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ARTISANAL WEAPON PROJECTS IN BIAFRA DURING THE NIGERIA-BIAFRA WAR, 1967-1970

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Abstract
The Nigeria-Biafra War which lasted for 30 months from July 1967-January 1970 witnessed tremendous efforts in the areas of local production of weapons and allied projects by the defunct secessionist Republic of Biafra. Previous writers on weapon and allied projects in Biafra during the war gave so much praise and credit to the scientists and technologists of the Research and Armaments Production (RAP) of Biafra for their enormous contributions to the war efforts of the Republic of Biafra. However, not much has been said or written about the role of the uneducated artisans such as blacksmiths and technologists in developing the celebrated inventions of the Biafra's during the Nigeria-Biafra War. Crucial to this study is the important role played by the blacksmiths and other artisans in Biafra's scientific and technological innovations during the Nigeria-Biafra War. The paper attempts to unravel the emergence as well as role of artisans in the weapon and allied projects of the defunct secessionist Republic of Biafra during the Nigeria-Biafra War (1967-1970). The paper adopts the historical analysis method and data was obtained from both primary and secondary sources. The paper concludes that apart from the celebrated efforts of the educated scientists and technologists that constituted the driving force of the Research and Armaments Production of Biafra, artisans, particularly blacksmiths and technicians also made remarkable contributions in developing the weapon and allied projects in Biafra during the Nigeria-Biafra War.
Keywords: Artisans, Blacksmiths, Technicians, War, RAP, Weapons.

Introduction
The scientific and technological innovations of the defunct Republic of Biafra during the Nigeria-Biafra War has continued to generate debates among historians, scientists, scholars, and commentators in Nigeria and abroad many years after the end of the conflict.[1] Many scholarly works on the history of weapon projects in Biafra during the Nigeria-Biafra War appear to glorify and celebrate the educated Biafran scientists, engineers, and technologists.[2]

Arguably, not much is known about the role of artisans notably blacksmiths and technicians in the war efforts of the Biafrans, especially in the areas of weaponry and allied services during the Nigeria-Biafra War.[3]

This paper argues that the blacksmiths and other artisans played important roles in the making of weapons and provision of allied services in Biafra during the Nigeria-Biafra War. The paper discussed the evolution and role of artisans such as blacksmiths and technicians in pre- war Igbo society. Furthermore, it demonstrates that the artisans that contributed in developing the weapon projects in Biafra during the Nigeria-Biafra War were already established in pre- civil war Igbo society. Necessity, that is, the outbreak of the Nigeria-Biafra War provided enabling environment for them to demonstrate their knowledge and skills in the defence of their nation and quest for survival

Literature Review

Fukuyama was right when he said that "… technological innovation, since its earliest days, has been connected with war and war has a major influence on the scientific society, allowing men to expand their technological limits …'' He noted further that "… war or the threat of war is known to force states to restructure social system along lines most conducive to producing and developing weapons …''[4] Furthermore, Otite posited that conflict if it is properly managed promotes development.[5] This implies that war has both its negative and positive effects. Some of the negative effects of war are felt in terms of destruction of lives and property while its positive impacts are expressed through the scientific and technological innovations that it helps to develop for the betterment of the society.

The Nigeria-Biafra War (1967-1970), witnessed the introduction of new weapons by the defunct Republic of Biafra. The Biafran weapon project has remained a guided secret and is one of the most topical issues in post war Nigeria. Several writers on the Nigeria-Biafra War have made useful contributions in the area of documentation of some of events of the war. However, just few works discussed the weapon project of Biafra, particularly the role of blacksmiths and other artisans in the novel innovations of the Biafrans during the war.

Ogbemudia argues that besides weapon project, one of the notable war induced innovations of the Biafran scientists and technologists during the Nigeria-Biafra War was in the area of petroleum refinery.[6] The Biafran petroleum refineries which were built out of necessity to solve a dire need in Biafra during the war demonstrates how warfare provokes and accelerates aspects of scientific and technological innovations for the greater good of the human society.[7] Nonetheless, Ogbemudia's work did not discuss the role of blacksmiths and artisans in the weapon project of Biafra during the war. This present effort discussed the role of blacksmiths and other artisans in the war induced weapon projects of Biafra during the Nigeria-Biafra War.

Umoh notes that at the outbreak of the Nigeria-Biafra War, the Biafrans went to the battle front armed with mere matchetes[8] produced by local blacksmiths but as the war progressed, the Biafrans formed the 'Science Group,' which was drawn from various people with 'formal or informal' scientific and technological ability to produce weapons for its armed forces. The task of the group was to conduct research and fabricate essential materials for the prosecution of the war through technological innovation, copy technology, creativity and improvisation. He argued that the Biafran weapon project was a novel attempt at indigenous military-industrial complex in Africa, but was lost after the civil war.[9]

Although Umoh's work is of benefit to this study, nevertheless he did not discuss the historicity of arms production in South-east Nigeria prior to the outbreak of the Nigeria-Biafra War. This present effort seeks to unravel the historicity of gun making in South-east Nigeria and demonstrate how the blacksmiths (cum gunsmiths) contributed to the weapon project of Biafra during the Nigeria-Biafra War.

Ogbudinkpa's work on the economic benefits of the Nigeria-Biafra War, posits that the Biafran weapon project was actualised by the 'Science Group' of Biafra whose membership was drawn from professional, skilled and uneducated persons who worked secretly in government designated facilities and they produced various weapons such as gun, bullet, grenade, rocket, armoured vehicles, petroleum refinery, among other inventions during the war.[10] Also, Oragwu writes that besides the 'Science Group', the Biafrans later created the Research and Production Organisation (RAP) which aimed at promoting a more coordinated effort in the area of scientific and technological inventions. Some of the Biafran inventions

include pistols, rifles, rocket launchers, *Ogbunigwe,* etc.[11] While Ogbudinkpa and Oragwu credited the artisans for their role in the weapon project of Biafra, however, the authors did not discuss the emergence and role of the blacksmiths in pre-civil war Igbo society as well as link their efforts to the Biafran weapon project during the war.

Ugwuja's work on the proliferation of small and light arms in post-civil war South-east Nigeria, demonstrates that the weapon project of Biafra was achieved through the combined effort of the local blacksmiths, professional and crude scientists and a host of local artisans and craftsmen with formal scientific and technological ability.[12] However, his work did not discuss the allied innovations of the Biafran blacksmiths and artisans in the area of construction of local petroleum refineries during the war.

Ogumike Opara's work on the Adaptive Diversity of the Research and Production Group of Biafra (RAP) discussed the evolution, and structure of RAP and some of its inventions during the Nigeria-Biafra War such as guns, rockets bombs, etc.[13] However, the origin and operations of Biafra's RAP is not well documented historically in his work. It should be noted that just as previous writers on aspects of the scientific and technological inventions in Biafra during the Nigeria-Biafra War, Opara's work also did not give the exact meaning of RAP. Furthermore, he traced the origin and formation of RAP to the effort of blacksmiths and other artisans and included Colonel J.O.G. Achuzia among the founding members of RAP and only surviving person that could give a detailed account of its origin and operations.[14] Among other things, this present work gave the exact meaning of RAP as well as traced its origin historically. It also discussed role of blacksmiths and other artisans in the weapon project of Biafra during the war in historical perspective.

In his work on the inventions of Biafra during the Nigerian Civil War Ukaegbu discussed some of the weapon projects of Biafra such as guns, grenades, bombs, etc.[15] However, the work did not discuss the role of the blacksmiths and other artisans in the weapon project of Biafra during the war in historical perspective. This present study discussed the role of blacksmiths and other artisans in the weapon projects of the defunct Republic of Biafra during the Nigeria-Biafra War in historical perspective. Furthermore, Momoh's work on the Nigeria-Biafra War discussed the origin of the war and identified tribalism, political rivalry, corruption, the January 15 and July 29 1966 military coups, among others, as some of the causes of the Nigeria-Biafra War. The work also discussed the evolution of the 'Science Group' of Biafra and aspects of the weapon project of Biafra during the Nigerian Civil War such as production of grenades, guns, bullets and bombs.[16] However, the role of blacksmiths and other artisans in the weapon project of Biafra during the war were not discussed in historical perspective in the work.

Arene's work on the Nigeria-Biafra War focused on some of the inventions of Biafra during the Nigerian conflict such as bombs, guns, bullets, etc., during the Nigerian conflict and how the Biafran scientists developed indigenous weapon project during the war.[17] However, the work did not discuss the specific role of blacksmiths and other artisans in the weapon project of Biafra during the war in historical perspective.

Ibezim also wrote on the Nigeria-Biafra War and posits that the Biafran scientists achieved industrial progress in weaponry during the war.[18] However, like most previous writers on the weapon project of the defunct Republic of Biafra during the war, his work did not discuss the role of the blacksmiths and other artisans in the weapon project of Biafra during the war.

From the review of literature, it could be seen that some of the works are relevant to this study, particularly in the area of weapon project and allied innovations in Biafra during the Nigeria-Biafra War. However, there are still identified gaps in most of these literatures on the specific role of blacksmiths and other artisans in the weapon project of the defunct Republic of Biafra during the Nigeria-Biafra war.

The Evolution and Role of Blacksmiths and other Artisans in Pre-War Igbo Society

In a simple term, a blacksmith is a person who works on iron to produce different types of objects and tools for various purposes.[19] Blacksmithing, according to Nancy Neaher, is an age-long industry among the people of Nigeria such as the Chamba, Bata, and Mbula peoples of northeastern Nigeria as well as the Yoruba, Benin, Awka, Nkwerre, Abiriba, and other Igbo communities particularly in Udi Division in Southern Nigeria. As Neaher remarked, various Nigerian smiths had attained the enviable height of "sophisticated traditions of blacksmithing as far back as the 17thcentury," but among the various pre-colonial Nigeria people, "the only region of significant size and population lacking technology was the coastal fringe. The coastal regions, that is, Niger Delta lacked local sources of ore hence they depended on smiths from the interior for their supply of metal objects and tools."[20]

Early observers such as W.B. Baikie, F. A. Talbot, G.T. Basden, and A.E. Afigbo among others, referred to the Awka, Nkwerre, Udi, and Abiriba blacksmiths known as "Uzu" in Igboland as the dominant and professional smiths.[21] Basden remarked that, "there are some towns which practically monopolised certain specialized professions. For example, Awka and Nkwerre and a few other places manufactured nearly all the metal work produced in the Ibo country …"[22] Due to the intricate nature of the industry (metallurgy) and the high demand for metal objects, many Igbo smiths had to travel or migrate to other Igbo and non-Igbo villages, towns and communities such as Owerri, Mbano, Calabar, Bonny and Warri, among others to trade their wares. Besides, the Awka smiths engaged in long distance trade which is a major characteristic Igbo predilection – to travel away from the homeland for trade and occupational specialisation. The blacksmiths produced various iron implements such as "hoes of all descriptions, machetes, knives and cooking stands, spears for fishing and traps … ritual items such as *Ozo* staff and iron bells (*Ogene*) and dane guns were produced in their workshops."[23]

Apart from Igbo land and the Niger Delta areas where they dominated the trade in metal objects, Awka blacksmiths also established themselves in some parts of Yoruba land. According to Oloidi, Oka smiths were among the early Igbo sojourners in Yoruba land, particularly in Okitipupa area of Ondo state around 1890-1904.[24] Their skill in gun-smithing enabled them to penetrate Yorubaland.[25] Besides the manufacture of guns, the Oka smiths were reputed as the first people that started the production of knives, cutlasses, hoes and others in large quantities for sale in Okitipupa.[26] in addition, it was said that "while the Yoruba gunsmiths used nails and riveted their gun parts, Oka smiths used screws. Oka guns could thus be taken apart, cleaned and re-assembled."[27] Furthermore, Oloidi noted, "… these Oka people performed their smithing ability by producing for the first time heavy duty double-barrel guns that could kill 2 or 3 animals at once … and a district if there is war …"[28] This does not imply that it was Igbo blacksmiths that pioneered the science of blacksmithing in Okitipupa or other pre- colonial Yoruba states, rather, it shows that the arrival of the Oka smiths contributed to the growth and expansion of blacksmithing in Okitipupa and its environs. The smiths in Igboland also functioned as "Dibia," native doctor or priest and purveyors of local religious cults and as itinerant traders.[29]

Thomas provided an insight into the warm reception various communities accorded the smiths, particularly the Awka smiths:

> The Smith's reputation made it possible to travel without serious threat of harm. They travelled in groups when possible, carrying their tools of trade with them. The frequency of their travels, the visible signs of their occupation on their backs, and the distinctive Awka dialect distinguished them from other transients and permitted them safe passage through alien territory.[30]

To attain the status of master *Uzu* – blacksmith, one had to undergo a regulated period of apprenticeship at a tender age. The first task of an apprentice known as *Nwauzu* was to handle minor duties such as pumping the bellows and making simple tools like sewing needles, barber's knives, and razors used for body scarification.[31] A prospective apprentice was discouraged from learning under his father because it was believed that he would be treated with levity by his father, hence, he was sent to a kinsman from the same village.[32] When the apprentice had mastered the trade, his master would organise a graduation ceremony known as *Mmaotutu* for him and also set him up with his first set of tools, such as bellows (*eko*) anvil (*oshiama*) and large hammer (*otutu*).[33] The hammer was the major tool that symbolised his accreditation as a professional. In addition, the blacksmiths had a distinct cult known as *Akputakpu* from which they sought protection for themselves and their families.[34]

Nadel and Jagger observed the following traits among the blacksmiths in Nupe and Kano:

1) Membership was closed, usually limited to kin groups.
2) Outsiders could only join after formal adoption and a period of apprenticeship.
3) The group was characterized by centralised control, with a hierarchy of ranks and grades.
4) The group was defined politically, as well as economically, and enjoyed special social privileges.[35]

The above remark was also observed by this present researcher while interacting with the blacksmiths in Agulu-Awka and Udi in Enugu state and Awka in Anambra state. However, there appears to be a divergence of opinion on the origin of the various blacksmithing communities in Igbo land. Paul Amalu however claimed that the Awka blacksmiths in Anambra migrated from Agulu-Akwa.[36] Major Obienyem on the other hand, argued that Awka-Anambra was the ancestral home of most blacksmithing communities in Igboland including Agulu-Awka.[37] It is also reported that the Awka-Ugiri blacksmiths in Isiala Mbano, Imo State, may have migrated from Agulu-Awka, Enugu state, or Awka, Anambra State.[38] Further field investigation by historians and anthropologists would be necessary to verify the authenticity of these claims.

Artisans and Technicians

An artisan or craftsperson is a worker who practices a trade or handicraft. On the other hand, a technician is a person who has acquired the technique of an art or other area of specialisation.[39] According to Eric Umeh a technician is:

> the factory hand or attendant that keeps the process line going by operating, maintaining and repairing faults; he is the skilled hand on the assembly line; he is the craftsman who repairs your watches, he is the motor or bicycle mechanic, he repairs or maintains your generating plant, your air-conditioner,

> and refrigerator; he is the mason, the plumber, and the carpenter, he is the technologist in the science laboratory or engineer who ensures your instruments and installations are in good working condition. He maintains aircraft; the ship and train and ensures they are in good working order. He installs and maintains telephone, the electricity supply system, and the gas lines and related instruments. He is the skilled engineer/builder or construction expert who interprets and practically, with his hands and other appliances, transforms the architects' drawings into concrete structures and long bridge spans and highways. He is also the craftsman who sews your clothes, binds books, makes and mends your shoes.[40]

The above definition and examples of artisans and technicians show that some of the inventions of the Biafrans during the Nigeria-Biafra War were not undertaken by the RAP scientists alone. The artisans, particularly, the blacksmiths made huge contributions in various areas such as weapon projects, construction of bunker, production of alcoholic drinks and refining of crude petroleum, among others. Moreover, some of the workers who contributed to the making of the Biafran mines and other weapons had acquired experience in operating crude equipment in the past where they worked in places such as Enugu coal mines.[41]

Production of Iron and Steel

The production of iron and steel is a specialized knowledge. The local blacksmith works with bellow and anvils and other tools in a workshop which are powered manually by applying force on them to generate heat or energy. The modern or conventional blacksmith works with a blast furnace which is powered by electric energy. Other common methods of producing steel are the Oxygen Converter and the Bessemer Converter. The technical term for iron production through non-conventional method is called 'direct reduction process'[42] and that was exactly the method the Biafran blacksmiths adopted during the war. In summary, the intricate process of iron and steel production involves the following steps:

(i) The conversion process – this refers to the process of converting iron ore into pig iron.
(ii) The conversion of pig iron into steel.
(iii) The production process in which the pig iron is processed into finished products such as blooms, billets, slabs, plates, sheets, bars, rails, and structural shapes.[43]

Before going into production, the blacksmith must also procure the basic materials such as iron ore, fuels and energy (coke and flux stone), water, alloys, and refractories. Refractories are non-metallic materials that will withstand severe or destructive service conditions at high temperature.[44] Ntamere writes that iron is a chemical compound where the iron content is of sufficient commercial importance.[45] The various classes of ore are; Hematite, Magnetite, Limonite, Siderite, Taconite, and Jasper. The quality and production cost of iron is determined by the chemical contents of the ore. Hence, the higher the Fe content the better quality and the lower the production costs. Fe refers to the chemical contents present in ore.[46]

This brief information about the production process of iron and steel shows that those who possess the local knowledge of its production and refinement into finished products – the smiths, provide important services in the society. Armed with such knowledge, the blacksmiths who also doubled as artisans and technicians fashioned various weapons including machetes. Machetes are produced by blacksmiths from iron ore and it serves the same purpose as a sword in combat. It is both an offensive and defensive weapon used by soldiers in warfare. Richard Dusgate noted that the warriors of Hausaland in Nigeria fought the British Army with swords and scored several victories before they were finally defeated by the European adversaries.[47]

After a careful study of an Ohafia war machete produced by local blacksmiths it can be said that a machete that is made for warfare has certain distinctive qualities and uses which include:

(i) a machete is a blade combat weapon;
(ii) a machete is used by soldiers in close combat battle;
(iii) a machete is used on the chest to damage the heart, kidney and lungs and break the ribs of an enemy;
(iv) a machete is used on the head to damage the skull and face of an enemy;
(v) a machete is used to cut off the hands and break the arm or leg of an enemy;
(vi) a machete is used on the stomach to slash open the intestines of an enemy;
(vii) the quality of a machete depends on the iron or steel used in producing it and the expertise of the blacksmith;
(viii) the sharpness of the blade of a machete depends on the expertise of the blacksmith and the owner of the machete;
(ix) during combat, the striking force of a soldier that is armed with a machete is important. A poor or weak strike will do little or no damage to the enemy while a hard strike will incapacitate the enemy;
(x) it is better for a machete to bend than for it to break in the hand of a soldier during combat;
(xi) a soldier armed with a machete is defenceless when fighting an enemy that is armed with a gun particularly an automatic gun.[48]

It is in light of the above qualities and uses of a machete that its use by the civilian volunteers from some villages near Enugu to defend the city at the beginning of the Nigeria-Biafra War should be seen and understood. In addition, it should be noted that at the beginning of the Nigeria-Biafra war, the Biafrans fought with machetes due to a lack of guns and ammunition.[49] However, the machetes were ineffective and were no match for the Nigerian soldiers who were armed with automatic rifles. While the machete could be described as an obsolete weapon of warfare, nevertheless, it formed an integral part of Biafra's weapon arsenal at the beginning of the war.

Artisans and Weapon Projects in Biafra during the Nigeria-Biafra War

It should be noted that before the outbreak of the Nigeria-Biafra War, the blacksmiths that had been hounded by the Eastern Region government for engaging in the illicit production of firearms became the very people the Biafran government relied on for the production and repair of (dane) guns and machetes at the beginning of the civil war. Their knowledge of the production of iron and steel proved invaluable to the Biafran government at the beginning of the civil war.[50]

It was said that the blacksmiths and other artisans involved in the Biafran weapon project were scattered all over Biafra in areas such as Akwa and its environs, Onitsha, Udi, Ndegwu, Bende, Ohafia, Ngwa,[51] as well as Mbano, Uzuakoli, and Nkwere, etc.[52] However, Chukukere informed that none of the units of RAP was involved in the production of any of the celebrated Biafran-made weapons independent of other units. Rather, all the units worked as a team at various stages of weapon and allied products production.[53] It should be pointed out that the blacksmiths/forgers were not fully involved in the operations of RAP, the artisans and especially the technicians and technician engineers were involved in everything that had to do with metals and iron, they helped to produce and repair guns, produced bullets, bolts,

and screws. They were fully involved in the construction and technical works of RAP during the civil war. All the conventional Biafra-made weapons were made from iron and steel and the technicians and technician engineers were fully involved in all the stages of production, especially casing and casting.[54]

According to Chukukere:

> RAP did not use blacksmiths and artisans in the archaic sense of ironmongery in crafts. Artisanal craftsmanship was almost totally irrelevant… RAP used well trained, highly skilled and experienced technicians in the indispensable key areas of iron and steel metal working called into play in the manufacture of conventional weapons. These are; foundry, forge and fabrication… Without our technicians RAP would not have flown, especially in mass production of weapons.[55]

Directorates

Specific significant contributions of artisans and technicians to the war efforts of the Biafran government are also evident in the various directorates that were established to provide civil and administrative services for the Biafran Army and civilian populace in 1967. General Madiebo recorded the following directorates:

(i) The Food Directorate: It was responsible for the purchase and distribution of food, drinks and cigarettes.

(ii) Transport and the Transportation Directorate: It was set up to provide land transportation services for the Biafran Army. It was responsible for the distribution and servicing of all vehicles needed by the military to function during the war.

(iii) Fuel and the Fuel Directorate: It was responsible for the production and processing of crude oil into refined products and onward distribution to various Biafran Army units and to the civilian population.

(iv) Clothing and the Clothing Directorate: It was responsible for the purchase, sewing and distribution of uniforms, boots and helmets for the Biafran Armed Forces, especially the Army.[56]

General Alexandra Madiebo among other writers on the Nigeria-Biafra War noted that the Biafran Army (BA) also lacked basic military kits such as uniforms, boots, and helmets throughout the war.[57] This shows that RAP and the various directorates did not produce enough materials and weapons for the BA and civilian population during the war. Major Clement Nwajagu also informed that the problem of lack of uniform for the BA was so severe that the Biafran artisans (tailors) resorted to the use of "*Obasara*" (condemned white clothes) made from calico materials to sew uniform for the Army. The "*Obasara*" materials were dyed into light-green colour, starched and ironed.[58] Thus, the problem of shortage of uniforms was partly solved by the clothing directorate. The uniform of a soldier serves two purposes. First, it is a symbol of identification from an enemy soldier. Second, it differentiates a soldier from a civilian.[59]

Production of Boots and Helmets

Madiebo noted that the Nigerian soldiers observed that the Biafran soldiers walked barefoot and without good clothes and they began to surround their positions with broken bottles to discourage the Biafran infantry from charging at them.[60] The problem of lack of boots was solved by the technicians and artisans who made sandals out of old tyres for the Biafran soldiers.[61] Opara also noted that the Awka blacksmiths and artisans made helmets and iron

boots for the Biafran Army.[62] Furthermore, Ogbudinkpa notes that the Biafran inventors produced military steel helmet for the Biafran armed forces with the use of press machines.[63]

Construction of Mini Petroleum Refineries

In the same vein, the artisans were involved in the construction of modular petroleum refineries in Biafra during the civil war. Oragwu noted that, ''Mini refineries – i.e., distillation plants – were set up by various organisations including armed forces based on the technology developed and tested by the Biafran scientists and technologists. Thus, it was possible to utilise the newly acquired technological capability for crude oil refining, to re-adapt former palm oil mills into petroleum refineries[64].

This shows that the technology for the construction of the mini refineries was borrowed from an existing technology – the palm oil mills. The palm oil mills (popularly known as *Igwe Nkwu* in Igboland) were designed and constructed with local materials by the blacksmiths and technologists materials as far back as pre-colonial times.[65] Apart from the construction of mini refineries by the artisans notably blacksmiths and technologists, the Biafrans also built two standard petroleum refineries at Uzoakoli and Amandugba respectively.[66] The locally built petroleum refineries helped to cushion the effect of scarcity of petrol in Biafra after the capture of Port Harcourt and the Port Harcourt refinery by the Nigerian army in 1968.[67]

Fabrication and Reconstruction of Military Weapons and Equipment

Another area where the artisans made remarkable contribution in the war effort of the Biafran government during the Nigeria-Biafra War was in the fabrication and reconstruction of military weapons and equipment. The technicians were involved in fitting the B25 and B26 Biafran aircrafts with machine guns and locally made bombs.[68] The Biafran Army, Navy and Air Force benefitted immensely from the services of the technicians. Besides, during the Nigeria-Biafran War, the various weapons, tools and equipment of the Biafran armed forces were serviced and maintained by the artisans based on their areas of specialisation. For example, gunsmiths made and repaired guns of various kind such as pistols, double-barrel, machine guns and rifles for the Biafran armed forces.[69] It was also said that the artisans at Otuocha, Okwulu and Nog were responsible for the production of explosives, rocket launchers, cylinders of home-made bombs and several other military equipment[70] while those at Awka and environs were responsible for the production of guns and tanks.[71]

Conclusion

In view of the foregoing, it could be seen that besides the celebrated Biafran scientists, artisans, such as the blacksmiths, artisans and technicians played important roles in the various scientific and technological accomplishments of Biafra during the Nigeria-Biafra War. Many artisans worked with the seasoned Biafran scientists under the auspices of the Research and Armaments Production (RAP) in the weapon project of the defunct Republic of Biafra while several others worked independently during the Nigeria-Biafra War. The design, construction and production of several weapons such as bullets, guns, bucket *Ogbunigwe*, shore batteries, among others, had 'the medas touch' of the artisans. The same thing can be said of their roles in the construction of modular refineries in Biafra during the Nigeria-Biafra War.

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