

<https://www.observatoiredeparis.psl.eu/jules-janssen-s-photographic-revolver.html>



Jules Janssen's photographic revolver

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astrophysique

The astrophysicist Jules Janssen suggested the use of photography as a way to improve the observations of the solar transits of Venus. The revolver enables one to take a series of successive photographs.

In 1873, Jules Janssen (1824-1907) presented to the Commission for Venusian solar transits, his « revolver method » for solving in an objective and permanent way the difficult problem of determining the exact moment of contact of the planet Venus with the solar disc. In effect, the accuracy with which can be determined the moment of transit, measured in different places on the Earth, is directly related to the accuracy with which can be known the mean distance of the Earth from the centre of the Sun.

Taking photographs automatically

After the failure of earlier visual observations, the idea was to make an automatic system, which would register a series of 48 successive pictures on an annular photographic plate, together with the exact time of the first image.



Janssen's photographic revolver - Deschiens

Rédier father and son.

Since the instrument made by Deschiens was not satisfactory, Janssen asked Redier father and son to make a new device : while the platform carrying the annular daguerreotype turns through 1/48 of a complete circuit, then stops to

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take the picture, the disc which carries 12 radial shutter slits (regularly spaced and with adjustable widths) turns continuously four times more rapidly. Thus, while the photographic plate has gone through a complete circle (in 72 seconds), the « shutter » disc will have gone through four. Janssen was able to test this instrument to his satisfaction, and he took it in 1874 to Japan.

The 1874 transit of Venus

In England, as soon as he heard about the project, the « Astronomer Royal » Airy had built instruments of the same type, called the « Janssen », and with which all the British expeditions were equipped.

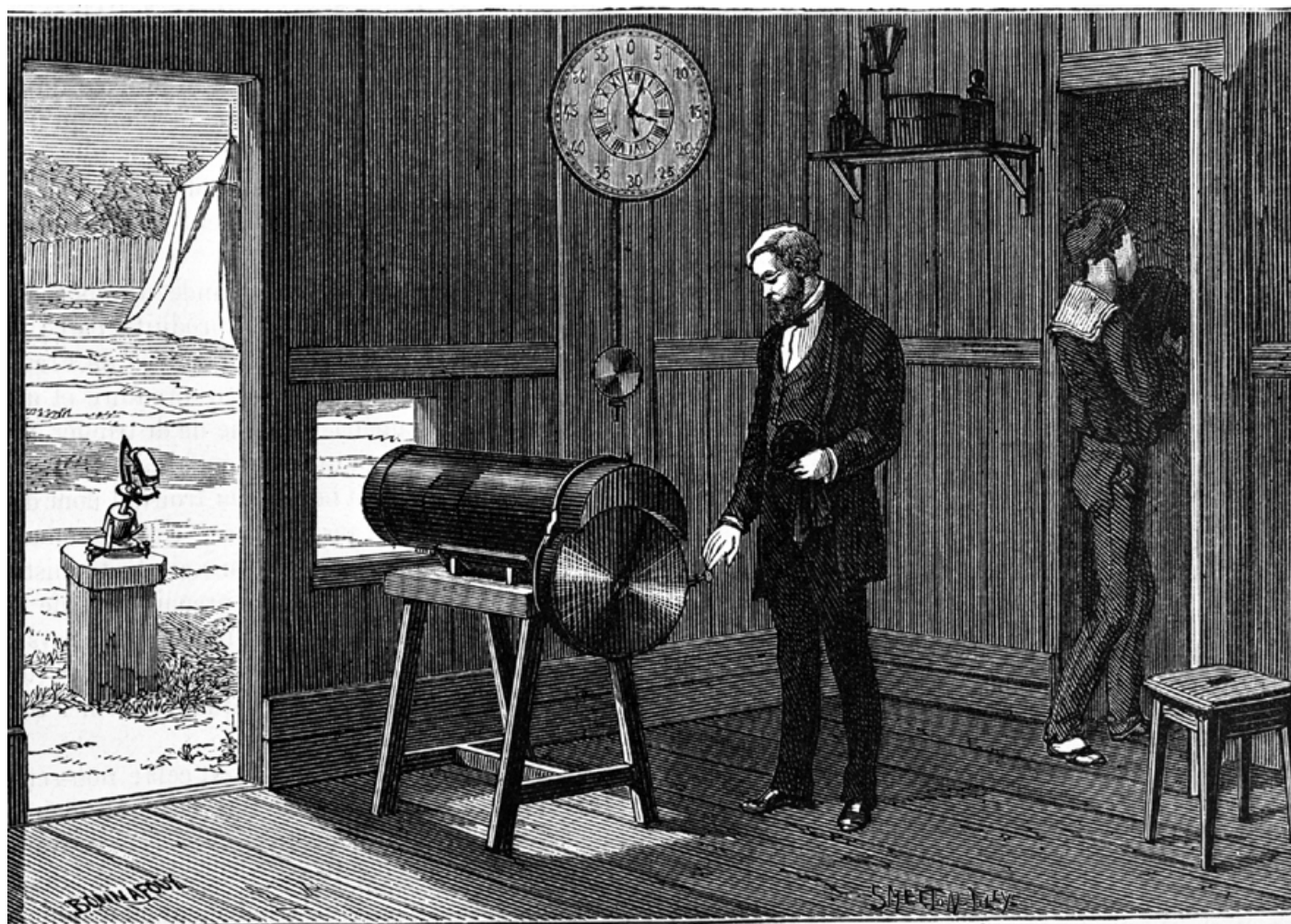


Fig. 5. — Revolver photographique de M. Janssen. — Vue de l'appareil en fonctionnement pendant le passage de Vénus.

Janssen's photographic revolver : picture taken during the 1874 solar transit of Venus

La Nature - vol. 3, 1875.

Even though the results of classical photography and those obtained using the eight or so revolvers working in 1874, were disappointing, Janssen (for whom the Physical Astronomy Observatory of Paris, situated in Meudon, had been

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created the preceding year), Janssen had nevertheless designed and created the first cinematographic camera.

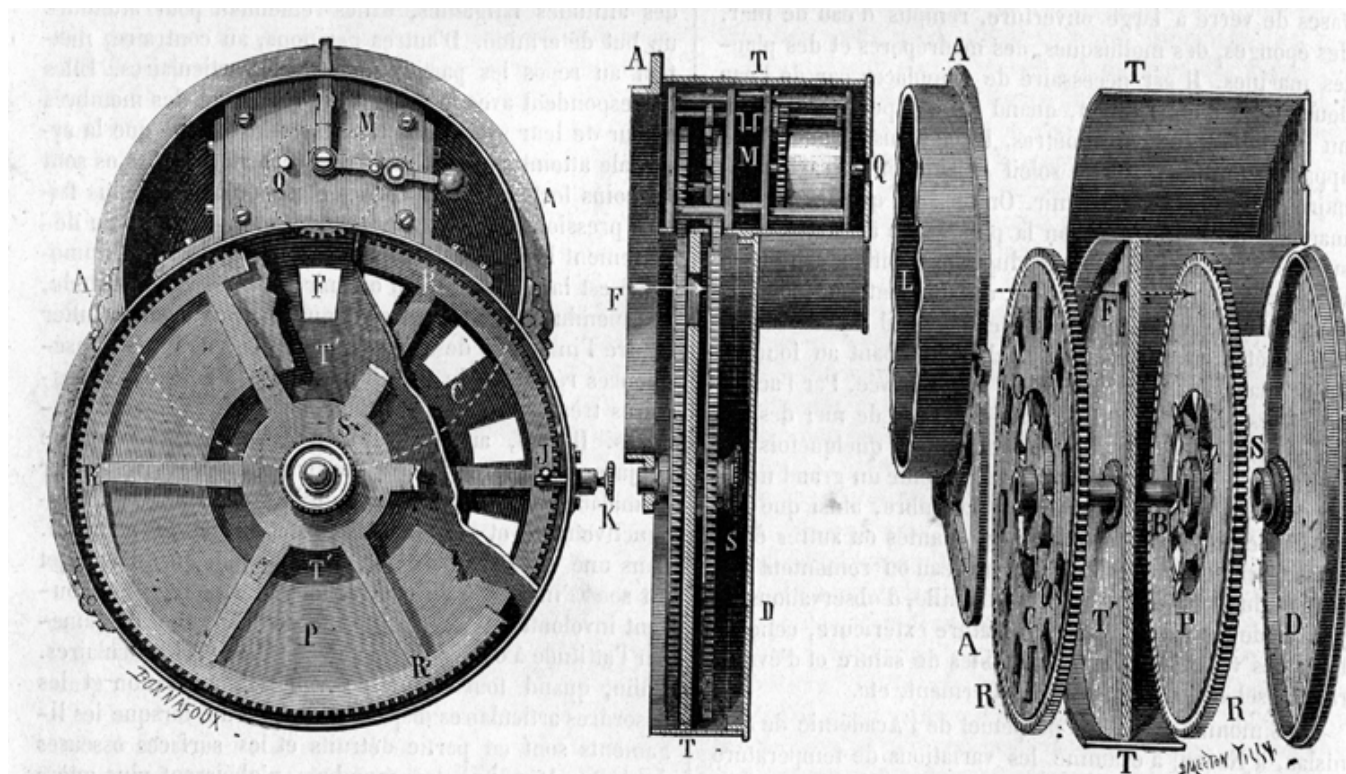


Fig. 1.

Fig. 2.

Fig. 3.

Appareil photographique de M. Janssen (revolver).

Fig. 1. Plaque photographique P. — Fig. 2. Coupe et profil. — Fig. 3. Détails des pièces séparées.

Exploded view of Janssen's photographic revolver

La Nature - vol. 3, 1875.