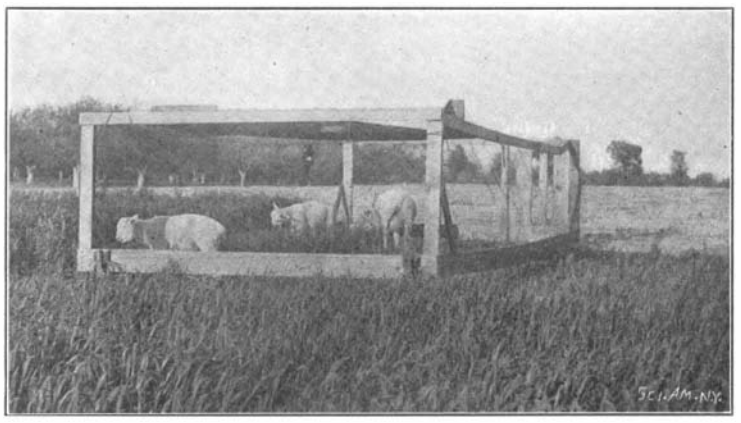
A MOVING, GRAZING PEN.

Mr. A. D. McNair, an agricultural expert, recently carried out some interesting experiments at the Michigan Agricultural College, Lansing, Mich. Having become acquainted with the remarkable productiveness and high feeding value of alfalfa, he conceived the idea of grazing it at the time when the stage of growth permitted of its having a maximum feeding value in such a manner that none of it would be tramped under foot. This stage is reached when the alfalfa is from one to two feet high. Mr. McNair proposes to construct bottomless pens mounted on wheels. After the sheep are admitted to the pen, the pen is drawn slowly across the field of alfalfa or other forage crop, so that the animals may eat all the approaching forage before they get their feet on it and trample it down. This system permits the forage to grow up behind ready for another grazing.

A practical experiment to demonstrate the value of the system was carried on at the Michigan Agricultural Experiment Station, at Lansing, and while it was on a small scale, at the same time it showed that the plan was perfectly feasible. Only a tenth of an acre of alfalfa was available for the purpose, so that only one grazing pen was required, and into it were put a Dorset ewe and her twin lambs. The pen was 16½ feet long and 8 feet wide. It was built of 2 x 4 inch bottom rails and corner posts, and 2 x 3 inch top rails, and braced with 1 x 3 inch pieces at each corner; poultry netting was used to inclose the whole pen. Caster wheels 8 inches in diameter were placed at each corner. Galvanized iron wires, No. 16, were attached to two corners of the pen and passed through swivel pulleys secured to stakes driven in the ground. They then passed around iron spools which were turned by an electric motor through the medium of gearing, pulley, and belt. The motor was a 1-10 horse power, 100-volt, single-phase, alternating-current motor, which was originally intended to operate a ventilating fan. It will be readily understood that a number of pens could be arranged in gangs and actuated by the same motor. The reduction of speed between the motor and the iron spools was in the ratio of 75,000 to 1, approximately. The movement of the pen was carried on first by hand until the electrical equipment could be gotten ready. The strip of alfalfa was a rod wide and 16 rods long, and this strip was to be grazed four times between May 1 and October 1. This meant a daily movement of 6.87 feet, and the area grazed was 113.35 square feet daily. Water was provided for the sheep, and a piece of rock salt was also supplied them. The pen was covered with canvas, serving as a protection against both rain and sun. The experiment was interesting, and the animals increased in weight, and had the lambs been butchered on August 1, the results would have been satisfactory, but after this date they sickened and died, showing that, while alfalfa is a very nutritious plant, animals need a variety of food. The electrical apparatus drew the pen about 2½ feet per hour, which was sufficient for the purpose. An effort was made to have the animals graze at regular times, as this would prevent their lying down against the side of the pen and blocking the motion, while, if they were accustomed to eating at regular intervals, they would get up at a signal and eat as the pen advanced. The electrical system of moving the pen seems to be commercially feasible, and it is immediately practicable along the lines of the electric railways which are now getting to be so numerous in the agricultural sections. Mr. McNair believes that a thousand pounds of flesh per acre of ground is by no means the limit that can be obtained by this means of grazing.



A MOVING SHEEP-FOLD OPERATED BY ELECTRICITY.

Arsenic in the Hair.

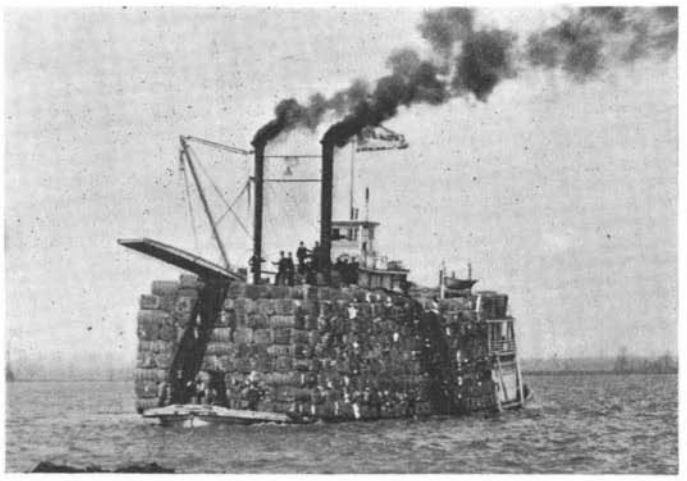
It has been found that arsenic occurs in easily detectable quantity in the hair of persons who have been taking the drug either medicinally or accidentally, as in the case of beer. The observation is of the utmost importance in affording a decided aid to the diagnosis of arsenical poisoning. A method of examining the hair by means of an ammonia copper solution containing an excess of the precipitated copper oxide has been recommended.

In patients taking small doses, the medulla of the hair will remain unchanged, as far as a half-inch objective is concerned; but when viewed by a sixth-inch objective, the small green particles of arsenite of copper are seen appearing as green granules without definite shape or formation. Dr. Reid was led to think that this simple test might prove useful forensically, says the Lancet. In some patients the quantity of arsenic found is too minute to be estimated, but in a patient who is taking the drug medicinally, the hair was found to contain arsenic in the proportion of 0.3 in 10,000. One of the patients who had been drinking arsenical beer had present in his hair the same proportion of arsenic, while another showed as much as 1 part of arsenic in 10,000. The method employed for the estimation of arsenic consisted in first destroying the hair by means of fuming nitric acid, then dissipating the excess of nitric acid, after which the product is transferred to the Marsh apparatus. There is abundant evidence now to show that the fate of arsenic in the body is partly in the hair, and this cannot but be of the utmost importance in medicine, especially in toxicology.

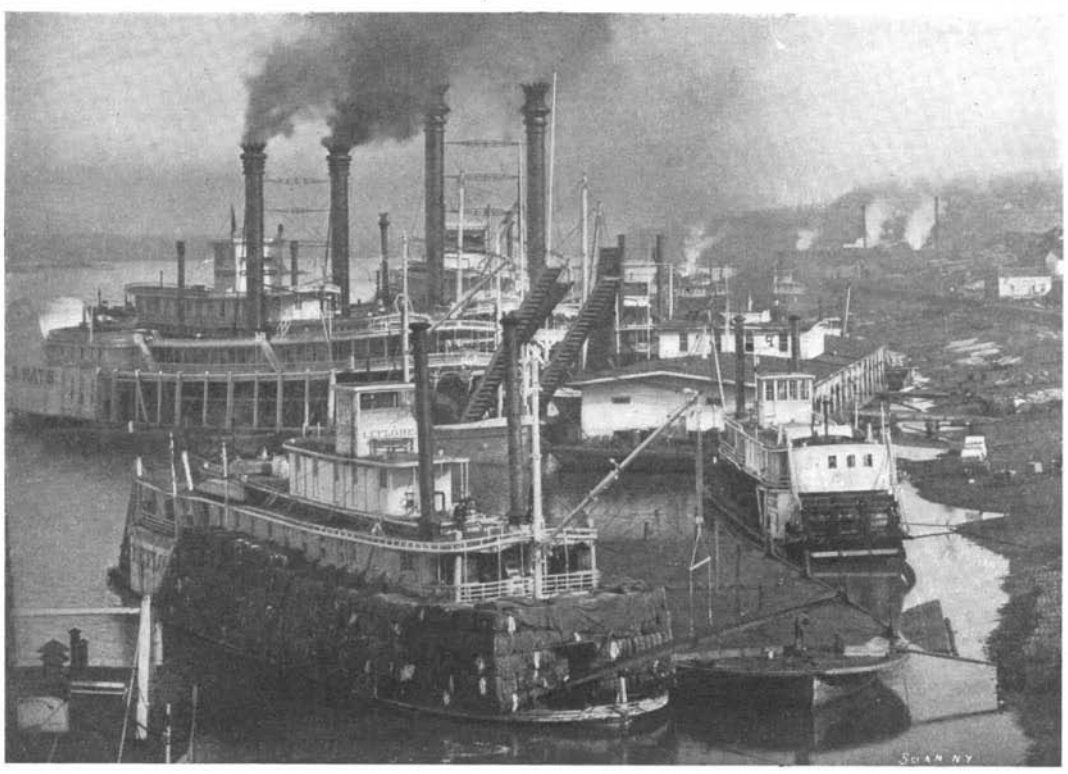
STERN-WHEEL STEAMERS ON THE MISSISSIPPI RIVER.

Although the development of the railroad system of this country, paralleling as it did the main arteries of water transportation, was a severe blow to the river steamship lines, the latter were by no means forced entirely out of the field of competition. There are certain classes of freight and passengers which still seek the river routes, and in spite of the vast reduction that has been made in railroad rates during the past two decades, transportation by water is still cheaper than by land. Naturally the inroads made by railroads upon river traffic were chiefly in the direction of passenger travel and of those classes of freight in which rapidity of transit and delivery was a leading consideration. The truly magnificent river steamers of the Mississippi—floating palaces, as they were not unjustly called—have had to give way as a means of passenger travel to the swifter, if less spacious and comfortable, railroad car; and while a few of the old passenger boats are still running, they are rarely crowded after the fashion of early days. In the transportation of freight in bulk, however, the river steamer still handles an enormous tonnage, not merely on the Mississippi proper, but on its tributary streams. The coal fields of Pennsylvania keep busy a vast fleet of peculiar, two-funneled, stern-wheeled steamers on the Ohio and Allegheny; while the products of the cotton fields of the South maintain an equally busy fleet on the great river itself.

These river steamers are purely an American product. Their peculiar form and the method of placing the motive power have been called forth by the nature of the rivers and the peculiar difficulties encountered in passing over shallow waters and through the swiftly-eddying currents of tortuous channels. The hull of the typical river steamer will have a draught which will vary from 5 to 6 feet to not more than 18 inches. The cargo is carried almost entirely on the main deck. On account of the shallow depth of the hull, care has to be taken to distribute the weights so as to prevent distortion of the hull, which is stiffened, either by means of a pair of timber trusses extending from bow to stern, or by a system of hog chains which are attached to the hull in the wake of the boilers and engines and so placed as to prevent the "hogging" effect of these loads upon the hull. In the type of river steamer shown in our illustration, the boiler is placed a third of the distance from the bow, while instead of the side wheels to which we are accustomed in Northern waters, a single stern wheel is used, which is carried across the square stern of the steamer, and is driven by a pair of high-pressure engines of abnormally long stroke, the engines being bolted to the main deck, one on each side. The connecting rod is of great length, and consists of a single stick of timber heavily strapped with iron. These steamers make landings, not merely at the regular stages, but at all manner of out-of-the-way places on the river banks. To facilitate the landings, forward in the bows they carry one or more gang-planks, which are handled by means of a derrick operated by a steam winch. In making a landing, the boat pushes her nose into the bank, swings the gang-plank ashore, and after discharging or taking on freight or passengers, raises it and backs off again to deep water, the whole landing being made with remarkable speed. The picture presented by some of the cotton steamers when they are loaded to their utmost capacity is decidedly striking, and to eyes accustomed to deep-sea navigation it certainly looks extremely perilous. In the accompanying illustration, the cotton is not only loaded on the main deck, but it is carried up above the upper deck, and even over the boat deck. The cotton is light for its bulk, and therefore the center of gravity of the enormous pile of cotton bales is not so high as might at first sight appear. The wide beam of these vessels, moreover, gives them great stability, and, except in the event of their being struck by a side wind of hurricane force, there is no special risk of capsize



A Full Cargo.



The Water Front at Vicksburg.

STERN-WHEEL STEAMERS ON THE MISSISSIPPI.

Sumatra Eclipse Expedition.

A message just received by President Pritchett from the Boston Institute of Technology eclipse expedition, on its way to Sumatra, gives good news of the progress of the party and of the good health of its members. Prof. Burton writes that all the instruments have been safely landed and placed on board the steamer, and as this steamer goes directly to Padang there ought to be no doubt of the safe arrival of the men and instruments in Sumatra.