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THE BEHAVIOUR OF DUCTILE MATERIAL UNDER TORSIONAL STRAIN.

A very interesting paper on this subject was read
at the Winnipeg meeting of the British Association for
the Advancement of Science by Mr. C. E. Larard,
M. I. Mech. E.

The experiments were carried on at the Northamp-
ton Institute, London, Eng., and the material used
varied in size from half an inch to three inches, and con-
sisted of Staffordshire wrought iron, mild steel, and an
alloy steel containing about three per cent. nickel.

Some of the results obtained are of peculiar in-
terest, because they are different to what was expected.

It was found that there was not, in ductile ma-
terial, a well-marked yield-point for torsion as there is
for tension.

It was also found that when maximum torque is
reached failure takes place by shear, the shear com-
mencing on the surface of the specimen and extending
inwards.

For homogeneous materials the work done is found
to be proportional to the volume, no matter what the
diameter or length.

The elastic limit and the elastic resilience of material
may be raised above the primary limit, which is purely
an artificial one, produced by manufacturing operations,
by (a) overstraining, with full recovery of elasticity to
a higher limit by heat treatment at low temperatures.
(b) By indefinitely long rest after overstraining. (c) By
continuous stressing of material at a fairly constant load
above the primary elastic limit. (d) In manufacturers'
works by scientific straining with subsequent heat treat-
ment. (e) Considering the forms of iron and steel, by the
addition of a small percentage of some other element.
Any one of these methods increases the ratio of elastic
limit to maximum load, and the ratio of elastic resilience
to the total work which has to be done on the specimen
to destroy it.

A comparison of the results of the tests on wrought
iron and steel shows the great superiority of steel as
compared with wrought iron for shafting.

As a practical outcome of these experiments Mr.
Larard drafted a set of specifications for torsion tests.

THE TELEPHONE AND ITS SERVICE.

Next week the Canadian Independent Telephone
Association will meet in Toronto. The problems of the
independent companies are just as vital as they ever
were. The difficulty of arranging exchange of messages,
long distance messages, and of maintaining a highly
efficient line at low cost and without excessive capital
expenditure is still a question with them.

The number of independent companies is increasing,
and the number of Bell-controlled companies is also
increasing.

Canada and the United States have now over
6,500,000 telephone stations, operated by 24,000 com-
panies. The Bell system control 32 companies and
3,215,245 stations.

The telephone and its service has become such a
part of our everyday and business life that we sometimes