

### The Shrinkage of Gelatine.

IN the *Kolloid-Zeitschrift* for August my friend Mr. Emil Hatschek describes some beautiful and symmetrical figures which result from the slow drying and consequent shrinkage of variously shaped blocks of gelatine. A squat cylinder shrinks into a biconcave disc with deeply grooved periphery; a cube becomes a beautiful stellate figure, with apices corresponding to the eight corners of the cube, and with sides which sag in towards a more or less cubical central hollow. The former case shows a striking resemblance to a simple vertebra, such as that of a cartilaginous fish; and it is very curious to see how so simple a phenomenon as shrinkage converts a cylindrical block into the form of an "amphicœlous" vertebra.

For the moment, however, I am less concerned with biological analogies than with what I believe to be a simple general explanation of these "shrinkage-figures." In one of Plateau's experiments, we take two parallel hoops of wire (within certain limits of distance apart), blow a soap-bubble between them, and then gradually exhaust the bubble; we thereby obtain a figure bounded above and below by concave spherical surfaces, and surrounded by a peripheral groove which is a portion of a catenoid. Again, if we dip a skeleton-cube of wire into soap-solution, films run inwards from the twelve sides in such a way that the common edge of three films meets either each corner of a plane quadrilateral fenestra, or each corner of a little central cube; the latter is the more symmetrical figure of the two, but in each case a figure *minimæ areæ* is realised, automatically and instantaneously.

The two gelatine shrinkage-figures which I have mentioned are nothing more nor less than *approximations* to these minimal configurations. The corners and edges of the gelatine block are the first parts to show shrinkage, for here the surface for evaporation has the highest ratio to the content within; thus edges and corners become rigid in comparison with the rest, and form (as it were) a framework for the whole mass. Bounded by this skeletal framework the mass of gelatine shrinks away; and its surfaces tend to realise, slowly and imperfectly, the self-same minimal-surface configurations which the soap-film achieves in immediate perfection. The actual curved surfaces of the shrinking cube are very beautiful: I take them to be conformal transformations between the original plane side of the cube and the square truncated pyramid which the four films on each side bound, as they pass from the outer skeleton to the little central cube; but the full elucidation of these surfaces is a job for the mathematician.

Only in small particulars, easy of explanation, do the actual shrinkage-figures differ from the above description. The shrinking edges and corners are not lines or points but graded areas, and the subsequent form of the curved surfaces is somewhat complicated thereby. Again, while the edges tend to become rigid, they do so imperfectly; they act not precisely as do the wire edges of our skeleton-cube, but rather as these would do were they replaced by threads. That is to say, the edges themselves tend to sag inwards, and do so, doubtless, in circular arcs. A minor point, to which Mr. Hatschek has directed attention, is that at first the sides of the several figures bulge slightly outwards—they show a temporary convexity before they become concave. This is simply due to the fact that the edges of the figure contract perceptibly before the whole volume is materially reduced.

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St. Andrews, October 4.

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### Microseisms associated with the Incidence of the South-west Monsoon.

THE late Dr. Klotz was the first to suggest a relationship between disturbed weather in the North Atlantic and the largest microseismic movements at Ottawa. The microseisms recorded by the Milne-Shaw seismograph at the Colaba Observatory during the burst of the monsoon on the west coast of the Indian Peninsula present many interesting features and indicate the possibilities of a forecast being made of the approaching monsoon at least a week ahead. The seismograph, which is installed in an underground constant temperature room, gives records remarkably free from microseisms during the cold weather period.

Microseismic movements of a type which is quite characteristic of the south-west monsoon period make their first appearance in the seismograms at the end of May with the advance of the monsoon in the south-east Arabian Sea, becoming more and more pronounced as the monsoon currents approach Bombay. They become less marked or disappear during a temporary break in the monsoon and reappear with the strengthening of the currents. This year the first indication of disturbed weather in the south-east Arabian Sea was obtained on May 21, and microseisms of the monsoon type made their first appearance in the Colaba records on the next day; these became more marked on June 2, when the monsoon finally appeared on the Malabar coast with rough seas and heavy rain. Very well-marked microseismic movements were noticed in the record for June 12, on which day Bombay received its first monsoon rainfall.

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### Potential Gradient and Atmospheric Pollution.

RECENT correspondence (*NATURE*, April 5 and June 14) on the connexion between the potential gradient and the degree of pollution of the atmosphere prompts me to put forward a suggestion to explain the alleged influence of a high-tension electric field on plant growth.

It is well known to all workers with high tension that, owing to the fact that the corona discharge takes place more readily from negatively than from positively charged wires, the dust-particles of the surrounding air become negatively charged and are rapidly precipitated upon neutral or positively charged surfaces, the air being thus freed from pollution. Conjoin with this fact the unquestionable deleterious influence of an excessive dust content in the air upon vegetation, as illustrated, for example, in the difficulties of the urban horticulturist as compared with his rural competitor, or in the damage wreaked by a cement-works upon all vegetation in its lee, and we have at least a possible *vera causa* for the beneficial action of the high-tension network.

The conflicting evidence obtained by different observers, and particularly the difference, noted by some, in the effect in dry and wet seasons, would also find a ready explanation in the obvious fact that the greatest benefit would accrue under conditions of maximum atmospheric pollution.

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