stars fainter than those of the sixth magnitude—have been able to distinguish the satellites of Jupiter without a telescope. The angular distance of the third and brightest satellite from the center of the planet is 4′ 42″; that of the fourth, which is only one sixth smaller than the largest, is 8′ 16″; and all Jupiter's satellites sometimes exhibit, as Arago maintains,* a more intense light for equal surfaces than

* Arago, in the *Annuaire pour* 1842, p. 284, and in the *Comptes Rendus*, tom. xv., 1842, p. 750. (Schum., *Astron. Nachr.*, No. 702.) "I have instituted some calculations of magnitudes, in reference to your conjectures on the visibility of Jupiter's satellites," writes Dr. Galle, in letters addressed to me, "but I have found, contrary to my expectations, that they are not of the fifth magnitude, but, at most, only of the sixth, or even of the seventh magnitude. The third and brightest satellite alone appeared nearly equal in brightness to a neighboring star of the sixth magnitude, which I could scarcely recognize with the naked eye, even at some distance from Jupiter; so that, considered in reference to the brightness of Jupiter, this satellite would probably be of the fifth or sixth magnitude if it were isolated from the planet. The fourth satellite was at its greatest elongation, but yet I could not estimate it at more than the seventh magnitude. The rays of Jupiter would not prevent this satellite from being seen if it were itself brighter. From a comparison of Aldebaran with the neighboring star θ Tauri, which is easily recognized as a double star (at a distance of 5½ minutes), I should estimate the radiation of Jupiter at five or six minutes, at least, for ordinary vision." These estimates correspond with those of Arago, who is even of opinion that this false radiation may amount in the case of some persons to double this quantity. The mean distances of the four satellites from the center of the main planet are undoubtedly 1′ 51″, 2′ 57″, 4′ 42″, and 8′ 16″. "Si nous supposons que l'image de Jupiter, dans certains yeux exceptionnels, s'épanouisse seulement par des rayons d'une ou deux minutes d'amplitude, il ne semblera pas impossible que les satellites soient de tems en tems aperçus, sans avoir besoin de recourir à l'artifice de l'amplification. Pour vérifier cette conjecture, j'ai fait construire une petite lunette dans laquelle l'objectif et l'oculaire ont a peu près le même foyer, et qui dès lors ne *grossit point*. Cette lunette ne détruit pas entièrement les rayons divergents, mais elle en réduit considèrablement la longueur. Cela a suffi pour qu'un satellite convenablement écarté de la planète, soit devenu visible. Le fait a été constaté par tous les jeunes astronomes de l'Observatoire." "If we suppose that the image of Jupiter appears to the eyes of some persons to be dilated by rays of only one or two minutes, it is not impossible that the satellites may from time to time be seen without the aid of magnifying glasses. In order to verify this conjecture, I caused a small instrument to be constructed in which the object-glass and the eye-piece had nearly the same focus, and which, therefore, did *not magnify*. This instrument does not entirely destroy the diverging rays, although it considerably reduces their length. This method has sufficed to render a satellite visible when at a sufficient distance from the planet. This observation has been confirmed by all the young astronomers at the Observatory." (Arago, in the *Comptes Rendus*, tom. xv., 1842, p. 751.)