.287019  | 5   | 0.348996  | 5    | 0.311215  |
| 6                   | 1.433298  | 6    | 1.454508  | 6   | -0.141404 | 6    | -0.472909 |
| 7                   | -0.836578 | 7    | -0.633485 | 7   | -0.376357 | 7    | -0.761576 |
| 8                   | -3.904316 | 8    | -3.979968 | 8   | 0.799421  | 8    | 1.146946  |
| 9                   | 1.260658  | 9    | 0.934135  | 9   | 0.541712  | 9    | 0.983434  |
| 10                  | 5.532708  | 10   | 5.646864  | 10  | -1.066078 | 10   | -1.404719 |
| 11                  | -1.013625 | 11   | -0.763091 | 11  | -0.617051 | 11   | -0.794629 |
| 12                  | -3.962632 | 12   | -4.044536 | 12  | 0.574506  | 12   | 0.854308  |
| 13                  | 0.318739  | 13   | 0.244756  | 13  | 0.246792  | 13   | 0.267130  |
| 14                  | 1.127073  | 14   | 1.149731  | 14  | -0.118509 | 14   | -0.216409 |

| OC.D |           | OC.F |           | PA.D |           | PA.F |           |
|------|-----------|------|-----------|------|-----------|------|-----------|
| 0    | 16.203545 | 0    | 18.378048 | 0    | 37.518146 | 0    | 39.667291 |
| 1    | 2.473271  | 1    | 2.448939  | 1    | 2.221550  | 1    | 2.114872  |
| 2    | -2.618637 | 2    | -2.632625 | 2    | -2.941383 | 2    | -2.909284 |
| 3    | -2.865128 | 3    | -2.884518 | 3    | -2.283852 | 3    | -2.095295 |
| 4    | -1.039704 | 4    | -1.023374 | 4    | -0.731944 | 4    | -0.685945 |
| 5    | 0.064296  | 5    | 0.026615  | 5    | -1.106611 | 5    | -1.056456 |
| 6    | 1.936501  | 6    | 1.881218  | 6    | 1.883662  | 6    | 1.763165  |
| 7    | -0.121402 | 7    | 0.182421  | 7    | 2.238290  | 7    | 1.723597  |
| 8    | -1.990534 | 8    | -1.715112 | 8    | -2.426329 | 8    | -2.365436 |
| 9    | 2.989029  | 9    | 2.536978  | 9    | -0.247882 | 9    | 0.432965  |
| 10   | 4.430524  | 10   | 3.978816  | 10   | 4.895016  | 10   | 4.868624  |
| 11   | -3.201334 | 11   | -2.910621 | 11   | -0.796037 | 11   | -1.202755 |
| 12   | -4.261958 | 12   | -3.948640 | 12   | -4.222821 | 12   | -4.168168 |
| 13   | 1.021258  | 13   | 0.949343  | 13   | 0.303399  | 13   | 0.400928  |
| 14   | 1.375949  | 14   | 1.294223  | 14   | 1.228865  | 14   | 1.199239  |

TO = O CORRESPOND AU O JANVIER 1988 à O H SOIT LA DATE JULIENNE 2447160.5

| AN 1988 SATELLITE 2 |           |      |           | P = 3.5540942 JOURS TO = O.O DT = 366.JOURS |            |      |            |
|---------------------|-----------|------|-----------|---|------------|------|------------|
| EC.D                |           | EC.F |           | OM.D  |            | OM.F |            |
| 0                   | 13.503642 | 0    | 15.769513 | 0   | 55.810950  | 0    | 58.068763  |
| 1                   | -0.411303 | 1    | -0.429763 | 1   | 0.567786   | 1    | 0.522923   |
| 2                   | -1.046925 | 2    | -0.951054 | 2   | 0.122811   | 2    | 0.161565   |
| 3                   | 0.585587  | 3    | 0.630310  | 3   | -0.980701  | 3    | -0.816620  |
| 4                   | 0.536931  | 4    | 0.347689  | 4   | 0.880079   | 4    | 0.850118   |
| 5                   | 1.593149  | 5    | 1.491911  | 5   | 3.726660   | 5    | 4.015907   |
| 6                   | -0.883686 | 6    | 0.041208  | 6   | -4.752811  | 6    | -3.746410  |
| 7                   | -6.314939 | 7    | -6.129755 | 7   | -10.028142 | 7    | -11.648726 |
| 8                   | 4.098404  | 8    | 1.748929  | 8   | 10.269234  | 8    | 6.420820   |
| 9                   | 10.741843 | 9    | 10.563542 | 9   | 15.100262  | 9    | 17.662732  |
| 10                  | -7.498619 | 10   | -4.341862 | 10  | -11.000845 | 10   | -4.839925  |
| 11                  | -8.623815 | 11   | -8.559058 | 11  | -11.350654 | 11   | -13.232852 |
| 12                  | 5.890840  | 12   | 3.744215  | 12  | 5.703313   | 12   | 1.099529   |
| 13                  | 2.630800  | 13   | 2.631652  | 13  | 3.324985   | 13   | 3.866265   |
| 14                  | -1.682274 | 14   | -1.100548 | 14  | -1.125298  | 14   | 0.198420   |

| OC.D |            | OC.F |            | PA.D |            | PA.F |            |
|------|------------|------|------------|------|------------|------|------------|
| 0    | 15.379110  | 0    | 17.659738  | 0    | 57.724404  | 0    | 59.999762  |
| 1    | 4.407705   | 1    | 4.245276   | 1    | 5.597919   | 1    | 5.401720   |
| 2    | -5.935641  | 2    | -5.766826  | 2    | -4.771532  | 2    | -4.690930  |
| 3    | -4.407435  | 3    | -4.485884  | 3    | -6.930911  | 3    | -6.861698  |
| 4    | -1.119822  | 4    | -1.501162  | 4    | -0.841482  | 4    | -1.096248  |
| 5    | -0.086679  | 5    | -0.096531  | 5    | 2.777667   | 5    | 3.224529   |
| 6    | -0.243515  | 6    | 0.648622   | 6    | -2.721231  | 6    | -1.514456  |
| 7    | -4.448469  | 7    | -3.711442  | 7    | -7.242535  | 7    | -8.655256  |
| 8    | 8.567921   | 8    | 7.192717   | 8    | 10.475579  | 8    | 7.177528   |
| 9    | 14.099607  | 9    | 13.189656  | 9    | 16.275158  | 9    | 18.670839  |
| 10   | -10.699902 | 10   | -9.167300  | 10   | -8.516335  | 10   | -3.495182  |
| 11   | -12.820139 | 11   | -12.418685 | 11   | -13.767241 | 11   | -15.740531 |
| 12   | 6.201897   | 12   | 5.132590   | 12   | 2.426143   | 12   | -1.427584  |
| 13   | 3.935338   | 13   | 3.885653   | 13   | 4.082221   | 13   | 4.696945   |
| 14   | -1.502952  | 14   | -1.187247  | 14   | -0.069553  | 14   | 1.080952   |

TO = O CORRESPOND AU O JANVIER 1988 à O H SOIT LA DATE JULIENNE 2447160.5

AN 1988 SATELLITE 3 P = 7.1663872 JOURS TO = 0.0 DT = 366. JOURS

| EC.D |            | EC.F |            | OM.D |            | OM.F |            |
|------|------------|------|------------|------|------------|------|------------|
| 0    | 52.452135  | 0    | 54.566385  | 0    | 138.567848 | 0    | 140.660693 |
| 1    | 0.492378   | 1    | 0.452051   | 1    | 0.346387   | 1    | 0.253828   |
| 2    | -0.403156  | 2    | -0.211179  | 2    | -0.479747  | 2    | -0.338544  |
| 3    | -0.342857  | 3    | -0.380359  | 3    | 1.124828   | 3    | 1.342328   |
| 4    | 0.528639   | 4    | 0.382920   | 4    | -0.294340  | 4    | -0.091908  |
| 5    | 5.053566   | 5    | 5.288834   | 5    | -8.341544  | 5    | -8.624527  |
| 6    | -2.393357  | 6    | -1.823800  | 6    | 1.204424   | 6    | 0.744597   |
| 7    | -19.367015 | 7    | -20.061299 | 7    | 29.876422  | 7    | 30.367966  |
| 8    | 6.245695   | 8    | 4.947860   | 8    | -2.019717  | 8    | -1.568366  |
| 9    | 34.537890  | 9    | 35.616932  | 9    | -50.082202 | 9    | -51.066623 |
| 10   | -7.687772  | 10   | -6.129425  | 10   | 2.991868   | 10   | 2.766983   |
| 11   | -28.711785 | 11   | -29.539568 | 11   | 39.665527  | 11   | 40.589374  |
| 12   | 4.272253   | 12   | 3.352688   | 12   | -2.701609  | 12   | -2.688744  |
| 13   | 8.980751   | 13   | 9.227166   | 13   | -11.981569 | 13   | -12.287189 |
| 14   | -0.815984  | 14   | -0.608132  | 14   | 0.949704   | 14   | 0.981787   |

| OC.D |            | OC.F |            | PA.D |            | PA.F |            |
|------|------------|------|------------|------|------------|------|------------|
| 0    | 56.294768  | 0    | 58.437277  | 0    | 142.374419 | 0    | 144.497624 |
| 1    | 10.706242  | 1    | 9.990272   | 1    | 10.420129  | 1    | 9.657403   |
| 2    | -10.131192 | 2    | -9.957419  | 2    | -10.288080 | 2    | -10.142278 |
| 3    | -11.954849 | 3    | -11.969786 | 3    | -9.947595  | 3    | -9.729303  |
| 4    | -3.860593  | 4    | -4.425774  | 4    | -3.221672  | 4    | -3.484622  |
| 5    | 4.087891   | 5    | 4.139459   | 5    | -10.773315 | 5    | -11.015162 |
| 6    | 4.003331   | 6    | 5.013850   | 6    | 1.624364   | 6    | 1.165524   |
| 7    | -19.606118 | 7    | -16.921949 | 7    | 33.360981  | 7    | 36.068588  |
| 8    | 1.658515   | 8    | 3.045373   | 8    | 7.187640   | 8    | 11.960346  |
| 9    | 46.955480  | 9    | 42.957515  | 9    | -43.899715 | 9    | -47.503238 |
| 10   | 4.464869   | 10   | 0.391249   | 10   | -2.850205  | 10   | -11.032314 |
| 11   | -41.573620 | 11   | -39.373430 | 11   | 32.078265  | 11   | 33.768590  |
| 12   | -7.613955  | 12   | -4.556900  | 12   | -2.483338  | 12   | 3.061703   |
| 13   | 12.971095  | 13   | 12.545175  | 13   | -9.689142  | 13   | -9.908124  |
| 14   | 2.841666   | 14   | 2.063104   | 14   | 1.360152   | 14   | -0.003173  |

TO = 0 CORRESPOND AU 0 JANVIER 1988 à 0 H SOIT LA DATE JULIENNE 2447160.5

