

# THE CALCULATION OF THE NUTATIONS

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It is well known that the knowledge of precession and nutation is essential for the computation of astronomical coordinates and the comparison of values obtained at different dates. It is therefore important to compute the nutations from the best available observations.

Unfortunately, there are not many long series of reliable observations that can be used for the calculation of the several nutations. Nowadays, we need more accurate values and, therefore, it is fundamental to have observations reduced in an homogeneous way. For this purpose, Commission 19 (Rotation of the Earth) set up a 'Working Group on Pole Coordinates', during the last IAU meeting in 1970 (Vicente, 1972), with the objective of reducing the 70 years of variation of latitude observations done by the International Latitude Service (called the International Polar Motion Service at the present time) that constitute a remarkable set of astronomical data. It is expected to obtain more reliable values for the coordinates of the pole and be able to calculate the nutations.

The Working Group on Pole Coordinates is transferring to punched cards all the observations registered in the original observation books and that involves nearly 2 million cards. This work has been hampered by financial difficulties, but it should be supported by the international astronomical community in order to obtain the best results from so many years of observations, done by international cooperation.

The theoretical researches done in the last decades have shown that the values of the nutations depend on the structure of the Earth (Jeffreys and Vicente, 1957). Lately, the researches done in seismology have resulted in a better knowledge about the structure of the Earth, leading to the setting up of many Earth models due to the availability of computers. This fact has led to the situation where one cannot propose better theoretical values for the nutations because they depend on the model adopted for the structure of the Earth.

In order to avoid such difficulties, the International Union of Geodesy and Geophysics has set up, during the 1971 General Assembly (Vicente, 1973), a committee formed by members of the International Association of Geodesy (IAG) and the International Association of Seismology and Physics of the Earth Interior (IASPEI), denominated 'Standard Earth Model Committee', with the purpose of recommending an Earth model that could be adopted as a standard in any studies that depend on the knowledge of the Earth's structure. This reference model will be important not only for astronomical purposes but also in geodesy and geophysics.

The Standard Earth Model Committee has set up a number of sub-committees

composed by specialists concerned with different layers of the Earth. The reports of these sub-committees will be published in order to be discussed by all scientists interested in these subjects.

### References

- Jeffreys, H. and Vicente, R. O.: 1957, *Monthly Notices Roy Astron. Soc.* **117**, 142.  
Vicente, R. O.: 1972, *Revista Fac. Ciências Lisboa*, **A14**, 5.  
Vicente, R. O.: 1973, *Bull. Geodes.* No. 107, 105.

### DISCUSSION

*Melchior*: The flattening of the core in a reference Earth Model is very important as the difference between the two axes is of the order of 10 km and this fact plays a great role in the theory of nutations.