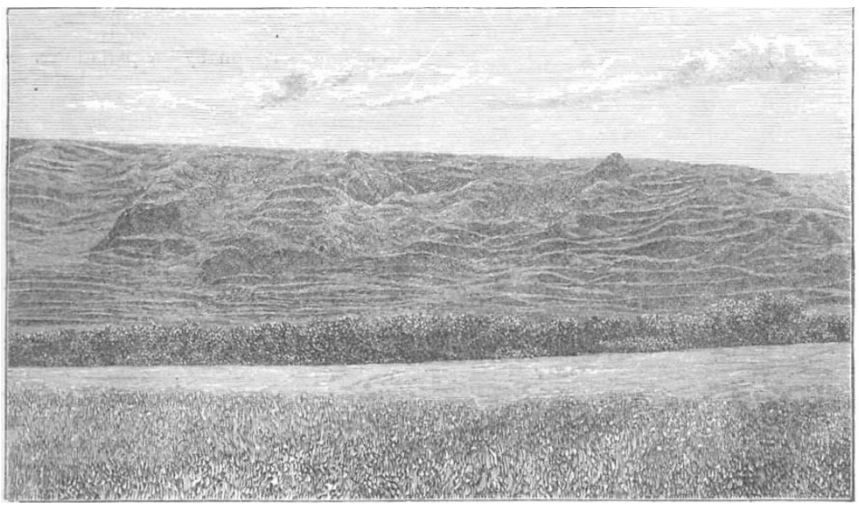
The Formation of Ledges on Hill-sides.

IN NATURE for February 28, Mr. Ernst draws attention to the formation of these ledges as observed by himself in Caracas. They are probably to be found in many places, if carefully looked for. The following diagram, taken from a photograph, illustrates one of the most striking instances I know, to be found near Ballantrae, on the Ballantrae–Girvan road, Ayrshire. The ledges, which are very numerous and fairly regular, occur on the western face of a series of low hills, very near to the sea-shore.



detrital mounds below the ledges at the foot of each slope. These, however, do not occur, and the soil meets the narrow strip of plain with surprising angular sharpness.

It seems clear that the ledges owe their origin to the action of rain-water, which would naturally penetrate below the surface covering of grass, and dissolve with comparative rapidity portions of the porous soil below. The grass layer would eventually have nothing to support it in places, and would collapse to a lower level. The effect of collapse, supposing the layer to hold together, would necessarily be a wrinkle or ledge at right angles to the ground slope. EDMUND J. MILLS.

Glasgow, March 4.

Weight, Mass, and Force.

IF Mr. Gray, as in his teaching he no doubt unconsciously often does, will always say "force of a pound" instead of "weight of a pound" when he wishes to express the force of attraction of the Earth on a pound weight, there will be no divergence between his theoretical instruction and the language of practical men and of every-day life.

But to the majority the expression "weight of a pound" will always call up the mental picture of a "pound weight," so that the idea of the mass of a pound and of the force with which it is attracted by the earth cannot be dissociated in the use of the word "weight."

Supposing, however, we accept the definition of the "weight of a body" as never meaning anything else than the "force with which the earth attracts the body," how are we to interpret "the weight of the Sun, of the Moon, of Jupiter, &c.," and what is the "weight of the Earth?"

As Mr. Gray declines my previous challenge, will he condescend to point out the fallacy in the following argument? "The weight of the Moon being the force with which the Moon is attracted by the Earth, *ergo*, by the law that Action and Reaction are equal and opposite, the weight of the Earth is equal to the weight of the Moon."

With our present system of instruction in elementary theoretical dynamics we run the risk of wasting our time on a mechanics which is as unreal as is the mediæval Greek grammar taught in our schools, a grammar that was never vernacular even in the palmiest days of Attic literature.

The subsoil is thin and open. The angle of slope ranges from perhaps 30° to 60°, seldom higher. Where the angle is much higher, the soil slips away bodily, and the grass with it, leaving a bare space; indeed, at one point of the road the precipitated soil forms readily visible mounds at the base of the cliff.

The whole locality is very unfavourable to earthworms, and I agree with Mr. Ernst that the earthworm theory must, as far as any practical effect is concerned, be surrendered.

On the other hand, had the ridges been due to anything like glacier action, as Mr. Ernst suggests, I should have expected

The warning note in the introduction to "Numerical Examples in Practical Mechanics," by R. G. Blaine, is well timed and deserves careful attention. A. G. GREENHILL.

The Inheritance of Acquired Characters.

A VERY strong *a priori* objection to the line on which most experiments on the inheritance of acquired characters are carried on is the following. These experiments involve mutilation; and a tendency to transmit characters so produced would, considering that every accident or fight produces some slight mutilation, involve the animals in a process of degeneration. Hence the tendency to transmit the characters acquired *by mutilation* would be constantly bred out by natural selection. But a tendency to transmit characters acquired *by habit* in youth rests on quite another basis, and would tend to the conservation of the race.

I do not know if observations have been made on the physique of the offspring of persons engaged in trades where apprenticeship begins before puberty: they would be most valuable.

But the following case seems to me to be thoroughly to the point. A. B. is moderately myopic and very astigmatic in the left eye; extremely myopic in the right. As the left eye gave such bad images for near objects, he was compelled in childhood to mask it, and acquired the habit of leaning his head on his left arm for writing, so as to blind that eye; or of resting the left temple and eye on the hand, with the elbow on the table. At the age of fifteen the eyes were equalized by the use of suitable spectacles, and he soon lost the habit completely and permanently. He is now the father of two children—a boy and a girl—whose vision (tested repeatedly and fully) is emmetropic in both eyes, so that they have not inherited the *congenital* optical defect of their father. All the same, they both have inherited his early acquired habit, and need constant watchfulness to prevent their hiding the left eye, when writing, by resting the head on the left fore-arm or hand. Imitation is here quite out of the question.

Considering that every habit involves changes in the proportional development of the muscular and osseous systems, and hence, probably, of the nervous system also, the importance of inherited habits, natural or acquired, cannot be