GEOLOGY

U. S. Buying Brazilian Diamonds for Victory

Maximum of 300,000 Carats of Commercial Stones To Be Purchased Annually For Use in War Production

THIS country will buy a maximum of 300,000 carats of commercial diamonds annually for two years from Brazil — diamonds to grind delicate lenses of bomb-sights, range-finders, telescopes, aerial cameras as well as the hard, cold steel of armaments.

In agreeing to buy the commercial diamonds from Brazil, the Metals Reserve Corporation, a subsidiary of the Federal Loan Agency, is getting set for a day when commercial diamonds might no longer be had from the present principal sources, the world-famous Transvaal and Cape Colony in the Union of South Africa. It is expected that military industrial needs and this country's increased Western Hemisphere economic program will rapidly increase diamond purchases from Central and South America.

For America at war has put the diamond in overalls to help create military weapons. So important are diamonds in industry, that the Nazis are reported compelled to use jewel diamonds a few of which they seized from Amsterdam and Brussels.

There are two reasons why industrial diamonds are more needed than ever. First, today's metal alloys are frequently many times more hard than the metals formerly used, and nothing but a diamond-pointed tool will cut them. Second, modern production is under such pressure that only diamonds — hardest substance in nature—will stand the pace. In fact, diamond-pointed tools do the work in practically every operation involving smooth "finish cutting" on metals.

They are used in lathe tools for rapid accurate machine finishing of metals; in dressing and truing abrasive wheels; in turning tough, fibrous, molded materials; in boring crowns for core drills used in rock drilling; in circular saws for stone cutting; in diamond cutting points for drilling holes in glass and porcelain; for etching and engraving; for cleaving other diamonds, and for glass cutting.

Massive tank and truck motors owe their precision to the action of diamond-dust finished pistons, connecting rods and main bearings. The inside of a submarine's torpedo tubes are finished to a mirror-like smoothness with diamonds. They machine the magnesium alloy sleeves used in the hydraulic gun turrets of modern battleships.

The myriad direct and indirect tasks industrial diamonds perform are important enough for military and industrial purposes to require the United States to import just a little more than three-quarters of a ton of industrial diamonds (3,908,071 carats) in 1940 from various sources. This figure, compared with the 263,484 carats imported in 1933, indicates the vastly increased demand and importance of the hard-working prisms. Annual world production of commercial diamonds has been estimated at 10,000,000 carats.

The ugly duckling cousin of the king of gems, is either used in its natural shape, or given a brief and brutal going over that fits it better for the tough job ahead. The prices vary in proportion. Top quality gem diamonds, finished but unset, bring $325 to $650 a carat in the retail market. Average price for commercial diamonds in 1940 was $2.86 a carat.

Hence the importance of the Brazilian source of raw diamonds — the United States has only one other source of supply, South Africa. It may well be that this amazing stone will play a bigger and bigger part in shaping our war industry for victory.

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Only eight of the 75 *essential oils* regularly used in perfumes are produced in the Western Hemisphere.

ENGINEERING

Steel, Oil and Labor Saved By Measuring Oil in Pipes

STEEL, oil and labor, the chief sinews of our war production, are saved by using recording or ticket-printing meters to measure oil as it flows through pipes, instead of pouring it into tanks. This was pointed out by L. R. Van Arsdale of the Pittsburgh Equitable Meter Company in an address to the American Society of Mechanical Engineers in Houston, Texas.

In the Army and Navy, trucks and warship tenders are equipped with these meters. They have been used for several years in some of the new oil fields, also in trunk pipelines and delivery trucks. Nevertheless, their use is somewhat in its infancy, Mr. Van Arsdale said.

An oil refinery, he explained, gathers up its crude through a vast system of pipelines coming from many fields. The contribution of each field must be measured. The oil in these pipes is under constant pressure, so that by measuring it by meters in the pipe, the oil is never exposed to atmospheric pressure as it is when poured into tanks. This prevents loss of valuable gasoline vapors, particularly important in the manufacture of 100-octane gasoline for aviators. It saves also a vast amount of steel in tanks and in pipes and pumps to serve them.

Leaks are quickly located by use of meters which record the pressure and the rate of flow on a chart. A drop in pressure means either a leak in the pipe ahead or trouble with the pumps behind. These meters distinguish between the two causes, thus avoiding sending out a crew of men to "walk the line" and another to investigate the pumps and saving many man-hours and long delays.

The meters are more accurate than the older methods and the ticket-printing feature saves time and mistakes in keeping records and accounts.

Further savings are effected by pumping natural gas back into the oil sands. The increased pressure thus obtained raises the oil in the wells and holds back the infiltration of water, which usually spells the end of an oil well. This gas is otherwise wasted by burning in flares.

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