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The Swede Meets the Red Man

by

C. A. Weslager

(*Paper read before the Delaware Swedish Colonial Society April* 3, 1956)

When the Swedes made their appearance in the Delaware River Valley they were immediately brought into contact with the native Indian tribe known as the "Lenni Lenâpē." Some Swedish writers called them "Renappi", and they were also termed "River Indians," "Our Indians," and later by the English as "Delaware Indians." Their villages were on or near the banks of the Delaware River and its main tributaries. They were one of a large family of Algonkian-speaking tribes occupying the coastal area from Maine to the Carolinas. (1)

The Swedes were also thrown into contact with two groups of so-called "Minquas Indians," namely, the "Black Minquas" and the "White Minquas." Both were Iroquoian-speaking peoples. The White Minquas were also known as the Susquehannock; their territory lay along the Susquehanna River and its tributaries; the Black Minquas lived west of them. These Minquas were great hunters and trappers, and they had large stores of beaver and otter skins to trade with the whites. The Lenape were primarily agriculturalists and fishermen. This does not imply that they did not hunt, because we know they sought deer, bear, and other animals to serve the food and clothing needs of their families.

The Minquas, prior to the coming of the Swedes, had been making predatory excursions into the Delaware Valley to attack the Lenape villages. They had already driven some of the Lenape across the Delaware to New Jersey for refuge, and they were excercising a kind of overlordship over the Lenape population at the time white man appeared.

(1) There is extensive literature on both the Lenni Lenape and the Minquas. For a brief account of both peoples, particularly with reference to the Delaware River area, see C. A. Weslager, "The Indians of Delaware," Chapter 2 Delaware, A HISTORY OF THE FIRST STATE, ed. H. Clay Reed, Lewis Historical Publishing Co., N. Y. 1947

To fully understand the relations between Swedes and Indians, it is important that this cultural difference and conflict between Lenape and Minquas be recognized. It must also be stressed that the Minquas were not occupants of the state of Delaware; this area, and land on the opposite side of the river, was long possessed and occupied by the Lenape who considered themselves the rightful owners. Since some white explorers encountered Minquas warriors in this area they erroneously concluded that the Minquas lived here.

In characterizing the relations between Swedes and Indians, I have selected three phases for discussion (*a*) *real estate* (*b*) *commerce* (*c*) *evangelism.* This does not by any means exhaust the subject engendered by Indian-Swedish intercourse, but are ones of major importance. I will leave for another time such items as the fishing and farming techniques which the Indians taught the Swedes; the use of firearms and whiskey which the Swedes (and others) taught the Indians; and the general moral relationships between whites and Indians of which there is documentary record of robbery, kidnapping, murder, rape, and arson, with one of the other parties as the offender. (2)

The relationship between Swedes and Indians, although often referred to loosely as "friendly," was by no means always peaceful or harmonious. The Swedes never experienced open warfare with the Indians, as did the Dutch at Manhattan, but on occasion blood was shed on both sides. In 1645 the situation became so critical that the Lenape chief Mattahorn sent his son Aggahorn to summon the other chiefs to decide on a retaliatory course of action against the Swedes.

Mattahorn then addressed the assembly as follows: (3) "My good friends, every single one, don't take it amiss that my son Aggahorn has called you to us in this place. For the Swedes dwell here upon our land; and they have many fortresses and buildings for their habitation, but as for selling, they have no goods to sell to us. We can find nothing; neither have they in their stores anything good that serves us that we might trade with them; the question is, whether we shall go out and kill all the Swedes, and destroy them altogether, or, whether we shall leave it at that. Which we shall do we do not know. Therefore, I am glad that

(2) Some of this is discussed in C. A. Weslager, RED MEN ON THE BRANDYWINE, Wilmington, 1953, see Chapter 4

(3) This dialogue was recorded by Thomas Campanius (Holm) in A SHORT DESCRIPTION OF THE PROVINCE OF NEW SWEDEN, etc. trans. du Ponceau Phila. 1834. However, a new translation of the dialogue was made for me by the Swedish linguist Nils G. Holmer from which the above is quoted.

you have come here, that we may consult together on this subject. You chiefs and common men, what advice do you give? What shall we do with the Swedes? They have no cloth, that is, red, blue or brown frieze. They have no kettles, no brass, no guns, no powder; they have nothing to sell to us, but the English and Dutch have got all sorts of good merchandise."

After weighing the question, it was the consensus of the chiefs that the Swedes would shortly receive goods in ships from Sweden and it was decided not to attack them. Needless to say the Lenape greatly outnumbered the Swedish population, and an organized onslaught might have resulted in exterminating the Swedes. That, we remember, was the destiny of the Dutch colony at the Hoeren-kil, following a misunderstanding with the natives.

Governor John Printz favored strong-arm methods in negotiating with the Lenape, and on one occasion he told them, through their chiefs, " . . . that in case they hereafter practised the smallest hostilities against our people then we would not let a soul of them live." At the same time he was reporting to his superiors in Sweden that, ". . . nothing would be better than to send over here a couple of hundred soldiers and [keep here] until we broke the necks of all them in this River, especially since we have no beaver trade whatsoever with them, but only the maize trade." (4)

The feeling of animosity that developed in these trying days had its roots in two of the subjects presently to be discussed: (*a*) *real estate* and (*b*) *commerce.*

Turning first to (*a*) *real estate,* the purchase of land from the Indians was the first step in any relations and a necessary one to enable the seating of a garrison or the establishing of a colony. You will recall the events that took place March 29, 1638 on board the *Key of Calmar* as she lay at anchor in the Christina. Peter Minuit had summoned the native chiefs to consult with him, and five of them, including Mattahorn, the head chief, were taken aboard the vessel. Minuit asked them, "if they wished to sell the river with all the land lying about there and as many days journeys as he would request." The sachems agreed and "ceded, transported, and transferred all the land and as many days journeys on all places and parts of the river as they requested; upwards and on both sides." (5)

(4) THE INSTRUCTION FOR JOHAN PRINTZ, trans. Amandus Johnson, Phila. 1930, p. 117

(5) "Affidavit of Four Men from the Key of Calmar 1638", NARRATIVES OF EARLY, PENNA. WEST N. J. AND DEL., ed. Myers, N. Y. 1912, pp. 86-89 pp. 86-89

At the same time the chiefs acknowledged payment "by good and proper merchandise which was delivered and given to them."

The deeds covering the transaction have not been found, and there has been some doubt about the exact bounds. Nor do we know exactly what the chiefs were paid, but the holds of the Swedish ships brimmed with several thousand yards of duffels and other cloth, hatchets, adzes, knives, tobacco pipes, mirrors, finger rings, combs, and earrings, all more precious to the Indians than riksdalers or florins. Later Mattahorn said he received an iron kettle as part of his share of the merchandise.

The subject of subsequent land purchases by the Swedes has been discussed by de Valinger (6) and the net effect was to provide the Swedes with what they believed was a legal right to ownership of land on both sides of the Delaware. Herein was a crucial point of difference in thought and understanding. The Lenape did not grasp the Swedish concept of land ownership and sale, and the eventual consequence to one who permanently disposed of his land. Land, to the Indian, like air, was everywhere and accessible to anyone who wanted to walk on it, Swede and Indian alike. If Swedes were generous enough to want to enrich the Indians with articles of inestimable value to acquire "use" rights to the land that was evidence of good faith. But to the Indian mind, land, air, and water were not articles of commerce to sell outright. Land might be used by others, and the "use" rights for hunting, fishing or even dwelling could be transferred, but that did not exclude the owner from continuing to share in its use.

Under the native concept, "use" rights to land could be given to Swedes, Dutch or English — individually or collectively — and each would acknowledge the privilege by appropriate tokens and gifts. To the Swedes and other Europeans such a transaction meant that actual ownership had been deeded to them, and from that point on they were within their legal rights to deny access to the land to others, even the original Indian owners, if they so chose. The other Europeans held to the same views.

The Indians also expected the white leasees to their lands to seal the bargain periodically with gifts. If the Europeans had no gifts to give (which is what happened when Mattahorn called his war council) the Indians felt themselves justified in denying further use to the land - - - even though the whites may have cleared it for cultivation, built houses on it, and had beautiful parchment deeds to prove their ownership in a

(6) Leon de Valinger, Jr., INDIAN LAND SALES IN DELAWARE, Wilmington, 1941 1941

white man's court. Here again the difference in values between the Swedes and Indians was a source of misunderstanding and conflict. The Indians found themselves dispossessed of land that they never intended to sell outright and thus deny themselves access to food, fish, and game necessary to their livelihood.

In the second major phase of Indian-Swedish relations, (*b*) *commerce,* another important difference between European concepts and the Indian barter system was brought into sharp contrast. In Sweden a medium of exchange in the form of currency had been well established, but Swedish money was useless to the Indians except as an oddity. Contrary to popular writers Indian wampum did not serve as currency, at least prior to the time the Indians began to borrow the white man's commercial ideas and institutions. In the absence of an accepted medium of exchange, the simple act of bartering duffel cloth for beaver skins, or gunpowder for otter pelts can and did lead to serious misunderstanding. The Indians had no formal system of linear measurement nor accepted standards to calculate weight or volume.

I might give an Indian a handful of gunpowder for a pelt - - but a traders with a larger hand than mine would innocently give more. The Indians who received the powder would compare the quantities and my customer would feel that he had been cheated. If I measured duffels from my nose to my extended thumb, the yardage would be greater than that measured by a trader with shorter arms. Lindeström said that when trading with the Indians, "in the merchandise of the Christians one can make an excessively large gain and profit." He pointed out that when measuring frieze for an Indian, the trader stretched it so that when the Indian bought three ells he really received two. Lindestrom said that when measuring powder, the unscrupulous trader drew his fingers tightly together so that the Indians received only one-half handful. (7)

After obtaining land rights from the Lenape, the Swedes started to reach for the beaver trade. They soon learned that the Lenape could not supply them with the type of pelts they were seeking for the European market. They obtained corn, beans, hops, fish, and other like commodities from the Lenape, but this type of merchandise was not in demand in Europe. Thus, a flourishing trade was started with the Minquas for the precious beaver which was plentiful in the Minquas' country. The Minquas came to Fort Christina to barter, and Swedish traders penetrated the Minquas' country.

(7) Peter Lindeström, GEOGRAPHIA AMERICAE, trans. Amandus Johnson, Phila., 1925, see Chapter 20.

Governor Printz's instructions told him to: " . . . allow the wild people to obtain the necessary things they need for somewhat more moderate price than they are getting them of the Hollanders from Fort Nassau or the adjacent English, all that said wild people may be withdrawn from them, and so much the more turn to our own people." (8)

The Swedes did underbid the Dutch and thus diverted the beaver trade to themselves as long as they had trade goods to barter. From this situation there developed two sources of friction.

FIRST, the Lenape resented the flow of Swedish trade goods to their Minquas enemies, causing Governor Rising to report that, "Our neighbors the Renappi threaten not only to kill our people in the land and ruin them before we can become stronger and prevent such things, but also destroy the trade, both with the Minquas and the other savage nations, as well as with the Christians. We must daily buy their friendship with presents for they are and continue to be hostile and worse than they have been hitherto." (9)

SECOND, trade goods became scarce because of the absence of ships from Sweden; problems in the homeland were taking precedence. Once the Indians had enjoyed the luxury of European goods they became unhappy when the storehouse at Fort Christina fell empty.

For two years, from 1644 to 1646, Printz claimed he had been without merchandise to trade with the Indians, and that 8,000 or 9,000 beaver pelts had gone to the Dutch. In 1650 he wrote that " . . . all the trade has this year been in the hands of the Hollanders, for we have had no cargoes at all and as long as we are without cargoes we must fear the Savages." (10)

Printz in master strokes of strategy had blocked the Dutch in the beaver trade by closing the principal avenues to the Minquas' country. But it was for naught, because control of the trading routes meant nothing unless one had sufficient goods to engage in commerce. The patience of the Indians was overtaxed and their loyalties shifted to those who could furnish the goods that they sought. Had the homeland been able to give full support to the American colony the commercial relations would have guaranteed the close friendship of the Indians. We now realize that commerce with the natives, worsened by the action of Dutch and English competitors, was a source of conflict.

(8) INSTRUCTIONS, OP. CIT.

(9) "Report of Governor Johan Rising, 1655" in NARRATIVES, OP. CIT., pp. 156-57

(10) INSTRUCTIONS, OP. CIT.

The third important phase of Swedish-Indian relations, (*c*) *evangelism*, comprised the efforts to Christianize the natives. From this activity there developed a number of interesting sidelights deserving of detailed comment.

Religion in the 17th century was something that affected the governments of Europe in a more direct and vital way than it does today. Gustavus Adolphus of Sweden was a champion of Protestantism at a time when religious differences was a direct cause of war between Catholic and Protestant countries. Protestant princes considered the Swedish king as a true defender of their faith and heritage.

In every Swedish city, every community, every home the duties of worship consituted a first requirement. Minuit's instructions when he left Sweden for the New World included, among other things, directions to conduct prayers morning and evening. and anyone absent without cause was to be fined.

Tobias Biörck wrote that Usselinx promoted the first expedition in Sweden by pointing out, "an extraordinary profit and income would be received by our country and on the other hand also that the light of the Gospel might thus be kindled and spread in th best way among the barbarous races." (11)

Governor Printz's instructions directed that he should, "at every opportunity exert himself that the same wild people may be instructed in the true Christian religion and worship."

There can be no doubt that the opportunity of spreading the Christian religion to a "heathenish" race was in itself an honest and sincere motive and a logical by-product of the wave of religious fervor then sweeping Europe. The missionary-preachers which Sweden sent to America were capable, educated men and the best the homeland could afford.

Among these preachers there is one who looms very important in Indian relations and whose work was unique; I refer to John Campanius. He arrived at Fort Christina with Printz in 1643. Campanius had studied theology at the University of Upsala where he received an M.A. degree: had served in Russia as a chaplain at the Swedish legation; had been a school teacher in a small town north of Stockholm; and a resident clergy-

(11) Tobias Eric Biörck, THE PLANTING OF THE SWEDISH CHURCH IN AMERICA, trans. Nothstein, Rock Island, Ill. 1943, p. 13.

nish. In 1628 it was published in Russian, in Stockholm, "after God Almighty hath graciously bestowed upon us Russian subjects."

Campanius saw the opportunity of bringing the catechism to a pagan people who needed it even worse than the Lapps and Russians, and he commenced a task of great difficulty—the translation of Luther's "Little Catechism" into the Lenape dialect. By 1646 the work was completed to the point that he could read from his translation to his Indian converts He was the first European to record a religious tract in the Lenape dialect; and the first white man to compile a written vocabularly of Lenape words.

Following his return to Europe, Campanius in 1656 presented his catechism to Karl X in the hope that it would be published and circulated in America. The catechism was not published, however, during Campanius' lifetime. In the year 1696, through the efforts of his grandson, Thomas, and others, it was finally published in an edition of 600 copies in the press of Buchardi at Stockholm. (18)

As an addendum, the catechism included a Lenape vocabulary with Swedish translations; Lenape idioms with Swedish translations; and numbers 1 to 100. There was also included a vocabularly of certain Minquas words. (19) From a strictly linguistic point of view the vocabularies are of greater value in contributing to our knowledge of the Algonkian tongue than the catechism itself. Holmer's careful analysis of the catechism indicates "it has more interest from a general point of view or for the sake of curiosity than for the linguistic study of the Algonquin languages." (20)

It is of interest to note that John Eliot's Indian Bible, published in 1664, is generally accepted as the first religious translation in the Algonkian language. Eight years prior to its publication Campanius had presented his catechism to the King. Eliot began his work among the New England Indians in 1646 whereas Campanius started his missionary activities in 1643.

(18) COLLIJN, OP. CIT. states that there are 20 known copies today.

(19) Almost identical vocabularies were published in Thomas Campanius (Holm) SHORT DESCRIPTION, OP. CIT. These were, of course, taken from his grandfather's notes.

(20) Nils G. Holmer, "John Campanius' Lutheran Catechism in the Delaware Language," No. 3 of Essays and Studies on American Language and Literature, University of Upsala, 1946.

Campanius was not the only Swedish minister to seek converts among the Indians; Reorus Torkillus was used by Printz in a mission to the Indians in 1643. (21) and, as we shall see, there were others.

With Governor Rising's surrender to the Dutch in 1655 New Sweden was lost to the mother country, and interest in converting the heathen Indians waned. There were, of course, many changes in political and social life, and the official ties were broken with Sweden. Eventually the Swedish congregations were without clergymen, and of particular interest to us was the situation at the Tranhook (Crane Hook) Church near Wilmington where Charles Springer occupied the pulpit as a lay leader. In 1692-93 Springer had an exchange of correspondence with John Thelin, postmaster in the city of Gotheborg, urging that ministers and religious books be sent. (22) The appeal eventually reached Charles XI, who gave his consent, and in 1696 three clergymen, Andrew Rudman, Eric Biörck, and Jonas Aurēn were chosen to come to America. Biörck, as we know, selected Tranhook and preached there until 1699, following which the congregation occupied a new building which we know today as "Old Swedes Church".

Among the religious books which the clergymen brought to America, as a donation from Charles XI, were 500 copies of the recently published Campanius Indian Catechism. (23) Of interest is a statement in Springer's letter to the effect that "the Indians have not molested us for many years" indicative of the peaceful relations that then existed, doubtless the result of the William Penn Indian policy.

A letter written by Biörck, October 29, 1697, indicates that the catechism was used in converting the Indians: "The Indians and we are as one people; we live in much greater friendship with them than with the English; they call the Swedes in their language their own people; they were very glad when we came, as they see now that Sweden does not abandon them. They are also very fond of learning the catechism, which has been printed in their language; they like to have it read to them, and they have engaged Mr. Charles Springer to teach their children to read it. Who knows what

(21) SWEDISH SETTLEMENTS, OP. C.T., p. 371.

(22) ACRELIUS, OP. CIT. pp. 176-199

(23) Of interest is the statement of Thomas Campanius (Holm) that Charles XI "in order to propogate the pure word of God in those parts caused the catechism translated into the English language by my grandfather, John Campanius Holm, to be printed and sent to his old subjects, the Swedes, in America." p. 45, A SHORT DESCRIPTION, OP. CIT.

God has yet in store for them, if our lives should be spared, when we shall have acquired their idiom? We shall spare no labor to attain that object." (24)

From 1696 to 1786 the Swedish government sent 24 clergymen to America; Jonas Auren conducted missionary work among the Indians, and on January 13, 1700, he wrote a long letter recording a conservation with an Indian on the subject of Christianity. (25) Andreas Hesselius also spent time in converting the Indians. (26) By the time these later preachers made their appearance the local Lenape had departed from their ancestral homes in the State of Delaware and were already moving westward, first pausing for a number of years along the Susquehanna with other groups of expatriated Indians. Here they were exposed to the influences of the Moravian preachers after the Swedish Lutherans apparently lost their interest in this effort.

(24) Complete letter quoted in J. C. Clay, ANNALS OF THE SWEDES ON THE DELAWARE, 4th edition, 1938, pp. 81-88.

(25) BIÖRCK, OP. CIT., p. 39.

(26) "Journal of Andreas Hesselius, 1711-1714" *DELAWARE HISTORY, Sept. 1947, p. 66*

The Interdependency of Religion and Art In the Culture of the North American Indian

by

John Swientochowski

Art and religion in the life of the Indian, I believe, was an outgrowth of the peoples feelings, based largely on their environment. To support this theory let us peer briefly into the various areas of our land and see the basis for this belief.

Here in the east, great forests covered the land, producing what we call the Woodland Culture. The people living here found passage difficult in the thick woods, so they made small clearings near streams or rivers and built permanent villages. Since they were stationary for periods of time, they took to cultivation of plants; tobacco, corn, potatoes, squash and tomatoes had their beginnings in the hands of the Indian planters. Though farming was practiced, hunting and fishing filled their greatest need. To supply meats the men were kept occupied through most of the daylight hours. This left the women to look after all the needs of both home and field.

Travel was mostly on water, by bark canoe in the northern portion of the land, and by dugout in the south. To wander through the woods was a dangerous and foolhardy business. Behind any tree could be found danger, either human or animal. The dark recesses were full of malignant spirits. Many stories evolved around the dark unknown, and many myths were woven into the religion. To better tell these stories, masks were carved to represent the beings portrayed. Carving the masks on living trees gave them life, and enabled the mythical beings to walk among, and be visible to humans.

The Lenape had masks that were painted half red and half black, in the belief that in evil there was also good. They believed that animals

Proving the Uses of Indian Artifacts

by

*Wesley H. Hayes**

Many years have passed since human eyes have noted and human brains have first realized that the relics of our forerunners have been lost, buried carefully, or left behind by the rovers of the populace of the primeval out-of-doors, to be afterward retrieved as material for our study of their way of living.

Many men during the last seventy-five years have hunted and studied these remains, and have written volumes regarding the geographical location of their deposition, the materials of which they were made, as well as lengthy descriptions of their colors, shapes, sizes and probable uses.

Names have been given to them by men closely connected to the circumstances surrounding their discovery in the light of archaeology. Romance has been built up by writers with active imaginations, so that the story of prehistoric life has at this day a great fascination for those who hear it from the ones who tell it well and can show the evidence in a collection of relics well displayed.

There still remain, however, to the average man and the amateur student mysteries unexplained which, if they will apply the detective's principle of attention to detail and deduction, they can discover many signs and proofs of the actual uses of whatever specimens or material with which they come in contact.

We are, I fear, many times too apt to pass too lightly by the tell-tale marks of usage, which if scrutinized closely, will unfold more of information and archaeological value than we had suspected.

**Editor's Note: Wesley Hudson Hayes (1877-1957) was a pioneer non-professional archeologist who resided for many years at Irvington, New Jersey. Prior to his demise, he presented many of his unpublished manuscripts to a long time friend and our Society's President, C. F. Kier, Jr. It is planned by your Editor, with Kier's consent, to have Hayes' articles appear from time to time in our Bulletin. A. G. S.*

Take the commonest aboriginal implements, the arrow points, for example. Maybe they are just that and nothing more if you don't care to go deeper into the matter, but if you study closely and learn all the varities of stone from which they are made, in every grade from homely sandstone or slate to semi-precious stones such as agate, obsidian, opalized wood, chalcedony and jasper, the lesson in geology and mineralogy contained therein is remarkable.

There are many times more broken artifacts than whole ones; and wouldn't you like to know how they became broken? Examine them thoroughly and be rewarded. It is plainly discernable on some of the points that they have been shattered by striking some hard object point first. Who can tell whether they hit the bone of an animal, or perhaps that of a human being, or they may have missed their mark completely and hit a stone as hard or harder than themselves? A close inspection will reveal the difference between the break which was accidental and the controlled fracture made by human hands. The specimens often found in cultivated fields which have been broken by horses' hooves or by farm machinery, should not be confused with those broken during actual use.

There are many crude-looking specimens which are commonly called rejects. This writer believes, subsequent to long study and observation that most of this class of artifacts are either the work of beginners in the flaking art or are unfinished. Of course the weapons broken during the course of manufacture are rejected, as witness the great number of such pieces found at workshop sites in different localities. However, many points are completed of what appears to be very refractory material, yet they are useful as weapons, so they prove their usefulness though not their beauty.

Many times specimens are to be found which were originally made for use as arrow points but which have become broken, then have, through the human characteristic of economy, been re-pointed, or trimmed across the broken edges to be used as scrapers, and thus have had dual usage, the proof being in the show of wear.

Each tool, or weapon, or utensil made by primitive man necessitated the use of some other, with the exception of the cobblestone hammer which was shaped by natural forces, and was used "as is". Yet, to prove that it was used as a hammer it must show the marks resulting from blows, otherwise it cannot be selected as a tool from other millions of cobblestones.

Could we but gather together a complete set of the implements and tools which are used in the making of any certain kinds of artifacts and display them in their true significance we would have as complete a cycle

of ancient man's activities and industry as would be possible with our historical accomplishments. Who has ever seen a complete set of the tools used in making a stone axe, for instance? Yet we can definitely state through observation just about what would be contained therein. Again, who has seen the sort of pick which was used to make a counter-sunk or inverted conical depression in a gritty sandstone rock? So far the writer has not been able to prove such a tool by the possession of a specimen. Who can show a set of the tools used in the pecking, drilling and polishing of a bannerstone of hard and resistant material?

There are some types of artifacts which have not yet been proved as to their real uses or significance in primitive life; namely, bannerstones, birdstones and those which are called ceremonials or problematicals. New evidence may some day prove their uses.

When an axe is mentioned the listener usually thinks immediately of its purpose as being fixed on the act of chopping wood, nevertheless the writer has seen axes of stone which show by the marks of use that they were definitely used for hammering, and in one case an axe from a cliff dwelling in Arizona bore the striae in exact duplicate of the same on the stone hoes and cultivators of other localities, thus strengthening the belief that this axe was used in the cultivation of food stuffs rather than the chopping of wood.

There are many so-called perforators and drills in existence to-day, none of which show the slightest wear from use, yet when one or more is found worn smooth on its cutting edges their case is proved. The same circumstances and evidence apply to all forms of scrapers, for the telltale marks left by the scrapers on artifacts made of steatite, slate, shell, etc., fit into the sequence perfectly. It is a fact that very many specimens do not show the wear and tear from use that we would expect to see, and which is hard to understand in view of the great numbers of artifacts in white men's cabinets and show-cases. Probably every student has seen more broken implements than whole ones in the course of his collecting and to the writer that is proof of their usage, for many of the most perfectly made ones are fragile and easily broken during use.

Every collector at times comes across artifacts which have him puzzled as to their usage, but let him seek and study and he will eventually arrive at the solution to the puzzle. The very mystery of the hidden past of the objects in hand precludes the knowledge of their exact uses many times. Guesswork has no part in science, and until the case is proved it does not become a science. So, let us prove our science while we see what we look at, understand what we see, and enjoy all that we understand.

An Improved Earth Shaker

by

Elwood S. Wilkens, Jr., James B. Akerman
and
Harry J. Simpson, Jr.

The effective screening of soil from an excavation is always a major job. The usual forms of screens are not particularly satisfactory because they do not fill the requirements for the job. The first requirement is the proper sizing for the material being handled. The second is no less important, that is, getting the soil through the openings with the least physical effort and the least possible damage to fragile artifacts. Of course, with all of this, the shaker must still be portable.

The authors were confronted with the need for more effective screens than the hand ones in use at the excavation at Minguannan. It was decided to construct a "Bird-Ford earth shaker" as described by Junius Bird and James Ford in American Antiquity Vol. XXI, No. 4, P. 399, 1956, but we wanted to build a more sturdy machine and to modify it in other respects. The shaker was constructed during the winter of 1956 and tried out in the field before completing the construction of a motor mount as in the original model. When the shaker was tried out it was found to be so satisfactory that the motor mount was abandoned. A motor-driven shaker would certainly be troublesome with a motor to be carried back and forth, starting a motor and keeping it running. It seemed to us a problem to keep a motor-driven shaker operating without considerable side-wise motion.

The machine is readily portable and it can be handled by two men. Because the shaker is hand-operated it can be stopped and started at will which is an advantage over a motor-driven shaker.

The screen consists of a 3x4 foot piece of 20 ga. perforated metal (steel) with staggered one-half inch round holes. This means that the screen actually sizes the materials to one-half inch and not about three-quarters of an inch as one gets with the usual one-half inch hardware cloth. The perforated metal will outlast hardware cloth many times. The original screen has been used one full season and will last at least one or two more. According to engineers, round holes are also more efficient as a classifier than are other shaped holes. Perforated metal with round holes is available in many sizes from extremely fine up to very large holes.

The intermediate sizes from 1/8 to one inch should prove to be useful so that the desired sizes could be obtained and used interchangeably according to the needs of the particular excavation. For instance metal with 1/8 to 3/16 inch holes would probably be ideal for sand, while holes larger than one-half inch would be suitable for gravelly or rocky soil.

In use the shaker is set at right angles to the grid being excavated, which puts the person at the screen in the proper position so that the screen and not the operator receives the soil. The open end of the screen is elevated slightly which prevents the soil leaving the screen until it is completely classified.

The shaker is easy to operate, even for women. One person can operate it with ease using one hand. The operator soon develops the proper rhythm so that the screen travels almost the full possible path at a rate of 40-60 strokes a minute. The proper technic is to pull the screen toward the operator for a distance of about seven inches and then permit the screen to almost go forward by itself, only enough push is given to cause a forward travel of about three inches, giving a total stroke of about ten inches. The screen is then pulled back as before but fairly sharply. When the screen is operated in this fashion it rocks backward and forward with ease requiring little physical effort. In so doing the soil is gently thrown up into the air and then falls back onto the moving screen. This motion gives the soil the very effective rapid change of direction that is necessary to send the fine soil through the openings and to break up the larger pieces.

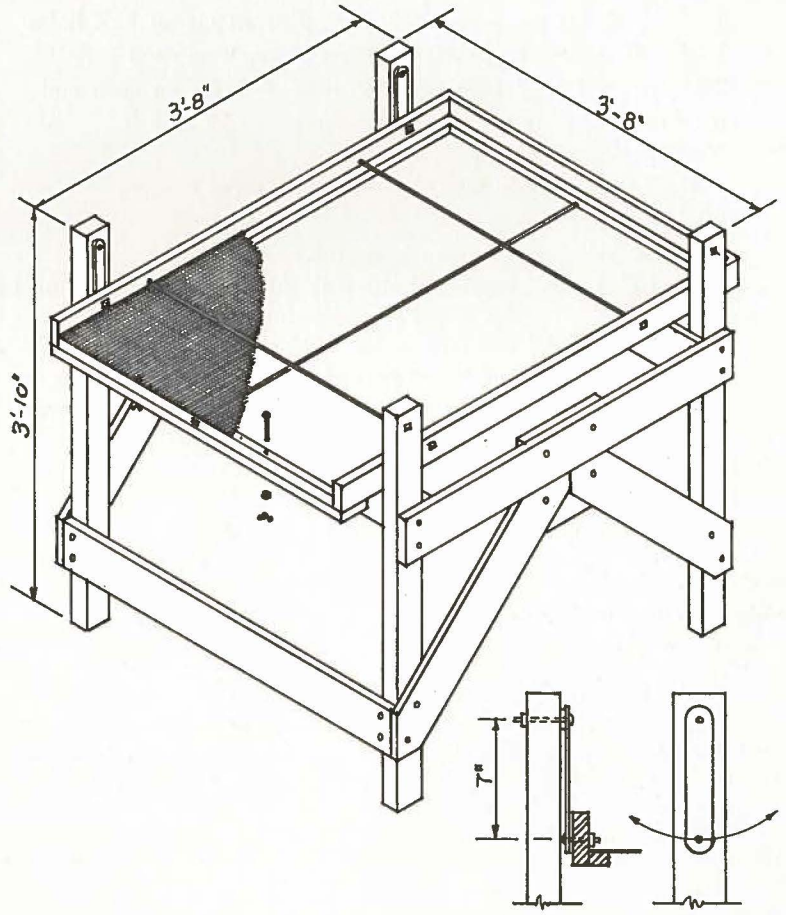
The soil at Minguannan is a heavy clay subsoil, overlaid with a micaceous silt. The silt is comparatively easy to screen on the usual screens but the fine roots from the grasses and trees soon clog them up. The subsoil is difficult to screen through one-half inch hardware cloth at any time, some areas contain small water-washed pebbles that are particularly troublesome. With the shaker and screen described in this article the screening is so much easier and so much more efficient under the above conditions. It only requires the services of one trained person so that the problem shifts to one of obtaining the soil for the shaker to screen. Thus more people can be put to digging and speed up the job. Even the wet clay subsoil can be screened with good results, when it would have been almost impossible with other equipment. A trowel is used to assist in breaking up the larger lumps and in scraping off the screen to clear the holes.

The shaker is permitted to stay on location during the digging season but the screen is removed at the end of each day. The screen is removed by taking out the bolts at the open end of the screen frame that holds it in place. We have experienced very little vandalism, only a few slivers of the corner posts having been sliced off by fishermen.

One unexpected dividend has been on backfilling. It has been noticed that in the areas where the new shaker has been used that the soil was sufficiently level as to require almost no smoothing out while

the old methods left the soil in piles. The soil after it passes the new screen is finer and looser than with the old hand screens. These screenings tend to roll and produce flatter mounds when shovelled away from the screen.

The accompanying sketch and bill of materials should permit any interested person to build a shaker and screen after our design.



BILL OF MATERIALS

Hardware for shaker frame:

16—5/16" x 3½" carriage bolts
16—5/16" x 4½" carriage bolts
12—5/16" x 2½" carriage bolts
(nuts and washers for the above)

Lumber for shaker frame:

4—2" x 3" x 46" oak for legs
6—1" x 5" x 44" oak for ends and sides
2—1" x 10" x 10" oak for side back plates
4—1" x 5" x 42" oak for angle braces

Hardware for screen frame:

1—3' x 4', 20 ga. perforated steel with staggered ½" holes
1—5/16" x 50" iron rod, threaded 5" back on each end
2—5/16" x 38½" iron rod, threaded 3" back on each end
16—#10 x 1½" flat-head wood screws
8—#12 x 2" flat-head wood screws
4—¼" x ¾" angle irons to reinforce frame corners
16—¼" x 1¼" stove bolts
4—1" x ¼" x 8½" strap irons for swing irons
4—5/16" x 1½" carriage bolts with the square shoulders filed off for lower end of swing arm
4—5/16" x 2½" carriage bolts with square shoulders filed off for upper end of swing arm
2—¼" x 3" stove bolts and wing nuts for fastening screen to frame
16—¼" nuts
18—¼" large flat washers
12—5/16" nuts
12—5/16" flat washers

Lumber for screen frame:

2—1" x 5" x 49" oak for side rails
1—1" x 5" x 36½" oak for back cross rail
1—1" x 1½" x 38½" oak for front cross rail
2—¾" x ¾" x 48" white pine for screen bed on sides
2—¾" x ¾" x 35" white pine for screen bed on sides

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