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WAR BETWEEN ENGLAND AND RUSSIA.

The capture of Penjdeh by the Russians, March 30, seems to put an end to peaceful negotiations concerning the disputed boundary of northwestern Afghanistan.

Though occupied by Afghans, Penjdeh lies in a region claimed by Russia to have belonged to its lately conquered neighbor, the Amir of Bokhara, and therefore should be surrendered to the conqueror. This claim was disputed by the Afghans and their allies, the British, and a survey commission had been appointed to examine the ground and fix the proper boundary, an agreement having been come to that neither party should move until the question was properly settled.

The nominal northern boundary of Afghan Turkestan, as shown on English maps, runs almost due east from Sarakhs, near the northeastern corner of Persia, to the southernmost bend of the Amu Daria, and thence along that river to its sources in the mountains of Hindo-Koosh. In the west that line crosses a desert region, without fixed inhabitants, and always in dispute between the semi-independent tribes of the ill-defined political border between Afghanistan and Bokhara.

The old frontier of Afghan Turkestan through the desert did not fulfill the prescribed conditions, and a better one was demanded, running east from Zulfirkar Pass through Akrobal and Bala Murghab. The English and the Afghans were willing to compromise on a line some forty miles further north, a line which would give the Afghans command of the mountain passes leading into their country; but the forcible advance of the Russians has probably put an end to all discussion of the matter, and only a stubborn war will determine whether the Russians stay their course for the time north or south of the mountains, on the Turkoman side or along the fertile valleys of Herat and Cabul.

The latest battle ground lies near the junction of the Kushk River with the Murghab, which streams drain the northern slopes of the mountains, and flowing to the northwest water the oasis of Merv, about 100 miles north of Penjdeh. There they are lost in the sands of the desert. The mountains are that prolongation of the Hindo-Koosh known as the Koh-i-baba, forking into three ranges westward under the general and very ancient name of the Paropamisus.

The Murghab River, the upper valley of which has never been explored, rises between the first and second range. The Heri Rud, or River of Herat, drains the valley between the second and third ranges, the middle range being much the highest, rising in places to 20,000 feet above the sea. The upper valley of the Murghab is inclosed by high mountains, and is said to be fertile and well watered. Its inhabitants are Mongol Hazards. At the foot of the mountains, near Bala Murghab, where the road from Maimana to Herat passes, the river runs through a narrow defile. At Penjdeh, about forty miles below, it enters a broad valley, which gradually opens upon the plain of Merv.

The Kushk flows more directly northward, through a narrow valley traversed by the direct road from Penjdeh to Herat—the best route from Central Asia to Herat and the heart of Afghanistan. It is along this route that the Russian advance will most likely be made. Robot Pass, 45 miles north of Herat, leads from the valley of the Kushk into the valley of the Heri Rud, and is where the severest fighting is likely to occur if the Russians meet with serious resistance north of Herat. Here the Amir of Afghanistan is said to have concentrated a considerable force. At other points, east and west, the mountains are said to be practically impassable by troops. There is, however, a fairly good road along the Persian frontier, and a Russian force is reported as advancing toward Herat by it.

To meet the advancing Russians, the English are said to have 30,000 men at Rawul-Pinde, to the southeast of Cabul and Peshawar, on the Indian frontier; 27,000 men on the road from Quetta, on the southwestern frontier, to Candahar; and 35,000 at Quetta. But before either of these forces can be brought into action the Russians have ample time to seize Herat if they wish to.

The distance from the Russian base at Michaelsvitch on the Caspian Sea to Saraks is about 400 miles, part of the route being covered by a military railway. From Saraks to Herat, as a bird flies, is about 100 miles, the actual route being probably double that distance.

Herat has a population of about 50,000, and is the capital of the province of the same name. It is situated in a fertile plain 2,500 feet above sea level. The plain is watered by canals from the Heri River. The city is 360 miles due west from Cabul, the capital of Afghanistan, and about 200 miles southeast of Merched, the principal city of Persian Khorassan. From a military point Herat is of great importance, as it commands the only route for an army from the northwest to Hindostan. For this reason it has been called the Gate of India. The city has been a strongly fortified post from the earliest times, and recently its defenses have been strengthened to meet the requirements of modern warfare. Candahar, the next place of importance on the route to and from India, is 265 miles southeast of Herat, and has a population somewhat greater. It is fortified, and is a place of considerable manufacturing importance. Cabul, about the same size, is 120 miles west from Peshawar, on the Indian frontier, and 200 miles northeast from Candahar.

LATHE FITS.

In a shop visited recently, workmen were setting up an engine and pumps for utilizing ammoniacal vapor for cooling purposes. The castings were of fine charcoal iron, melted in the cupola by the nicest of coke, and run into moulds made by the most expert workmen. They turned and bored "like old cheese," as one of the enthusiastic workmen declared; they were really very elegant specimens of the capabilities of cast iron. The boring and turning were worthy of the character of the iron—perfect. While looking at the process of ultimate "assembling," it was noticed that a workman could not induce the piston in a cylinder to move by quite energetic coaxing, and it was necessary to turn the eccentric shaft and shift the valve before the piston would budge. This was a fit; and it was done in the boring machine and on the lathe, with no packing rings on the piston! Here was fine work; how much of it is done in our best shops? When it was suggested that it was "too fine," facts were given from recent experiments that proved that, either with steam or with the highly attenuated ammoniacal gas, the closest fits of the initial work are the best; giving not only the best results at the start, but the best during the wear of actual service.

In cylinder boring, scraping to fit is not reasonable; neither can a piston—head, follower, or rings—be properly scraped by hand to fit; this work must be done in the lathe or the boring machine. But very exact work may be done in the lathe without recourse to hand scraping. None of it, however, can be done by the file. It is outrageous that the file should still be permitted on turned work in the lathe. Even in well managed shops this abominable practice is permitted. The variations in the density of metals, and those in the handling of the file, preclude the possibility of filing a turned cylinder true. Where perfect fits are required in the lathe, as plugs for template gauges, nothing can be more exact than the grindstone, the emery wheel, or the corundum wheel, used in a grinding lathe or in an ordinary lathe with the grinding wheel mounted on the tool carriage. But some jobs will not pay for this trouble.

Very good fits may be made in the lathe by the square nose tool and water or oil. This is known as the "water polish;" but it is a polish only incidentally—it is a finish really. For doing it properly the tool should be a square nose tool, but with rounded corners—a tool with a face of one-quarter of an inch, perhaps more, ground perfectly straight across, but with both corners slightly rounded by being rubbed on the oilstone; not enough to be noticed by the eye. The size of the work before this tool is used should be as near the finish as possible, shown by springing a pair of calipers over it, as the object is only to clean off the ridges left by ordinary turning. If properly done, the water polish will leave a piece of lathe work so nearly perfect that it will not only appear to be smooth to the eye, but it will respond to the "feel" of the calipers, and even the finger touch will fail to detect ridges and ridges.

American Tin.

The district in which the deposit occurs is a grand uplift, the highest point of which is Harney's Peak, 7,443 feet above the sea level. The superincumbent strata have been eroded so as to expose the tin bearing stratum, and that itself has been subjected to erosion until large placer deposits have been made around the foot of the peak, yielding stream tin, or concentrate, of great richness. Since May last the Harney Peak Company, of this city, have been engaged in sinking shafts, running tunnels, etc., to ascertain the extent of the deposit, while Professor G. E. Bailey, in a laboratory erected upon the spot, has been employed in making tests of the character of the ore. The developments have been so satisfactory to the company that they have just closed a contract for a sixty stamp mill to be erected at the mines.

Professor Bailey read a paper recently before the New York Academy of Sciences, embodying the results of his observations.