

British Assessments of Tipu Sultan's Hill Forts in Northern Mysore, South India, 1802

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Abstract Hundreds of early modern forts dot the South Indian landscape, but more is known about their art-historical aspects than how these fortifications were built, maintained, and used. The latter aspects are examined in a comparative analysis of six Mysore hill forts, using East India Company surveys that were prepared in 1802 shortly after British forces took command of these installations from Tipu Sultan's garrisons. These highly detailed inventories show that the hill forts were poorly maintained, inadequately supplied, contained relatively few garrison buildings, and, from the British perspective at least, were inadequately armed to mount a successful defense. At the turn of the century, these forts were functionally obsolete, ill prepared to serve as supply depots, and strategically valuable only to quiet local populations and deny the use of such places to potential enemies.

Keywords India · Mysore · Early modern period · Hill forts

Introduction

Much more is known about the art-historical aspects of Indian forts than their functional characteristics (Deloche 2007, p. 1; Gommans and Kolff 2001, p. 37). Both perspectives are necessary to the accurate interpretation of these sites, which were the most massive, obtrusive, and costly features of the Early Modern cultural landscape. Many contemporary drawings and paintings encourage stereotypical images of Indian forts either as picturesque ruins or as well-constructed, finished entities that were properly maintained and kept in a state of readiness commensurate with their strategic importance, the ruler's status, and the considerable investment each fort represented (e.g., Godrej and Rohatgi 1989; Michell 1998; Rohatgi and Parlett 2008). It is reasonable to expect that most forts lay somewhere between these

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extremes, but what were they like? The answer, addressed here, necessarily colors how such places are interpreted by modern researchers.

This article describes a comparative analysis of six Mysore hill forts as they were in 1802, shortly after they passed into British hands at the end of the Fourth Mysore War. The overall objective is to assess what these immense works were like when they were active military installations and to identify important similarities and differences in their construction, general maintenance, armament, and supplies. The analysis develops an accurate, highly detailed comparative picture of the Mysore hill forts that cannot be duplicated by reference to paintings, drawings, travelers' accounts, and, to a great extent, even by modern archaeological excavations.

The data for this study were compiled from unpublished East India Company (EIC) field surveys of six major forts on Mysore's northern frontier (IOR Board of Control Collections 1805, pp. 127–479), which was its most vulnerable region in the early 1800s. Authorized by the EIC Board of Control in England and ordered by the Military Board at Madras, these surveys were conducted in September–October 1802 by professional soldiers and military engineers, all of whom had experience in attacks against comparable Indian forts and who followed the same set of instructions to prepare their reports. Their orders required detailed assessments of each fort's strengths, weaknesses, suitability as a supply depot, present condition, recommended improvements, and estimated repair costs.

Historical Background

The end of the Fourth Mysore War in May 1799 left the British as the conquerors of Mysore and arguably the premier political power in South India (Beatson 1800; Wilks 1989). Their greatest rivals were the Marathas to the north, with whom fresh conflict was inevitable. Acting on Articles 8 and 9 of the “Subsidiary Treaty with the Rajah of Mysore,” which gave the British discretionary control over Mysore's forts (Aitchison 1892, 8, pp. 469–473), Arthur Wellesley (the future Duke of Wellington), then commanding Seringapatam and Mysore, issued orders in late 1799 for EIC troops to garrison 16 Mysore forts (Wellington 1858, 1, p. 402). All but two of these forts (Bangalore and Sawendroog) lay in the kingdom's northern reaches.

In late April of 1802, the EIC Court of Directors approved a proposal submitted by the Military Board at Madras to survey Mysore's forts (IOR Board of Control Collections 1802, p. 5). The following August, after being notified that he would soon receive a formal order to initiate this survey, Wellesley directed the commanding officers at Chittledroog, Paughur, Nundydroog, Mudgherry, Mergasy, and Gooribundah (Fig. 1, Table 1) to inventory their forts (Wellington 1858, 3, pp. 276–279). Each commanding officer was also charged with following the draft fort survey instructions that were currently under review at Madras.

Wellesley and the other fort survey committee members, William Cunningham and Robert Barclay, left Seringapatam on their tour of northern Mysore forts on September 11, a few days after formal orders were issued at Madras. The committee returned 30 days later “having surveyed the following forts:—and Chinroyapatam, Cadoor, and Banawoor, not occupied by our troops, but on the road to the Mahratta frontier;

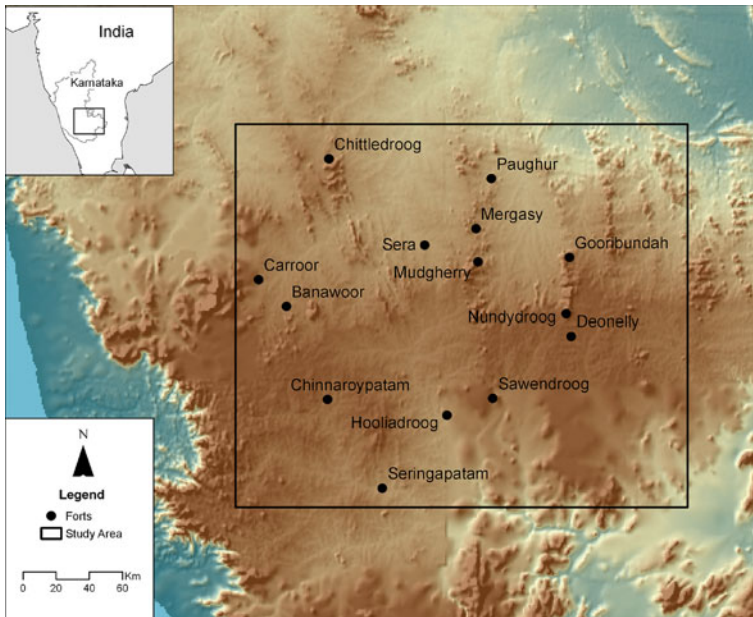


Fig. 1 Mysore forts mentioned in the text

Chittledroog, Sera, Mudgherry, Mergasie, Paughur, Goorybunda, Nundydroog, occupied by the Company's troops; Deonelly, Severndroog, and Hooliadroog, not occupied by the Company's troops" (Wellington 1858, 3, pp. 336–337).

The fort survey project ended with Wellesley's brief September–October tour. In mid-November he advised battalion and regimental commanders in Mysore to prepare their troops for field service (Wellington 1858, 13, pp. 82–83). Turmoil

Table 1 Important sites mentioned in the text and their modern names and locations

Name in Survey Report	Modern Name	Location
Banawoor	Banavar	13° 24' 30" N, 76° 09' 44" E
Carroor, Cadoor	Kadur	13° 33' 02" N, 76° 00' 20" E
Chinnaroypatam, Chinroyapatam	Channarayapatna	12° 53' 52" N, 76° 22' 44" E
Chittledroog, Chitteldroog	Chitradurga	14° 12' 48" N, 76° 23' 43" E
Deonelly	Devanahalli	13° 14' 57" N, 77° 42' 37" E
Goorbundah, Goorybunda	Gudibanda	13° 40' 35" N, 77° 42' 04" E
Hooliadroog	Huliyurdurga	12° 49' 13" N, 77° 02' 10" E
Mergasy, Mergesy, Mergasey, Mergasie	Midigeshi	13° 49' 56" N, 77° 11' 36" E
Mudgherry	Madhugiri	13° 39' 11" N, 77° 12' 13" E
Nundydroog, Nundidroog	Nandidurga, Nandi Hills	13° 22' 14" N, 77° 40' 59" E
Paughur	Pavagada	14° 06' 20" N, 77° 16' 38" E
Sawendroog, Savendroog, Severndroog	Savandurga	12° 54' 43" N, 77° 17' 05" E
Sera, Serah	Sira	13° 44' 35" N, 76° 54' 05" E
Seringapatam	Srirangapatna, Srirangapattana	12° 25' 22" N, 76° 41' 04" E

in the Maratha Confederacy reached crisis proportions in late December with the signing of the Treaty of Bassein (Aitchison 1892, 5, pp. 52–58), which effectively left the Peshwa as a British feudatory. Soon afterward, Wellesley began ordering supplies, transport, and troops moved to the northern frontier for war with the Marathas.

The fort survey remained on the shelf until late March, 1805, when Madras ordered the Mysore command (Wellesley left India for England earlier that month) to submit reports on the work accomplished to date. Robert Barclay, who was now Deputy Adjutant General, Mysore, gathered together most of the project documents, totaling 355 manuscript pages, and sent them to Madras in April (IOR Board of Control Collections 1805, pp. 124–127). In his September 3, 1805 cover letter that accompanied the Mysore fort survey report to England, Maj. Gen. J. Cradock, Commander-in-Chief, Madras, informed the EIC Court of Directors that the survey had been halted because of war with the Marathas (IOR Board of Control Collections 1805, pp. 1–30). The report was subsequently filed away in London and forgotten.

Mysore Fort Survey

The survey report that Cradock sent to England consisted almost entirely of the inventories that Wellesley ordered commanding officers to prepare for their forts in August 1802. It is significant because of the deep insight it gives into the maintenance and use of South Indian forts and because of its extraordinary detail—in some cases even to the point of noting if a particular granary door needed to be replaced. The report covers Chinnaroyapatam, Carroor, Chittledroog, Mergasy, Mudgherry, Paughur, Gooribundah, Nundydroog, and Sawendroog (see Fig. 1, Table 1). Chittledroog, Mergasy, Mudgherry, Paughur, Gooribundah, and Nundydroog, all of which were garrisoned by EIC troops, consume 324 pages of the 355-page manuscript report and are the focus of the present study.

The six examined sites represent only a small fraction of the forts known to have existed in Mysore in the eighteenth and early nineteenth centuries (Deloche 2006, 2007; Lewis 2005, 2006, 2009; Patil 1999). These forts did not vanish from the cultural landscape overnight. As late as 1861, Charles B. Saunders, Officiating Commissioner, Mysore, reported that there were 7,417 hill and village forts in Mysore (which at that time was roughly the size of modern South Carolina or Scotland), of which 159 were hill forts (House of Commons 1862, p. 256). In his view, 22 of the latter were in good condition. Many of them are still prominent features of the landscape.

The next section briefly describes each fort, after which their built environment and material culture are examined in a comparative analysis. The data, which were compiled from each fort's inventory, include detailed contemporary descriptions and assessments of 203 curtain walls, 278 bastions, 232 buildings, and 257 different kinds of portable objects (everything from cannons to rice). These data were supplemented by on-site visits to each fort between 1996–2008. The final section examines the implications of this analysis for the accurate understanding of the functional aspects of hill fort use.

Mysore Hill Forts

The hill forts that held garrisons at the end of the eighteenth century represented the cumulative building efforts of generations of local kings and chiefs, to which Hyder Ali and, later, his son Tipu Sultan added improvements and changes designed to counter threats posed by the British, the Marathas, and the Nizam. The British, who threw garrisons into these forts in late 1799, initially viewed them in the same light as Tipu Sultan and foresaw that they were potentially valuable supply depots in the event of war with the Marathas. However, EIC officers assigned to command these forts had had neither time, skills, resources, nor the authorization to do much more than garrison them by the early fall of 1802 (Gurwood 1837, 1, pp. 241–242).

The surveyed forts form a rough arc across northern Mysore with its westernmost point anchored at Chinnaroyapatam, passing through Carroor, and then bending to the north through Chittledroog, east to Paughur, and finally turning southward past Mergasy, Mudgherry, Gooribundah, to Nundydroog (see Fig. 1).

Chittledroog (Fig. 2) had been one of Tipu Sultan's most important northern forts and its location, size, defensive works, and depot suitability also made it of considerable potential interest to the British in 1802. The lower fort consisted of two lines of defensive walls, bastions, and gates surrounding different parts of the town. The upper fort on the hills that flank the town to the west and south comprised many detached works and seven fortification lines, some of which were already centuries old (Lewis 2006). After Hyder Ali defeated Madakeri Nayaka, the last of the

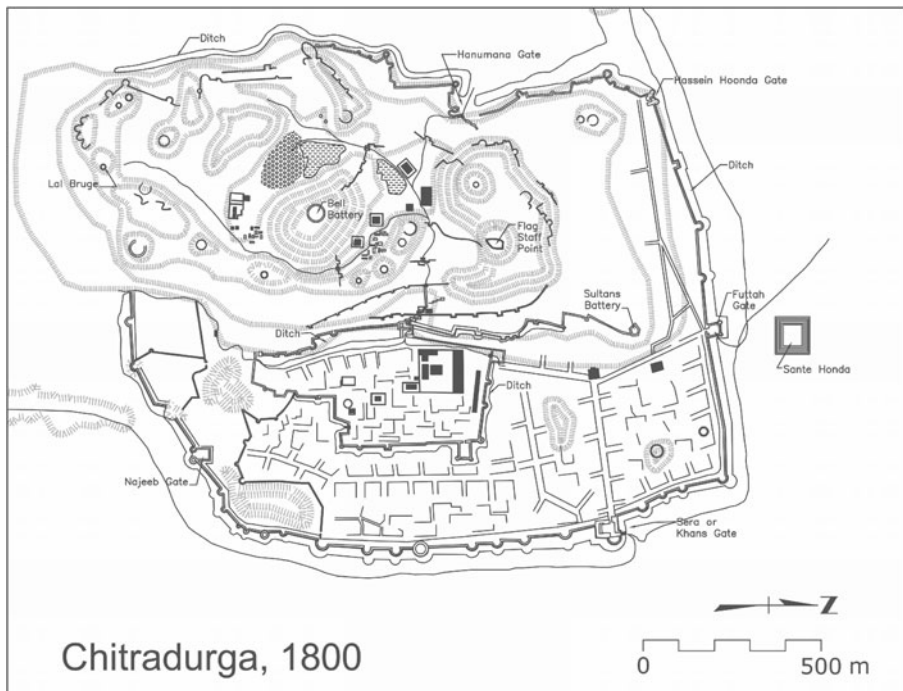


Fig. 2 Chittledroog, based on a drawing made by Colin Mackenzie in 1800

Chittledroog *nayakas* (kings), in 1779 (Saletore 1940; Wilks 1989, 1, pp. 734–735), he and his son Tipu Sultan added to the fort's defenses, with particular attention being paid to its artillery capabilities. The Chittledroog *killadar*, or fort commander, surrendered the fort and its stores to the British on 6 July 1799, a couple of months after Tipu Sultan's death and the decisive defeat of his army at Seringapatam (Vibart 1881, 1, p. 334; Wilson 1883, 3, p. 2). In November of that year, the EIC ordered "one regiment European infantry, two battalions native infantry, one regiment native cavalry, and one company of artillery" to Chittledroog, a decision that gave it slightly more than one-half the garrison strength assigned to Seringapatam during the same period (Wilson 1883, 3, pp. 76–77).

The 118-page Chittledroog survey is dated 20 September 1802. The overall assessment of this fort was that, while some lines were well-sited, others actually weakened Chittledroog's defensive capabilities. Its weakest point was the west-facing fort wall in the area of the old Water Gate, and the report outlined several possible remedies. Most of the buildings that could be used for military and garrison purposes were in decrepit condition, but, unlike the other forts examined in the 1802 survey, Chittledroog had a lot of them.

Paughur, Mergasy, and Mudgherry were smaller forts than Chittledroog and held correspondingly small garrisons. Taken together, they mainly served as strategically placed outposts in a region given to unrest by its former poligar, or chief. Like Chittledroog, Paughur (see Fig. 1) possessed a lower fort of two lines that protected the town lying at the foot of the south side of its fortified hill. Hyder Ali took the fort from its poligar in 1779 and extensively reworked the parapets and bastions of several lines, ignoring others. The British assumed control of Paughur in 1799 and garrisoned it with one battalion of native infantry (Wilson 1883, 3, p. 77). Dated September 29, the 68-page survey characterizes the three lowest fortification lines on the hill as useless, but their disadvantages were mitigated somewhat by the strength of the uppermost line. The report concludes that it would take extensive modifications to make Paughur a strong fort, but even with these changes the final product would not serve well as a supply depot.

Mergasy (see Fig. 1) lies more than 30 mi (48 km) to the south of Paughur. Given its small size, it required only a small garrison. When Francis Buchanan visited it during his survey of the newly conquered territories in early August 1800, he found it manned by a few companies of EIC native infantry and the region around the fort was struggling to recover from earlier depredations by both the Marathas and its hereditary poligar, the latter of whom had not taken lightly to being dispossessed of his property (Buchanan 1807, 2, pp. 2–4). The 15-page fort survey, dated 28 September, concluded that access to the protected interior of the fort was difficult and, like Paughur, it was ill-suited for use as a supply depot.

The fortified hill of Mudgherry (see Fig. 1) lies about 10 mi (16 km) south of Mergasy. The 42-page report, dated September 27, noted that the fortifications consisted of lower and upper forts, parts of both of which were commanded by a hill to the east. The lower fort covered the town, but was judged to be a weak defensive work. The upper fort consisted of seven lines, several of the lower of which also weakened the defense of the hill in the eyes of the British.

Gooribundah (see Fig. 1) is situated about 30 mi (48 km) to the east of Mudgherry. It was a relatively small fort and, like Paughur, Mergasy, and Mudgherry, the British

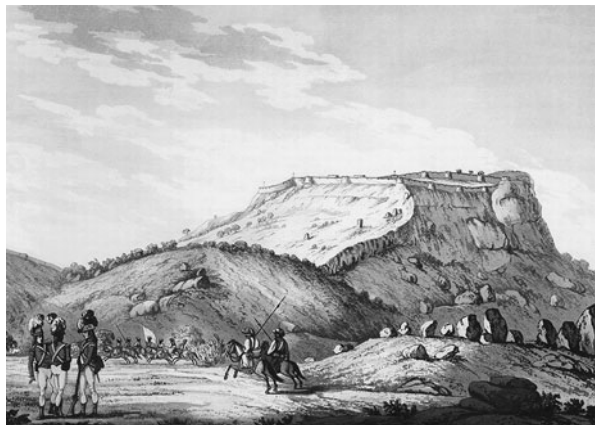
viewed it mostly as a way to thwart the ambitions of the local poligar. Five fortification lines partly encircled the hill and defended a small hilltop enclosure with a few buildings. The 38-page survey, dated October 2, identified several significant weaknesses in the fort's design and concluded that it was also an unsuitable supply depot.

Although Chittledroog may have been the most extensively fortified hill fort of those surveyed by the Wellesley's committee, Nundydroog was the only one that the British ever took by storm (on October 18, 1791, during the Third Mysore War). Returned to Tipu Sultan in the early 1790s, it was again surrendered to the British in 1799 and garrisoned by one battalion of EIC native infantry (Wilson 1883, 3, p. 77). Most of this hill is so precipitous that the fort wall line partially encircling its top seems largely superfluous to modern observers, but the 38-page survey, dated October 2, concluded that the fortified summit was actually vulnerable to attack in several places. The defensive works were concentrated on the fort's western side (Fig. 3), where three fortification lines near the top of the hill protected the main approach (unsuccessfully, as the British proved when their assault punched through these lines in 1791; see Dirom 1793, pp. 42–50; Vibart 1881, 1, pp. 239–241). The inhabitable area enclosed by the uppermost fortification line was greater than all of the other hill forts except Chittledroog, but it contained comparatively few buildings; fewer still were new or in good condition. The lack of suitable garrison buildings, along with the difficulty of supplying this fort, mitigated against its use as a supply depot.

Built Environment of the Forts

The next few sections examine the major features of the forts' built environment, namely the curtain walls, bastions, and buildings, after which we will take a similar look at their arms, stores, and provisions. Each individual fort survey report also contains valuable information about ditches, water storage features, and cost estimates for the materials and labor needed to repair and improve each fort, but space does not permit its consideration here.

Fig. 3 Nundydroog viewed from the west (Allan 1794, pl. 10; image (c) The British Library Board. X378(10))



The comparative approach taken in these sections assumes that the six sites are representative of the best-constructed, most well-maintained, and strategically most important forts on the northern Mysore frontier at the beginning of the nineteenth century. Support for this assumption comes from no less an authority than Arthur Wellesley, who included these sites in his 1799 list of the “principal forts of Mysore” (Wellington 1858, 1, p. 402).

Technical and military terms used in these sections tend to follow early nineteenth-century British usage; useful references for these terms include James (1802) and Adye (1802), copies of both of which are currently accessible online through Google Books. To facilitate inter-site comparisons, European and Indian measurement units reported here are those used in the 1802 Mysore fort survey report.

Curtain Walls

A curtain wall is a length of defensive wall that stretches between two bastions, towers, or similar fortification features. Curtain walls and bastions are typically the most visible elements of a South Indian hill fort. The Mysore fort survey report describes 203 curtain walls in the six hill forts. Were they to be combined and placed end-to-end, these walls would extend more than 8 mi (roughly 13 km).

The materials used to build these walls were fairly consistent within a curtain wall, but could differ greatly both between curtains of the same *wall line* and between wall lines. (A *wall line* consists of multiple curtain walls and the bastions, towers, gates and other features that they link together. It terminates at a natural feature such as a rock face or at a bastion or tower that is not connected to other curtain walls. Alternatively, it may join itself to form an enclosure.) This largely reflects both the effects of repair work and the accretional nature of forts, in which it was common for successive rulers to tear down, build up, extend, contract, and redesign parts of the forts under their command.

Most curtain walls were made of rubble, mud, or earth cores faced with stone masonry laid in dry courses. Where *chunam*, the indigenous concrete, was used to set the wall courses, such as at Mergasy and Mudgherry, it was used almost exclusively. Less common were walls like the older inner line of the lower fort at Chittledroog and the “2nd Line” on the eastern side of its upper fort, both which were faced with courses of dry-laid “small loose stones.”

Most masonry walls, whether dry-laid or set in *chunam*, were reported by the surveyors to be in “good” condition. The few walls described as “ruins” were older constructions, such as the “small loose stones” wall lines at Chittledroog mentioned above. Although all of the forts except Mergasy had at least one curtain wall that was identified as “unfinished,” Mudgherry and Paughur, with nine and seven unfinished curtain walls, respectively, were decidedly works in progress.

Ramparts are the thick wall bases that support the parapets and other upper works of a curtain. More than any other architectural feature, ramparts define the trace, or outline, of a fort. This point assumes greater significance when one also considers that fort renovations everywhere tend to follow the trace of earlier defenses (e.g., Turner 1971, p. 56; see also Viollet-le-Duc 1876, which illustrates the point by following the history and renovations of an imaginary fort). Simply put, it is generally cheaper to

build on an old trace than it is to start anew, especially on a site that may offer limited options to do otherwise.

Ramparts at the four forts for which there are relevant data ranged between 5–31 ft (1.5–9 m) thick with an overall median thickness of about 16 ft (5 m). Nundydroog's narrow ramparts, which averaged only 9 ft (3 m) thick, presented attackers with a much easier egg to crack than at Chittledroog, where the typical rampart was roughly 22 ft (7 m) thick. Rampart strength was not uniform and could vary within the same wall line, presumably in response to decisions made about the terrain and the likely force that might be brought to bear against a given curtain wall. One general, but apparently universal rule of pre-modern fortifications is to have rampart strength vary inversely with the natural defensive strength of the position (see Corps of Royal Engineers 1850, p. 24).

Parapets crowned the ramparts and were designed to play an important role in an active defense of the fort. Most were made of brick and chunam, the remainder being a mix of brick, chunam, mud, and stone. Notably, variations in parapet raw materials do not consistently map onto variations in curtain wall construction styles and materials.

Median parapet height was 5 ft (1.5 m), with a 3–6 ft (0.9–2 m) range, at Mergasy, Mudgherry, and Paughur, the three forts for which there are data. Battlemented parapets with crenels for directing small-arms fire were rare and no machicolations were present in the six forts. Also, the survey report made no mention of banquettes, or firing steps, at the foot of the parapets at any of the study sites. Banquettes were standard features in European forts of this period; those constructed by British military engineers tended to raise the base of the firing step to within 4.5 ft (1.4 m) of the top of the parapet (Landmann 1853, p. 9). Modern on-site surveys of Mysore hill forts confirm that few parapets are lined with banquettes. Good examples can be found at Chittledroog, where parts of some wall lines and the Sultan Battery (see Fig. 2), the latter a large detached work that covered much of the town, are said to have been built or at least renovated in the late eighteenth century by British prisoners-of-war held by Hyder Ali and Tipu Sultan (Junius 1838, p. 48; Robson 1786, pp. 200–201). It is also possible that some of the existing banquettes in these hill forts were added by their British garrisons.

Indian builders erected tall parapets pierced with loopholes to give greater protection to defenders on the wall walks. The British fort surveyors felt that this approach simply weakened the parapet and made it hard for defenders to effectively employ the power of their small-arms. Recommended parapet heights for British permanent fortifications of this period were roughly 6–8 ft (2–2.4 m) (before factoring in the height of the banquette, which reduced the effective height to 4.5 ft (1.4 m) for defenders firing over the parapet) (Adey 1802, pp. 128, 131). The issues raised reflect fundamental differences between Indian and British military thought on the relationship between firepower and protection in the design of parapets. British soldiers of this period assumed that a proper parapet should both shield defenders and enable them to comfortably fire over it. Tall, loopholed parapets, in their opinion, were not the answer (Opinion shifted later in the nineteenth century, when the British military viewed loopholed walls as appropriate for situations that did not interfere with the offensive power of small-arms fire; see, for example, Corps of Royal Engineers [1850, pp. 308–312].)

As a general rule, the wall walks of the curtains for these forts were used for firing wall pieces and small-arms (Harding 1997, pp. 353–373) and for maintaining communication between bastions (Moor 1794, p. 257). Most were too narrow to mount guns (Fig. 4). The fort surveyors noted a few instances of gun embrasures in curtain wall parapets, but most of them were in close proximity to major gateways. The individual fort survey reports give few details about gateways, typically noting little more than whether or not they had suitable guard rooms.

Most parapets were made of bricks set in chunam. The result was so durable that many of these parapets are still standing, if long overdue for a fresh coat of chunam. Bricks were commonly used in parapets because they, like mud, did not splinter as badly as stone when blasted by artillery (Adye 1802, p. 131; Duffy 1988, p. 198; Straith 1833, p. 19). A few brick parapets in the lower fort wall lines at Paughur were set in mud. The use of mud mortar on these parapets may have been intended as a temporary or cost-cutting measure since the survey report also notes that three of the four Paughur curtain walls with brick-in-chunam parapets were unfinished.

At least 22% of all parapets were made entirely of mud. Nowhere is this more clearly in evidence than at Chittledroog, where mud parapets were particularly common. Nearly all of these parapets were judged to be in good condition in 1802 and the eroded remains of a surprising number of them still cap Chittledroog's walls (Fig. 5). Most of the few brick-in-chunam parapets at this fort were on the outer, or Town Wall, of the lower fort. The latter was a patchwork of mud and brick-in-chunam parapets that stretched between the Sera Gate (modern Rangiyabagilu) on the northeastern side of the Town Wall and the Water Gate on its northwestern corner (see Fig. 2), apparently reflecting repairs made by Hyder Ali and Tipu Sultan. Similar evidence of renovations and repairs that incorporated different building materials than the existing wall or structure can be found in all of the forts.

Median parapet thickness was 5.5 ft (1.7 m), with a large range of 2–14 ft (0.6–4.3 m), which shows there was considerable variation between sites. Chittledroog's parapets were the thickest by far with a median of 7 ft (2 m), but most of these features were part of curtain walls in the lower fort; on the hill they were closer to the 5.5 ft (1.7 m) average. Mergasy and Nundydroog had thin parapets with median thicknesses of 2.5 and 4.0 ft (0.8, 1.2 m), respectively. The thickness of Mudgherry's

Fig. 4 Curtain walls with narrow wall walks join round bastions that flank a covered gateway through one of Paughur's lower wall lines

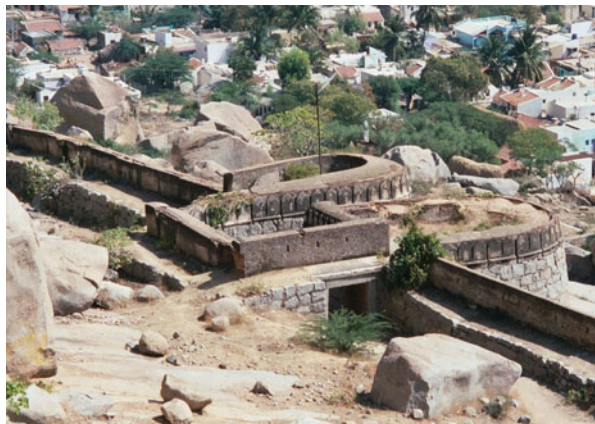


Fig. 5 Exterior view of curtain wall with a mud and masonry parapet in Chittledroog's lower fort; this stretch of curtain joins a round bastion to the left



parapets were certainly the most variable of all six forts, with an extraordinary range of 2–10 ft (0.6–3 m). All of these parapets were unusually thin by early nineteenth century European standards, where the recommended parapet thickness to resist artillery was 18 ft (5.5 m) of earth or 8–9 ft (2.4–2.7 m) of masonry, and that needed to resist musketry was 2 ft (0.6 m) of masonry (Adye 1802, p. 131).

The survey report identified several areas in which fort walls needed maintenance and repairs. The most common recommendation was for fresh coats of chunam on curtain walls and parapets. The fort survey parties also suggested that gun platforms and embrasures be cut into several parapets at Chittledroog and Gooribundah, but these were clearly special cases, as few hill fort curtains could be easily modified to serve artillery because of their narrow ramparts. Another unusual maintenance case was Paughur, where the surveyors urged the repair of no fewer than six curtain breaches, all of which appear to have been due to shoddy construction.

In summary, curtain walls show considerable variability in the mode and materials of their construction. This variability partly reflects the accretional nature of hill forts and partly the low standard of maintenance that was typical of each site. This said, it is also clear that greater attention and expense were paid to the quality of materials and masonry work that went into hill fort curtain walls than into the curtains of village forts. Village fort walls in central Karnataka were typically constructed with the most abundant cobble- and boulder-size stone in the immediate locality (Lewis 2009).

At forts where it was used, chunam tends to be particularly common. However, the use of dry-laid masonry at some sites may have been due more to the relative expense of chunam than to cultural preference. Later colonial builders across India argued that one good reason to increase the average size of bricks used in construction was that bigger bricks were cheaper than chunam and that this translated into construction cost savings (Jones 1809, p. 378). Cost, therefore, may account for at least part of the patterning in wall construction materials and methods in the hill forts. Cases in point are the Paughur parapets, where most of the bricks were set in mud, and Chittledroog, where most parapets were built entirely of mud. Mud was less expensive than chunam.

The fort walls supported parapets that, given differences in their materials and mode of construction, were viewed by Indian and British soldiers alike as a distinct

feature of the curtain. Typically lacking banquettes, the parapets were of a greater height than one would find in their European counterparts of the same period. They were also often pierced by narrow loopholes. From the perspective of British soldiers, such parapets were unacceptable as defensive works and needed to be rebuilt.

Overall curtain wall condition was generally good, but each new ruler appears to have carefully weighed the cost and relative value of new wall construction against the maintenance and repair of existing walls. Older wall lines could be renovated, removed (and presumably recycled), or simply left to decay into ruins. The latter appears to have been true at Chittledroog, where the British found that the lowest two wall lines on the hill were old, poorly constructed, and in ruins when they relieved Tipu Sultan's garrison of its command in the summer of 1799.

Bastions

Were a fortification comprised only of walls and gates, the task of successfully defending a fortified place would have been an even greater challenge than history shows it generally was. Bastions, which project beyond the curtain, add point-type defensive works at intervals. Originally developed to give flanking fire to a curtain's defense, by the latter half of the eighteenth century many South Indian hill fort bastions were being modified to serve as gun platforms. Where effectively deployed, guns mounted on the bastions greatly increased the size of a fort's defensive envelope and the destructive force that could be brought to bear within that envelope.

This section examines 278 bastions inventoried by the Mysore fort surveyors. As the term is used here, *bastion* broadly refers to any point-type defensive work manned by several soldiers, whether it is salient to a wall line or stands alone as a detached work. Bastions so defined include works described by the surveyors as bastions, batteries, cavaliers, fleches, towers, and turrets; qualifiers used in the report to describe these features, when viewed in plan, include round, square, rectangular, octagonal, oval, and hollow.

Ideally, bastions are sited to provide overlapping frontal and flank fields of fire with no dead ground that could give cover to an enemy close to the fort. The fort surveyors took exception to the siting of few bastions, opting instead to describe how these works might be effectively employed in a defense. In cases where they did identify serious defects in a bastion's siting, the surveyors usually recommended removing it.

A rough rule of thumb among many South Asian archaeologists and historians is that square bastions are older Hindu works and round bastions are the product of Islamic influence on South Indian military engineering (e.g., Brubaker 2004, pp. 370–371, 374, 455–458; Cousens 1900, p. 51; Deloche 2007, p. 37; Gommans 1999, p. 113; Ramachandra Murthy 1996, pp. 112–114). What one sees in the 1802 Mysore fort survey, and again in modern field investigations, is that older fort wall lines tend to have square bastions and more recent ones tend to have round ones when viewed in plan. Examples in which both types are present in the same wall line and part of the same construction episode can readily be found in hill forts, fortified towns, and even in fortified villages (Lewis 2009). Such exceptions to the informal rule suggest that, while one may be able to delineate a trend from square to round bastions over time,

the decision to use one plan more than the other was more likely a function of such factors as the increased use of artillery and differences of terrain than either religious affiliation or ethnicity. As Turner (1971, p. 60) notes of medieval England, where the predominantly round towers of town walls gradually gave way to those with a square plan, “It is probably more important to study the disposition of the towers and their relation to the wall, and to study the weapons against which they were designed, than to try to establish an exactly dated sequence of plans.”

Bastions in upper forts, or those on the hill, are much closer together on average than bastions in lower forts, or those that are part of wall lines that surround the town at the foot of the hill. Lower fort bastions had an overall median distance of 72 yd (66 m), while upper fort walls show a median inter-bastion distance of only 33 yd (30 m). Several factors must be considered to account for these differences. First, one must obviously consider hill topography. As one moves up in elevation from the base of a hill fort, or, viewed more generally, through successive fortification lines, the protected area decreases, but the trace of the fort wall may require several bastions where fewer would suffice in wall lines at lower elevations on the hill. Second, given that the ultimate point of defense within a fort is the space defined by the innermost fortification line, decreasing inter-bastion distance may also reflect the builder’s intention to concentrate greater defensive force in successive wall lines approaching that point.

Like curtain walls, most bastions were faced with dry-laid stone masonry. The exceptions were 31 bastions in Mudgherry’s upper fort, which were masonry set in chunam. Bastion parapets, on the other hand, were predominately brick in chunam. Chittledroog, which accounts for about one-third of the bastions in the data set, showed the greatest diversity of bastion parapet building materials. Roughly one-half of the Chittledroog bastion parapets were brick in chunam and the remainder were a mix of mud, stone, brick, and chunam.

Eight bastion parapets, all of which were at Chittledroog, were loopholed. Several of these structures were relatively small towers that the surveyors judged to be “fit only for musquetry”; the others were described as older defensive works. Thirteen Chittledroog bastions were also equipped with gun platforms, 11 of masonry and 2 of pavement. (A gun platform is “a floor of wood, stone, or other materials, on which cannon are placed” [Landmann 1853, p. 37].) All but one of these bastions were in the lower fort and defended the town. The exception was the Sultan Battery, a detached work that still overlooks the town from the lower hill slope above the Uchchangiyellamma Temple. Nine of the 11 Chittledroog bastions with gun platforms also had 1–2 sentry boxes made of brick in chunam. The Chittledroog bastions did not have expense magazines associated with them, but the survey report recorded the latter in 10 upper fort bastions described as cavaliers or batteries at Mudgherry, Mergasy, and Paughur, none of which were equipped with gun platforms or sentry boxes.

The fort surveyors also judged most bastion parapets to be in “good” shape. Unlike three curtain walls at Chittledroog and one wall at Mudgherry, none of the 255 bastion parapets for which there are condition assessments list them as being “in ruins.” Five of the seven bastion parapets described as “poor” condition were at Nundydroog, where cracked parapets and curtain walls provide convincing evidence that its works had been badly maintained. Bastions with mud parapets in

Chittledroog's lower fort accounted for most of the "unfinished" parapets reported at the six sites.

Median bastion parapet height was 5 ft (1.5 m), the same as curtain wall parapets. Median thickness was 7 ft (2 m), considerably more than the 5.5 ft (1.7 m) curtain parapet average, a difference that likely reflects their greater defensive role. Roughly 75% of the bastions at each site had at least one embrasure, and about two-thirds of all bastions had 1–3 embrasures. Only 21 bastions had more than five embrasures and most of these were appropriately described by the fort surveyors as cavaliers or batteries. The number of embrasures per bastion did not differ appreciably between upper and lower fort wall lines.

The fort survey team's most common recommendation to improve hill fort bastions was the addition of gun platforms. The want of platforms was particularly felt at Chittledroog, which accounted for more than two-thirds of these recommended improvements. After platforms, the parapets and embrasures of many bastions needed fresh coats of chunam. Unfinished bastions at Chittledroog accounted for nearly one-half of the chunam recommendations, followed by Nundydroog, where bastions in the main wall line at the top of the hill were plagued by cracked parapets. The remaining recommendations concern the mounting of guns so their muzzles could be depressed to fire below the horizontal; such capability was critical to the defense of hill forts because it enabled their guns to fire in the flat trajectories in which they were most effective. To achieve the necessary angle of fire, embrasures had to be cut down low and the guns mounted on depressing carriages. Depressing (or depression) carriages superficially resemble garrison carriages, but, unlike the latter, the gun barrels can be depressed to fire as much as 30° below the horizontal (Griffiths 1859, p. 65). At the time of survey, none of the hill forts were prepared for the use of depressing carriages without rebuilding the embrasures.

The overall impression gained from the examination of hill fort bastions is that, like the curtain walls, they had been designed to defend against armies that differed in technology and tactics from that which they were increasingly likely to face in the late eighteenth and early nineteenth centuries. The forts' fundamental shortcoming, on which the survey report dwells at length, is that the works were not designed to cope with artillery, whether it be employed to defend the fort or attack it. Viewed in this light, both Hyder Ali and Tipu Sultan deserve greater recognition for their efforts to at least partly rebuild some of these forts to adapt to the rapidly changing nature of warfare in the South. That their attempts did not enjoy greater success can be laid at the feet of the extraordinary era of chronic warfare during which they lived and, to be fair, which they actively sought out.

For the most part, the hill fort bastions were originally constructed to defend against sieges, cavalry, and attempts to storm curtains by escalade or by blowing in the gates. Inter-bastion distances were well within matchlock and musket ranges, particularly in the upper forts. As noted by Keeley et al. (2007, pp. 70–72), bastions were expensive features and inter-bastion spacing was driven by the estimated range of defensive weapons current at the time they were constructed. Most guns, where they were mounted in bastions, must have been light pieces that did not require heavy carriages, have a recoil of greater than roughly 3–4 ft (0.91–1.22 m), or deliver a strong concussion when fired. Had firearms with greater power than, say, 3-pounders, been a consistent features of these works, one should expect to see greater frequency

of stone or pavement gun platforms within the bastions, embrasures cut lower than they are, and many more expensive magazines.

Buildings

The six hill forts contained 232 buildings that served military and garrison purposes or could be adapted to such uses. Most of these buildings were used for storage or as administrative facilities (Table 2). Tipu Sultan's regulations authorized the construction and maintenance of few buildings in the hill forts (Greville 1795, 1, pp. 39–40, 73–74). Similarly, the British commanding officers of these forts generally had to make do with existing structures because the Madras government was reluctant to authorize essential repairs, much less allocate money for new construction (Gurwood 1837, 1, pp. 258, 336, 351). Private dwellings, most temples and mosques, shops, and similar non-military structures contained within the defensive works of each fort's "lower town" were not included in the survey inventories.

Chittledroog had more military and garrison buildings within its hill fort wall lines than the other sites (Fig. 6). It also had the greatest diversity of functional types, including nearly all of the buildings described as magazines and the only structures listed as arsenals, palaces, barracks, hospitals, and offices (see Table 2). Mudgherry is the only inventoried fort at which there are no reports of granaries, but its large total number of storehouses compared to other forts and the grain and other provisions reported in its inventory of stores suggest that Mudgherry's granaries were counted under that broad heading. Generally speaking, buildings serving military uses were more likely to be assessed in the survey reports as being in "good" condition than buildings assigned to general garrison functions.

Table 2 Building types

Structure Type	Chittledroog	Gooribundah	Mergasy	Mudgherry	Nundydroog	Paughur	Totals
Granary	33	2	4	7		13	59
Storeroom	7	7	2	8	14	1	39
Magazine	21				1	1	23
Arsenal	1						1
Palace	3						3
Barracks	1						1
House				2			2
Hospital	2						2
Workshop	2						2
Building	4	2		5	2		13
Choultry	9	1	3	26	8	21	68
Office	7						7
Pagoda	6	1		1	2		10
Mosque			1			1	2
Totals	96	13	10	49	27	37	232

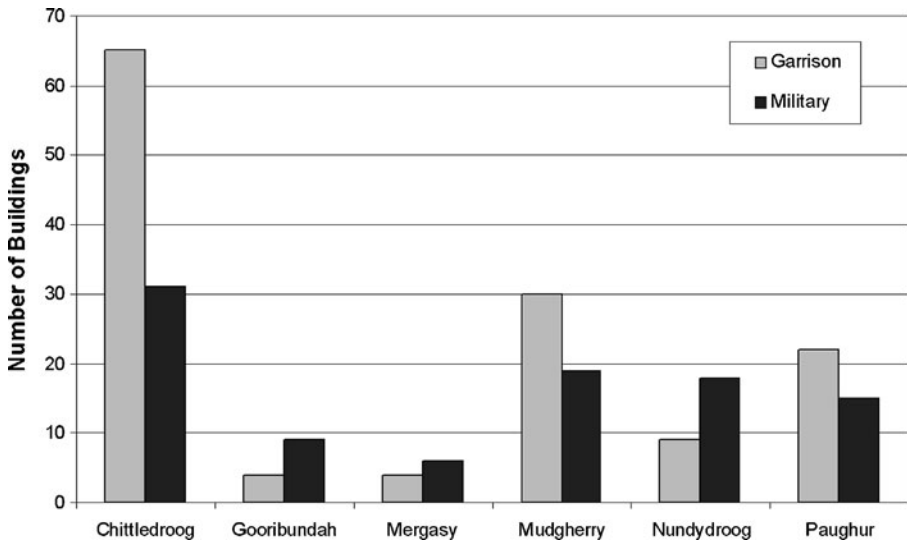


Fig. 6 Garrison and military buildings by hill fort

Most structure walls were built of stone, augmented by mud, bricks, and chunam. While mud-walled buildings account for only about one-third of all structures, the largest buildings tended to have walls of mud, not stone (see Fig. 7). Only 10 of 220 buildings, all of which were at Chittledroog and Mudgherry, were constructed with bricks set in chunam. Most stone and all but a few mud structures had terraced roofs, a roof style still common in this region because of the shortage of suitable wood for building materials and the low average annual precipitation. About one-third of the terraced roofs, most of which were mud, were judged by the fort surveyors to be in “poor” condition.

The six building types with the largest median areas occur only at Chittledroog (Fig. 8). None of Chittledroog’s palace structures appear to have been in use in 1802. The two largest palaces both measured 250 ft (76 m) on a side, and were two-storied, mud-walled buildings with mud and chunam terraced roofs; both were also judged to be in “unserviceable” condition. The remaining palace was considerably smaller, measuring 80 ft (24 m) long, 50 ft (15 m) wide, and 24 ft (7 m) tall with walls of

Fig. 7 Ruins of mud and mud-brick storehouses and granaries in Chittledroog fort’s palace area



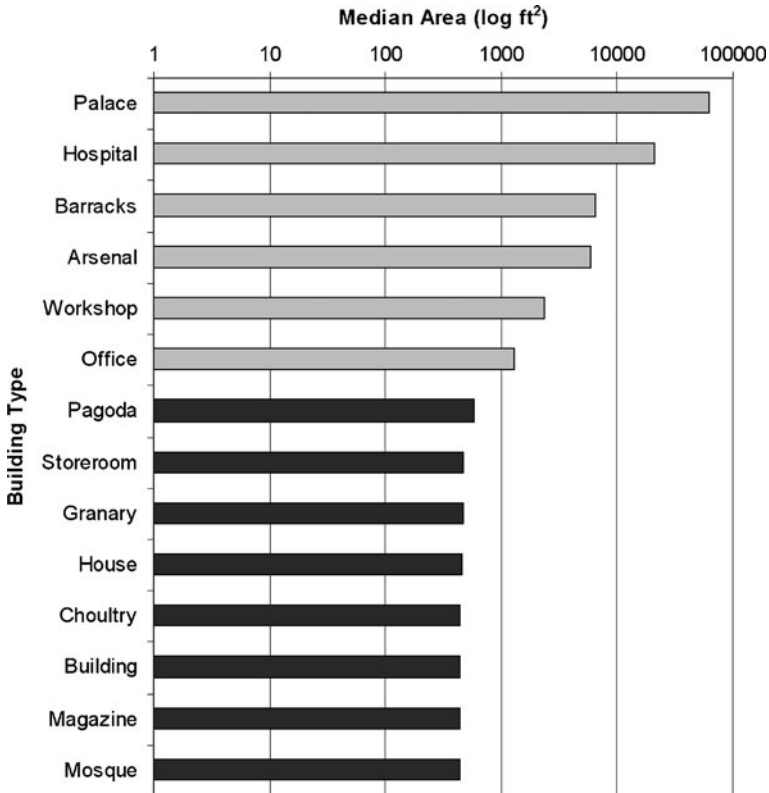


Fig. 8 Median areas of hill fort buildings by type. The six largest building types (light-shaded bars) are present only at Chittledroog

bricks set in chunam and a mud terrace roof that needed to be replaced. The largest of the two hospitals was designated for the sepoy and was located in the town. It measured 200 ft (61 m) square, 12 ft (3.6 m) high, and had mud walls with a tiled roof. The inventory adds the note that it “was built in a square.” Given its dimensions and roof type, it was likely a series of rooms built around an open courtyard. It too was judged to be in unserviceable condition. Lest the reader speculate that the “garrison hospital” (interpreted here as one for the garrison’s European soldiers) was any better, the survey report describes it as a 56×44 ft (17×13 m) mud-walled structure with a tiled roof. During Tipu Sultan’s reign, this structure housed a machine for grinding chunam. At the time of survey it was in such a shabby state that the report recommended repairing its roof, leveling its floor, replacing two doors and 12 windows, and clearing and cleaning its yard.

The remaining building types were roughly comparable in median size (see Fig. 8) and examples of each type were reported at most of the six sites. Structures described in the inventories as choultries were typically used as guard rooms or barracks at the time of survey. Hindu temples (listed as “pagodas”) and mosques have a complementary distribution across the sites (see Table 2), but at least in one instance, that of Chittledroog, other temples and at least one unfinished mosque were used as storehouses both by Tipu Sultan and the British (Lewis 2006).

A total of 47 buildings, nearly all of which were at Chittledroog, were judged to be “unserviceable” and required either extensive repairs or to be torn down. Among the 12 unserviceable military structures, most were magazines that had been ruined by damp (Gunpowder is susceptible to moisture, temperature extremes, and poor storage facility ventilation [Straith 1852, 1, p. 248].) Military-type buildings also had many more rotten doors than garrison buildings. Among the latter, poorly maintained roofs and terraces stand out as the most common defects. Most of the 35 “unserviceable” garrison buildings were granaries with decrepit mud-terraced roofs (see Fig. 9).

Taken as a whole, the fort building inventories describe a narrow range of functional types, most of which are clearly relevant to the military nature of the larger facility within which they were constructed. As noted earlier, far from having been crowded with structures, hill forts probably contained few structures relative to the size of their enclosed areas, and even fewer would have been of a non-military nature. Tipu Sultan’s revenue regulations of 1793 mention only two non-military buildings that were to be maintained by government in its forts, one a cutcherry or office for the *amildar* (revenue collector), and the other a residence for the killadar (Greville 1795, 1, pp. 39–40, 73–74). The visible ruins (as well as ancient temples and mosques within the fort precincts) that one finds within fort walls today are therefore a fairly accurate guide to what was present when these forts were in active service in the late eighteenth and early nineteenth centuries (Figs. 6 and 8).

Material Culture

Analyses of inventories of a fort’s ordnance and stores offer insights into the state of readiness of a fort to repel attack and the expected military capabilities of a likely attacker. These inventories also tend to reflect strategic considerations that were made in garrisoning a fort, such as the role it played as a supply depot. Regrettably, however, the accurate interpretation of fort inventories is seldom a straight-forward task. As Spearman (1844, “Garrison Artillery”) explains, “The proportion of ordnance, ammunition, and stores required for the defense of a fortified place, depends,



Fig. 9 Two well-preserved masonry granaries at the top of Mergasy’s fortified hill. Access would have been through flat terrace roofs. Slab steps lead up the side of the granary in the background

not only on the particular situation of each individual fortress, and its relation with the surrounding country,—the system according to which it is fortified,—and the species of attack which it may be possible to open against it, but likewise, on innumerable minor circumstances, each of which may exert an important influence on the defense.” To this list, the archaeologist and historian could add the equally compelling points that, unlike fort walls, bastions, and buildings, the ordnance and stores of a given fort were portable, expendable, and subject to the constantly changing constraints of supply and demand.

Fortunately, the interpretive task is facilitated somewhat by reference to external corroborative evidence, here provided by comparative analysis of the inventories of multiple contemporary forts in the same region. Nevertheless, it is impossible to dispel every uncertainty about the provenance and recent history of the inventoried stores in these forts. Most, but certainly not all, of their ordnance and stores can probably be attributed to Hyder Ali and Tipu Sultan, but each case bears close examination. For example, the British assumed command of Chittledroog in mid-1799 and stationed a small garrison there. Its stores were supplemented in 1800 when it served as a depot and forward base during the hunt for the freebooter Dhoondia Waugh (see Davies 2010). Additional supplies also began to trickle into the fort by late summer of 1802 in anticipation of the build-up for war against the Marathas. All of these events could have had an impact on the garrison stores inventory reported by the fort commander.

Inconsistent weights and measures create another complicating factor in the accurate interpretation of the stores, but one that was effectively dealt with by sacrificing a certain amount of detail for the sake of general points. Many different systems of weights and measures were in use across most of the world in the early 1800s. Indian metrology, in particular, was extraordinarily diverse and it remained so well into the twentieth century. Such units as *garce*, *mercal*, *seer*, *candy*, *vess*, etc., could be defined differently depending on the nature of the material being compared, the context within which it was measured, and even the local customs of a town or village. For discussions of the complexities of nineteenth-century Indian metrology, see Maclean (1885, 2, pp. 505–520) and Prinsep (1840, pp. 65–96).

Since it is impossible to accurately convert to common units the Indian weights and measures reported in the fort inventories, the between-site comparisons are largely based on whether a given item was present or absent at a given fort. Several exceptions to this rule were made. First, dry military stores reported in *maunds* were compared across sites in this unit of measurement, following the Madras standard of 1 maund equals 25 lbs (av.) (11 kg). Although the Madras maund was a little heavier than the Mysore maund of 24 lbs (10.8 kg) (Rice 1897, 2, pp. 556) that was common later in the century, the fort inventory tabular data appear to reference the former. Second, weights such as tons, hundredweights, pounds, gallons, and drams are assumed to be in Imperial units; tons and hundredweights were converted to pounds (av.) for the sake of comparability. Imperial fluid measures, such as gallons and drams, were kept in these units.

Ordnance

By the late eighteenth century, major South Indian fortresses that lacked well-served artillery were vulnerable (see Weller 1993, pp. 279–287) for a good general overview

of the state of artillery in India between 1798–1805). While multiple wall lines dotted with bastions and covered by deep, wide ditches were important components of the successful defense of a well-chosen hill, the guns could decide the point.

The surveyed hill forts held a median of seven guns each (Table 3), most of which was ordnance surrendered by Tipu Sultan's killadars during the summer of 1799. In view of the artillery's increasingly important role in South Asian warfare and the large perimeters that these forts defended, forts of only seven guns may seem poorly armed at first glance. While true enough from the perspective of contemporary British soldiers, these forts were well-armed by comparison with other Mysore forts during Tipu Sultan's era. The list of returns of cannons captured from Tipu Sultan's forces during the Third Mysore War (1790–92) provides a useful frame of reference for evaluating the quantity of ordnance found in the six Mysore hill forts a decade later. According to these data (compiled from Dirom 1793, pp. 262–264; Vibart 1881, 1, pp. 600–602), one-half of the 47 forts and other fortified positions that fell to the British and their allies in the Third Mysore War contained four or fewer guns; three-quarters of all captured forts held no more than 13 guns.

Chittledroog and Nundydroog stand out from the other forts surveyed in 1802 by having 51 and 18 guns, respectively. Nevertheless, the ordnance at both sites is comparable to that reported for late eighteenth century captured Mysore forts of similar importance. Nundydroog, for example, held 17 guns when it was taken by

Table 3 Ordnance present and required

Size ^a	Chittledroog	Gooribundah	Mergasy	Mudgherry	Nundydroog	Paughur	Totals	
							Present	Required
1.5	2				5		7	
2.5								1
3	2			3			5	4
3.5					1		1	
4	5		1	1		4	11	7
5						3	3	
6	19		4	2	5		30	62
9	2				1		3	37
12	7		2		1		10	37
14	2						2	
18	6				4		10	39
22					1		1	
24	1						1	17
32	1						1	6
5.5 inch	3						3	
6.5 inch	1						1	
Unknown		2					2	
Totals	51	2	7	6	18	7	91	210

^a "Size" = weight in pounds of shot for guns; howitzer and mortar sizes are expressed as muzzle diameters in inches.

Cornwallis in 1791. Returned to Tipu Sultan in 1792, it surrendered to the British again in 1799. It held 18 guns when it was surveyed in 1802. The number of guns present at Chittledroog in 1791 is currently unknown, but, given that Bangalore had 102 guns in 1792, it is hardly surprising that Chittledroog, a fort of lesser importance, made do with one-half that number in 1802.

The main point is that, evaluated from the Mysore perspective, the forts were adequately armed with artillery. These comparisons show that the six surveyed hill forts, after having been in British hands for two years, were among the reasonably well-armed of Tipu Sultan's former forts, when one views them in the context of the recent history of other Mysore forts. Some guns undoubtedly also arrived with the British garrisons, but many of them appear to have been in these forts when their first EIC garrisons marched through the gates.

Technically speaking, the British in Mysore were at peace during the early autumn of 1802, and, in keeping with European practices of the period (see Duffy 1996, p. 101), most guns and howitzers were dismounted from their carriages. At Chittledroog, for example, only six (four 12-pounders and two 18-pounders) of this fort's 51 pieces of ordnance were mounted at the time of the survey (they were mounted on field carriages and are likely guns of the company of artillery ordered to this fort in November, 1799). One would reasonably expect to find suitable carriages for the unmounted ordnance in covered storage, as well as an adequate supply of replacement carriages, which was typically 1/3 more carriages than the number of available guns (Adye 1802, p. 38). However, Chittledroog's stores contained only 28 field and garrison carriages of all types to mount the remaining 45 pieces of dismounted ordnance. Given some carriages that lacked suitable guns and some guns that lacked suitable carriages, the Chittledroog garrison could realistically expect to mount only about 25% of its artillery. Viewed by itself, this would not have been an unusually small proportion of mounted ordnance. For example, returns of the ordnance captured by the British at Seringapatam in May 1799, show that only 31%, or 287 of the 929 captured guns in this fort, were mounted and deployed during the siege (Beatson 1800, pp. 138–139). What makes Chittledroog stand out is that the garrison could only mount 25% of its guns if it used *every* carriage; there was no reserve.

Nundydroog held 18 iron guns (see Table 3), but no mention is made in the survey report if these guns were mounted; the inventory shows only a single gun carriage in its stores. Five of Mergasy's seven guns were both mounted and deployed; they were scattered one each to bastions around the hill fort. Mergasy's inventory lists six carriages, but it is unclear if this total includes the carriages in use or is a count of replacement carriages. Mudgherry and Paughur possessed six and seven guns, respectively, all of which were dismounted. Only one gun carriage is reported in Mudgherry's inventory, and none were listed at Paughur. Mudgherry's guns and one of Paughur's guns were judged to be "serviceable." The remaining six Paughur guns were described as "repairable." Finally, at Gooribundah there were only two guns, both of Country make (as used in the fort survey report, the term "Country" implies only that the item was made in India, not that it was necessarily made by Tipu Sultan or some other indigenous power), one a "Malabar gun" made of iron bars held together by bands of iron rings, the other described only as "Iron Covered with Brass." No mention is made of gun carriages in Gooribundah's inventory, but that tells us nothing because Country guns such as these were often mounted on blocks of

wood or “put on the embrasure,” perhaps by means of metal pivots, rather than on European-style carriages when deployed in the defense of forts (Balasubramaniam 2008, Fig. 3.13, 3.16, 5.12, 5.37; Deloche 2007, pp. 243, 246; Irvine 1903, p. 123).

Wellesley’s survey instructions of August 1802 directed each fort commander to specify the ordnance needed, if any, to mount an adequate defense. A comparison between the inventories of existing guns and the lists of requested ordnance shows that the iron 6-pounder was the most common gun in all six forts, but fort commanders wanted more guns and bigger guns (see Table 3, compare “present” and “required” columns). Excluding the mortars, howitzers, and Country guns from consideration, approximately two-thirds of the 85 guns present in these forts were 6-pounders or smaller. However, guns firing metal in this range account for only about one-third of the ordnance that Mysore fort commanders said they needed. In brief, they had plenty of light guns, but what they really clamored for were heavier ones.

Although the Mysore fort commanders all shared the desire for heavy calibers, the 6-pounder and the 5.5 in (14 cm) howitzer were the workhorse pieces of British artillery during this period (Hughes 1969, pp. 71–72). It is also true that bigger guns did not necessarily translate into better fortress defense. Even light guns could do good practice if well served and, by virtue of being lighter, they had the advantage of being more economical of powder than the heavier guns. In point of fact, early in his India experience, Arthur Wellesley argued that the 6-pounders are “lighter than the 12-pounders, they are more easily transported; and carrying both grape and round shot as far, they ought to be preferred for all field purposes” (Wellington 1858, 1, p. 3). If anything, the lack of serviceable carriages for the existing guns in these forts posed a greater potential liability than the lack of heavy calibers if the garrison was called upon to defend itself.

In summary, the ordnance found in the surveyed forts represents a mix of equipment surrendered by Tipu Sultan’s killadars and that which the British hauled up from Madras. Each fort held only a few more guns than was typical of comparable Mysore forts a decade before. The most common guns were in the 6-pounder and smaller range. Viewed through the eyes of their British commanders, the six hill forts held fewer guns and lighter guns than they felt they needed for an adequate defense, a pattern that, once again, appears partly to reflect cultural differences in ways of waging war.

With the notable exception of Mergasy, the artillery in the surveyed forts appears to have been organized on a peacetime basis. Few guns were mounted; in some cases, none were mounted. This would have been a good policy if the necessary ordnance could be quickly brought into service during a time of crisis. However, the inventory data suggest that none of the forts could have moved to a war footing without considerable work and additional supplies. Suitable gun carriages were in particular short supply throughout Mysore generally during this period. This situation was critical enough that, in an 1801 memorandum to the Military Board in Madras, Arthur Wellesley wrote that at Seringapatam, “There are not now garrison carriages from which it is safe to fire even a salute” (Wellington 1858, 2, p. 517).

Military Stores

The survey report also contains detailed inventories of the military stores present at each fort. Given the impossibility of reducing these inventories to a common system

of weights and measures that possesses any degree of reliability, Table 4 counts only the presence of discrete classes or types of items. In other words, these counts scale the diversity of material items in the stores, not their abundance.

One cannot read the long lists of inventoried stores present at each site without being immediately struck by the absence of most small-arms. No muskets, pistols, bayonets, swords, or other common personal weapons are mentioned in the fort inventories. However, the absence of evidence is not evidence of absence. The store inventories examined here only cover the supplies and materials on each garrison's books. Small-arms and other materials and supplies were the property of individual units that composed the garrison. Unit equipment and spare parts (other than expendable items such as lead, powder, and gunflints) were not, strictly speaking, garrison stores and they would have been inventoried separately. Regrettably, unit inventories were not part of the 1802 fort survey, and this information is unavailable.

Table 4 examines item diversity in four general categories. "Artillery" refers to such things as carriages, mortar beds, and carts (but not guns), that are component parts of ordnance. Items classified as "artillery" in Table 4 follow Spearman's (1844) "Composition of an Artillery Armament for the Defense of a Fortified Place." "Ammunition" includes everything from fuses to shot, as laid down in Spearman's (1844) "Detail of a Proportion of Artillery Ammunition for the Defense of a Fortified Place." The "Implements" list closely follows Spearman's (1844) "Implements and Stores for the Service of the Artillery in the Defense of a Fortified Place." Finally, "Infantry" includes such objects as musket gunflints, which are more closely associated with infantry than the artillery.

Taken together, the six forts held at least 236 kinds of things. The inventories included most of the items listed in Spearman's artillery table; at least 11 of the 15 items (73%) in Spearman's ammunition list; and 28 of the 119 items (24%) in his implements and stores list. More than one-half of the 236 items were present in Chittledroog's storehouses. The other forts were impoverished by comparison.

Among the ammunition items, hand and rampart grenades, light balls, and wood bottoms or sabots for round shots are enumerated in Spearman's table, but are not found in any of the fort inventories. Grenades appear to have been scarce in Mysore during this period (Gurwood 1837, 1, p. 108). Light balls (see Adye 1802, pp. 82–84), which would not have stored well, may have been better made up as needed. As for the wood bottoms, many wooden objects in these forts appear to have been in

Table 4 Diversity of military stores

Type	Chittledroog	Gooribundah	Mergasy	Mudgherry	Nundydroog	Paughur
Ammunition	60	3	5	7	22	16
Artillery	11	1	3	4	1	2
Implements	78	6	6	7	22	13
Infantry		2	2	3		2
Totals	149	12	16	21	45	33

poor condition or were missing altogether. On this point, consider a few examples. First, all 11 of Paughur's bullock carts, the only carts inventoried in the six forts, were marked as unrepairable. Second, Paughur and Gooribundah held a total of 20 Country pick axe heads between them, but not a single wooden haft. Third, as noted elsewhere, many wooden doors, windows, and shutters in these forts were rotten and needed to be replaced. Finally, the same problems are evident in the returns of unserviceable military stores captured at Seringapatam in 1799 (East India Company 1800, pp. 256–263). Taken together, these examples suggest that wood preservation was a chronic problem in these forts and not merely an artifact of poor maintenance during the two years that the forts were in British hands.

Mudgherry and Paughur made up for their lack of guns with an inventory of 21 and 17 matchlock wall pieces, respectively. Wall pieces were common fortress weapons in the South and could do considerable damage (Harding 1997, pp. 353–373), but first they must be usable. Paughur's inventory notes that all of its wall pieces were unserviceable.

Mudgherry's small arsenal also contained two small-arms described as "pieces brass 7-barrelled, 15 inches long." The description appears to reference a short-barreled version of the Nock Volley Gun, the original model of which was designed in the late 1700s to be used by seamen in a ship's rigging during naval battles (Peterson 1964, p. 329). Fired much like a wall piece, this weapon had a nasty recoil that could break the firer's shoulder, but its blast was undoubtedly devastating at close range. While it was likely more of a curiosity than a weapon, enough pieces were in British service that several editions of *The Bombardier, and Pocket Gunner* mention "7 barrel guns" as a distinct category (e.g., Adye 1802, p. 46; Adye and Eliot 1827, p. 52).

All of the surveyed forts held artillery-related ammunition stores, a considerable amount of which was Country gunpowder. While some of this gunpowder was undoubtedly Tipu Sultan's, it is equally likely that part of it was recent British stores. Both Tipu Sultan and the British operated mills for making Country gunpowder (Harding 1999, pp. 31–108). Chittledroog, which may have had its own powder mill (Government of Karnataka 1993, p. 17), held 72,638 lbs (32,948 kg) of "coarse Country powder." Mudgherry had 12,158 lbs (5,515 kg) of Country gunpowder on hand, plus 5,936 lbs (2,692 kg) of brimstone (sulfur) and 232 lbs (105 kg) of saltpeter, which gave it most of the raw materials needed to make half again as much powder. Mergasy held some Country gunpowder, along with several hundred pounds of brimstone. Paughur and Gooribundah alone had no gunpowder (possibly a temporary condition at Paughur, which is known to have had a bad magazine (Wellington 1858, 3, pp. 517–518)). Nundydroog differed from the other forts in that its powder appears to have come mostly from other British stocks; it held about 30,000 lbs (13,608 kg) of corned or mealed (i.e., granular) gunpowder in 60- and 100-lb (27, 45 kg) barrels.

Chittledroog's gunpowder included 2,306 lbs (1,046 kg) identified in the inventory as "damaged," presumably by damp, poor ventilation, or extremes of temperature. Gunpowder storage would remain a problem at this fort. In 1821, the improper disposal of damaged gunpowder at Chittledroog caused an explosion that took the lives of two British officers and their two servants (Anonymous 1822, p. 185).

Along with gunpowder, Chittledroog held the largest stores of shot, shells, cartridges, matches, portfires, wads, cartridge formers, and other ammunition-related

materials; Nundydroog's ammunition stores were a distant second in terms of the kinds of materials on hand. Chittledroog and Nundydroog also had supplies of cloth gun cartridges, all but a few of which were unfilled. Country paper cartridges were found only in the stores at Mergasy, Mudgherry, and Paughur, along with nearly 24,000 lbs (10,886 kg) of loose ball and pig lead. All of the forts except Chittledroog reported inventories of loose round shot of various calibers. Mudgherry's inventory notes that 223 of its loose round shot were "unserviceable," a comment that suggests chronic poor storage conditions. Quilted grape shot and canister-type case shot were present only at Chittledroog.

Alone among the forts, Paughur had 576 "loaded rockets." No information is given in the survey report that enables us to identify whether these were signal rockets or weapons. Given Tipu Sultan's effective use of rockets against infantry and cavalry in several engagements elsewhere in Mysore (Narasimha 1985), the latter seems most likely.

With the exception of eight unserviceable matchlocks noted in the Paughur inventory and Mudgherry's two volley guns mentioned above, no other personal weapons and small-arms are mentioned in the fort inventories. Chittledroog and Nundydroog, the largest of the six hill forts, also held no garrison stores that one could characterize as exclusively intended for use by foot soldiers. Mergasy, Mudgherry, and Paughur had a total of more than 40,000 musket flints on hand, more than half of which were at Paughur. Since Paughur held no gunpowder, its large store of gunflints was as useless to the garrison as its eight matchlocks. Between them, Mergasy, Mudgherry, and Gooribundah also had 22,320 shotted musket cartridges, to which Mudgherry could add 1,235 leaden musket balls. Gooribundah had an additional 1,226 "balls matchlock load" [sic].

Among the stores that cannot be directly tied to the artillery defenses of the surveyed hill forts, Paughur inventoried its 12×18 ft (3.6×5.5 m) garrison flag and also dutifully noted that the fort's stores held 650 "earthen pots" and two elephant tusks. Gooribundah was the only fort to include any cavalry-related materials in its inventory. It had on hand 1,954 horseshoes, but only seven horseshoe nails. Mergasy, Mudgherry, and Paughur collectively tallied nearly 42,000 lbs (19,051 kg) of "old iron." The closest that Gooribundah had to old iron (other than, of course, its horseshoes) was 216 "iron wedges."

Along with the generally poor representation of wooden objects, most of the artillery-related implements and stores enumerated in Spearman's tables, but not found in the six forts, are relatively small, common, and useful for a wide range of non-military tasks. Examples of such items, include hammers, nails, saws, wheels, buckets, and lanterns. Given the details afforded to similar items in the fort inventories, it is inferred that they were not present in the garrison stores rather than simply overlooked.

In summary, the lists of military stores emphasize the dominant role that artillery was clearly intended to play in the defense of these forts. However, the forts were inadequately prepared to fulfill the basic requirements of this role. Chittledroog's stores appear to have been the most war-ready, with a wide range of equipment and roughly 32 tons (32,514 kg) of gunpowder at the garrison's disposal. The distribution of military stores between the six forts is noticeably uneven, with most forts having some useful items that the others lacked or possessed only in short supply. Taken as a

whole, the inventories provide little information about small-arms and personal weapons, most of which lay outside of the domain of garrison equipment and stores. The inventoried small-arms and ammunition included a few unserviceable matchlocks, a couple of volley guns, gunflints, and enough musket cartridges to provide each soldier with a few rounds.

Grain and Provisions

Tipu Sultan rank-ordered forts according to their strategic importance and issued regulations concerning the provisioning of forts consistent with where they fit in the hierarchy. According to these regulations, the most important Mysore forts were supposed keep an eight-month supply of provisions and stores, while the lowest ranked forts were only expected to have a two month supply on hand (Greville 1795, 1, p. 80). Had these regulations been scrupulously followed, the six hill forts should have contained at least 4–6 months of provisions and stores when they surrendered in 1799.

The British view on supplies was similar to that of Tipu Sultan. In 1800 and again in 1801, Wellesley recommended to the government in Madras that “wherever there is a garrison there should be a store of provisions sufficient to last the garrison for six months” (Wellington 1858, 2, pp. 188, 538–539). While this may have happened, Gooribundah and Mergasy reported no garrison provisions in the 1802 inventory, and none of the other forts contained sufficient supplies to sustain a garrison for more than a couple of months.

The stored food grains and other provisions in these forts were basic commodities such as salt, pepper, and ragi, or finger millet (Table 5). Ragi was a common food grain in many Mysore regions during the early 1800s (Buchanan 1807, 2, pp. 103–104; Wilks 1805, p. 37), just as it is today. It has many desirable qualities, among

Table 5 Grain and provisions. An “X” indicates that the item is present in the garrison stores

Article	Chittledroog	Mudgherry	Nundydroog	Paughur
Raggy (ragi; <i>Eleusine coracana</i>)	X	X	X	X
Pepper	X	X	X	X
Salt	X	X	X	X
Paddy (unhusked rice)	X	X		X
Horse gram (<i>Macrotyloma uniflorum</i>)	X			
Arrack	X			
Gee (ghee)		X		
Dall (dal, a pulse)				X
Salt mud		X		
Soap nute (possibly <i>Sapindus emarginatus</i>)		X		
Lamp oil	X	X		X
Firewood billets	X			X

No grain or provisions were reported in the Gooribundah and Mergasy inventories

them that it will make a crop even on indifferent soil, it is insect resistant, and it stores well, remaining usable for many years (Watt 1908, p. 520).

Paddy, or unhusked rice, another common grain, was in the granaries of three of the four forts that held provisions, but in smaller quantities than ragi at all of the forts except Chittledroog (the large store of paddy at Chittledroog may reflect action taken on Arthur Wellesley's 1801 recommendation to begin moving rice and other supplies there in anticipation of war with the Marathas; see Gurwood [1837, 1, pp. 357–365]). Relatively small stores of pulses (horse gram, dal) were also present at Chittledroog and Paughur. Although horse gram was grown by early nineteenth century Mysore villagers (Buchanan 1807, 2, pp. 4,105), it was commonly fed to cattle and horses and its major use as a food grain for human consumption tended to come only after local ragi crops failed.

Chittledroog and Paughur also held 400,000 and 8,695 billets of firewood, respectively. Although 400,000 billets may seem like a lot of firewood to modern readers, the fort survey report assumed that it would be consumed at the daily rate of approximately five billets per soldier. By this reasoning, a Chittledroog garrison of, say, 2,500 men, would have exhausted its firewood supply in one month.

Finally, Chittledroog further distinguished itself by having on hand 1,884 gal (7,132 l) and 6 dr (22 ml) of arrack. Like the paddy, some of this arrack may be British supplies recently shifted to Mysore's northern frontier. If, however, it was intended solely for garrison use, it was not a particularly large arrack store. Issued at the daily rate of two drams per European soldier, it represents about a two and one-half month supply for a Chittledroog garrison.

With the possible exception of some of Chittledroog's supplies, the provisions listed in Table 5 are probably best viewed as the remains of old siege stores, some of which may have even predated Tipu Sultan's time. For example, the report claims that gram stored in one of Chittledroog's granaries was 40 years old in 1802. And at Paughur, it was estimated that the large stores of paddy, ragi, dal, and pepper would not keep good for more than another year or two. In view of how well ragi keeps, Paughur's supplies must have been old, poorly stored, or both. At Mudgherry, the stored ghee was so bad that it was declared "unserviceable," and the report recommended that it be sold as oil. Mudgherry's store of lamp oil was only in slightly better condition; it was "At present serviceable. But will not keep so another year."

The survey report also includes each fort commander's estimates of the garrison provisions needed for a certain number of men per year. These lists are pretty uniform. European soldiers were to be issued daily rations of arrack, rice, salt, sheep, and firewood billets (see also Wilson 1883, 2, p. 345), while their Indian counterparts received rice, ghee, tamarind, chilies, garlic, turmeric, tobacco, and firewood. Cultural differences in the food habits of the two main components of the EIC armies are readily evident in these lists.

Although ragi was the major food grain in the inventory of existing provisions, it is noticeably absent from the fort survey report lists of provisions needed for EIC European and native troops. Significantly, even Tipu Sultan's regulations governing fort provisions and stores identified rice, not ragi, as the food grain to be given to garrisons (Greville 1795, 1, pp. 78–79). The large stores of ragi in the hill forts demand explanation, and part of the answer may be found in the returns of provisions for Seringapatam. A committee report on the contents of Seringapatam's grain stores,

which was submitted to Wellesley on July 8, 1799, about two months after this fort fell to the British, found paddy in all but six of its 27 granaries and godowns. One of Seringapatam's granaries containing paddy also held some ragi, the sum total of this grain in the garrison stores (Wellington 1858, 1, p. 257). The most likely explanation for the rice/ragi difference between the provisions drawn by the capital city's garrison and the hill fort garrisons is that the latter were mostly comprised of locally raised irregular infantry and militia, variously called *candachar*, *ahsham*, etc., for whom ragi was the staple food grain.

Rice and ragi would have been relatively cheap in Seringapatam's bazaars because both are common crops in this southern region of Mysore. Farther north around the six hill forts, ragi would have been locally more available than rice and cheaper due to lower transport costs and greater supply. Given Tipu Sultan's financial difficulties in the years leading up to his final defeat by the British (Gopal 1971), there may have been significant cost savings to be had by provisioning the northern frontier forts mostly with ragi. Another relevant point is that rice was typically viewed as a higher status food than ragi in much of Mysore (as it is today). Since the Seringapatam garrison was undoubtedly drawn from Tipu Sultan's best troops, it is unlikely that they would have been content with a steady diet of ragi *mudde* (commonly called "ragi balls" in English) and sambar. The same was apparently not true for hill fort garrisons on the northern frontier.

In summary, the hill forts typically held enough supplies to sustain their garrisons for a couple of months. Most provisions, notably salt, pepper, and ragi, appear to be the remains of old stores originally deposited by Tipu Sultan's garrisons. The stores at Chittledroog and possibly Nundydroog also probably included some recent supplies stockpiled by the British in preparation for war with the Marathas. While inventories of such items as firewood and arrack seem large when viewed in the aggregate, they are considerably less so when placed into context by examining the rate at which these supplies would be expended. The large store of ragi versus rice in the hill fort granaries may reflect the combined effects of Tipu Sultan's chronic financial difficulties and hill fort garrisons comprised mostly of peasant militia.

Discussion

South India is dotted with the picturesque ruins of hundreds of hill forts, nearly all of which were built or extensively renovated in Late Medieval and Early Modern times, roughly between 1300–1800 CE. Bryant (2004, p. 460) attributes the abundance of forts in eighteenth-century India to the relative autonomy of local rulers and the greater militarization of early modern society. Few of these forts can be said to be reasonably well-documented (Deloche 2007, p. 1), and fewer still are well understood from perspectives that examine them as they were, not as one might imagine them to have been. The Mysore fort survey offers the compelling evidence of direct observations of what six strategically important forts actually looked like in the early 1800s. This section draws some lessons from the comparative analysis of these aspects of forts, many of which facilitate the general understanding of such places.

Hill Forts in the Modern Imagination

Forts often possess symbolic as well as military value (Gordon 1994, pp. 92–93, 96–97; Narayana Rao et al. 1992, pp. 83, 86; Parrott 2000; Toy 1957, pp. 1, 68), and the tug and pull of these frequently incompatible dimensions can be readily seen in the Mysore hill forts. Their main symbolic value was to reflect the ruler's status, legitimacy, and control of force. It was largely achieved visually by the choice of fort locations that were imposing when viewed from a distance and as one entered them. Curtain walls and bastions that marched tier after tier up a hill made an unambiguous statement, as did elaborate gateways and conspicuous storage facilities for food and water. One finds these qualities expressed architecturally in varying degrees in the Mysore hill forts, from Chittledroog, where the fortifications dominate the town even today, to Nundydroog at the other extreme, where the fortifications are themselves overwhelmed by the sheer scale of the massive, steep-sided granite rock upon which they were built. Emphasis on the symbolic value of forts yielded sites that were typically an imposing combination of mass and elevation, which persisted even after such features became defensive liabilities.

By the second half of the eighteenth century in South India, visually obtrusive fortifications still possessed symbolic value, but the South was undergoing its own manifestation of the military revolution that had changed European warfare and fortifications a couple of centuries earlier (Gommans 1999, pp. 118–120; Parker 1989; for an introduction to the continuing debate over the validity of the military revolution thesis, see Rogers 1995). To their credit, Mysore, the Marathas, the Mughuls, and the Nizam moved relatively quickly to adapt aspects of their armies to new tactics, training, organization, and technology that were winning battles across India. However, fortifications are not as malleable as armies. Major changes were constrained not only by available time, money, and labor, but also by the material legacy of past rulers' decisions, which was an integral part of the symbolic capital of each place.

Although obtrusiveness and a good defense were often incompatible qualities of a South Indian fort by the end of the eighteenth century, a few more decades passed before it was widely accepted that such places had become little more than expensive, picturesque anachronisms that were better abandoned or destroyed than garrisoned. Some forts were still useful to police a region, awe the peasants, and discourage marauders, but they also tied down troops and diverted other resources while contributing little to the kingdom's defense.

Hill Forts and the Material Record

The 1802 Mysore survey report also provides information about these forts that differs considerably from that which can be found in contemporary drawings, histories, travel narratives, military action reports, and the memoirs of old soldiers. They reveal, for example, how variable forts in one region could actually be. Any given curtain wall could (and likely did) show a variety of building methods and materials and a wide range of condition from unfinished to ruins. Parapets and bastions were particularly variable, largely because they were the functional spaces most closely tied to an active defense. Such variability is typical of forts worldwide and is consistent with the accretional nature of their construction.

The British surveyors dismissed the possibility that most hill fort parapets could be modified to mount guns and recommended that many of the bastions be renovated as gun platforms. That few such renovations were undertaken reflects the changed nature of early nineteenth-century South Indian warfare, fundamental changes in the political landscape, and, at a more basic level, the reluctance of the EIC Court of Directors to invest money in that direction.

Another wall pattern that bears mention is that bastions that are square or circular in plan may occur in the same South Indian fort, if not the same wall lines. While circular bastions tended to become more common than square bastions through time, it is unnecessary to attribute, as some researchers have, the use of circular bastions to the late medieval and early modern campaigns of Muslim armies in the South. As its extraordinarily rich architectural traditions demonstrate over the past couple of millennia, South India has never run short of outstanding designers, engineers, and stone masons for whom accommodating the stresses present in a curtain or bastion wall of any shape was typically a trivial task.

Had these forts been constructed and renovated by Hyder Ali and Tipu Sultan solely according to functional considerations, most would have seen less emphasis on new fortification lines and more invested in gun platforms, works sited so that they could be covered by the flanking fire of inner lines, greater standardization of artillery, and adequate storage facilities. The former rulers of Mysore appear to have been aware of these shortcomings, but they lacked the time, and probably also the money, to correct them.

One of the surprises revealed by the Mysore survey report is how sparsely the interior spaces of forts were populated with buildings. In all six cases, the scatter of ruins one finds today inside the fort walls appears to be a fairly accurate representation of what military and garrison buildings existed at the beginning of the nineteenth century. Chittledroog stands out for the quantity and diversity of its buildings, and for the fact that roughly 20% of them were described as “unserviceable” when inventoried in 1802 (a point to which we return in the next section).

Comparative analysis of the ordnance and garrison stores and provisions also shows several consistent patterns. Most of the ordnance was dismantled and organized on a peacetime basis. British garrison commanders also consistently reported that the forts had too few guns and what they did have was of too small caliber to do the job. However, compared with other forts that had been under Tipu Sultan’s control, these hill forts held a few more guns than most. Taken as a whole, while they had no shortage of powder, shot, shells, and artillery-related equipment, these supplies were unevenly distributed between forts. This would have made little difference had the Marathas invaded northern Mysore in 1802 because the chronic shortage of suitable gun carriages meant that these forts could, at best, present only a feeble defense.

When one turns to supplies other than ordnance, few small-arms and other personal weapons are mentioned in the inventories. Their absence is particularly evident when one compares these inventories with the returns of captured arms at Seringapatam after the British took it in May of 1799 (East India Company 1800, pp. 256–263). As explained earlier, the fort surveys did not record the small-arms that belonged to each battalion that composed the garrisons. What this means in practical terms is that there are still some pieces missing from the complete picture of military assets in each fort.

It is notable that most of the food grains and other provisions in the hill forts appear to be old siege stores from when Tipu Sultan held these forts, and some provisions may have even predated Tipu Sultan. The poor state of these supplies suggests that the EIC garrisons had not received orders concerning the maintenance or replenishment of siege stores in their command. Regardless of their source, only Chittledroog had enough food on hand to feed a bare bones garrison for more than a couple of months, far short of the 6–8 months worth of provisions that Tipu Sultan and, later, Arthur Wellesley viewed as necessary.

Implications of Fort Maintenance

The survey report unequivocally shows that the hill forts were in poor condition in 1802, and very little was too critical to each fort's military mission not to be described as in ruinous condition in the inventories. The list runs the gamut across curtain walls, gateways, ditches, buildings, granaries, guns, carriages, wall pieces, gunpowder, food grains, lamp oil, and sundry other items. The mediocre state of the fortifications, buildings, ordnance, and stores is particularly significant because it implies that these forts were essentially unprepared to fulfill their fundamental military role.

Given their symbolic significance alone, one might expect to see a higher standard of fort maintenance reflected in the survey report. After all, the fortifications and buildings were, until quite recently, emblematic of the power and status of Mysore rulers. Instead, the report leaves one with the impression that each fort's symbolic message was best viewed from a hazy distance.

Significantly, however, the symbolic value of a fort was not necessarily diminished even if the works were in a poor state of repair, incompetently constructed, or unfinished. The EIC hung on to Seringapatam after the defeat of Tipu Sultan partly because they recognized its significance among the people of Mysore. Simply put, he who ruled at Seringapatam, ruled Mysore (Gurwood 1837, 1, p. 344). However, this quality alone was insufficient to convince the EIC to authorize the expense of basic repairs. More than two years after the British took Seringapatam, Arthur Wellesley wrote in great frustration, "If Government do not soon determine to commence in earnest a repair of this fort, the expense will be saved as there will be no fort to repair" (Gurwood 1837, 1, p. 336). Although the EIC eventually authorized the most essential repairs needed at Seringapatam, comparable attention was never paid to the six forts addressed in this article.

Most of the blame for the inadequate maintenance and poor storage conditions found at these forts can be laid at the feet of Tipu Sultan and the East India Company. Tipu Sultan spent much of the 1790s rebuilding his kingdom and preparing for the next war, but he sorely felt the loss of state revenue that was an important consequence of the Third Mysore War. Viewed in that light, it is hardly surprising that he should try to economize on fort repairs (other than his capital at Seringapatam) where he felt that he could. The EIC also was quick to feel a financial pinch, but in their case, they appear to have acted like many governments down to the present, which enthusiastically cut corners on defense spending until they perceive a real and immediate threat. Wellesley's correspondence records his frustration

that the EIC repeatedly refused to authorize repairs and other maintenance for the Mysore hill forts.

Some of the spoilage of equipment and stores reported in the survey reports could be due to negligence on the part of the British garrison or Tipu Sultan's garrison before them, or to Mysore's slow recovery from the general political turmoil of the late eighteenth century. Alternatively, it could reflect a level of wastage that seems excessive only when viewed by modern standards. The explanation cannot be found in the data at hand, other than to note that all of the forts warranted major renovations of their storage facilities. The problem was particularly significant in view of the fort survey instructions approved by the Military Board in Madras, which required each fort to be evaluated for its suitability as a storage depot.

Finally, the poor overall condition of these forts provides convincing evidence that, while the Madras government saw the newly conquered territory of Mysore as an important buffer between themselves and the Marathas, the main roles envisioned for the hill forts were as forward posts and potential supply depots. So long as their use could be denied to the Marathas, the Mysore forts possessed relatively little strategic value.

Conclusions

The 1802 Mysore fort survey demonstrates that many *a priori* assumptions about the condition and use of these and similar forts are likely to be without foundation in the absence of external evidence to support such claims. While the historical record and archaeological remains leave no doubt that a given place was an important Early Modern fort, there is no basis to assume that it was in ruins or, at the other extreme, in good repair, adequately supplied, or even prepared to offer a viable defense when Tipu Sultan's garrisons last manned the walls or after EIC troops replaced them.

Forts are massive, complex, and expensive cultural spaces built to legitimize local rulers, enhance their status, protect their interests, impress the neighbors, guard frontiers, serve as supply depots and prisons, provide refuge for villagers, and defend the realm in time of war. Given their scale and great expense, they cannot change easily with shifts in local and regional political climates, the fortunes of their rulers (and those of their neighbors), and available military technology. As this study shows, neglect and inadequate logistical support can quickly degrade a fort's abilities to meet the demands of its essential roles. Viewed in that light, what happened to the Mysore hill forts in the beginning of the nineteenth century differs little from the effects of national defense cutbacks that typically accompany modern outbreaks of peace.

Ultimately, the changing South Indian political climate and the limitations inherent in the design of such installations spelled the end of hill and other forts during the early nineteenth century. The era during which such facilities made political and military sense was past. These forts are now tourist attractions, picturesque ruins, and handy sources of recyclable building materials for local villagers. Their remaining enemy is simply benign neglect, which appears to be unbeatable and is the odds on favorite to win the final battle.

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