• *ABSTRACT*

Benjamin Banneker is well known for his accomplishments in early American applied science, as well as for his seminal role in African-American science history. Historical and linguistic evidence suggests that his grandfather was of Wolof origin, and that his father was from the area between what is now Ghana and Nigeria. This cultural heritage may have emerged in some of his mathematical thinking.

The African Heritage of Benjamin Banneker

Ron Eglash

In the preface to *The Life of Benjamin Banneker*,[1] his biographer, Silvio Bedini, introduces the historical importance of his subject by contrasting Banneker's lack of formal scientific training with his many accomplishments in mathematics, astronomy and instrumentation — in particular, his leading role in the land survey for the construction of Washington, DC. Bedini cautions his readers against the tendency to highlight Banneker's work on the basis of his race, noting the erroneous exaggerations that have detracted from the authenticity of those accomplishments, which are fully documented.

Implicit in Bedini's writing is an historiographic theory that there is a danger in mixing motivations. Bedini does not criticize black science history in general, and often cites the material generated through interest in Banneker's ethnicity as accurate, erudite, and of strong ethical grounding. But he implies that since an historian of early American science who did not know of Banneker's ethnic heritage would still be motivated to study his work, there is something lost by allowing the two motivations to collapse into one. Thus there are three components to Bedini's biography: an attempt to provide a kind of 'colourblind' assessment of Banneker's work;

an account of his historic role as the first African-American 'man of science'; and the interaction between the two.

This interaction is often focused on opposition to racist theories of biological determinism. In addition to Bedini's own personal stance, unfounded claims that Banneker was incapable of his mathematical achievements, and had stolen them from a white man, provided Bedini with the motivation specifically to oppose the racist view. Thus he persistently provides excerpts from historical descriptions suggesting innate intelligence: Banneker's African grandfather was 'a man of bright intelligence';[2] his black mother was 'a woman of uncommon intelligence';[3] and, as a youth, Banneker had a 'latent mechanical skill' and 'natural mathematical skill' that awaited the proper stimulus to be 'aroused'.[4] Bedini suggests that because Banneker saw few people other than his parents, sisters and some other relatives, he 'became more and more withdrawn into himself, and his senses became all the more alert to the world around him'.[5]

This portrait of a self-birthing man of science, with inherited talent, is in direct opposition to the racist fabrications of stolen accomplishments. There is nothing either inaccurate or unethical about Bedini's emphasis; it is just that the strategy of emphasizing genetics and independent thought results in a de-emphasis of any cultural contribution — including that of Africa. When I spoke to Bedini in 1993, he said that, since the book's publication, he had taken a strong interest in the possibility of African influence in Banneker's work, and he provided me with information throughout my field study in West Africa.

Clues to Banneker's Family Origins

Banneker's grandmother, Molly Welsh, was a young milkmaid in England when she was falsely accused of stealing milk and sentenced to seven years of indentured servitude in the province of Maryland. After serving her time, she was granted freedom and, having no money, she rented a small farm on tobacco credit. Although personally opposed to slavery (no doubt due in part to her own experience of it), she felt that she would have to purchase slaves herself to obtain the labour necessary to survive. So (probably around 1692) she bought two newly arrived slaves. One, named 'Bannaka', refused to work and, after he and Molly learned

to communicate, apparently explained that his royal heritage as the son of a king made it improper for him to be a slave, or to convert to Christianity. Once she had repaid her loans, Molly freed both slaves and, defying the stringent miscegenation laws, Molly and Bannaka married in 1696.

The historical record leaves four clues to Bannaka's African origin. We have already noted his name and his royal heritage; we also have the time and place of the slave ship's arrival. In addition, there is consistent reference to the extremely dark colour of his skin.

Bedini told me that he had tried to track down Bannaka's name by phone calls, and that the only country which seemed to have corresponding name phonetics was Senegal, although no-one there seemed readily to identify it. On my arrival in Dakar, I found a sign for the now abandoned 'Bannekke Bar'. However, this turned out not to be a name, but a compound word in Wolof meaning 'the sweet place'. This may be derived from the word for the sweet nectar used to make palm wine, which the neighbouring Jola call *Banuk*, and perhaps ultimately from the *Bainuk* society, which inhabited the major palm-wine growing area before the Jola.

There is also a Wolof first name of *Banne*, which apparently has a semantic relation to the nectar term (something like the English female name 'Honey', inferring a sweet disposition from association with the sweet taste). There is no last name of *Ka* in Wolof, but there is in Peul. Since Wolof men are sometimes given their mother's first name, it would have been possible that Bannaka's name derived from a Wolof mother and a Peul father. Two factors cast doubt on this explanation. One is the royal heritage, which makes intermarriage between the two ethnic groups less likely during that time period. The other is Bannaka's extremely dark skin, which is associated only with the Wolof ethnic group in the Senegambian region.

A stronger identification was finally made by the linguistic historian Pathé Diagne. He cited the Wolof name *Banakas*, which came from the royalty of the Wolof kingdom of Walo — now in the St Louis region of Northern Senegal. According to Diagne, the name originated from the Arabic *Tanakas*, meaning 'belongs to the place', and was then 'West-Africanized', with the B consonant sound replacing the T.[6] Colvin notes that 'the socioeconomic situation of Walo was more fragile than other Wolof kingdoms, as it was more directly exposed to European slave traders'.[7] Holloway

provides a specific time frame which closely matches that of Bannaka's arrival in the New World:

> The enslavement and transport of large numbers of Wolofs in the seventeenth century is attested to by Senegambian history. Around 1670 the Wolof, or Jolof, empire broke up into a number of kingdoms owing to a revolt instigated by Mauretanian marabouts. . . . The long-term effect of this instability and continual warfare was that large numbers of Wolofs were taken as prisoners of war, sold to slavers, and transported to America. But after the seventeenth century the Wolofs were never again to provide such a significant number of Africans to the North American slave market.[8]

This also explains why members of a royal family would be taken, as has been documented for other Wolofs sold into slavery.[9]

African Culture in the Life of Benjamin Banneker

Benjamin Banneker's mother Mary was born about 1700. In 1730, she married another recently arrived slave, Robert, who took Mary's last name of 'Banneky'. Robert was reportedly from 'Guinea' — a designation that changed with the time period. Holloway, citing the work of Phillip Curtin, indicates that, at this time, the term referred to the area from present-day Ghana to Nigeria.[10] The tendency to send Angolan and other Bantu groups to the southern colonies (below North Carolina), and the decrease in the Wolof trade after 1700, also make this origin more likely.

Benjamin (who made the final change to 'Banneker') was born to Robert and Mary in 1731. Bedini notes that there is no basis for the rumours that Bannaka passed down African irrigation techniques to Benjamin, but he maintains that African cultural influences of some sort must have been circulating among family members: 'Theirs was an unusual heritage, combining the traditions of English country life . . . [and] the mystic lore of the African continent, conveyed in the accounts on Bannaka and Robert . . .'.[11]

There are two possibilities for African influence in Benjamin Banneker's mathematical thinking. The first is numeric, and is found in the answer to a mathematical puzzle-poem written by Banneker:

> Just Seventy two I did Suppose
> An Answer false from thence arose,
> I Doubled the Sum of Seventy two,

But still I found that would not do,
I mix'd the Numbers of them both,
Which shew'd so plain that I'll make Oath,
Eight hundred leaps the Dog did make,
and Sixty four, the Hare to take.[12]

The problem of the hare and the hound is a classic in European arithmetic texts, dating back to Alcuin of York's puzzle book of AD775. Banneker's example, as well as his method of solution ('false position', which requires making two guesses and then determining the answer based on resulting errors) is standard. The only changes he has made are in the particular values he chose. One change is the use of doubling to create the second guess. Although it is not unique, it does appear to be less common than other methods.[13] Another change is the value of the answer, which he then split into 800 and 64.[14] Both changes fit the numerology found in the area of the West African coast of Robert Banneky's putative origin. The numerology is based on Ifa and Fa divination systems,[15] in which elements of a doubling sequence (4, 8, 16, 32, 64 . . .) and multiples of 100 based on these doublings (400, 800, 1600 . . .) were considered sacred numbers. Banneker may have been inspired by the similarity between the European 'hare versus hound' maths puzzle and African myths about the trickster (a figure associated with divination) which, in America, became known as 'Brer Rabbit' versus 'Brer Fox' stories.[16]

The second possibility is geometric, and links to Bannaka rather than Robert. It occurs in a journal passage in which Banneker records a dream:

On the night of the fifth of December 1791, Being in a deep Sleep, I dreamed that I was in a public Company, one of them demanded of me the limits Rasannah Crandolph's Soul had to display itself in, after it departed from her body and taken its flight. . . . When I returned I found the Company together and was able to Solve their Doubts by giving them the following answer: Quincunx.[17]

The quincunx is the most pervasive religious symbol in Senegal. According to researchers at the Museé National in Burkina-Faso, the figure originated in an animist amulet on which an X was drawn to indicate 'power radiating in all directions'. Islamic adaptation merely changed this to more two-dimensional, geometric forms, said to indicate 'the light of Allah'. These were often inscribed on leather neck bags which held Koranic writings.[18] A portrait of the

'Husband of the Queen of Walo' wearing such a bag was painted in 1853 (Figure 1). A variety of these forms, usually close to the standard quincunx shape, appeared on floor tiles, prayer mats, iron and leather work, and other material designs in both ancient and

FIGURE 1
Walo Royalty

Originally published as plate IV of *Esquisses Sénégalaises*, Père David Boilat. Reproduced here with kind permission of Karthala Press, Paris.

contemporary Wolof society (Figure 2). Since an important role of the quincunx is in protective amulets for children, it is not unreasonable to suggest that Bannaka had drawn or fabricated the quincunx design before Benjamin's birth, passed on some idea of its religious significance to his family, and that Benjamin recalled the design in the dream. It was clearly part of Banneker's geometrical armoury.

FIGURE 2
The Quincunx in Wolof Material Design

Design for Leather Neck Bag

Prayer Mat

Floor Tiles

Balcony

Bus Grille

Toolbox Decoration
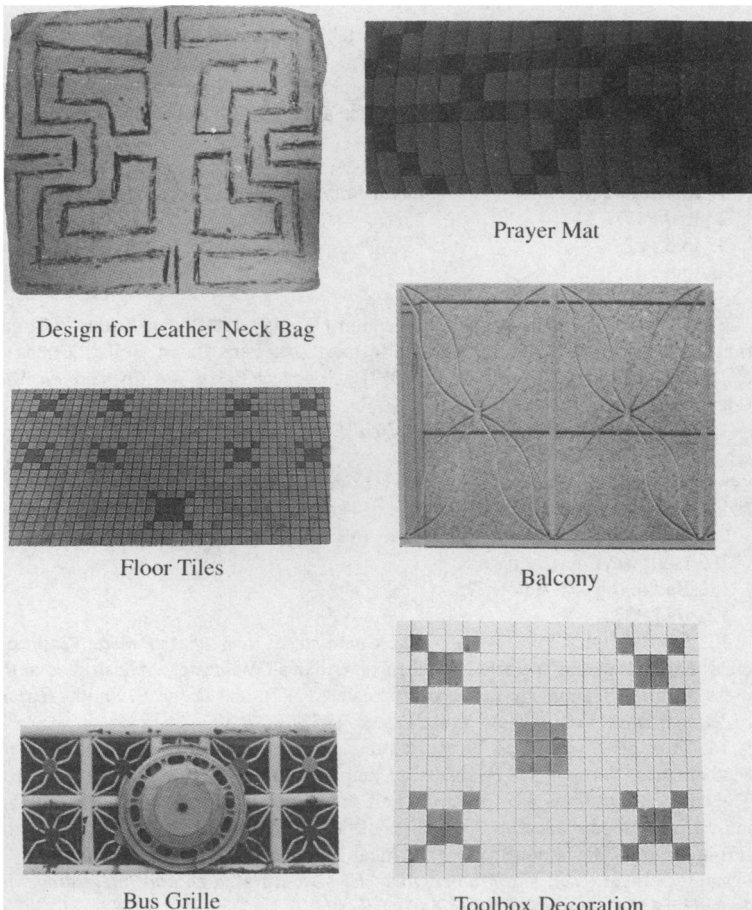
Photographs provided by Ron Eglash.

Conclusion

Analyses of Africanisms in America have generally focused on linguistic and artistic activities, but mathematics also offers a domain in which the retention and syncretic adaptation of African culture can be investigated.

• *NOTES*

1. Silvio Bedini, *The Life of Benjamin Banneker* (New York: Scribners, 1972).

2. Ibid., 17.

3. Ibid., 22.

4. Ibid., 42.

5. Ibid.

6. Pathé Diagne, personal communication (10 May 1994). For further information on this region of Africa, and its history, see: Père David Boilat, *Esquisses Sénégalaises* (Paris: Karthala, 1984 [1853]); Boubacar Barry, *La Royaume du Walo* (Paris: Karthala, 1972).

7. See Lucie Gallistel Colvin, *Historical Dictionary of Senegal* (London: Scarecrow Press, 1981), 289.

8. Joseph E. Holloway, *Africanisms in American Culture* (Bloomington, IN: Indiana University Press, 1990), 4–5.

9. Terry Alford, *Prince Among Slaves* (New York: Harcourt Brace, 1977).

10. Holloway, op. cit. note 8, 4–5.

11. Bedini, op. cit. note 1, 25.

12. Ibid., 325.

13. See Nicholas Pike, *A New and Complete System of Arithmetic*, 2nd edn, enlarged, revised and corrected by Ebenezer Adams (Worcester, MA: printed at the press of Isaiah Thomas by Leonard Worcester, 1797), and David E. Smith, *History of Mathematics*, Vol. II (New York: Dover, 1953), 437–39.

14. In a paper delivered at the conference on the History and Pedagogy of Mathematics (Toronto, 1992), Beatrice Lumpkin showed that this answer is in error. The correct solution is 432, precisely half the value given by Banneker — another indication that his calculation made unusual use of doubling. See B. Lumpkin, 'From Egypt to Benjamin Banneker: African Origins of False Position Solutions', in Ronald Calinger (ed.), *Vita Mathematica, Historical Research and Integration with Teaching, MAA Notes*, Vol. 40 (1996), 279–89.

15. See William R. Bascom, *Ifa Divination* (Bloomington, IN: Indiana University Press, 1969), Philip M. Peek, *African Divination Systems* (Bloomington, IN:

Indiana University Press, 1991), and Henry Louis Gates, *The Signifying Monkey* (Oxford: Oxford University Press, 1988).

16. David J. Muffett, 'Uncle Remus was a Hausaman?', *Southern Folklore Quarterly*, Vol. 39 (1975), 151–66.

17. Bedini, op. cit. note 1, 333.

18. Information gained during fieldwork in Senegal in 1993–94. The most reliable sources for the leatherwork designs are in the holy city of Touba, where religious traditions have been strongly upheld. The 'light of Allah' is the only interpretation I was given for this symbol.

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