of the young Cassia leaves were far from coming into contact (see in Hothouse). The terminal pair & even penultimate pair of young leaflets turned not only downwards but at a considerable angle backwards towards the base of the compound leaf. The whole compound leaf at 8.20 p.m. stood at an angle of 36° with the perpendicular, & next morning at 9h.45m a.m in my study this same leaf stood at 52°½ with the perpendicular: it had therefore risen 16°½ in the act of going to sleep, the rising (with gradual limits &c.) having been conspicuous to the eye.

Cassia (4

The main petioles are arched (does arc change during sleep?) & I measured angles of a line from point of main petiole with axis to the point of terminal leaflets. — By the 12° on the 30° in the above main petiole had sunk a little more than (viz 6° ~~64½°~~) i.e. to 64°.

I felt so much surprised that Morren on Leaves mentions [?] was not for petioles being sleepy, that I syringed on 30th at 12° the 3 young upper leaflets for 2m (placing plant out of doors in middle of window) with water at 64°, (except the tips of ...) & within 1 hr afterwards measured the inclination of several leaflets, which before had all been horizontal, (as explained in p. 1)

The leaflets were sloped at various angles between 45° & 56° to the horizon: from edge of one leaflet they are hung most downwards than 45°, & the edge of other

The older leaves were not syringed

The terminal & penultimate were much more inclined, (as in sleep) & were inclined at a considerably higher angle than 56° to horizon —

Cassia

being moved down their angle of ~~34~~ 56°.

The main petiole about 1 in. below which it before (viz at 12°) had stood with perpendicular at ~~an~~ angle of 58°½, after the syringing stood at 64° (& so remained until 1° 25') & had therefore become depressed 5°½ (too little to be certain about). In appearance the leaves had become considerably depressed; I think they became more bowed? The upper surface of the leaflets was much spotted with wet, but dots on wetted (Bloom?) the lower surface was dry partly from the Bloom; & then lower surface was wholly syringed, as I syringed obliquely — They were utterly got much wet in the oblique position.

Old fairly sharp, when one on grey leaves, & others

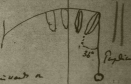
(a) scarcely more wetted, better with petioles on upper surface of main petioles

(a) Can the fluid act as gum or as a hyaloid secretion — In ch. to the leaves, as far as I saw the gland dry & blackened, & the tentacles on the leaves only turned thro' 90°. —

The sponge was finished at 12° 18m. at 12° 46' to the leaflets began to bend up 10 m. to which they to move nearly horizontal – at 1° 20' most of the leaflets were horizontal, but some still considerably inclined.

Nov. 30th 8° 45' P.M. Measured angle between of divergence of 2 upmost leaflets on each – & it was 50° – i.e. 4 less than last night in y. sleep.)

I measured angle from the perpendicular of 2 terminal or 2 subterminal leaves & found one (red wool) & an angle of 36°. & the other (white wool) of 14° turned inwards or to base of leaf – In the day, 2 terminals or 2 terminal leaflets are directed much forward.



14½ hr

Red wool left

(see next page)

Cassia

Dec 1 1873 12°. Finish for the younger leaf at base of last page (Red wool), the divergence of the midribs of the 2 terminal leaflets was now 84°, so that each diverged from the prolonged line of the midrib 42°, or 48° from a line at right angles to the midrib; & as last night the midrib (pinnule) was 36° from the perpendicular, it must have moved 84° backwards from its position during the day, neglecting the downward movement. The midribs of the next pair diverged at 144°, & there bend a little backwards at night. The midrib of the 3rd leaflet formed a straight line.

Turning now to the next older leaf (white wool) the divergences of the terminal leaflets was 74°, & on the same principle

Copia (18

as before, it must have moved backwards 51°. The divergence of the midribs of the next pair was 138°. The midribs of the 3rd pair in a straight line.

It is clear that if the terminal & penultimate leaflets merely twisted on their axes & simply became depressed during sleep, ~~their midribs wd occupy the same position~~ the divergence of their midribs wd be the same as in the day; but we have seen how the case is.

Shook the plant for exactly 1 minute in hothouse; & leaflets were then somewhat twisted. [Judging from 2 leaves brought from Eliz., cutting them off causes the leaflets to become vertical, & it might be want to sleep in ordinary position, but the kept by standing in water never resumed horizontal position; nor did putting in water at 95° cause it to expand

Dec 1. 12.30 There are only small drops on tops of the glands, & the sub-petioles not at all wet. I put a little scraped indigo & vermillion on the summits of 2 glands on diff^ts leaves, (viz on leaf with red wool & with thread) [illegible]. Dec. 2^d [illegible] sub-petioles, [illegible] along channelled main petiole.— My [illegible] on [illegible] leaf with thread, [illegible] pairs with no glands [illegible] ; so with leaves from [illegible] moved at night...]

[Dec. 27. at [illegible]° [illegible] brought plant from Greenhouse & shook it intentionally, [illegible] jarring for 2^m; leaflets were dropped [illegible] at end of journey.— Before starting I measured angle of main petiole of younger leaf (red thread) with the perpendicular & it was 73° & so it was after the journey.— A second leaf, with white wool (third leaf on axis) had angle before journey of 82½° & after journey of 71°, so it had fallen 8°½; which is contrary movement to sleep movement of main petiole. [illegible] with both leaves the main petiole seemed, after [illegible] [illegible] the journey the other, [illegible] (See Back)