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propound what I believe to be a much more likely explanation, and one founded on a wider basis; but other claims upon my time prevent this; I must be content to give the reasons of my withdrawals, and leave reconstruction for some other time.

In my previous paper I stated that "young noblemen, including the chief, " even till advanced middle age, are never called purely and simply *turanga*, " but always *ngone turanga*, that is *turanga* youth." I have since ascertained definitely that they are called so however advanced in age they may be. It knocks the bottom out of my argument if even noblemen of eighty are spoken of as noble youths, or child noblemen. The term implies that a man is a "prince of " the blood," as we might say, as opposed to the chiefs of clans. This is also the use of the term in Samoa and Tonga (*tamāli'i*; *tama* 'eiki'). In Tonga the King was addressed as "Child" (*tama*)*; while the term *motu'a'eiki*, or "old chief" was applied to minor chiefs. In Samoa the highest rank is the "child chief"; I have found some minor chiefs bearing the title of "fathers of the chief"; a chief is sometimes simply called "child."†

The word "child" is, therefore, a title reserved for the highest rank; the term "old man" is polite address for minor notables.

Finally, the etymology of *turāna* is against the view I previously expressed. The first syllable *tū* is obviously the same as the title *tū* as in *Tū Vumā*, Lord of Vumā, and in *Ra Tū*, Sir Chief. The second part of the word is doubtful, but is presumably the same as *raŋa* in the Maori, Mangarevan, and Paumotuan *raŋatira*. Hawaiian *lanakila*, Tahitian *raatira*; *raa* in Tahitian means "sacred"; *tūrāna* would then mean "Sacred Lord." If this etymology is correct the word goes back to the days before Polynesian and Melanesian split up, and the words have been connected with divine chieftainship from time immemorial.‡

It is interesting to note that the use of the word *turāna* to mean both chief and noble is paralleled by the Indian *rājā*, which means both a king or chief and a member of the *rāja* or *kshatriya* caste whence kings are drawn. A. M. HOCART.

Italy: Archæology.

MacIver.

On the Manufacture of Etruscan and other Ancient Black Wares. By Dr. Randall MacIver, D.Sc. **51**

It might have been supposed that so familiar a class of pottery as the Etruscan black "bucchero" had been by this time fully studied and the process of its manufacture adequately described. But although hundreds of pages have been written on the subject, they have been written principally by authors who had little or no first-hand knowledge of pottery-making. Consequently many impossible and even ludicrous solutions have been offered for what is in reality a fairly simple problem. The results of some actual study of the methods of primitive potters may therefore be useful to those who are interested in ancient Mediterranean wares, whether these be found in the Troad, Crete, and Egypt, or in Italy, Sardinia, and Spain.

For the first point that must be appreciated is that the unglazed lustrous black wares, which are called "bucchero," are found over the whole world, almost literally "from China to Peru," and that, as the products are identical in all essential respects, there is no reason to suppose that the processes are different. We can be enlightened as to these processes by studying them amongst modern peoples like the Zuni Indians, and can then imitate them and observe the results for ourselves.

* *Dictionnaire Tonga-Français* par les Missionnaires Maristes, s.v. *tama*.

† Pratt's *Samoa Dictionary*.

‡ Tregear's *Comparative Dictionary of Maori*, s.v. *raŋatira* and *tu*.

I had been studying in every detail the modern methods of making primitive pottery as they have survived in North Africa and Egypt when, in 1908, I chanced to be visiting Mr. Henry L. Mercer at his pottery works in Doylestown, Pennsylvania. Mr. Mercer, who is not only famous as a potter, but is also an experienced and trained archaeologist, was struck with my description of the results obtained by burning earthenware in an open bonfire instead of in a closed kiln. We immediately determined to make some experiments with materials and means as nearly as possible identical with those which I had seen used. The procedure was as follows :—

Having fashioned of such clay as was most readily available a few vases of small dimensions, we rubbed their outside surfaces with red ochre, that is to say, with the oxide of iron which, often in the form of “*hæmatite*,” is constantly employed by the primitive potter. Next we burnished the surface of the half-dry clay with bottle glass, which chanced to be more convenient than the smooth pebbles generally used for this purpose. The pots, being then ready for the fire, were placed within a ring of stones and the fuel was piled over them and set alight. When the fire had burned out and the pots were cool enough to remove, the experiment was complete. Several valuable points were established. In Mr. Mercer’s own words we proved—

(1) “That our uncontrolled, and therefore usually smoky, bonfire burned the clay in the variegated hues of grey, black, reddish or buff, common to the ancient pottery of prehistoric America, Germany, and France” (and of other countries, it might be added).

(2) “That a pebble polish upon a piece of half-dry clay retains its lustre after the drying and burning of the clay” (this I have frequently observed in watching the modern Egyptian potters).

(3) “That a piece of clay smeared with red ochre will burn red in a moderately smoky bonfire where, minus the ochre, it will burn grey.”

(4) “That a lustrous black unglazed pot is produced, with or without ochre, by polishing the vessel with a pebble, or its equivalent, and smothering it when red hot with coarse sawdust, dry oats, or chopped corncobs.”

The actual fuels used by Mr. Mercer were chopped straw, corncobs, fine sticks, soft coal, sawdust, coarse and fine, and chopped corn stalks, but the material matters very little; at one remote place in Algeria the fire was made of old grass shoes, and any other combustible rubbish.

After our success in producing polished vases which were all black or all red, we turned our attention to a much more difficult problem. This was how to produce the two colours clearly and sharply defined from one another upon the same vase. This combination has never been achieved except in ancient Egypt, and, at one time, in Cyprus under Egyptian influence. Although it is not necessary for the solution of the “*bucchero*” question, Mr. Mercer’s description elucidates several points that have seldom been appreciated as to the causes which determine the redness or blackness of a pot which is being burned in an open fire. After several failures he succeeded in evolving specimens which so exactly reproduced the appearance of black-topped red Egyptian pottery that only by their shape could they be distinguished from the originals. The Egyptian pottery is the well-known “*predynastic*,” which recurs again just after the 12th Dynasty in a more delicate fabric.

Mr. Mercer writes :—“Having made a pot of ferruginous clay which, in a clear fire, would burn red, I rubbed red ochre diluted in water upon it with the hand when half dry, immediately polishing the surface by rubbing with the circumference of a blown glass bottle in lieu of a pebble. I next thoroughly dried the pot, and then stood it upside down with the rim buried an inch deep

“ in a layer of rather fine white pine sawdust, in the centre of which, immediately
“ under the vessel, I placed a piece of resin of the size of a chestnut. Over the
“ bowl thus arranged I so bent a piece of common wire netting as entirely to surround
“ and overarch the pot at a distance from it of about two inches. Both wire and
“ sawdust stood within a circle of about three feet in diameter of loosely piled
“ stones about one foot high. Upon this I threw about a bushel of finely chopped
“ dry rye-straw, so as to fill the stone circle to the brim and entirely cover the bowl
“ and wire. The straw when ignited burned about three quarters of an hour,
“ leaving the pot when cool a good duplicate—even to the waving buff-grey zone
“ below the black of the original specimen. The ancient Egyptian might have
“ varied his fuels, and substituted powdered dung or pulverised bark or fibre for
“ the sawdust. He might have improved upon the straw by substituting piles
“ of caked dry manure (the Zuni Indian process), or reeds or pith or fibre, suffi-
“ ciently ventilated to be nearly smokeless or vaulted over the pot so as to burn
“ to an ash without touching it or crumbling too soon. Or he might have covered
“ the pot with charcoal. But the principle of his process and ours was probably
“ the same. You produce two kinds of heat widely differing in their chemical
“ effects upon clay, smokeless heat and smoky heat, in one and the same operation.
“ The straw, lifted away from the pot by the wire, burns fiercely and with too
“ little smoke to stain an ochred, as it might stain an unochred, pot. When the
“ pot becomes red-hot the sawdust, igniting last and smothering its own flame,
“ ends the baking in a smoky heat which carbonises the rim of the vessel already
“ enough heated by the flame from above to absorb fully the blackness of the
“ smoke before the fire goes out.”

It follows naturally from what has been said in the preceding paragraphs that the black can be burned out of any bucchero thus produced by submitting it to a higher degree of heat in a smokeless fire or oven. This explains the fact, sometimes quoted with such naïve surprise, that a black sherd from Troy turned red when burned in Doulton's modern kiln. It explains also many interesting transitional cases that may be observed in any large collection of primitive pottery, in which the potter has only partially achieved his real purpose, and has produced specimens in which the black fades into paleness, or the red is unintentionally contaminated with black.

Assuming then that the process by which most if not all of the early Mediterranean black wares were produced has been settled by these experiments, I suggest that there is no reason to make any exception of the Etruscan. I am unable to see that this differs from the others in anything but its superior finish. The black penetrates the body of the fabric precisely as it does in the other wares. The fine slip or engobe which coats the fabric has been fired at the same time with the body of the vase in a single operation; it has not been applied after the firing. And it should be unnecessary to state that all the principal burnishing and polishing must have been done on the surface of the half-dry clay; which is the invariable practice wherever I have seen primitive potters at work. The clay when hardened by fire is not amenable to any appreciable amount of pebble-polishing. But it is no doubt possible that wax, resin, or oil was applied to the pot when it came hot from the fire, which would have the same effect as the waxing of a hot meerschaum pipe; that is to say, it would bring the colour more to the surface and distribute it more evenly. It might be easier to determine whether this was done or not if dealers and collectors would refrain from polishing and waxing their antique pottery in the hope of making it attractive to the unscientific public

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