lakes, except when the movements were unusually rapid or extensive, the argument from geographical distribution fails; for we have no evidence to show whether rock basins are more or less abundant in regions that have been glaciated, than in those that have not; and seeing, further, that differential movements are known to take place, while it has never been proved that a glacier is physically capable of excavating a rock basin, the *onus probandi* rests with the advocates of the glacial theory; and until they have shown that rock basins are less common in regions that have been glaciated than in those that have not, this argument is not logically admissible. Observations on this point are very desirable, but it must be remembered that filled up lake basins are not the only thing to be looked for; what is desired is evidence of the production of rock basins, or of such differential movements as would have led to their formation, had the erosion of the barrier been less rapid. In the Himalayas such rock basins appear to have been formed in quite as great abundance as in the mountains of Europe, and to correspond with them in position and form; but the elevation of the mountains has been so recent, and the rainfall is so great, that the processes of nature are more rapid than in Europe, and the rock basins have consequently not only been filled up, but the barrier has afterwards in many cases been destroyed, and the deposits largely removed by erosion, so that the fact of their having originally been accumulated in a rock basin is not always easily recognisable.

The one new argument of Dr. Wallace's is that derived from the supposed difference between the outlines of existing lakes and those that would result from the submergence of river valleys. In the selected instances, however, he has compared mountain lakes with submerged lowland valleys instead of with mountain valleys. In the latter, long stretches are frequently found where the slopes of the beds of the side streams are much steeper than that of the main valley; these valleys if submerged would give rise to lakes of great length in comparison with their breadth, and without the numerous deep embayments of the shore line which would be usually found in a submerged lowland valley. As a single easily verified instance to show that a submerged mountain valley need not have numerous deep bays, I may instance the Pangong lake in the Himalayas, which will be found on any good map of India, and is nothing more than a submerged subaërially formed river valley; on a smaller scale the Malwa Tal near Naini Tal and the Pil lake in the hills east of Quetta, both of which are river valleys dammed by landslips, have simple outlines without any embayments. The instances I have chosen are from regions where there has not been a great extension of the glaciers, and where the form of the valley before its submergence was entirely produced by subaërial denudation.

R. D. OLDHAM.

On the Change of Superficial Tension of Solid-Liquid Surfaces with Temperature.

IN a recent very interesting communication to the Birmingham Phil. Soc. (*Bir. Phil. Soc. Proc.*, vol. ix. part 1, 1893), upon the effect of a solid in concentrating a substance out of a solution into the superficial film in accordance with Prof. J. J. Thomson's investigation ("Applications of Dynamics to Physics," p. 191), Dr. Gore has quoted an observation of Pouillet's (*Annales de Chemie*, 1822, vol. xx. pp. 141–162), that when inert powders like silica are mixed with liquids that do not act on them heat is evolved. On the other hand, when the superficial area of contact between a liquid and its gas is increased heat is absorbed. This latter is known to be the case because the superficial tension diminishes with rise of temperature. In the case of the solid-liquid surface being produced, it would appear at first sight to follow that the superficial tension should increase with increased temperature. The matter is, however, somewhat more complicated. When a dry solid is mixed with a liquid we are substituting a solid-liquid surface for a solid-air surface, and from the fact that most liquids soak *up* into a mass of dry powder, we may conclude that the superficial potential energy of the solid-liquid is less than that of the solid-air surface, *i.e.* that more work must be done to separate the liquid from the solid than is developed by the air getting at the solid. *If these actions are reversible*, we may apply the laws of thermodynamics, and conclude that as heat is evolved when the system does work, *i.e.* when the solid-liquid surface is increased, that it must require more work to separate the solid from the liquid at high temperatures than at low ones, and in the case of silica and water, for instance, that is very much what one would expect from the action of water at very high temperatures on silica. If we could assume that the superficial tension of air-solid were zero, it would follow from this that the superficial tension of a solid-liquid surface is negative, *i.e.* that there is a superficial pressure, and that the liquid has more attraction for the solid than for its own particles, and that this difference increases with increased temperature, *i.e.* the superficial pressure increases.

The whole subject deserves careful investigation and quantitative treatment, but the difficulty of measuring the superficial tensions of solid-liquid surfaces seems almost insurmountable, so that it would be very difficult to verify the theory. Perhaps something might be done with finely divided liquids that did not mix, and whose superficial tensions might be measured.

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A Lecture Experiment.

WHEN charcoal, which has been allowed to absorb as much sulphuretted hydrogen as it can take up, is introduced into oxygen gas, the charcoal will burst into flame owing to the energy of the action of the oxygen upon the sulphuretted hydrogen.

This fact is stated in most text-books on chemistry, but no description that I have ever seen of this experiment is calculated to bring about the effect with certainty. The following is a simple method for illustrating this reaction upon the lecture table, which I have never found to fail:—

A few grammes (from five to ten) of powdered charcoal are introduced into a bulb which is blown in the middle of a piece of combustion tube about twenty-five centimetres long. A gentle stream of coal gas is then passed over the charcoal, which is heated by means of a bunsen lamp until it is perfectly dry. This point may be ascertained by allowing the issuing gas to impinge upon a small piece of mirror, and when no further deposition of moisture takes place the charcoal may be considered to be dry, and the heating may be stopped. The charcoal is then allowed to cool in the stream of coal gas until its temperature is so far reduced that the bulb can just be grasped by the hand, when the coal gas is replaced by a stream of sulphuretted hydrogen. The sulphuretted hydrogen should be passed over the charcoal for not less than fifteen minutes, by which time the bulb and its contents will be perfectly cold, and the charcoal will have saturated itself with the gas. (In practice it will be found convenient to prepare the experiment to this stage, and allow a very slow stream of sulphuretted hydrogen to continue passing through the apparatus until the experiment is to be performed.) The supply of sulphuretted hydrogen is then cut off, and a stream of oxygen passed through the tube. Almost immediately the charcoal will become hot, and moisture will be deposited upon the glass. The supply of oxygen should be sufficiently brisk to carry the moisture forward from the charcoal, but not so rapid as to prevent it from condensing on the glass tube beyond the bulb. In a few moments the temperature of the charcoal will rise to the ignition point, when it will inflame and continue to burn in the supply of oxygen. G. S. NEWTH.

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PIERRE JOSEPH VAN BENEDEN.

THIS distinguished Belgian zoologist was born on December 19, 1809, at Malines, in the province of Antwerp, a town once well known for its extensive manufacture of lace. He received an excellent education, and early showed a decided taste for natural history; his native town being built on the borders of a tidal river, his attention was soon called to the examination of the littoral fauna of Belgium, though it will be remembered that Belgium only evolved itself into a kingdom in the year 1830, when Beneden came of age. His first promotion was to the keepership of the Natural History Collections at Louvain, and in 1835 he was made an assistant professor in the University of Gand, a post which he appears to have held for only one Term, as we find him in the same