

(36) W. A. says, in reply to W. H. P., who asked how a solution of ammonio-sulphate of copper may be rendered colorless and still retain all the copper in solution: Add potassic cyanide. The composition of the solution is altered, but the copper is all there. It may appear dark brown when fresh, but this is due to a little iron in the copper sulphate, and will subside on standing.

(37) M. W. W. says, in answer to the question: Shall we attach a horse to his load at a high point or low? If the load is light and is to be propelled at considerable speed, it perhaps makes but little difference. Possibly it might be advantageous to put it level with the point of draft, as (see your reply to K. C. & Co., No. 40, July 10, 1875), would seem to be your opinion. But if the load is heavy, and the horse will have to exert himself to propel it, it will be, as experience has demonstrated fully, not only advantageous, but frequently absolutely necessary to make the attachment so low that he may have to exert some lifting as well as propelling force; and the rationale of this is that the animal has not weight enough to keep him from pushing his feet backwards instead of pulling his load forward, and he requires to be supplied with it from some other source. I have seen a horse pull a load with a man on his back that he was unable to move without; and any person who has not tried it will be surprised to see how light a load will stall a team when the attachment is such that it is required to exert some downward pulling force. This consideration is also implicated seriously in the practical operation of tractive enginæs, and their efficiency would be greatly increased by any device by which the engine could be given the benefit of a portion of the load to hold it to the ground or track, preventing slipping and carrying unnecessary weight.

(38) M. W. W. says, in reply to several inquiries in regard to the draft of high and low wheeled vehicles: A high wheel will be more easily drawn over any small obstruction in the road (such as a stone or stick), or out of a rut, or through mud; but whether this is the case on an ascending grade is a question not easily determined. It has been asserted that a man will draw a heavier load up a given incline on a small wheeled truck than on a large wheeled one, and the theory for it is that a perpendicular line drawn from the center of the axle falls nearer to the point of contact between the wheel and floor; this is equivalent to the short end of a lever, the distance from the axle to the point of contact being the long end. At first this might seem plausible, but an examination of the accompanying engraving will show

