llth June 1960 P.O. Box 2 Green Bank West Virginia, U.S.A.

Dr. R. L. Jones Physical Laboratory D. S. I. R. Lower Hutt, New Zealand

Dear Dr. Jones:

Your article in Nature, 12th March 1960 interests me greatly. I have been performing a rather different experiment onbean vines and hope to have some results soon. There are very few people actively doing work on twining vines. Some time ago I searched the literature and came across the following references which may interest you.

"Klinostat-studies in Twining Vines", H. V. Hendricks, American Journal of Botony, Vol 27, p 195-198, March 1940

"Torsion Studies in Twining Vines", H. V. Hendricks, Botonical Gazette, Vol **36**, ph25-hhl, December 1919 " Vol 75, p282-297, May 1923

If you have references to other articles where people manipulated the vines and studied the results, I would much appreciate receiving same.

Sincerely yours, Grote Reber

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Dr. R.L. Jones Physical Laboratory D,S,I,R, Lower Hutt, New Zealand Dear Dr. Sonk: Your anticle in Nature, 12 the March 1960 interests me very much. I have been performing a rather different experiment on beau vines and hope to have some results soon. There are very few people actively doined work on twining plants. Some time ago I searched the literature and came across the following references which may interest your. "Klinostat-studies in twining vines", H. V. Hendrichs, american Sound of Bolony, Vol 27, p. 195-8, March 1990. "Torsion Studies in Twining Plants", H.V. Hendricks Botonical Gozette, Vol 68, p 425-490, Dec 1919 and " ", Vol 75, p 282-297, May 1923 I you have references to other articles where people wanipulated the vines and studied the results, I would much appreciate receiving sauce. Sincerely yours, Grote Reber

were branchered at an saily at age of reaction to anti- cloiling fixed riche bighting with timeston hour that had antic which wore twind clockwise began to twine but bat that during antics and some beause of our due to twine but bat these rotated autre bolissies at our ravolution por dangemender supporte when growing plante and these supports were auticledurise wou found not to turne on our their were as healthing and twiced as at allower ones. NAN clo clawise showed, ofter two-or shore dans, a hors of tworking in some of the house, which is bound and died as the experiment continued. Hanks humed out clocking top habitudes planta which were will to note the In rubelled danfledet, or in artificial . moronom turning of plante, the witted rowelds are beined reported. auticlos purse direction strundette growth. Us the is clotherier when weened from about interfits growith, dang. The sum the suggest more was not allow, a rectain which The runder anggest that the plants word and about a voitred avrie at a rate of our swoowhen pur and humidely have been turned continuously Laupudur uge Plufued Laboreous fred conductions of haded Ressound of Grywwey Hants to a l Physicology 1340 month 51

understand experiment the mouse of the cloilewice interest of the cloilewice interest of the cloilewice of the cloilewic " 2'St many " 9'St many " 9'8 - 7'S' anticlotherise humidelle to 1 parant. In successive experiments the longthe of of themetables to our clockourse and anticlochourse rotations. About the humperature was contracted to ? C and relative hadding per holder) were broughoud to a complete duck, controlled chinete cabinet provided with a suitable set to with at 5°C for 48 hours. The seld was the source disk, groove side down, on more but seld and sold was disk, gerninded and hild it 20°C in doubies. Each holder and disk, gerninded selding word troughouted on to 9 in diameter propolog movement that showed partial or full alcourance.

Response of Growing Plants to a Uniform Daily Rotation

PLANTS under various fixed conditions of light, temperature, and humidity have been turned continuously about a vertical axis at the rate of one revolution a day. The results suggest that the plants used are sensitive to the direction of rotation; a rotation which is clockwise when viewed from above inhibits growth, anti-clockwise direction stimulates growth. As the finding may be useful background to a study of the twining of plants, the initial results are being reported.

Cyclamen. In subdued daylight, or in artificial top lighting, plants which were made to rotate clockwise showed, after two or three days, a loss of turgidity in some of the leaves, which yellowed and died as the experiment continued. Plants turned anti-clockwise were as healthy and turgid as stationary ones.

Scarlet Runner Beans. Beans which normally twine anti-clockwise were found not to twine around their supports when growing plants and their supports were rotated anti-clockwise at one revolution a day under fixed side-lighting with tungsten lamps. Plants which were turned clockwise began to twine but lost turgidity, and some leaves yellowed and died. When these plants were transferred at an early stage of reaction to anti-clockwise movement they showed partial or full recovery.

Oats. Husked oats (variety Milford), were prechilled in tap-water at 5° C. for 48 hr. The seed was then sown, groove side down, on moist filter paper in a covered dish, and held at 20° C. in darkness. After 24 hr., germinated seedlings were transplanted on to 4-in. diameter perforated plastic holders over tapwater. Each holder and dish (48 seedlings per holder) was transferred to a completely dark, controlled-climate cabinet provided with a suitable set of turntables to give clockwise and anti-clockwise rotations. Cabinet temperature was controlled to 1° C. and relative humidity to 1 per cent. In successive experiments the controlled temperatures ranged from 25° C. to 28° C. and the relative humidity 85–95 per cent. After 5 days, the lengths of coleoptiles and roots were measured. In every experiment the mean lengths under each treatment were expressed as a percentage deviation from the mean of the stationary plants. The average deviations throughout nine experiments were as follows:

Clockwise	Coleoptiles	- 6.1 per cent
Anti-clockwise	Boots Coleontiles	-8.6
	Roots	+10.2 ,

In individual experiments the means of the clockwise-rotated sets of plants were always smaller than those of the stationary, and the anti-clockwise in all cases larger (for example, for coleoptiles— clockwise $42 \cdot 7 \pm 0.8$ mm., stationary $46 \cdot 3 \pm 0.7$ mm., anti-clockwise $48 \cdot 2 \pm 0.9$ mm.). The subject of diurnal rhythms as affecting the above is being considered

above is being considered.

R. L. JONES

Dominion Physical Laboratory, Department of Scientific and Industrial Research, Lower Hutt, New Zealand.

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