

## DOMES OR NO DOMES.

Mr. Wm. Lachlan, a gentleman well posted in matters pertaining to European locomotive practice, contributed to one of the late issues of the *American Journal of Railway Appliances* an interesting letter on domes for locomotive boilers. As the relative advantages of such boilers with and without domes have at times been very freely discussed, his remarks showing the tendencies on some of the European railroads cannot fail to be of interest. We quote:

Opinion is much divided in England as to the advantages of domes on locomotive boilers. On the Great Western Railway all broad-gauge engines built or rebuilt since 1846 have boilers without domes. The narrow-gauge engines built about 1862 were built without, but subsequently a large number of passenger and freight engines were built with domes. However, since 1875 nearly all passenger engines have been built with flushed topped boilers, and without domes, and all new boilers are built in this way, the locomotive superintendent, Mr. Dean, clearly preferring domeless boilers. On the Bristol and Exeter Railway all the broad gauge engines were built without domes; in fact, these engines resemble the G. W. R. stock. The Great Northern Railway has probably the largest number of domeless boilers, no engines with domes having been built for this road for many years. There are probably not more than 30 engines on it with domes, and these are tank engines or old engines different from the standard types, and when any of these require new boilers they always are made to conform to the pattern of the standard stock.

The South Eastern Railway is now building nothing but domeless engines, all engines requiring new boilers being altered to the new pattern. This line as far back as 1851 had some 25 engines without domes, some of which are still running; and I can remember two or three of the boilers thus built still in active service on engines running fast passenger trains as recently as 1881, the old boiler barrels of 1851 having then done 30 years' good work. The Glasgow and South Western Railway has no domes on its engines; in fact, the boilers are preferred without. The Lancashire and Yorkshire Railway having such a very mixed lot of engines, and so many different types, has probably as many engines without as with domes, but recently domes appear to be gaining ground. The North British Railway has several domeless engines. At one time domes were the exception rather than the rule; now they are probably nearly as many of the one type as the other. There are a few isolated cases of domeless boilers on the Great Eastern, London and North Western, Caledonian, London, Chatham and Dover, and North Eastern Railways, but they are all stray types, and not in conformance with the standard patterns of those companies. As for the exclusive employment of domes, the following railways in England may be quoted: The London, Brighton and South Coast, London and South Western, Midland, Manchester, Sheffield and Lincolnshire, Tisbury and Southern, and the Metropolitan and Metropolitan District railways. In France domes were not much in favor from 1848 to 1860, but are now used almost exclusively. Very few of the old French "Crompton" engines had domes, and their boilers have certainly done wonderful service. In Switzerland a large number of engines built recently have no domes. In Germany domes are the rule; there are, however, a few old engines to be there met with that are without. In Belgium large domes are the rule. In Holland, as nearly all locomotives are imported, they resemble the types of the countries in which they were built.—*Ex.*

## THE HARDENING OF STEEL BY PRESSURE.

The many trials to harden steel by pressure have usually led to the metal being first heated, and when it has attained the requisite degree of softness being subjected during cooling to a considerable pressure. Clemandot has stated that by his process, as above described, the same properties are obtained as by the usual method of hardening. There is (according to Stahl and Elsen) a greater fineness of grain obtained than in the case of steel allowed to cool naturally, a higher degree of breaking strength and greater hardness being likewise arrived at, provided the steel used for various qualities is sufficiently highly carbonized. It resembles steel hardened by immersion in water, without, however, being identical with it. Two different and almost simultaneous physical effects take place; a forcible and lasting condensation and a rapid cooling of the steel. The latter circumstance (brought about by the contact of the steam

with the stamps of the hydraulic press or with the inserted metal plates) is attributed to the intimate contact with the cooling agent thus effected. The most remarkable consequences produced by Clemandot's process result from the simultaneous operation of these opposing physical actions, corresponding respectively with hammering and hardening by immersion. The pressure need only be exercised upon two opposite surfaces, which should be of a certain extent. It is recommended for the steel to be brought to a cherry red heat, and for the pressure to be brought as quickly as possible to the extreme limit in view, which may be six, twelve or eighteen tons per square inch of surface. The metal-pressing plates should have smooth surfaces. The real difference between this method and hardening by immersion consists in the fact that toward the end of the latter operation an increase of volume is possible, and consequently a diminution of condensation, while the hydraulic press (exercising an active influence during the entire process of cooling) strives to bring back the metal to its original volume and specific gravity, and to prevent the generation of internal tension, such as is known in hardening steel. Experiments have confirmed these theoretical assertions as to the density and resistance of the metal, which becomes much harder without increased brittleness resulting. The effect is greater according as the steel is more highly carbonized.—*Ex.*

## A LARGE PRICE FOR A BIBLE.

A Bible was sold at auction in London the other day for three thousand nine hundred pounds sterling (about \$19,500). It was knocked down, after spirited bidding by a number of contestants for the book, to Mr. Quaritch, a dealer in rare works, and is believed to be the highest price ever paid for a single copy of any book at auction. It is known to bibliophiles as the Mazarin Bible.

The title is derived from the fact of a copy having been discovered in the library of Cardinal Mazarin in Paris, about the middle of the eighteenth century, and it is generally assumed to have been the earliest printed book. There are said to be eighteen of this edition in existence, one-half of which are in public libraries in Europe.

The copy for which Mr. Quaritch bid such a wonderful price is described in the *Art Age* as "magnificent." It is printed in double columns in type similar to church script, and is "splendidly" bound in blue morocco. The Mazarin Bible is without date, and is variously ascribed to the years 1450, 1452, and 1456. A copy preserved in what used to be called the Royal Library at Paris contains a note stating that it was completed "in binding and illuminating" in the year 1456, which would put the probable date of printing at twelve months earlier. According to the catalogue of the Syson Park Library, the Mazarin Bible is printed with metal types. Typefounders, however, have differed on that point among themselves, some contending that it was compressed from wooden blocks, others declaring for letters cut in metal, and a third party deciding in favor of cast letters, the last in every material respect like those now in use. But, whatever kind of type may have been employed in producing the earliest printed book, it would, even at the present time, be accepted as a noble specimen of the typographical art.

The printing of the Mazarin Bible is ascribed to Gutenberg, but the fact, we believe, has never been established beyond a doubt. Mr. Quaritch, in an interview with a newspaper reporter after the sale, said that three out of the five copies of this edition of the Bible known to be owned by private parties had passed through his hands, the first being purchased by him when a young man for £590. "The present copy," Mr. Quaritch went on to say, "I have also bought for my stock, and it is purely a speculation of my own. I do not expect to keep it long."—*Ex.*

A GENERAL SUBWAY.—It is proposed to build a general subway under all the principal streets of London. The cost of such an enterprise would be considerable, but the benefits derived from it would, in the end, more than pay the cost. The architectural and scientific papers speak approvingly of the scheme.

It is proposed to arrange the fire engines belonging to the Fire Department of Brooklyn, N. Y., to burn crude petroleum, instead of coal. The great advantage expected to be gained is that engines on duty can carry a less bulky and more convenient supply of fuel.