being so great, and making it impossible for the French manufacturers to make their china as cheaply as their foreign neighbors, various devices have been tried, but with little success. In order to compete, wages have been reduced to the lowest point, and still the manufacturers are said to have lost money. The coal that is employed is necessarily costly, as a smokeless, long-flame variety is required. Many of the factories burn wood only, as that produces a purer white than the very best kinds of coal; but wood is dearer than coal. It is consequently only used in firing the muffles, and in the finest grades of porcelain. A few years ago a new process was tried, that baked the porcelain in a short time; but the cost made the process impracticable. It was under such circumstances as these that one of the most progressive houses in Limoges was induced to employ petroleum or residuum oils as a fuel, to accomplish which, an American firm using the Wright burner was requested to make a trial with the fuel. There was very much doubt and fear connected with the experiment; but after a time it was attempted, and the results were far better than anticipated. The heat was shown to be absolutely pure. No gases or smoke in any way discolored the china, which came from the kiln much whiter, and in better condition, than when it is fired with the best of wood. In the muffles there was a decided advantage. The delicate colors, which show at once the presence of the slightest quantity of gas, were perfect. "This new discovery," says Consul Griffin, "promises to revolutionize the whole porcelain industry." It is estimated, that, by employing these oils, there will be a reduction of about 15 or 20 per cent in the making of china. The only question now is the present classification of residuum oils in the customs tariff, as the present duty on petroleum — 120 francs per ton — is prohibitive; but strong pressure is being brought to bear on the French Government to have fuel oils classified as fuel, which pays only 1 franc 30 centimes a ton. New life is given to an industry that was seriously threatened; and it is hoped that the French porcelain will be brought to a greater state of perfection by this new American invention.

## MEXICAN ARCHÆOLOGY.

MR. CARL LUMHOLTZ writes, "Since I wrote last, I have had an interesting though sometimes rather rough time of it, crossing Sierra Madre in December and January. We had snow several times, and the grass is of poor quality, so I lost altogether thirteen of my animals. There are three Sierras to cross at an elevation of about nine thousand feet: you may therefore easily imagine what a rough country it is to traverse in the winter-time, making our own trails. I had thirty men and about a hundred animals, and I pulled through all right. My camp is now near Casas Grandes in Chihuahua, where my animals are resting. The scientific result is very satisfactory so far. The most interesting things I came across were some wonderfully well-preserved skeletons in a series of caves. In some of the caves were small villages; others were reserved as burial-places, and here I dug out several of the above-mentioned skeletons, the porphyry pulp having preserved for centuries the corpses so well as to be made into some kind of mummies. The features on some are complete, even hair and eyebrows still there. These people were of small stature, and bear a striking resemblance to the Moqui Indians of the present day. In the eastern slopes of Sierra Madre I also dug out many mounds, and every day brought to light fine stone implements and beautiful pottery. I might profitably spend two years in excavating mounds only; but I am going on with this kind of work only till the end of April, when I start out again in the mountains. Among the fossils found on the western slopes of Sierra Madre, near Nacory, is a huge horn six feet eight inches long and twenty-six inches at the largest circumference, probably belonging to some extinct bison. Many birds and plants (about two thousand) were found. I am entirely confident of the success of the expedition. Next time you will hear that I have found people alive in the caves. There is a wonderfully rich field before me, and I know that my expedition will bring greater results than anybody at present anticipates. But the expenses are far greater than I expected. My animals only cost three thousand dollars. In December and January I paid wages each month, respectively, $1,000 and $1,025. I mean to reduce my force; but a small party cannot well travel here, as there are plenty of Apaches, and farther south any amount of bandits that are equally bad. I now have a fine gang of men and every thing in regard to outfit complete, speak Spanish fairly well, am on excellent terms with the Mexican Government (they imprisoned lately for three years an inspector who stopped my provisions last fall), and the field before me is of exciting interest. But more material support will be needed, if I shall not have to go just with two or three men. Still, I am determined to do even that, because I must accomplish my aim. I am now on a fortnight's trip to the United States to see some friends that I think may give me further support, and on the 26th or 28th of April I expect to be on the march again."

## HEALTH MATTERS.

### Influence of Exercise on Digestion.

DR. STRENG, in a lecture before the Medical Society of Giessen, on "The Influence of Exercise on Digestion," an abstract of which appeared in the *Lancet* for March 7, states that he concludes from his own experiments that this influence is of a retarding nature. His experiments, however, suffer from the fact that he always injected 300 cubic centimetres of water before obtaining the contents of the stomach, so that the proportion between gastric juice and water continually varied. The first experiments in the clinic at Giessen were made on two dogs. Twenty-five grams of meat suspended in 300 cubic centimetres of warm water were twice injected into the fasting stomach; and after one feeding, the dogs were compelled to remain for three hours in absolute bodily rest, while after the other feeding they were made to take active exercise. After the three hours, the contents of the stomach were obtained and analyzed. The quantity did not essentially differ in the two cases: the experiments consequently tended to prove that exercise does not influence the time required for digestion. The chemical analysis also detected no difference. The same results were obtained by substituting the white of an egg for the meat. The experiments were then repeated twenty-five times on three men with healthy stomachs. Two of these suffered from sycosis, and the third from insipient muscular atrophy. They were fed each time with 200 grams of minced meat, a bun, a plate of bouillon, and three spoonfuls of mashed potatoes, and the contents of their stomachs were obtained four hours and a half afterwards. The exercise after meals consisted partly in gymnastics, partly in walking. Absolute rest was obtained in bed. These experiments gave the same results as those on the dogs, the difference resulting from the chemical analysis being especially imperceptible. The author therefore concludes that the gastric function is in no way influenced either by muscular action or by absolute rest.

## LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

*On request, twenty copies of the number containing his communication will be furnished free to any correspondent.*

### The Pollination of Zea Mays.

THE brief report, in *Science* of March 27, of the interesting experiments with American corn at Cornell University does not give the results of the control tests, and thus fails to prove that removing a number of the tassels from a corn-field increases the yield of the emasculated stalks. The standard given for comparison is the yield of certain stalks under abnormal conditions.

The experiments of Darwin, Gaertner, and others, make it probable that the fertilization of a monœcious organism with the male element of another individual of the same species increases the vigor of the progeny, and, conversely, that self-fertilization either results in sterility or a weakened progeny.

Applying this biological law to the corn-field in question, it might be claimed that the stalks which were allowed to tassel were self-fertilized to an abnormal degree, and thus were weak-

ened, reducing their yield below the normal. It might be claimed also that from the reduced amount of pollen, and the shock of the injury, the yield of the emasculated stalks was also reduced below the normal, and thus that removing the tassels really reduced the yield.

All claims of decrease or increase rest on mere probabilities, unless the control experiments are known. The produce of a like number of rows in the corresponding situations on the other side of the corn-field would give the normal yield. Simpler, though less accurate, the average yield of the untreated portion of the general field would suffice for a standard.

The great number of undeveloped grains on the ears of isolated corn-stalks and on the borders of fields may be due to self-fertilization; but, as a like frequency of undeveloped grains occurs on the cobs of corn whose tassels have been blasted by the western hot winds, the non-development may be due to lack of pollen.

As it does not seem reasonable that there was any lack of pollination in the Cornell University corn-field, the results of the control experiments may prove the claimed increased yield, and may also be another proof of the injury of self-fertilization. But these results may show that the decreased yield of the abnormally self-fertilized stalks more than counterbalances the increased product of the maimed stalks.

DICE MCLAREN.

Baltimore, March 31.

### Homœopathy in Relation to the Koch Controversy.[1]

EVEN the authority of Dr. Koch's eminent services has been unable to uphold parataloid in the terrible search-light of the Virchow and Chiari necropsies; and it is questioned whether the reported improvement of Kaposi's cases of lupus promises permanent cure in that form of tuberculous disease. Experience with Koch's fluid in this country has afforded results no more favorable. Koch, nevertheless, hopes "to extract from the tubercle bacillus its curative substance alone," and there remains on all sides enduring hope that true curative power can be liberated from the parataloid.[2]

Is it generally known that the homœopathic school has for many years made use serviceably, not poisonously, of Koch's material in the treatment of consumption and other tuberculous disease? For twenty years this most misunderstood and maligned body of observers has recognized the indispensable curative service of the products of disease, and, in addition, the necessity[3] for their extreme attenuation, before they might be safely administered in sickness. "Tuberculinum," "anthracin," and "syeotin" belong with such drugs as arsenic, which develops dangerous lesions if given to persons in health, but is curative in certain disturbed conditions. The testimony given by these physicians appears singularly fitting, and their experience would be of vital importance at this time of wholesale experiment threatened by the followers of Koch. I will now attempt to describe the cultus and professional training of these men who are accused by the dominant school of failure to accomplish any thing for medical science, of bigotry, of narrowness, and of "having a fixed belief."[4]

The college requirements for students of homœopathy do not differ materially from those of the older school. Many of these students are already graduates of Harvard or of foreign medical schools, who afterward finish their studies at a homœopathic college.

"By their fruits ye shall know them." Among the noteworthy results of a professional education in the methods of this school has been the discovery of unexpected remedial agents far in advance of other medical investigators. The homœopaths have long recognized the life resulting from death in natural growths, and have not hesitated to explore filth, decay, and disease for morbific products or nosodes. Diseased material from animals and plants, and the poisonous secretions of reptiles, fishes, and insects, are found to be indispensably curative in desperate or obscure diseases, but are only thus helpful when the powers of each have been clearly differentiated by a thorough proving. Is it generally known what is meant by a proving or study of a remedial agent? Let me, then, briefly show you the labor, the research, and the professional skill required to make a proving.

A proving is made by administering to several healthy persons a substance or extract, and recording its effects, with the ultimate object of using the proven material in disease. Each agent must be studied[1] with regard to its chemical, functional, and the whole pathological effects in the body. Study the pulse, actions of the heart, lungs, brain, kidneys, liver, systems of nerves, blood-vessels, lymphatics, glands, digestive organs, machinery of the senses, each anatomical part and tissue. Study the connection of the proven material with eruptions, parasites, contagions, climates, influences inherited or acquired. Note the resemblance of this to other drugs and its antidotes. Above all, there must be perceptions of mental states, tact to avoid deceit, artistic insight, and quick sight; for all these matters, sought out by stethoscope, ophthalmoscope, sphygmograph, microscope, analyses of the urine, blood, etc, and the whole armentarium of a modern physician, enter into the preparation of a proving, and must be brought together with laborious, painstaking care before the proving is offered.

Professor Constantine Hering prepared in the year 1850, for his colleagues of the medical college at Allentown, Penn., a scheme of twenty closely written pages, — simply directions for epitomizing and recording their provings. The systematic habit of German university training which has given their prestige to German scientists was thus early brought to bear upon students in this matter.

A proving is accepted, and enters materia medica and text-book, only after its characteristics have been confirmed by scores, often by hundreds, of independent observers.

At last the proving stands, full of interest, a new discovery, an elaborate, sometimes a learned analysis, entirely unknown to old-school methods, and one more weapon is ready for use.

The authorized works of homœopathic materia medica are very numerous: fully eleven hundred remedies are available.[2] Many practising physicians carry in memory the chief characteristics of the greater proportion of these.

Provings, and the repertories founded upon them, naturally differ in value; yet a curious observer must, I think, find in the general result the evidence of such persistent industry and scientific research, that all statements which assume a lack in either respect obviously proceed from uninformed persons.

Regarding attainments in literature and the liberal sciences *per se*,— a welcome addition, no doubt, to the real service of medical men, and the supposed lack of which on the part of these practitioners has been made the subject of grave comment,[3] — to four bright spirits only, in all these two thousand years of physicians, have seats been assigned among the immortals. Hippocrates, Galen, Sir Thomas Browne, finally Dr. Holmes, have severally gained a place in letters. Each of these is a rebel and an innovator, for without rebellion and innovation was never yet wrought any good thing. But fifty years have passed since the death of Hahnemann, himself a man whose vast learning was fully recognized in his time.[4] Meanwhile neither poet nor sage has yet chanced to be "an ornament to his profession." The fact is, its founders have been at work so hard that they have had no time to hold up their heads to sing.

[1] Abstract of a paper by C. F. Nichols, M.D., in Popular Science News, April.

[2] See Report of the Imperial and Royal Society, Vienna; Medical News, Jan. 17; Boston Medical and Surgical Journal, March 5; Medical Record, March 7, 14, 28; Lancet, March 28.

[3] "Koch usually injects only one-millionth of a gram of the active principle. From the effects of this inconceivably minute quantity some idea may be formed of the almost uncanny energy which the substance would display if let loose, so to speak, in the fulness of its untamed strength" (Sir Morell Mackenzie, in the Contemporary Review). "One part to a ninety-eight billionth of the bulk of the whole body in a man weighing fifteen stone," is Dr. Hine's estimate (London Lancet, Feb. 14, p. 357).

[4] See Professor H. C. Wood's Yale address, also addresses published in Medical and Surgical Reporter, all previous to November, 1889.

[1] Usually in a so-called college of provers.

[2] Boenninghausen's Repertory, an early publication, might fairly be compared with Roget's Thesaurus or a modern lexicon. The recent compendiums (of which three are available) aggregate many hundred pages of closely printed text.

[3] See letter in the London Times, Jan. 8, 1889; also Dr. D. K. Newell's annual address before the Massachusetts Medical Society, 1890.

[4] See the writings of Jean Paul Richter and Broussais.