wheat and other cereals, and make a hard, glass-like straw that keeps the plants firm and erect, and opposes the attack of rust. A lack of silicia or flint in corn-stalks, wheat and oats, causes them to fall very easily to the ground; and salt, as a fertilizer, is one of the best preventives. Farm-stock, some distance from salt-water, receive less salt than their best health and growth demand. Give hogs and other stock little at a time, and often.—*Plantation.*

Practical Uses of Science.

"Practical men" frequently ask the question, "What is the use of scientific study?" They have accustomed themselves to regard those far-reaching investigations among the heavenly bodies, which astronomers are every year making more extensive and minute, those exacting analytical processes of the chemists, those delvings among the igneous and the aqueous rocks, and the fossils which the geologists are carrying on, as having no real bearing upon material interests. The *Scientific American* collates a few facts showing what has actually been realized from some of the apparently most recondite researches, which will go far to cause these "practical men" to reconsider their judgment:

"Newton's analysis of light by passing a beam through a prism was a discovery of no apparent value at the time it was made. The spectrum was very beautiful to look upon, but few persons could understand or appreciate it. No one could have anticipated that this was the germ of a method which would gradually lead to the discovery of new metals on our earth; to a study of the atmosphere of the sun and planets; that minute quantities of substance would be detected by it in mineral waters and rocks; that steel would be manufactured by watching the light produced by burning gases; that an instrument called the spectroscope would become one of our most important adjuncts in the study of astronomy, in technical researches, in the detection of new bodies. And thus the ray of light passed through a hole in a shutter becomes, in the contemplation of future men of science, the starting point in a great array of discoveries."

Another discovery, of apparently not the slightest practical importance, was that of polarized light. This has been developed, till now "the value of glass for optical instruments, the extent to which glass has been annealed, the testing of stone jewels, and the detection of paste diamonds, are accomplished by the use of a polarizing apparatus. But the most important application of the power of rotation possessed by different substances is seen in the apparatus employed to determine the quantity of sugar contained in any solution. The crude sugar of commerce is bought and sold on a polarized test.

"Hans Christian Oersted observed the deflection of the needle produced by an electro-magnet, and the needle telegraph was the natural growth of the observation; and afterward, by further research, we arrive at the telegraph in its present form. A little deposit of copper on one of the poles of a battery, when seen by De la Rive and Jacobi, soon developes into electro-plating and galvano-plastic operations. Gold, Silver, copper, nickel, and other metals, thrown down from solutions by battery currents, offer an occupation to a large number of persons, and enable publishers of illustrated papers to furnish their readers with prints for electrotype plates in a manner far superior to what was formerly accomplished in this line.

"Professor Tindall's observations on haze and dust have for their practical result improvements in ventilation, and the discovery of the precautions to be observed to ensure good health.

"Pasteur's researches on the germs of fermentation have revolutionized our former notions on this subject. The same theory carried further in its consequences points out the probable origin of epidemic diseases, and thus indicates the best remedies to be applied.'

Faraday discovered a substance called benzole, which was seemingly worthless, except as a curiosity. But out of this substance has sprung a long line of important industries. From it we have the most magnificent colors; we prepare sweet perfumes; we concentrate the light of illuminating gas; we dissolve resins, and make varnish.

When glycerine was first discovered, no use was found for it. Now it is in demand in immense quantities, for the most diversified uses—for making soap, in medicine, in perfumery and confectionery, and as an essential ingredient in the most powerful explosive compounds.

So gutta-percha was first brought to the United States as a curiosity. Without it, we could not have ocean telegraphy. The list of practical adaptations of "usefulness" discoveries might be indefinitely extended.—*Exchange.*

Veterinary Department.

Firing or Blistering in Severe Sprain of Ligaments.

Breaking down is an accident to which hunters are especially liable. Roadsters cannot claim absolute exemption from the disaster; but, from the nature of their work, they enjoy advantages which horses employed in field sports do not share.

The term "broken down" refers to various degrees of injury to ligaments and tendons of the anterior extremities, including the flexor tendon and the suspensory ligament, all of which are situated at the posterior part of the leg between the knee and the foot, and are included in the expression, "back sinews." In a state of rest the tendons and ligaments at the posterior part of the leg may be said to counteract the tendency of the animal's weight to cause extreme extension of the bones below the fetlock joints. The flexor tendons, when acted on by the muscles to which they are attached, bend the foot and the pastern bones towards the back of the leg: and in their passing condition they naturally resist the extending forces both of the extensor muscles and the superincumbent pressure of the animal's body on the fetlock joint. The suspensory ligament has no active function at all; it arises from the posterior and upper part of the cannon or shank bone, runs down the channel between the small splint bones, and divides just above the fetlock joints into two parts, one which is attached to the side of each floating bone (sesamoids) of the joint, spreading over the pasterns down to the bones of the foot. The course of the ligament can be traced in a clean-limbed horse very distinctly down each side of the leg close to the posterior edge of the splint bones, and between them and the flexor tendons. Composed of dense fibrous tissue, elastic but inextensile, the ligament possesses immense restraining power in preserving the proper position of the fetlock joint and pasterns when the weight is thrown on these parts, as it is in ordinary movements, and to a more decided extent when the animal lands after a leap.

Deprived of the restraining action of the suspensory ligament and flexor tendon, the bones below the shank naturally, from their position, yield to the slightest pressure, and become so far extended that the articular surface of the cannon bone is brought in contact with the ground. Even the tonic contractility of the extensor muscles suffices to pull the foot and pastern bones upwards and forwards without the influence of the animal's weight, when the suspensory ligament is divided; it is clear, therefore, that the chief function of the ligament is to resist the tendency to undue extension of the plantar bones on the cannon bone. Every time that the weight of the body is thrown suddenly on the planter surface this tendency to extension is apparent; and, in order to counteract it, the suspensory ligament is called upon to exert its resistant force in aid of the flexor muscles. Under ordinary circumstances the dense ligamentous structure is equal to the emergency, and supports the strain without injury; but occasionally, without any apparent alteration in the external conditions—that is to say, without any additional force being applied—the structure yields beyond the limits of its elasticity, and a "sprain" is the result. Inflammation follows, exudation of plastic materials occasions swelling or thickening of the ligamentary cord, and ultimately the parts are left in a condition as nearly as possible allied to the normal state, save that the adventitious deposit of fibrous structure impairs the due proportions of the ligament.

At this point the question of treatment arises; up to this there is no difficulty. While inflammation exists, and the progress of exudation is actively in progress, it is agreed that repressive measures are necessary; purgative medicines, local and general bleeding, fomentations to the heated parts, followed by cold lotions when the pain has subsided, are the means which experience has proved to be efficacious in dealing with the primary results of the injury. But after all active disease has been cured, there remains the thickening of the skin and the enlarged ligament, with a certain weakness or want of resistant power, and to correct these defects the use of the hot iron has been advocated from the earliest times of veterinary surgery; and undoubtedly after deep firing, horses have sustained severe work in the hunting field, notwithstanding that they were to all appearance hopelessly broken down during the previous season. Owing to the many successes gained apparently by the actual cautery in these cases, firing has assumed a position in the estimation of practical men from which it will not be easily dislodged; but it is nevertheless perfectly evident that the arguments in its favor are based on the principle *post hoc, propter hoc;* and so long as no other remedy is used in severe cases of sprain of tendon and ligament, the evidence is all on one side. But a few practitioners have had the professional hardihood to abandon the use of the firing iron altogether, and their experience has tended to confirm them in their determination to adopt less barbarous modes of treatment.

Bearing in mind that the primary action of the cautery is that of a counter-irritant, and that the long rest which follows its use is in itself powerfully restorative, they have tried blistering instead of firing, and with equally satisfactory results.

A step further has been taken by some who had faith in the effects of rest and cold lotions in repairing the damage done by a severe sprain, and they have obtained good results by the use of cold water persistently applied during a long period of abstinence from active service. In one case of so-called break-down, we had an opportunity of testing this treatment, with unexpected consequences. The horse on which the experiment was tried had suffered from severe sprain of the suspensory ligament and flexor tendons of one fore leg; and after the acute symptoms of inflammation had been removed by the usual treatment it was proposed to complete the cure by firing. The owner was, however, persuaded to leave the animal to nature for a time, and excepting that cold water was freely used, no treatment was attempted. The leg became perfectly firm, and the animal went well. He was hunted during the following season, and towards its close again broke down, as it was prophesied he would—but in the other leg, which was not referred to in the prediction. In spite, however, of this testimony in favor of rest and cold water, both legs were fired in obedience to the prevailing prejudice in favor of the operation, and the animal has remained sound.

It may be considered as quite certain that the use of the firing iron will not be discontinued so long as horses suffer from such desperate injuries as rupture of ligament and tendon. There can be no question that the operation is often performed where there is absolutely no occasion for it. So severe a remedy should at least be reserved for the most desperate cases.—*The Field.*

Harness, and How to Fit it to Horses.

The collar is the first thing of importance. That large thing that will admit a man's arm between it and the neck of the horse, is very unfit for a horse to work in. The collar should fit as neatly and as closely to the neck as a pair of gloves. Then, if it is soft and supple, as it should be, it will seldom gall the skin, if the hames are properly made and correctly adjusted. The hames should fit the collar well, and should not be too far apart at the top, as they often are. The staples which hold the side-straps and traces are almost always attached too far up from the lower ends. A horse cannot draw well when the traces are attached near the top of his neck. If a horse is apt to gall near the top of his neck, take out the staples and put them lower in the hames. If the backbands are just right for a cart, they will be too short when ploughing, and will gall the backs of the horses.

Some horses have a very tender skin, and the harness will sometimes gall them cruelly, in defiance of all means to prevent it. But many times the true cause is attributable to a bad collar, bad harness, or to a good harness improperly fitted to the animal. When a harness or yoke of bows do not fit properly, and the skin is liable to be galled, bathe these parts before they are galled with cold water, until the outside skin appears quite soft, and then bathe these parts with a strong decoction of white oak bark. Let this be done every day and the skin will soon become much harder and tougher than it usually is. A little care in preventing an ill is far better than much labor and skill in curing it, or in endeavoring to obviate its injurious effects.