

servations, pp. 468-474, will see that these co-ordinated values form a curve instead of a straight line."

I felt much surprise at reading this statement, because if the observations agree with the central cubic (2), they must agree with any transformation of equation (2).

I now give the values of $\frac{n}{f}$ and nt and diagrams, comparing them with equation (3), an inspection of which will show that Mr. Nipher is in error in saying "that these co-ordinated values form a curve instead of a straight line." Anyone accustomed to such observations will see that they do *not* form a curve, but deviate *irregularly* as all observations do, above and below the "straight line," which is the true "curve" that represents them.

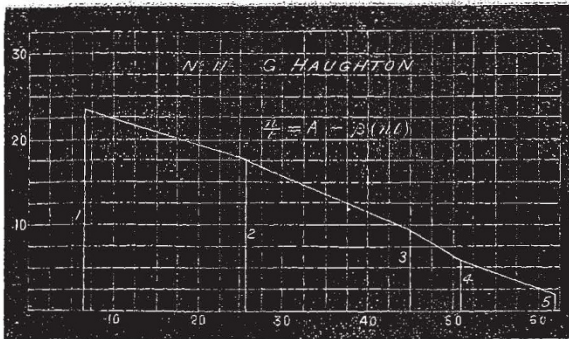
No. 1.—*Dr. Macalister's Experiments* ("Animal Mechanics," p. 468).

| No. | nt | $\frac{n}{f}$ |
|-----|--------|---------------|
| 1 | 23.40 | 55.4 |
| 2 | 29.25 | 52.1 |
| 3 | 60.18 | 43.2 |
| 4 | 72.38 | 36.9 |
| 5 | 106.00 | 26.5 |
| 6 | 126.38 | 15.6 |
| 7 | 139.10 | 10.2 |
| 8 | 139.97 | 5.4 |

The accompanying diagram (No. 1) shows these values plotted, and the right line which represents them all except No. 8, which falls too much below the line.

No. 2.—*Mr. Gilbert Haughton's Experiments* (p. 474).

| No. | nt | $\frac{n}{f}$ |
|-----|-------|---------------|
| 1 | 6.89 | 24.5 |
| 2 | 25.58 | 18.1 |
| 3 | 44.94 | 9.8 |
| 4 | 51.00 | 5.7 |
| 5 | 61.20 | 1.7 |



The accompanying diagram (No. 2) shows that these observations also may fairly be represented by a straight line.

Trinity College, Dublin, SAMUEL HAUGHTON
March 13

(To be continued.)

The "Wolf" in the Violoncello

As the question asked by Mr. Fryer in your issue of the 25th of March (p. 406) remains unanswered, allow me to suggest what has been brought prominently before me in some recent experiments.

The "wolf" of which he speaks occurs in all instruments of the violin family, and not only in the violoncello; indeed, it is present even in fine specimens by the great masters. It is perfectly true that it depends on the resonant case of the instrument itself, as can easily be shown in the way he suggests; a "false string" is soon detected and remedied by any player.

No doubt it indicates that the consonating box has the power of reinforcing certain vibrations, but not others; and even of stifling some by interference. Curious facts on this topic have recently been brought before a foreign scientific society, which show that the acquired power of consonance depends on a molecular change in the material of which the instrument is made, that it can be increased by steady and good playing, that it is to be detected even in brass instruments like the trumpet. It has long been known that a violin deteriorates in the hands of a bad performer. But there is an obvious cause of weakness in all fiddles which seems to me to have hardly attracted sufficient attention; I mean the two "sound-holes" in the belly. These *f*-shaped apertures, which are doubtless needful to allow escape of aerial vibrations, cut the grain of the wood completely across in a most important part. Every connoisseur pays particular attention to the straightness and regularity of grain; indeed, blocks of wood well matched in this respect, from which two similar sides might be cut, have been handed down in workshops as of inestimable value. Wheatstone's well-known experiment of the Telephonic Concert proves how perfectly musical tones can be conveyed along the fibres of pine-wood to a considerable distance. These considerations led me recently to submit the point to the test of trial. What I have elsewhere termed "elliptical tension bars" are simply four longitudinal struts of light pine glued to the back of the belly, intercepting the sound-holes. They have the effect of removing the "wolf"; sometimes entirely, nearly always to a marked extent. No doubt they also act by strengthening the fabric exactly in the line in which the string pulls. The pull, which is considerable even in a state of rest, increases enormously when it is moved slightly out of its position of quiescence, for well-known mechanical reasons; and hence, besides the removal of the "wolf," there is gained by means of the bars a decided increase of power and tone.

The "elliptical" form was adopted because it is found to give considerable resistance with small amounts of material. Anything which rendered the belly of the fiddle heavy would perform the function of the "mute" as now commonly applied to the bridge, but which can be, and often is, replaced by a penny or a half-crown wedged between the strings below the said bridge. The great rigidity and low specific gravity of dry pine-wood meet the two requirements: the whole mass added does not exceed twenty or thirty grains.

Musicians are slow to adopt theoretical improvements, and dealers in violins cannot be expected to favour anything which puts a one and ninepenny fiddle more nearly on a level with a Stradivarius than it was; but I am honestly of opinion that the system is of value. I must, however, protest against its being prejudiced by the unsuccess of imitators or of previous efforts. Something of the sort has often been tried before, and it was only after long and laborious experiment that this particular attempt gave good results. By these, and in due time, I am content to let it be judged.

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W. H. STONE

Flowering of the Hazel

THE question whether the male and female flowers of the hazel mature simultaneously on the same bush has been already discussed in your columns (NATURE, vol. i. p. 583, vol. iii. pp. 347, 509). A repetition of the observations this spring has enabled me to confirm my previous statement that this is the case, at all events very frequently; in fact, almost invariably in all the cases that have come under my notice. As this is in direct opposition to the statements of several of your correspondents, especially one resident in Kentucky, who affirms that the hazel, though apparently monoecious, is practically dioecious, it would be interesting if we had further information as to the circumstances under which these varying conditions occur. On the present occasion the male and female flowers were found in close contiguity and both in a mature condition at the close of a remarkably protracted cold and dry season, at an unusually late period, the last week in March.

ALFRED W. BENNETT

A Flint Celt

ON Tue-day last, the 6th inst., I found on the west shore of this bay a very fine specimen of a flint celt, quite perfect. The cliff in the immediate vicinity is composed of fluviatile clays, capped with a thin bed of Bembridge limestone, in a very broken state: the vegetable soil resting on the latter is only from five to ten inches deep. Perhaps it may interest some of your readers if you do me the favour to notice this. It is rather remarkable