

maintained at a temperature of 251° (which is 75° below the melting point of lead) for thirty-one days. At the end of this period the solid lead was cut into sections, and the amount of gold which had diffused into each of them was determined in the usual way. Other experiments follow, in which the lead was maintained at 200° , and at various lower temperatures down to that of the laboratory. The following are the results:—

	<i>k.</i>
Diffusivity of gold in fluid lead at 550°	3·19
" solid " 251°	0·03
" " " 200°	0·007
" " " 165°	0·004
" " " 100°	0·00002

The experiments at the ordinary temperature are still in progress, but there is evidence that slow diffusion of gold in lead occurs at the ordinary temperature. The author points out that if clean surfaces of lead and gold are held together *in vacuo* at a temperature of only 40° for four days, they will unite firmly, and can only be separated by the application of a load equal to one-third of the breaking strain of lead itself.

The author thinks it will be considered remarkable that gold placed at the bottom of a cylinder of lead, 70 mm. long (which is to all appearance solid), will have diffused to the top in notable quantities at the end of three days. He points out that at 100° the diffusivity of gold in solid lead can readily be measured, though its diffusivity is only $1/100,000$ of that in fluid lead at a temperature of 500° . He also states that experiments which are still in progress show that the diffusivity of solid gold in solid silver, or copper, at 800° is of the same order as that of gold in solid lead at 100° .

He concludes by warmly thanking Mr. A. Stansfield, B.Sc., who assisted him in all but the earlier portion of the work, and by expressing the hope that the experiments described in the paper will show that the diffusion can readily be measured in solid metals, and that they will carry one step further the work of Graham.

Presents, February 20, 1896.

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Set of Photographs, taken by Mr. A. A. C. Swinton, illustrative of the so-called "Röntgen's Rays."

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