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O T T A W A

August 6th, 1940.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 879.

Hardness Tests on Eight Steel Wrenches.

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Bureau of Mines  
Division of Metallic  
Minerals

CANADA  
DEPARTMENT  
OF  
MINES AND RESOURCES  
Mines and Geology Branch  
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Origin of Material and Object of Investigation:

On August 2nd, 1940, Mr. H. H. Bleakney, of the Department of National Defence, Ottawa, Ontario, brought in eight steel wrenches. Four wrenches manufactured in the United States represented the specified quality. The other four wrenches were submitted by a

Canadian manufacturer as being of the specified quality. An examination of the tools was requested in order to test this claim.

Nature of Material:

The following table lists data on the tools received. The numbers given in the table will be used in subsequent reference to the tools.

<u>Number.</u>	<u>Manu- facturer.</u>	<u>Type.</u>	<u>Length.</u>	<u>Size classifications.</u>
1.	Snap-On (USA)	Ratchet socket wrench.	9 $\frac{3}{4}$ in.	Adjustable.
2.	Blue-Point (USA)	Flat spanner	8 $\frac{3}{4}$ "	$\frac{3}{4}$ x 7/8 in.
3.	" "	( " ) " "	8 $\frac{1}{2}$ "	$\frac{3}{4}$ x 7/8 "
4.	" "	( " ) Curved "	5 $\frac{1}{2}$ "	$\frac{1}{2}$ x 9/16 "
5.	F.S.Gray, Toronto, Ont.	Ratchet socket wrench.	9-3/8 in.	Adjustable.
6.	" " " "	Flat spanner	8 in.	$\frac{1}{2}$ BSW x 7/16 BSW.
7.	" " " "	" "	7 $\frac{1}{2}$ in.	3/8 BSW x 7/16 BSW.
8.	" " " "	Curved "	5 in.	$\frac{1}{4}$ BSW x 5/16 BSW.

The wrenches made in the United States were better finished than the Canadian-made tools.

Hardness Tests:

Hardness tests were made on all tools. The Vickers method, with a 30-kilogram load, was employed. The following results were obtained:

(Continued on next page)

(Hardness Tests, cont'd) -

Tool No.	<u>VICKERS HARDNESS NUMBERS</u>		
	<u>Small End hardness</u>	<u>Middle hardness</u>	<u>Large End hardness</u>
1	473	457	418 *
2	537	511	537
3	540	540	560
4	415	391	425
5	250	340	308 *
6	337	307	358
7	315	282	302
8	138	140	140

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\* At ratchet end.

Discussion of Results:

The hardness tests definitely indicated that the steel of the wrenches made in the United States would be considerably stronger than the steel of the Canadian-made wrenches. Prior to making these hardness tests it had been intended to make further physical tests on the steel. There was such a difference in the hardness values, however, that these further tests were not considered necessary. The harder U.S.A.-made wrenches would be considerably stronger and consequently would be less likely to bend, open up, or dent. The hardness values are low enough, however, to ensure a fair degree of toughness.

Conclusion:

The investigation would show that the tools made in the United States were better finished and had better physical properties than the Canadian-made wrenches, which cannot be considered as being of the same quality.

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