

quite apart from the earth's rotation the force of gravity impelling a body to the ground is not correctly measured by the rate of change of momentum relative to the earth. Though the neglect of the mass of the body itself, compared with that of the earth, may not lead to serious contradictions in this particular instance, the definition is wrong in principle unless absolute momentum be meant, or unless it be specified that the momentum has to be taken relative to some body unacted on by any forces.

For our definition of force we shall have to return to Newton, and I may have to trouble you with a further communication to justify my belief that though modern criticism has been able to point out the weak spots of the Newtonian system, it has failed to substitute any more secure or more logical basis for our foundation of mechanics.

ARTHUR SCHUSTER.

#### The Diffusion of Solids.

IN view of the interest attaching to the vapourisation and diffusion of solids, the following observations may be worthy of record.

On the inside of the case of a silver watch between forty and fifty years old, and opposite the steel pin of the key-hole, a diffused, dark patch, larger than the key-hole itself, was noticed. When a drop of strong hydrochloric acid was placed on the spot, bubbles of gas were evolved, and the colour gradually became lighter, though after ten minutes, when action had apparently ceased, the patch was still plainly marked. On adding a drop of potassium ferrocyanide solution the blue precipitate due to iron was formed. Similar results have been obtained with other old watches. Since it was shown that the iron was not in contact with the silver, the facts indicate that the iron, or possibly some compounds of iron contained in it, vaporises, dissolves in the silver, and penetrates for some distance into the latter by diffusion.

Prof. F. D. Brown has observed an effect of similar nature. On a porcelain writing tablet were notes written in blacklead perhaps forty years ago. While recent writing is easily removed, these marks can no longer be defaced in any way by washing or mere surface scratching, showing that the carbon has penetrated into the porcelain no inconsiderable distance. That this should have taken place in the case of two such refractory solids as carbon and porcelain is all the more remarkable.

JOHN H. HOWELL.

Grammar School, Auckland, N.Z., February 4.

#### Earth Tremors in India.

IN connection with the short description of the Kangra earthquake, and the reference to the still greater earthquake of 1897, contained in NATURE of March 1, p. 418, it may be of interest to note that, at a distance of about twelve miles from the point that was supposed to be the centre of greatest disturbance in the latter earthquake, tremors were still appreciable, at frequent intervals, in the early part of 1904.

While we were sitting on the verandah of the Government bungalow at Rongmudu, in the Garo Hills, near the point at which the river Somersary changes the direction of its flow from east to south, in the early afternoon of February 10, 1904, my travelling companion, Mr. A. B. Nowell, of Dwarra, Sylhêt, directed my attention to a booming sound like the beating of distant gongs, and at the same time pointed to a glass of water standing on the table in front of us, in which the water was distinctly agitated. The tremor lasted for only ten or fifteen seconds.

Mr. Nowell, who had spent some months of each year in that neighbourhood for several years in succession, informed me that tremors occurred at frequent intervals every day when he first came there, but were getting fainter and less frequent as time went on. Later in the same day he directed my attention to another tremor, but as we were then walking in the jungle I failed to appreciate it. On the following day we travelled many miles southwards, or away from the centre of disturbance, so that I had no further opportunity of observing these phenomena.

W. GALLOWAY.

#### Peculiar Ice Formation.

I SHOULD like to direct attention to a peculiar ice formation which I have noticed during the last week on the moorland area at this place, and I should be glad to know if this phenomenon has been observed elsewhere.

The moorland here is of considerable extent, and at a height of 1000 feet above the sea level. The rocks on the upper surface are of a brittle shale with outcropping sandstone, and on the lower slopes beds of clay and gravel. On March 2 I noticed the surface of the ground for distances of a hundred yards or more raised to a height of from 1 to 2 inches, and supported by ice pillars, which had evidently grown by addition of water from below the surface. The sensation of walking on these patches was somewhat analogous to that observed when walking upon a good pile carpet. The late snows had all melted, but the surface contained much moisture, and there had been a certain amount of frost the previous night. The time was 9.30 a.m., and as I stood there these ice pillars crackled and fell in such order as to give the surface a honey-combed appearance.

I found on examination all the talus slopes in the gullies of the moorland to be covered with the same ice structure. These ice pillars were not very evident until some of the earth had been cleared away, as a thin layer of earth was held up in a very uniform manner on the top of them. I found them perpendicular to the surface, both on the pathway and upon the inclined surfaces in the gullies. Several hours afterwards, when the heat of the sun's rays had melted the ice pillars, the whole surface presented a honeycombed appearance. I only noticed this to have taken place in those areas void of any vegetation whatever, and where the heat would be quickly radiated into the atmosphere. The whole of these areas is now broken up into a very fine titrated soil; if this tendency to superficial vertical ice thrust is at all general, it appears to me to be a great factor in the disintegration of surface soils.

JAMES FOULDS.

Darwen, Lancashire, March 5.

#### Cooperation between Scientific Libraries.

IN connection with the discussion raised by the note on Dr. Muir's paper (p. 372) and Dr. Bather's letter, it may be of interest to note that the Royal Irish Academy, some five years ago, prepared a classified card-catalogue of the scientific serials accessible in various libraries in Dublin, and it is proposed to keep this up to date through the co-operation of the various librarians. This catalogue is always ready for reference by any member or visitor in the academy's reading-room; and it has been of late years the custom for the library committees of various Dublin institutions to inquire, when a new periodical is proposed, as to its possible previous inclusion in one of the other libraries.

GRENVILLE A. J. COLE.

March 10.

#### Sounding Stones.

WITH regard to Mr. Tingle's letter in NATURE of January 4 (p. 222) on sounding stones, it may interest you to know that I have just seen at Pagan, the former capital of Burma, now in ruins, a large log of fossil (or rather silicified) wood, used as a gong. It emits a clear ringing note when struck, and is used, like all pagoda bells or gongs, to direct the attention of the guardian spirits to the offering about to be presented by the pious Buddhist.

O. F. WHEELER CUFFE.

Meiktila Upper Burma, February 11.

#### An Inquiry for Books.

CAN any reader of NATURE direct me to English books on the history of Arabic literature, history of Arabic education, and general sanitation?

G. HAMMAM.

Oriental College, Zahleh, Beirût, Syria, February 24.