remedies were again applied, but to no effect; the symptoms became more and more aggravated, until, in the middle of November, the boy was seized with eclamptic convulsions. These were arrested by a hypodermic injection of morphine into the arm. Up to this time the patient suffered no diminution of sensibility or mobility in any limb, and there was no difficulty in speech. It was accordingly to be presumed that neither the great hemispheres nor the medulla oblongata was implicated in the morbid abscess. Soon, however, the aspect changed. The iris dilated, sensibility became weaker, and, after lingering in a half comatose state for a few days, the patient died on the 26th of December. An autopsy was permitted and made twenty-six hours after death. The scalp was removed and an examination of the skull made, but no traces of an inflammation from any bruise were detected. The cortical substance of the hemispheres was in a moderate state of venous congestion. At the base of the brain, between the dura mater and arachnoidea, was a moderate quantity of serum; such liquid was also found in the ventricles after incision of the corpus callosum. The surface of the thalamus opticus of the right side showed, in comparison with that of the left side, a grayish, injected color. It was softer and uneven. An incision into that substance opened an abscess of considerable size, comprising more than half the body of the thalamus. Two tablespoonfuls of pus-matter mixed with softened brain-substance could be removed; parts of the right hemispheres, especially in the neighborhood of the thalamus, were also inflamed and softened. The organs of the left brain were in healthy condition. We may now ask, Was the development of this abscess really the consequence of the fall of the boy during last winter, or must another yet unknown cause of it be sought for? An effusion and deposition of lymph may take place in consequence of a fall, and lie embedded under the arachnoid, if the quantity is very small, without producing serious symptoms for a long time. 'Effusion and deposition of lymph,' says Dr. Jonathan Hutchinson, of London, in a lecture on inflammation at the base of the brain, 'is always found in the greatest quantity where the arachnoid bridges over the largest spaces, as, for instance, at the base of the brain.' Large spaces are bridged over, particularly between the nerve-centers of the middle brain, and from the hemispheres to the former. It may then require a long time until from the spot of the lymph-deposit an abscess is formed, which, by growing larger and larger, produces also more serious symptoms, and determines more clearly the individual diseased organ."

ON AN UNUSUAL CASE OF ELECTROLYSIS.

By J. W. MALLET.

A GALVANIC battery of six couples, of Smee's construction, the flat rectangular plates about 15 by 7 centimeters, was frequently used, in connection with an induction coil, for lecture-table purposes. When not required in action the plates, all attached to the same wooden frame, were raised from the divided stoneware trough by cords wound upon an axle, and kept suspended above the acid by means of a ratchet-wheel and pawl. The two terminal copper wires were generally coiled loosely together, so as to be out of the way when the battery was thus set aside.

On one occasion the apparatus was carried from the lecture-table to an adjoining room, the plates having been raised out of the acid, and it remained unnoticed for two or three days, when I perceived that the pawl had slipped from its place and the plates had fallen down and were fully immersed in the acid liquid—originally consisting of about one part, by weight, of sulphuric acid to seven or eight of water, but to which some additional strong acid had afterward been added by pouring directly into the cells when, during a lecture, the action was found insufficient, the apparatus having been used at intervals for some time. This additional acid was not accurately weighed or measured, but was poured in, as far as could roughly be guessed by the eye, in equal quantity into each cell. On emptying the trough and washing off the plates, those of zinc were found much corroded, and it was noticed that one of the sheets of thin platinized silver foil lying between them was quite stiff and very considerably thickened. Detaching it from the rest—it belonged to the third cell from one end, or fourth from the other—I found that the surface on both sides was thickly coated with metallic zinc. By immersing it in pure dilute sulphuric acid in a beaker 14.813 grm. of zinc was removed, and then, the solution taking place slowly, connection was made with the negative pole of a small galvanic battery, and an insoluble opposite electrode from the positive pole immersed in the same beaker of acid, when 15.762 grm. more was removed; so that, the silver foil being now clean, 30.575 grammes altogether of zinc had been taken from its surface.

Obviously the condition of the liquid had not been quite the same in all the divisions of the trough, the acid having been of different strength; doubtless, as the plates lay neglected in it, it had first become completely converted into zinc sulphate in this particular cell, in which subsequently, the circuit being closed by the loose contact of the terminal wires, the chemical action of the battery had transferred itself from hydrogen sulphate to zinc sulphate, this becoming a "decomposing cell," and metallic zinc was electrolytically thrown down from the strong solution of its salt.

Although the explanation of the fact is simple enough, its actual occurrence is new to me. Such an accident may have often been observed, very probably by telegraph operators or electro-platers, but, if so, I have never seen any notice of it. It seems, therefore, worth a passing mention.—*Amer. Chem. Journal.*

THE RECLAMATION OF BOG LAND BY THE GERMAN METHOD OF BURYING WITH GRAVEL.

By PROFESSOR F. H. STORER.

FOR a dozen years or more a good deal of attention has been given in Europe to a peculiar method of cultivating bog land, which seems to have originated upon the great moors of North Germany, but which is manifestly applicable in many other localities, particularly in cold or temperate climates. This process has been occasionally referred to in American publications, and a brief account of it suggested by Prof. Playfair, of Edinburgh, was printed in the report of the U. S. Commissioner of Agriculture for 1877. In the same year some chemical examinations of old fields, that had been reclaimed in the manner now in question, were made by a chemist named Osswald, whose results deserve the careful attention of every intelligent farmer.

The fundamental idea of the German method is to cover the bog earth with a deep layer of gravel—after means have

been provided for draining the land—and to leave this gravel permanently as a surface layer, which is never to be mixed with the bog earth which lies beneath it. Upon this gravel the crops are grown, as will be explained directly. The gravel surface shields the young crops from destruction by night frosts in the spring; it lessens the evaporation of water from the soil and the radiation of heat, also, and so keeps the land comparatively warm. Moreover, as practical experience has shown, the buried humus can still supply the crops with food.

The layer of gravel might, of course, be brought to the bog in carts or sleds from hills or pits, in case that plan should happen to be convenient. But upon the great level moors of Europe, where the process originated, there was no alternative but to get the gravel from beneath the moor earth. It happened, withal, that the excavations made for gravel could readily be put to use as ditches to drain the land.

As explained by Rimpau, to whom the original description of the processes is commonly accredited, there are two general methods of lifting the gravel, one of them applicable to cases where the beds of humus are deep, and the other to the case of shallow beds. Where the layer of black earth is from a foot and a half to three feet thick, or more, the operations consist in digging large, deep ditches at stated intervals, and spreading upon the surface of the moor the sandy or gravelly subsoil which is taken from the bottoms of the ditches. In Rimpau's practice, the ditches are dug at distances of about 75 feet, one from another; they are 16 feet wide at the top, 11 feet wide at the bottom, and 4 or 5 feet deep. The black earth from the ditch is spread upon the surface of the moor, and then the sand or gravel or clay taken from the bottom of the ditch is spread in its turn, so that a layer of it about 4 inches thick shall everywhere cover the moor earth. A gravelly sand is held to be best; and, in general, the more gravelly the material is the better, though it is well to have a small proportion of clay in it. Pure, fine-grained quartz sand does not answer nearly so good a purpose as gravel. Oats may be sown at once upon the gravel, and afterward potatoes, roots, grain, and all kinds of forage crops.

The gravel layer is left permanently upon the surface of the land. It is never plowed under or mixed with the moor earth. But, from time to time, when the surface land becomes hard or incrustated, it is worked with a subsoil plow in such wise that the soil may be loosened without mixing one layer of it with another. It is well, however, in preparing the field at the beginning, to plow a little of the sand or gravel into the upper layer of black earth, so that there may be good capillary connection between the moor earth and the final layer of gravel. Some writers have argued, also, that it is well to sweeten the moor somewhat, by burning, before proceeding to spread the gravel upon it. The objection to fine sand, just mentioned, is not only that it is liable to be blown away by the wind, but that it dries out too rapidly and chills off too quickly by night. Indeed, one advantage of the method is, that the gravel layer compresses the drained moor earth, which would be apt to become too light and dry if it were cultivated in the ordinary way and exposed directly to sun and wind. Another objection to pure sand is, that its particles lie too close together, so that a thick layer of it would, when moist, hinder the proper access of air to the humus.

It is still an open question, perhaps, whether this burying process is the most economical method of reclaiming moor land, but there is no longer any room for doubt that it is a method of very great merit. It has been found in practice that the effects of the reclamation are sure and lasting, and that better crops can be got from the moors in this way than by any other known process.

The most interesting feature of this system of husbandry is the readiness with which crops get their nitrogenous food from the buried humus. Analysis of plants grown on the gravel layers has shown all along that the crops taken from moor land thus reclaimed are particularly rich in nitrogen; and after some years' experience, it began to be noticed by the farmers that grain crops are apt to lodge badly on reclaimed fields that are eight or ten years old. On critical examination it appears that the trouble is due to the extreme fertility of the soil, which had not been properly appreciated.

In the beginning, Rimpau's practice was to manure the gravel layer, much in the same way that he would have manured an upland field. But it appears that in so doing he made a grave mistake, for by using stable manure he got too much humus and too much nitrogen into the gravel layer. Osswald's examinations of the soil from reclaimed fields of various ages, from two to twelve years, have shown that the gravel of the older fields have become very much charged with organic matter. Not that the gravel had become mixed with moor earth from below; on the contrary, the line of demarcation between the moor earth and the gravel was surprisingly sharp, considering that twelve years had elapsed in some instances since the gravel was spread, and that arable crops had been grown upon the land continually. The only trouble was that the continued application of stable manure and the accumulation of plant roots, through injudicious shifts in the rotation of crops, had led to an accumulation of humus in the gravel. No very great quantity of nitrates was detected in these old fields. But there was an abundance of ammonia; and it was plain that there was present in the soil a far larger quantity of active nitrogenous manure than there was any need of, or, indeed, than was good for some kinds of crops, as the lodging had already shown.

Instead of being exhausted by cropping, the reclaimed fields had actually become too fertile. They were no longer competent to grow so great a variety of crops, at any given moment, as they had been at first; they still did very well for grass, however. Some of the twelve-year-old fields yielded the best crops of ray grass, cut over and over again for green fodder, they had ever given, though they had previously been well manured with dung, with superphosphate, bone meal, and Stassfurt potash salts.

Speaking in general terms, the continued use of dung upon these fields was a great error. Here, assuredly, if anywhere, the exclusive use of mineral fertilizers will be in order. Here, if anywhere, the farmer may put his trust almost exclusively in the great store of nitrogen which the humus can supply. It has, indeed, been found best, in practice, to use a little nitrate of soda, in conjunction with the mineral manures, at the beginning of the process of reclamation, before the moor earth has fairly begun to decompose. But there is little or no need of this nitrogenous amendment subsequently, since the mere oxidation and decay of the humus supply enough nitrogen for the support of most kinds of crops.

It remains to be seen whether, after very long-continued

cultivation, the accumulation of humus in the gravel layer will be large enough to preclude the growing of grain crops, or to necessitate the laying down of another gravel layer, at enormous expense. But for the present it is plain that pains must be taken to work against the accumulation of humus, both by avoiding the use of organic manures and by growing a proper proportion of exhaustive crops, fit to bring down the exuberant fertility and to promote the destruction of the unwished-for humus.

The other method of lifting gravel, alluded to at the beginning of this article, is with plows. It is used upon moors which have only a thin layer of black earth. When the moor earth is no thicker than from 8 to 16 inches, Rimpau gets his top layer of gravel or sand by throwing up the subsoil from below by a system of trench plowing. He runs three plows, specially adapted to the purpose, one after the other. The first plow turns a flat slice, 3 inches or so deep; the second plow stirs the sole of the first furrow to a depth of 12 or 16 inches; and the third plow throws up at least 6 inches of the loosened subsoil to cover the inverted sod. These plowing operations are carried on in summer and autumn. Next spring the furrows are leveled with a heavy harrow, and oats are sown. As was said before, it is to be understood that the moor must be well drained before it can be cultivated in this manner.—*Rural New Yorker.*

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