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TIPU SULTAN: An Encounter with the British Vis-a-Vis War Technology and Medicine

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ABSTRACT

This paper briefly traces the progress of science and technology during reign of Tipu Sultan the most controversial in historiographical terms. It particularly explains certain aspects of iron and wootz steel, rocket technology and Unani medicine. Most of the narratives on Tipu Sultan are a reflection on his administration, economic innovations, religious and social service aspects. This paper tries to highlight that how Tipu realize technology as a very power full weapon to counter the British colonial expansion unmindful of the French motives.

INTRODUCTION

India has a long years of scientific history is borne by the fact that it has contributed certain original scientific and mathematical concepts to the world. However its traditional scientific perspectives were changed by the European scientific and Industrial revolution that was driven by the renaissance. Europe and particularly England used its scientific advancement as a tool for the establishment of colonies across the world including India (Arnold, 2004, pp. 19). The British thought that their technology especially the warfare technology was far superior to the rest of the world during the colonial time. But, during the end of eighteenth century, the British colonial expansion into south India, was greatly resisted by Tipu Sultan, the ruler of Mysore, challenged the colonial superiority of the British warfare technology. The British were able to defeat and kill Tipu sultan, not because of lack of inferior advancement in warfare but rather because of jealousy, self-interest and disunited attitude of native rulers. Tipu Sultan was one of the well known native rulers and fought against the British in 1792 and 1799 Anglo-Mysore wars. He was very keen to adopt new scientific discoveries related to warfare and introduced the process of modernity in Mysore state. He was not only a model for the resistance of colonial power in India but also advanced in science and technology of his time. There is a need to situate in historiographical terms his scientific promotion which he adopted in his military and economic reforms. The weapons used in his army were made of iron and wootz steel. He made use of rockets and missiles in war time. His knowledge of public health was well informed than means of his contemporary Indian rulers and Europeans.

TIPU SULTAN AND WOOTZ STEEL

India has more than 2500 years of history in the fabrication of iron. Iron pillars at Mehrauli in Delhi, Dhar in Madya Pradesh, Kollur in Karnataka and huge canons at Bijapur, Bishanpur, Murshidabad, and Kalburgi etc. are the best examples of the quality of iron used in pre-colonial India (Tripathi, 2007). The metal called 'steel' which is a mixture of iron and carbon is known to India ever since the pre-Christian era. The steel is named as "Wootz Steel"(Ukku in south Indian languages) by Europeans in nineteenth century (Coze, 2003). The weapons such as muskets, guns, cannons used in the Tipu's army including his sword, made of wootz steel were superior to those used by western countries. Major Alexander and William Kirkpatrick who were contemporaries of Tipu Sultan and officers of the East India Company talk about native technology in the making of muskets and guns. They have documented that these were superior to the rest of the world in contemporary times (Guha, 2002). Francis Buchanan Hamilton, the surveyor of East India Company conducted survey of Mysore state in 1800. He covered not only topography and natural resources but also aspects of social, economy and history of Mysore state. In 1807 he published his work in three volume *'A Journey from Madras through the countries of Mysore, Canara and Malabar'*. It is a firsthand source to understand the socio-economic condition of Mysore state. Bucannan gives information in detail about the raw material, labors and the method of manufacturing iron and steel in Mysore state. Madugiri, Channarayadurga, Hagalavadi, Devaradurga, Gattipura etc. were important places of iron deposits and steel furnaces (Buchanan, 1870, pp. 16-22). Benjamin Heyne was a Botanist in East India Company at Madras and in charge officer of Lal Bagh in Bangalore from the death of Tipu to 1812. In his work *'Tracts, Historical and Statistical, on India; with Journals of Several Tours Through Various Parts of the Peninsula: also, An Account of Sumatra in a Series of Letter'* describing the quality of iron and steel manufacture in Mysore as states that " the steel of India was decidedly the best I have yet met with" (Benjamin, 1814, pp. 358-364).

There was a basic difference in the production of iron by modern method of technology in Europe and India. In European technology iron begins to take up carbon at 1000c. Indians were using some kind of wood which provided more carbon for carbonization of iron (Guha, 2002). Though modern technology was unknown in India, the quality iron and steel was far more advanced than its European counterparts. Some

times Tipu even rejected iron muskets which were imported from France because of poor Quality (Sridharam, 1999). Tipu tried to share this technical knowledge with French and Constantinople through business. In this way, Mysore under Tipu Sultan was not only self-sufficient in iron and steel but also was exporting steel to other provinces of India. He used this technology effectively against the British. Later, the British came to know the quality of Indian iron and steel and they used these metals in the constructions in England. Further, the studies on technology and manufacture of steel were carried out by European scientists and this technology became the subject matter of research in Europe. Scientists including Michael Faraday pursued research in this field (Ranganathan & Srinivasan, 2006).

TIPU SULTAN AND ROCKET TECHNOLOGY

The quality of iron which was available in Mysore state played vital role in making of weapons of Tipu's army. Among the weapons he used the rockets and missiles were the most dangerous and ingenious (Wilks, 1817, pp. 272-278). But Tipu was not the inventor of rocket. The technology of rocket has more than 2500 years of history and it was developed at different stages of historical development. Archytaas, a Greek astronomer attempted to design a wooden bird and amused the people of Italy around 400 BCE. It was a first step in the origin of rocket technology. After the 300 years Archytaas attempt, another Greek Philosopher Hero of Alexandria invented a steam engine that used the principle of rocket flight. In the first century CE, the Chinese produced gun powder with mixture of saltpeter, sulphure and charcoal dust. This gunpowder was used to make colorful fireworks and it was an entertainment and used for religious purpose. Later, they began to use this gun powder in bamboo tubes with arrows and converted them into firearms. In 1232, Chinese used these firearms in the battle of Kai-Keng against Mongols. Until seventeenth century Indians, Persians, Europeans including the Chinese knew same method in the technology of rocket (Das, 2010, pp. 3-14).

There were new experiments made in rocket technology in the eighteenth century South India. There are literary records available regarding firearms in India like *Black Ayurveda* and *sukraniti*. Indians had a crude knowledge of the technology of rockets and there is no evidence for the use of rockets in battle field. It was only with the entry of Portuguese in 1498 a new era begun in India regarding technology of rockets. Zamorin, the ruler of Calicut used rockets against Vasco Da Gama of Portugal in 1498. But these rockets were inferior in quality compared to European made. Further, the Zamorin realized the importance of rockets and he was a first Indian ruler made serious attempt to learn its technology by employing European technicians in his state. The Mughals, who managed huge military force in India for nearly two centuries were under the influence of European technology of warfare. Mughals employed large number of European soldiers in their army and concentrated on the huge canons, but there was no progress in the development of rocket technology (Qaisar, 1998, pp. 46-57) the advancement of rocket technology was once again centered in south India by Mysoreans in the middle of eighteenth century.

Haidar Ali, the ruler of Mysore state, fought against the British in the first two Anglo-Mysore wars. He used the rockets against British in the battle of Pollilur in 1780 (Wilks, 1810, pp. 272-278). Even though he defeated British, it was less significant politically, but was a land mark in the history of science and technology. Because, the rockets which caused great fear and confusion among the British for, they were advanced weapon compared to any other weapons that the British and any other European country knew. Until eighteenth century the Chinese, Europeans and Persians used card boards and Bamboo tubes in the propellant area of their rockets. But Haider Ali used iron tubes instead of card board and bamboo, and the iron tubes were 8 inches long, 1.5 to 3 inches in diameter, weighing about 3.5 kg and with a range of 2.4 km. These rockets are called 'Mysorean Rockets'(Roddam, 1985). The Mysorean rockets were very advanced state that time compared to Europeans and Chinese rockets during this time. He had about 7000 rocket men with wheel launchers which were capable of launching five to ten rockets almost simultaneously (Das, 2010, pp. 7-8).

Tipu Sultan, son and successor of Haider Ali gave more importance to rocket warfare. Tipu used Mysorean rockets mainly in 1792 and 1799 Anglo-Mysore wars. He also wrote a military manual called *Fathul Mujahidin* and maintained 5000 of rocket men (Gopal, 1971, pp. 32-33). Major Dirom and Edward Moore, who fought against Tipu in Anglo-Mysore wars, provide us valuable information about Mysorean rockets. According to Moore “A missile weapon, consisting of an iron tube of about a foot long, and an inch in diameter, fixed to a bamboo rod of 10 to 12 feet long. The tube being filled with combustible composition, is set fire to, and directed by hand, files like an arrow, to the distance of upwards of a thousand yards. Some of these rockets have a chamber and burst like shells" (Ghosh, 2002).

These rockets could also be considered as the first missile, because it was not only carrying itself with iron case and stick but also had stability to carry shells and steel blades. The rockets had steel blades attached to the bamboo, these blades made the rockets unstable towards the end of their flight so that the blade could spin around like flying scythes, cutting and mowing down anyone who came in their path. A single rocket could kill at least three soldiers and injured many in the battle field (Narasimha, 1985).

After the death of Tipu Sultan in the fourth Anglo-Mysore war in 1799, the British found 600 rocket launchers and 1600 rockets inside the fort of Srirangapatna. Some of them were carried to England for analysis. Till today two specimens are preserved in the Museum of The Royal Arsenal at Woolwich, England. The death of Tipu marked the end of serious rocket development in India. Further, as it was a game changer in war and economy and the development of rocket technology was shifted to England. William Congreve, a British scientist and who was working in The Royal Woolwich Arsenal began research on decoding Tipu's rockets. He tried to develop them on the basis of Newton's principles. By 1806, he had manufactured thousands of rockets. His rockets range was about 5.5 km. The earlier European rockets range was 500-600 yards, less than half that of the Mysorean rockets. Later, these Congreve rockets were used by the British in the wars against America and France successfully (Ghosh, 2002).

Unfortunately, Congreve never acknowledged Tipu's contribution in development of rocket technology and even there is a misconception about the link between Tipu's French connection and his rockets. Tipu considered Napoleon as his best political ally. He employed French technicians in his state

but there was nothing to do with the rockets. According to Tipu's correspondence his link with French was confined to glass making, brass technology, ship building and paper making etc. but not rocket technology. In case, French had a technology of rocket they would have used it against British. There are no evidences that Tipu was looking forward anything from the French regarding rocket (Kauser, 1998, pp. 199-208). Therefore it is important to note that the technology of rocket was purely indigenous knowledge. Because, as earlier said that the superior quality of iron available in Mysore was an added advantage in the making of weapons and Tipu set up four Taramandalas at Srirangapatna, Bangalore, Chitradurga and Bidnur for rocket research (Narasimha, 2015).

TIPU SULTAN AND MEDICINE

Along with his warfare technology Tipu was a great promoter of indigenous medical system. He had a deep knowledge and interest in the Unani system of medicine and he also facilitated several clinical trials. He founded a study centre called JAME-UL-ULOOM for the medical research. Chemical laboratory, Pharmacology and Pharmacy were important parts in this study centre. Apart from the defense and religion, there were several books regarding medical science in his personal library. The book *FATEH - UL - MUJAHIDEEN* which was written by Munshi Zaunul Abideen Shoshtari contained information on the treatment of various poisonous animal bitings. He had a deep concern towards his military officials and even he ordered to treat them by his court physician Hakim Mohammed Baig. The writings of the British and other correspondences reveal that Tipu himself prescribed some medicines and methods for curing various diseases like mad dog bite, urinary bladder stone and toothache etc (Khan, 2002).

The Col. William Krikpatrick, Secretary in East India Company and played a notable role in the fourth Anglo-Mysore war of 1799 which witnessed the killing of Tipu Sultan. He collected 435 letters out of 2000 letters from Tipu's personal library. In 1811, based on these letters he published a book *"Selected Letters of Tipoo Sultan"* and concentrated only on Tipu's political issues (Krikpatric, 1811, pp. ix). Denys Forrest, the author of *"Tiger of Mysore: Life and Death of Tipu Sultan"* gone through the Tipu's letters which were neglected by Krikpatrick and reflected upon Tipu's scientific knowledge (Forrest, 1970, pp. 363).

Tipu Sultan was practicing not only Unani medicine but also he recommended Ayurveda. He was also interested in European medical methods and he wanted to incorporate the latest technical knowledge in the health care system in his state. But, he was not a blind believer at European system of medicine. Because there are many examples for rejecting French physicians. He even guided his soldiers and Europeans to follow Unani medicine instead of European medicine (Sridharam, 1999).

CONCLUSION

Tipu's achievements in the field of technology was not only confined to warfare technology but also extended to agriculture, coin making, plantation, silk industry, fortification and shipbuilding etc. He made Mysore as a centre of industrial activities. He opened numerous commercial depots both within the country and abroad to popularize Mysore goods (Hasan, 1971, pp. 344-49). Unfortunately he became the centre of controversies because of historiographical discourses which are filled with opposites of opinions on him. The beginning of controversies are credited to colonial writers like Mark Wilks, Lewin Bowring, Francis Buchanan, Dirom and others who tried to sketch the dark face of Tipu as bigot, monster and cruel etc. On the other hand pre-defined writes like Mahibul Hasan Khan, Praxy Fernandes, Bhagwan Gidwani, Shaik Ali and others over praised him as secular, humanist and freedom fighter. But, there are very few historians like Anne Buddle, Joseph Francois Michaud and others who providing a balanced view of Tipu sultan as a man and the statesman of contradictions (Sil, 2013).

Despite these controversies one cannot ignore his contributions to the technology world. Majority of scientist and science and technology writers who have been involved in writing of history of wootz steel and rocket technology, have given sufficient space for Tipu Sultan's contribution. National Institute of Advanced Studies (NIAS) and Defense Research and Development Organization (DRDO) are involved in taking up a series of lectures and projects regarding wootz steel and rocket technology. Aerospace scientist, Roddam Narasimha and his team have taken up Mysorean rocket rebuild project (Narasimha, 2015). In a way it is worth that the National Aeronautics and Space Administration (NASA) holding Tipu's rocket flying painting in its reception lobby (Kalam, 1999, pp. 37-38).

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