RECENT INVENTION.

Head Net for Horses.

To protect a horse from being annoyed about the head and throat by flies, Messrs. Luther B. and George W. Lee, of Ridgewood, N. Y., have invented the net shown in our illustration, which can be easily placed upon a horse's head. It can also be adapted to the size of the horse. One strip of leather passes back of the ears, around the neck, and is tied by strings under the throat; a second strip is between the eyes and ears; a third below the eyes, and the fourth near the ends of the nose. To these strips the pendent pieces are fastened. There are also strings from the lowest strip to tie the net under the jaw. As an adjunct to the usual body net this new improvement is of decided practical value.

Rival to the Carson Footprints.

A correspondent of the New York *Evening Post*, writing from Greenfield, Mass., relates what wonderful footprints have been discovered from time to time in the vicinity from whence the writer pens his story.

There is probably no other part of the world which has recorded in its rocks so wonderful a story of the past as that of the red sandstone of the Connecticut River Valley. With the exception of a central range of trap rock, the entire valley is underlaid with a dark red sandstone, lying in stratified beds and extending from the highlands bordering it on the east to those on the west—a space varying in width from twenty miles on the Connecticut line to six or eight miles near the middle of Massachusetts, and gradually narrowing to about one mile on the Vermont border. This vast bed, which extends about one hundred miles, to Long Island Sound, occupies what was once the bottom of a great estuary or arm of the sea, which extended inland in the Mesozoic era and perhaps earlier. The sand and gravel, washed by the elements from the gneissic and schistose rocks of the neighboring hills, gradually filled up the valley and in the course of ages hardened into rock.

While this process was going on, the estuary, into which the tides flowed, was the home of immense numbers of animals of many different kinds, mostly of species now extinct. When the tide was out and the muddy bottom was left bare along its shores, great troops of quadrupeds and bipeds frequented the flats, where they probably found vegetable food suitable to their wants, or perhaps feasted on each other in the soul-harrowing manner depicted in some of our early schoolbooks. Among them were great ornithic reptiles representing a higher type of reptilian organization than any now existing—a sort of connecting link between the bird and the reptile—which stood ten or twelve feet high and weighed from six hundred to eight hundred pounds, whose feet measured eighteen inches long, and whose stride was from thirty to sixty inches; apterous, low-organized animals, in many respects not unlike the giant dinornis or moa of New Zealand. A dozen smaller species, some no larger than a turkey, fed in flocks along the shore, mingled with batrachians as large as an elephant, and gigantic crocodiles and lizards—or animals approaching them in form. The labyrinthodon of Europe, a frog as large as an ox, was, says Dr. Hitchock, a pygmy compared with the great otozoum of New England, whose hind feet measured twenty inches long by thirteen to fifteen wide, and whose fore feet—not more than a third as large—were probably used only when the head was brought to the ground. Beside these sported a host of smaller bipeds and quadrupeds, three-toed, four-toed, and five-toed; some with bird-like feet and some with webbed feet, some long-legged and some short legged, some with tails and some without, some graminivorous, some carnivorous, forming such a procession as mortal man never looked upon.

Eons have fled since then, the tropical climate which clothed this ancient New England valley with giant ferns and conifers has passed away, and with it have gone the wonderful organizations which once crowded the banks of its quiet waters; yet they have as truly left the story of their lives behind them as if some special antediluvian reporter had watched their gambols from the neighboring heights, depicting their forms and recording their daily acts for our benefit. Wherever they stepped along the mud bottoms, left bare by the receding tide, the plastic sand or clay took and retained the exact impression of their feet; the mud dried rapidly under the tropical sun, and on the inflowing of the tide the tracks were filled with fine sand, which made permanent the impression. The ebbing of the waters left another coating of soft mud, which was in turn tracked by the animals and covered in the same way; and so it went on, year after year, and age after age, one layer being deposited upon another until the strata had accumulated to a great thickness. It is probable that there was a gradual subsidence of the shores of the sea until the strata were piled up hundreds and thousands of feet in thickness. Under immense pressure and certain chemical conditions, these layers of sand hardened into stone, which was in time elevated above the waters. When the sand again saw the light in the form of sandstone, the layers were no longer horizontal, or nearly so, as they undoubtedly were when the otozoum walked their muddy surfaces; but, tipped or tilted by the immense internal force which threw them up, they lay at an inclination to the horizon of 30° to 50°, with a dip generally toward the east. This is the condition in which they exist to-day, and geologists compute that the strata must be from 3,000 to 15,000 feet thick.

In numerous places throughout the Connecticut Valley, where quarries have been opened in the sandstone, the fossil racks of these ancient animals have been found impressed in the stone in as perfect a condition as if they had been formed but yesterday. By far the most numerous and the best preserved specimens have been discovered at Turner's Falls, which, being near the head of the ancient estuary, seems to have been a favorite resort of the fauna of the time. The Field Farm, near there, now controlled under a lease by Mr. T. M. Stoughton, where the most satisfactory specimens have been obtained, has been frequently visited by scientific men interested in ichnology—among others by Professors Hitchcock, Silliman, Dana, Agassiz, and in 1876 by Huxley, who examined the quarry in company with Professor Marsh, of Yale College. Mr. O. H. Lebourveau, the superintendent of the excavations, told me, during a late visit there, that Professor Huxley, after examining the footprints, rapidly sketched for him on one of the slabs with a piece of chalk the outlines of the animals which made them.

The principal quarry is on a bluff, at a considerable elevation above the river, on the bank of a small inlet called the Lily Pond. The strata, which can be traced in the neighborhood to a depth of about 4,000 feet, rise in a nearly perpendicular ledge directly from the water. The dip is apparently about 45°, but it is said to be considerably greater in several places, and in one place near the river the strata are said to lap over on the top, seeming to indicate that the upheaval may have been sudden and not gradual, as is generally believed. In some parts the stone is a loose conglomerate made up of gravel and sand; in others a fine, close-grained sandstone, which readily splits into thin layers like slate or shale. It is in the latter that the tracks are found.

The quarry has been opened nearly on the top of the bluff, and as the edges of the strata lie upward a trench has been cut across it in a north and south line, exposing the face of the layers on the west side to a depth of ten or twelve feet. The stone is cut into rectangular slabs with the chisel and then split off by wedges, the slabs being generally one to two inches thick. When a part containing footprints is found, it is carefully removed to one of the buildings above and fastened in a rough frame to prevent breakage. A large number of the slabs are now on exhibition, awaiting purchasers. One, measuring twelve feet long by three feet wide, contains tracks of the otozoum, twenty-two inches long by fifteen inches wide, the stride being five feet and two inches from toe to toe.

Mr. Stoughton has one slab—named the "Huxley Slab"—which is twenty-six feet long by six feet and a half wide, and has on it four hundred small tracks. So accurately has the clay preserved every trace made upon it that in some cases it is easy to see where an animal with a broken or malformed toe has trodden. The tracks, too, of many insects, of mollusks, and some of the lower articulata are discernible, as well as marks made by fishes swimming in shallow water. Even the furrows of the ripple of this ancient sea, the blisters of the gas bubble which rose through its mud, the cracks caused by the sun, and the indentations made by the pelting rain along its shores have been preserved to us, so that we may study as easily as in a printed page the history of that primeval time, reconstructing its tropical flora and fauna and depicting the wonderful conditions of their life as clearly and accurately as if they lived in the present.

Ichnology as a science belongs wholly to this century. In 1802 Pliny Moody, of South Hadley, plowed up a stone with well defined tracks upon it, which were familiarly spoken of at the time as the tracks of poultry or of "Noah's raven." In 1835 similar footprints were discovered on some flagging stones from Montague City, which were being laid near the house of Dexter Marsh in Greenfield. Dr. James Deane, of Greenfield, whose attention had been called to them, described them in a letter to Dr. Hitchcock, President of Amherst College; and the latter, after a thorough investigation of several quarries, published in 1836 a scientific description of the tracks, with his views concerning them, which, though now regarded as substantially correct, did not obtain general acquiescence for several years. His first publication was followed by many others, in which he described more than one hundred species of animals which had left their traces in the sandstone. Professor Silliman, W. C. Redfield, Dr. Deane, Sir Charles Lyell, and others contributed also to the literature of the subject.

Within the past few years fossil footprints of extinct animals have been discovered at several places in the West, especially at Carson City, Nevada, and in other parts of the earth, but none of the localities compare in extent and in richness with the now world famous ones of the Connecticut Valley, of which that at Turner's Falls is supereminent.

Nickel Crucibles.

M. Mèrmet recommends the use of nickel crucibles instead of silver in chemical manipulations. They are slightly attacked, it is true, by melted potash, but silver itself is not indifferent to this action. They cost at first much less than silver, and moreover they have the great advantage of melting at a higher temperature. It often happens, in fact, that inexperienced chemists melt their silver crucibles in heating them over a gas lamp; such an accident is not to be feared with nickel crucibles.—*Chron. Industr.*

A New Property of Sulphate of Iron.

When ferric sulphate is as neutral as it can be, *i. e.*, it does not cause effervescence with sodium carbonate, and contains no perceptible quantity of protoxide of iron, nor any ferric chloride, which is always acid, it is capable of uniting with organic substances or vegetable extractives to form very definite and stable compounds, that are not removed by solution in water nor decomposed by contact with the air.

The organic substances in urine, as well as the phosphates, were instantly precipitated by the addition of 2 per cent of a liquid preparation having a density of 50° B., and containing 26 per cent of oxide of iron. Fresh urine treated in this way, May 16, 1882, remained odorless and unchanged more than a year, although kept in a warm room, exposed to the air. An analysis showed the precipitate to contain 5·34 per cent of nitrogen, and 12·42 per cent of phosphoric acid, representing 16·44 per cent phosphate of lime. Excrement treated with 3 per cent of this reagent remained unchanged for a year. Fish entrails were put for two days in water containing 1 per cent of the reagent, then washed a long time in water, and on the 16th of May, 1882, were dried in the open air without any bad smell. They were subsequently cut up and digested in water in which only traces of iron salt could be detected. After drying again they kept as well as ever in the air. A similar treatment again with dilute hydrochloric acid only dissolved a little more iron, and the substances did not change afterward when exposed to the air of summer.

To show that a true compound was formed between the iron salt and the organic substance, heads, intestines, the scales and skins of fishes, and ox hide were exposed to the action of this salt of iron, then dried and preserved with the greatest ease. They were subsequently mechanically divided up and exposed for several hours to the action of a boiling solution of barium chloride. A perceptible quantity of the reagent could not be detected. Barium sulphate could only be found in minimum quantities, and the mixture of these substances could be kept a long time in ordinary water. After being in contact with water for more than a hundred days only a few gas bubbles arose on stirring it up, having a slightly acid odor quite unlike sulphydric acid gas. Hence we may safely assume that a very stable compound was formed by the iron and the organic substance.

Some fish, a dog, and a rabbit were put in the iron sulphate solution. The rabbit weighed 839 grammes and remained in the solution for five days; it became stiff, its skin kept its reddish color and became so hard and horny that it could scarcely be scratched with the nail. The bath lost 6° B. in density, and after drying the surface the animal only weighed 539 grammes, having lost 36 per cent in weight. An experiment with a goat's heart showed the same loss, the bath having taken the water out of the animal. When perfectly dry, the rabbit weighed only 326 grammes. It has kept perfectly for a year, and the process of mummifying it cost less than one-tenth of a cent. Similar observations were made upon other animals.

In 1882 a horse died from a very infectious disease, and the entrails, dipped in a solution of the neutral sulphate (a few parts of the salt in a thousand of water), were used immediately for demonstration as well as for examination by the students.

A pheasant egg weighing 9·35 grammes was deprived of its shell and lost 38 per cent in the solution; it dried and shriveled up and was completely mummified, without giving out any bad smell. These results will be an incentive to further experiments.—*Comptes Rendus.*

Ferric sulphate, or persulphate of iron, is easily made from the protosulphate, or green vitriol, by the addition of a suitable quantity of sulphuric acid, enough nitric acid to oxidize the iron, and thorough boiling. It can be rendered perfectly neutral by adding, while hot, just enough ammonia to cause a slight precipitate.

Wasps and Grapes.

Most gardeners experience more or less trouble with bees and wasps on their ripening grapes at this time of year. A gardener of Strassburg-Neudorf possesses a large vine, from which the wasps in one week removed 300 pounds to 400 pounds of grapes. After trying in vain to get rid of the insect pest by attaching to the vine bottles with honey water, which attracts and drowns the wasps, he took a bucket half filled with boiling water, placed it under the grapes, and by beating the attacked vines he brushed the wasps off into the boiling water. In two hours he killed nearly two quarts of wasps. The early morning, when the wasps are stiffened with the cool air, at noon, when they are giddy from the juice which they have absorbed, and the evening are the best times for this operation.

The Telegraph not to Aid Betting.

In the House of Commons recently the Secretary of State for the Home Department was asked if his attention had been drawn to the fact that the police in London had been threatening licensed victualers with opposition to their licenses at the annual meeting, unless they at once gave up the receipt of general, sporting, parliamentary, and stock exchange news by the automatic news-transmitting instruments. The Secretary replied that it was the duty of the police to put down betting houses, and when facilities were given by means of telegraphic instruments for betting, proceedings would be taken against the holders of licenses.