

division as the left method does to the right in an ordinary multiplication, *e.g.*

(1)	(1)	(2)	(2)
321	321	321	24171'3
753	241713(753	753	
2247	2247	963	96
	1701		407'5
1605	1605	1605	160
963	963	2247	224'7
241713	963	241713	224
	....		

Anfield Road, Liverpool. ROBT. W. D. CHRISTIE.

**Earthquake in North Britain.**

It may be of interest to you to note that on Wednesday, February 16, at about 1.35 p.m., a sharp shock of earthquake was felt here. Houses were shaken, dishes rattled and tumbled, and much alarm was created, though no damage was done. At the time mentioned there was a loud report, as if of a heavy shot fired underground: earth movements—such as would result from violent concussion—immediately followed, lasting for about two seconds; the character of the movements then seemed to alter from vertical to horizontal, the latter being sustained for nearly four seconds. About two minutes after the first report a second was heard, louder and sharper than the first, but no tremors were felt. Judging from the sounds, it would appear that the wave travelled from west to east.

I may state that within recent years several shocks of earthquake have been felt in the district.

Kilsyth, N.B., February 18.

JAMES M'CUBBIN.

**ON THE USE OF GLYCERINATED CALF LYMPH FOR PROTECTIVE VACCINATION AGAINST SMALL-POX.**

THE terms of the Report of the Royal Commission on Vaccination, published towards the end of the year 1896, made it evident that there was a general feeling on the part of the Commissioners that the use of calf lymph should be encouraged as far as possible; and it was patent to those who grasped the full significance of the Report, that in order to fall in with popular sentiment, even apart from other considerations, some effort would be made by those in authority to examine carefully into the claims advanced on behalf of calf lymph vaccination as carried out at home and in European countries. For some time past it has been recognised by those who have been cognisant of Dr. Monckton Copeman's work on the "glycerination" of vaccine lymph, and especially of that derived from the calf, that the advantages connected with the use of this lymph are of such a nature that many of the objections that have been urged against the use of calf lymph are practically eliminated. Although this work has been going on in our midst, it appears that, in order to obtain any knowledge of the practical outcome of Dr. Copeman's investigations, we are compelled to turn our attention to the large vaccine establishments of France, Germany, Belgium and Switzerland, where, under State control, the use of glycerinated calf lymph has now come to be recognised as the method, of all others, which is attended with the greatest success.

The addition of a certain bulk of glycerine to vaccine material does not at first sight appear to be a very important matter, but, as Dr. Copeman has demonstrated, this glycerine does exert an extraordinary influence.

Taking the method employed in the Institute in Berlin as an example, we find that the vesical pulp collected from a single calf weighs from 10 to 15 grammes; to this is added a mixture of glycerine and water of equal parts, fourteen times the bulk of the vesicular pulp; it then, if used carefully, forms a sufficient volume to vaccinate 15,000 individuals.

All this we learn from the Report drawn up by the

NO. 1478, VOL. 57]

Medical Officer of the Local Government Board, in conjunction with Dr. Monckton Copeman, published in "The Supplement containing the Report of the Medical Officer for 1896-97 to the Twenty-sixth Annual Report to the Local Government Board."

The advantages early claimed by Dr. Copeman for this method are:

(1) That the addition of glycerine in this diluted form has the effect of ensuring the destruction of micro-organisms that are sometimes found even in the calf lymph collected under the very best conditions. It has been maintained that certain of the cases of erysipelas that have followed vaccination with calf lymph have been due to the accidental presence of certain of these organisms. Again, the possibility of infection with tubercle has sometimes been raised, though there is very little evidence of such infection being conveyed by vaccination; still the point has been raised, and it is right that it should be considered as a possibility. Glycerination of the lymph entirely does away with any danger from either of these or other allied sources. The addition of the glycerine kills off not only non-pathogenic microbes, but such pathogenic organisms as are ever likely to be found in vaccine lymph. This in itself, then, is a forward step of vital importance to those who, whilst fully convinced of the advantages of vaccination, and of the enormous preponderance of these over the possible disadvantages, are desirous that such disadvantages as there are shall be removed, and that every cause of objection should be done away with for those who have conscientious, even though unfounded scruples, against the use of lymph taken from the child, or from the calf under ordinary conditions.

(2) The dilution with glycerine appears to have absolutely no effect in diminishing the specific activity of the lymph, although it affects the bacterial flora of the lymph in such a marked degree. It is even maintained that such specific activity is actually increased, though it is difficult to see how this can be the case. It is possible, however, that various changes set up by bacteria are inhibited, and that in consequence the active elements in the lymph remain in a stable and unaltered condition for a longer period.

It is interesting to note in this connection that, although the lymph is diluted some fourteen or fifteen times, it remains sufficiently active at the end of three or four weeks to produce a good crop of vesicles when the same amount of the dilute fluid is used as is ordinarily employed of the undiluted vaccine. It is evident, therefore, that the amount of active principle present in ordinary vaccine is far in excess of what is necessary. That being the case the amount of available fluid is multiplied by fifteen, and to that extent the production of a good supply of trustworthy calf lymph is facilitated, and it becomes a comparatively easy matter to supply a pure lymph at a small cost. Hitherto at the animal vaccine establishment in Lamb's Conduit Street the amount that could be obtained from a single calf was, at the outside, only sufficient for the vaccination of some 200 to 400 patients, and this had to be done under somewhat unfavourable conditions—namely, directly from the calf to the arm of the patient—in order that there might be as few organisms in the lymph as possible, as naturally any organisms would multiply comparatively rapidly in stored lymph to which antiseptics could not be added. With the lymph from a single calf, used according to the new method, 4000, 6000, or even 15,000 vaccinations may be carried out, of course not at once from calf to arm, as the lymph may be kept under observation for some time, during which test-plate cultivations may be made, and the presence or absence of micro-organisms demonstrated. The glycerine does not kill certain organisms instantaneously. Consequently test-plates, made immediately after the emulsion has been prepared, may