ORIGIN, DEVELOPMENT AND GROWTH OF FIREWORKS INDUSTRY.

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2.1. INTRODUCTION:

In the first chapter, the introduction and design of the study was seen. The issues relating to the origin of fireworks, development, their entry into Sivakasi and their growth is discussed in this chapter.

2.2 FIREWORKS:

Fireworks means explosives or combustibles used for display. Of ancient Chinese origin, fireworks evidently developed out of military rockets and explosive missiles and they were used in elaborate combinations for celebrations.

Fireworks are combinations of gunpowder and other ingredients that explode with loud noises and colourful sparks and flames when they burn. Fireworks are also called pyrotechnics.
2.2.1. Gun Powder (or) Black Powder:

Gunpowder is the oldest of all explosives. It was used by the ancient Chinese, Arabs and Indians. The art of manufacturing this was not known to the Western world until 1242, when Roger Bacon of Oxford University, in England, published a book in which he explained its manufacturing technique. Today gunpowder is not used as a very powerful explosive. Modern gunpowder usually called as black powder, is a mixture of charcoal, sulphur and saltpetre (Potassium Nitrate). Saltpetre usually makes up 75% of the mixture.

"Gunpowder was being used in canons as early as 1346. At that time gunpowder was actually in powder form. A new process for making gunpowder into grains rather than powder was invented in the 1400's. Smokeless gunpowder was invented in 1884 and had replaced gunpowder for use in firing shells by the early 1900's."

2.2.2. Saltpetre:

The discovery of possibility of saltpetre as an aid to combustion, somewhere in Asia led to the gradual development of pyrotechnic mixtures. The knowledge incourse of time, spread to Europe, where early in 14th century the monk Berthihold Schnrzo invented the gun adopting a pyrotechnic mixture for his purpose.

Saltpetre can be definitely described as a new feature of Indian commerce. Before the coming of the British and the Dutch merchants, it was either not exported at all and if it, was its quantity was negligible.

"Saltpetre was mostly used in gunpowder. The first reference to its export occurs on a letter from the king of spain written in the year 1605,
directing the viceroy of Goa to send him 10 or 12 casks of saltpetre yearly until further orders" \(^2\)

Saltpetre was obtained from various parts of our country. The coromandal coast, Gujarat, Agra regions and port of Konkan together with Bihar province were well known for this product. "In 1630 and 1650 the export was limited to 200 and 300 tonnes. However, by 1653 it became the monopoly of the English Co., which fixed an annual quantity of 800 Tonnes. If this "ton" is taken to indicate the measurement and not weight them, one thing is obvious that there was a considerable expansion of Trade in this item, besides this the Dutch in the year 1661 shipped as large a quantity as 1480 Tonne" \(^3\)


3. Ibid, Page 121.
2.3. HISTORY AND DEVELOPMENT OF FIREWORKS

The art of fireworks may be traced back to the early stages of civilization. The historical records of fireworks show that ancient Chinese, Europiens, Russians and other countries used the fireworks for military purposes and later for entertainment purposes.

The art of blending fireworks mixtures having been in China for centuries before it spread to Europe. China made war Rockets and explosives as early as the 6th century and the craft spread to Arabia in the 7th century. The Arabs called the rockets as "Chinese Arrows".

"The Chinese claim to have made gunpowder during the Sung Dynasty (960-1279) and their
chronicles mention the use of war rockets against the mangol invaders in 1279.4

In spite of China's initial progress, Europe surpassed China, in pyrotechnic development in the 14th Century, when the gun was invented. Shot and gunpowder for military purposes were made by skilled military Tradesmen, who later called firemakers and who also were required to make fireworks for celebrations of victory and peace.

In Russia, Gunpowder was produced in the 15th century. It was reported that 200 canons were found in their army in the year 1563. Fireworks were used in celebrations and entertainments in the 17th century in Russia.

In 1613, the marriage of Elizabeth, daughter of James I of England, was celebrated with the splendorous display of fireworks on the Thames.

A Swedish Captain, Beckman was responsible for display of fireworks at the coronation ceremonies of Charles II, James II and William II, as well as the celebrations that marked the birth of the old pretender and the peace of Ryswick. In 1677 he was appointed comptroller of fireworks.

An act of William III, made the use of fireworks illegal. A penalty of 5 pounds was imposed on those who manufactured fireworks or sold them.

An attempt was made to regularise the manufacture of explosives by the Gunpowder Act 1860. It provided for the licencing of premises, making fireworks, stating a maximum quantity to be permitted on each.
The results of permission of Explosives Act 1875, as they afflict the fireworks factory, call for a defined explosive area, in which buildings are spaced at distances proportionate to the quantity of explosives each contains. The number of persons allowed in a building is predetermined by the nature of work and the maximum weigh of explosives to be used in each is strictly controlled.

Much of the work in the explosive area is carried out by hand, although for a few operations, except on premises licenced under this Act is illegal.

Fireworks spread through Arab countries to Europe and according to available evidences, fireworks were first made in Italy by the Florentines. The Italians have made tremendous development in the field of fireworks displays. The Italians held their supremacy in this field until the beginning of the 18th century, when France overtook Italy in this field.
At first this fireworks were made for military purposes rather than for purposes of entertainment. Several centuries however had to pass before any real advancement was made in the field of fireworks. In the 18th century a real new effect to produce spark by addition of iron powder, to mixture of gunpowder known as Chinese fire was used in the manufacture of flower pot, in earth pot in India. The use of electricity led to the manufacture of magnesium and Aluminium metals by electrolysis, in the later part of the 19th Century. With the help of this powder, bright white sparks and white light was produced in the pyrotechnic mixture. Coloured flame with the help of metal salt like strontium, Barium and Copper compounds were also produced during the 19th century. And modern pyrotechnic industry has developed much safer coloured composition with the help of resin i.e.Polyvinylchloride.
There are two main classes of fireworks. Force-and-spark, and flame. In force-and-spark class, saltpetre (Potassium Nitrate), Sulphur and finally ground charcoal are used with additional ingredients that produce various types of sparks. In flame class, Potassium Nitrate, salt of antimony or arsenic and sulphur may be used.

2.4 HISTORY OF FIREWORKS IN INDIA

Some authorities believe that the fireworks mixture has their own origin in India and this knowledge spread throughout the east. The development of pyrotechnic in India was over a long period.

In 13th century Marcobola a Chinese pilgrim who visited India under the Kaniskar's reign mentioned that there is a reason to believe that fireworks had been existed in China and in India hundreds of years earlier:
Until quite recently, when the influence of Western methods and technics began to be felt, the range effect was very limited. The cracker in different places of India forms different names such as "Fatak", "Vedi", "Atosh Bagi" etc.

Traditionally the art of making fireworks in India experienced very slow growth. This is for the genuine reason that they were with the hands of very limited private families of South India, coupled with that they had been tied up with cut-throat-competitions even from among their own families. But it is believed that, renaissance took place only in 80's and during that period artistic features in respect of designs and packing were added and a few mechanical devices introduced to replace manual operations.

The freedom struggle in India witnessed developments of country made bombs and weapons and the fireworks industry had a set back. After independence
import of fireworks and firecrackers into India was restricted and finally banned. This gave a chance, for the Indian fireworks industry to organise on Modern methods.

Home made fireworks had its origin at Bengal, in India. Names of some fireworks items such as Bengal illumination and Bengal light (colour match) show that the Bengal have invented the items:

2.5 GROWTH OF FIREWORKS IN SOUTH INDIA

In 1922, two persons named Shree.P. Ayya Nadar and Shree.A. Shanmuga Nadar went to Calcutta to take training in Match industry and home made fireworks. They spent 6 months in Calcutta. They took training from Shree.Satish Chandra Dasgupta of Bengal. On their return they started first semi-mechanised match factory at Sivakasi and then they switched over to hand made
match factory. The success of the handmade safety matches paved the way for making of Bengal light, known as colour matches, a cousin of safety match.

This eventually led to the making of sparklers and other fireworks items. They also setup their first industrial fireworks factory jointly at Sivakasi, in the year 1923. Gradual reduction and total ban on imports helped the indigenous fireworks industry to adopt and make all the items hitherto the imported items including the famous Chinese crackers.

In 1934, the Government levied excise duty on match industry. So that match industry was separated from the fireworks industry. In 1948 the Amorces (or) paper caps industry was started.

Until 1958, the industry could not highlight itself because, it was dependent on imports of its raw materials such as potassium chlorate, potassium perchlorate, pyroaluminium powder and so on. By 1970,
almost all the raw materials including some items, like tissue and fancy papers were indigenously produced and the availability of these raw materials in the proximity of the production centres with trained and skilled hands of over 20 years experience helped it to make rapid growth and to expand vastly.

"There are now over 350 industrial fireworks factories and at least 450 store houses. Some factories have a business turnover of about up to Rs. 70/= lakhs and the turnover of business of 5 or 6 large types of factories exceed Rs. 2/= crore. There are 20,000 (approx.) licenced dealers throughout India. On the whole it is estimated that the total turnover of the business in India is nearly 60 crores"\(^5\)

Fireworks factories are also present in Kumbakonam and Sirkazhi in Tamil Nadu, Trichur and Irinjalakuda in Kerala, Gwalior and Sanguala in Maharastra state and in the union territory of Pondicherry.

Fireworks are classified as non-essential luxury products produced with low technology. Till today trial and error method is the only avenue open to Indian fireworks manufacturer. At present nearly 100 items are produced. Almost all the manufacturers of this country make relatively the same products with different names only.

There are two fireworks manufacturer's Association in India namely, "Fireworks Manufacturer's Association, Gwalior (M.P) and Tamil Nadu Fireworks and Amorces Manufacturer's Association, Sivakasi".
In India manufacture of fireworks or similar products is illegal unless conducted in a duly authorised or licenced establishment. From time to time attempts are being made to control the manufacture of fireworks and the sale to public. Explosives Rules of 1940 contain a list of authorised fireworks, to be manufactured with a stipulation on the size. The explosives Rule of 1983 lays some restrictions on the use of fireworks and prohibits unauthorised people with no experience to involve in the display.

2.6 GROWTH OF FIREWORKS INDUSTRY IN SIVAKASI

Until the beginning of the 20th century the various occupations of the people of Sivakasi area were classified as Agriculture, business or Trade, Tobacco curing, cotton spinning and rice pounding.
2.6.1. Destruction of Occupations

In the early decades of the 20th century men workers were engaged in tobacco curing, women labourers were utilised for cotton spinning through charka and pounding of the rice by hand.

When the government levied excise duty on Tobacco, the rate of excise duty collected for Sivakasi tobacco was the same as that of Gundur (Andra). During that period Sivakasi tobacco was used only for chewing. But Gundur's tobacco was used in Cigarette and Beedi making. So Sivakasi tobacco business could not compete with Gundur's. The introduction of scented tobacco by Anguvilas, Thangapashpem affected Sivakasi's tobacco business further. (It is to be noted here that majority of snuff powder firms are being owned by Sivakasi people at Madras).
Introduction of spinning mills affected the hand spinning by charka, scented tobacco reduced the demand for chewing tobacco and rice mills affected the hand pounding business.

Due to the weakening of these occupations, a large number of labourers (both men and women) lost their employment and lost their source of income.

2.6.2. Introduction and Development of Match Industry:

The development of a match industry was a historical one. In 1921, Chinna Nadar, who was a student at a Trichy college, happened to note a news item in a newspaper relating to the production of matches at Calcutta. He advised his cousins Ayya Nadar and Shanmuga Nadar to learn something of the match making technology. In the year 1921 they went to Calcutta to get the necessary training and on their return to Sivakasi they started a match factory in the year 1922.
It was a source of great relief to the employees, who had lost their employment in occupations which had become defunct. They were now offered opportunities of employment in the newly started match business. The women labourers who benefited much by the new industry.

In 1922 match industries with machines imported from Germany came into being. The mechanised production was expensive. But labour was cheap, because of the backwardness of economy of the area. Hence, they switched over to hand made production instead of production by machines. Gradually other Nadar families moved into this business and more number of units were started. The Nadars who had started match industries moved into allied business like, printing and fireworks.
2.6.3. Development of Fireworks Industries:

The success of the match industry made the manufacturers, to switch over to colour matches and fireworks. In 1923 the first fire works industry was started under the name "National Match Industry". In 1928 this match industry ceased to exist and a new one was started in the name "National Match Industry" by Ayya Nadar and "Kaleeswari Match Industry" by Shanmuga Nadar.

In 1934 the Government levied excise duty on the Match industry. So fireworks industries were separated from Match industries and they were as "National fireworks industry and "Kaleeswari fireworks industry".

In 1948 the Amorces (or) paper caps industry was started. Gradually other Nadar families moved into this busines and more number of units were started.
In 1960, 3 fireworks factories were started in Uttar Pradesh and Madhya Pradesh, by Sivakasi business men with the patronage of the respective Governments. But these industries could not thrive long there.

During 1977-78 fireworks items were exported from Sivakasi to the U.S.A., China and Japan.

Between 1980-1986 there were about 189 to 260 fireworks industries in Sivakasi. At present, there are about 280 fireworks industries in Sivakasi.

Fireworks industries are categorised as big and small on the basis of the quantity of the raw materials used and work force. Amorces industries are distinguished from fireworks industries.

2.6.4. Progress of Fireworks Industries in Sivakasi.

All the fireworks industries which are categorised as big and small come under small scale
industries. The explosives Act also restricts the quantity of chemicals used or kept in each factory. Crackers, sparklers, coloured matches, magnesium pencil, pinwheels (chakrams) are some of the important popular products of fireworks industries.

Fireworks/explosives factories are conducted in such a way that, there will be only minimum damage to properties and only little risks to human lives in the event of an explosion in a factory. To avoid risks, the Government rules permits their presence on the periphery of the towns. In sivakasi there are about 155 small fireworks industries and 112 big fireworks industries.

The researcher has selected 16 small fireworks and 11 big fireworks units, for his research, on the basis of stratified random sampling. To assess the rate of growth of the fireworks industries in the study area, the researcher has collected the production and sales figures from the sample units.
The table which shows the production figures and sales figures covering a period of five years from 1986 to 1990 is given in Appendix. On the basis of the collected data, the overall production and sales figures of respondents have been arrived at yearwise.

The trend of production and sales for the five year period is shown in the graphs 1 and 2.

2.6.4.1. Fireworks Production Trend:

The production of sample units Table shows that, the total production figures in terms of rupee value exhibited an increasing trend year by year, during the period of study. The year 1985-'86 has been taken as the base year. The total production of that year was taken as 100 per cent.
Graph 1.

FIREWORKS
PRODUCTION TREND

PRODUCTION (in Percentage)

YEARS

The production figures in terms of percentages also showed an increasing trend throughout the period of study, which can be identified clearly from the production trend graph.

From the table, it is also evident that the total production of the sample units have increased 2 times in the year 1990 from the base year.

2.6.4.2. Fireworks Sales Trend:

The sales figures in terms of rupee value exhibited an increasing trend year by year, during the period of study. Here also, the year 1985 - '86 has been taken as the base year and the sales figure of the base year was taken as 100 per cent.
FIREWORKS SALES TREND

SALES (in Percentage)

YEARS


GRAPH: 2
The sales figures in terms of percentages also shows an increasing trend throughout the period of study; which can be identified clearly from the sales trend graph.

From the table, it is also evident that the total sales of the sample unit have increased two times in the year 1990 from the base year.

2.6.4.3. Growth Rate of Fireworks Industry in the Study Area:

The progress of fireworks industries was analysed by the researcher, to find out the rate of growth from the year of starting of fireworks industry. On the basis of the samples selected, the year of establishment of the fireworks industries in the study area is shown in Table 2.1.
<table>
<thead>
<tr>
<th>Year of establishment</th>
<th>No. of fireworks industry in the study area</th>
<th>Percentage to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921 - 1930</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>1931 - 1940</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1941 - 1950</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1951 - 1960</td>
<td>4</td>
<td>14.8</td>
</tr>
<tr>
<td>1961 - 1970</td>
<td>2</td>
<td>7.2</td>
</tr>
<tr>
<td>1971 - 1980</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td>1981 - 1990</td>
<td>14</td>
<td>51.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

From the above table it is inferred that, in the years between 1921 and 1930 only one industry was started.
No new fireworks industries were started during 1930-1950. The reason was that the fireworks industry was introduced in 1923 in Sivakasi by a particular family. They did not disclose the production techniques of fireworks till 1950. Then the labourers engaged in these factories became skilled and managed to learn the techniques and components of fireworks. In the 1950's with the help of these skilled labourers, new fireworks units were started and hence during 1951-1960 the percentage of growth was 14.8, when compared to the 3.7 per cent during 1921-1930.

There was a steady growth of these industries during 1961-1980. But in the 1980's there was a unprecedented growth of these industries, which is evident from the above table. The percentage of growth during 1980-1990 is 51.9.

The above table clearly shows that the fireworks industries have developed rapidly after 1980.
CONCLUSION

The craft of blending pyrotechnic mixtures and packing them is an ancient one. At first the fireworks compositions were made concerned with the possibility of using them for military purposes rather than for entertainments. The China made war Rockets and explosives, as early as the 6th century and this craft spread to Arabia in the 7th century. Inspite of China's initial progress, Europe surpassed China in pyrotechnic development in the 14th century. The new real advancement was made only on the 18th century.

Historical record show that fireworks had been existed in India even before 13th century. But the art of making fireworks in India experienced very slow growth. Home made fireworks had its origin at Bengal in India.
In 1922, the match industry was started at Sivakasi by Shri. P. Ayyá Nadar and A. Shanmuga Nadar. The success of the match industry led to make sparklers and other fireworks items. They also setup first industrial fireworks factory jointly at Sivakasi in the year 1923. At present there are about 155 small fireworks units and 112 big fireworks units in Sivakasi. The progress of fireworks units increasing steadily. But in 1980's there was a unprecedented growth.