THE MORAVIANS OF COLONIAL PENNSYLVANIA:
Their Arts, Crafts, and Industries

A Thesis Presented for the
Degree of Master of Arts

by

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THE MORAVIANS OF COLONIAL PENNSYLVANIA:

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FOREWORD

The writer's many visits to Bethlehem, Pennsylvania, prior to 1926 stimulated interest in the Moravian settlement there. The years since 1926 have been spent in the study and teaching of Industrial Arts. A revival of interest in Moravian Bethlehem occurred while attending the 1939 Summer Session at The Ohio State University, Columbus, Ohio. While a member of a seminar on thesis writing, "The Arts and Industries of the Moravians in Pennsylvania" loomed as a possible research study and likely contribution to the historical literature for the field of general education. As a subject this brought a nostalgic flood of memories of former walks along the banks of the Lehigh River and Monocacy Creek, with their background of stolid old Moravian buildings. In 1941 some of these buildings will have seen two centuries of uninterrupted service. Their present condition, a veritable tribute to those who built them, seems to indicate that they will be in service for many centuries to come.

This study of the Moravian movement became a reality in the summer of 1939. At that time a tentative outline on "The Arts and Industries of the Moravians" was approved and placed in the files of the area of Industrial Arts at The Ohio State University, as a graduate research problem in progress. Special appreciation for assistance in the development of this study is extended to Dr. Robert E. Smith, my advisor, who gave freely of his time and effort throughout the course of the research; to Dr. William E. Warner for his assistance in the development of the outline; and to Dr. William H. Stone and Dr. Burl N. Osburn for their valuable suggestions and criticisms. Sincere appreciation is further extended to the following people who assisted in the collection of materials
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CHAPTER I

ELEMENTS IN THE STUDY OF MORAVIAN CULTURES
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ELEMENTS IN THE STUDY OF MORAVIAN CULTURES

This study is based upon the arts and industries of an early Pennsylvania pioneer called the "Moravian." The word "Moravian" is interpreted differently by people in the various walks of life. "Who are the Moravians?" is the usual response of the layman. The more informed may know them as a people who came to America from the European province of Moravia. The Easterner readily associates the name with Bethlehem, Pennsylvania; the Southerner with Salem, North Carolina; and the Midwesterner with Schoenbrunn, New Philadelphia, Ohio. Local interpretations such as these are confined to rather specific areas. It is a commonly accepted principle that an increase in distance away from any area is generally accompanied by a decrease in knowledge pertaining to that area. There are exceptions in this principle however, in that the achievements of a people often bring prominence and renown to their respective communities. This seems to be the case with Bethlehem, Pennsylvania, and the Moravians who founded that city.

The great steel empire which has grown in Bethlehem is regarded as the major cause for the national prominence of that city today. Too often are the early people of Bethlehem disregarded as the industrial pioneers responsible for the progress of their city. It is true the missionary, evangelist and educator may be better informed about Moravian culture than the layman, but each is inclined to restrict his knowledge and writings to his respective field. This is probably the major reason why so little remains known of Moravian life in general, outside the immediate confines of their communities. Since Moravian secular activities were made subordinate to those of an ecclés-
istical nature, the significance of the former has remained compara-
tively unknown. A distaste of publicity, due to their religious beliefs, 
has tended to retard the dissemination of all Moravian literature ex-
cept that of a religious nature. Religious beliefs have also caused the 
Moravians to be considered somewhat as radicals throughout their early 
life in America. Henry (18, p. 2), * in writing about the Moravians, 
gives this interpretation of their status in 1859:

To the many who search out greatness in the numerical 
strength, eclat and general worldly influence of a people, 
it may appear a matter of wonder why the "Brethren's Church" 
(Moravian Church) should be at all deserving a place in 
history; since the space it occupies in society is so small, 
the influence it wields so unpopular, and the decoration 
of its interior worship so little in accordance with the 
concealous wants of the times we live in, as well as of all 
time.

That the Moravians as an organised people have not grown proportionately 
with other movements in America, is partially explained in the above 
quotation. Other factors having a bearing upon their early status in 
American life will be brought out in the chapters to follow.

**Purpose of the Study.** Although the Moravians have been an out-
standing pioneer people in the most formative period of American history, 
the contributions they have made toward the industrial and educational 
progress of this country are prone to be forgotten. Regardless of their 
isignificance in terms of population, their industrial accomplishments 
and the educational value derived from these accomplishments have left a 
lasting, though somewhat forgotten imprint upon American culture. That 
this culture should go unheralded is somewhat in keeping with Moravian 
desires, but continued conformity to such desires will eventually cause 
much that is of historical value to be lost in obscurity to the American

*Throughout this thesis bibliographical reference will be made in this 
norm. The first number indicates the bibliography item referred to; 
the second number indicates the page.*
people. A desire to record and thereby accentuate the remaining evidence of past Moravian arts and industries, in the light of involved socio-economic factors and their significance to the present, may be called the major purpose of this study.

**Delimitations.** Missionary, evangelistic and educational work represent the major concerns of the Moravian church in that order of importance. All secular activities; literary, philanthropic, sociological and cultural are incident to the church life of the Moravians but are common characteristics in all their communities. In the early American beginnings of the Moravian movement, the economic phase of life was the major means of support of the above mentioned work. The gradual development of the missionary enterprises of the Moravians was made possible in great measure by the many agricultural and industrial pursuits they carried on in Nazareth and Bethlehem, Pennsylvania. These two towns were called the Northern Province of the Moravian Church, Salem, North Carolina, was later developed as the Southern Province.

Since the first large-scale growth of Moravian activities occurred in Nazareth and Bethlehem, this study will be limited, as far as possible, to these communities. Due to the nature of the study, it will be essential to incorporate happenings occurring since the years 1740 to 1762. This era marked the beginnings and dissolution of the "Communal" mode of life or "the General Economy." Since great prominence has been given to the religious phase of Moravian life and so little is said about the economic factors involved, missionary and evangelical considerations have been excluded unless mention of them was unavoidable. The educational values which were an outcome of the arts and industries made the inclusion of Moravian education necessary throughout the entire study. The
areas of research which have been included in this study are: Art, Architecture, Music, Graphic Arts, Woodworking, Ceramics, Farming, Milling, Leatherworking, Metalworking, Textiles, and the Household Industries.

Recent Status of the Moravian Movement. A brief statistical summary of the more recent status of the Moravian movement should aid considerably in bringing about a better understanding of this problem as a whole.

According to the Yearbook of American Churches (43, Table 5, p. 8) the Moravian church in the United States during the years 1937-38 had 36,283 members. It was one of 153 churches in America with a membership of less than 50,000. The United States Bureau of Census' publication Religious Bodies (38, p. 1055) shows that there were 127 Moravian churches in the United States in 1936 with a total membership of 71,699. The Northern province had 91 churches with 23,159 members while the Southern province had 36 churches with 8,540 members. The increase in membership from 1926 to 1939 was 6,554. Although this increase seems insignificant over a period of approximately thirteen years, it tends to show that the Moravian Church is dynamic in character.

The foreign missions of the Moravian church are conducted under the superintendency of an international missions board of five members, including representatives for the Continental, British and American provinces of the church. The board’s headquarters are in Europe. The boards of the various provinces act jointly, as a general directorate to which the mission board is responsible, and separately, as agents for the mission board. Missionary work is carried on in 13 fields, including North, Central and South America; 10 of the West Indies; South Africa; East Central Africa; the borders of Tibet; and among the Lepers of
Jerusalem. According to 1926 statistics there were 136 occupied stations in these fields with 180 outstations and 335 preaching places; 45 American and 224 European missionaries with 2,265 native missionaries and helpers; and 136 organised churches, with 36,242 communicant members. The total membership is 106,711. There are 251 day schools with 26,566 pupils, in the charge of 750 teachers; 4 teacher-training schools and theological seminaries, with 118 students; 5 hospitals and dispensaries and 180 Sunday schools with 1,190 teachers and 24,448 pupils. (43, p. 1055)

Support of a program such as described above would necessitate the maintenance of a high degree of economic success throughout the entire development of the Moravian movement. Frugality in management has always been one of the greatest assets in both past and present successes of the Moravians. Psychological application of the underlying principles of personnel management has contributed in a high degree to the perpetuation of Moravian aims in America. Elwood (12, p. 24-25) makes this statement in regard to the economic values in a society:

"Prices, markets and economic organization are as much a part of human behavior as is anything else in human society; and these cannot be explained on the basis of individual psychology but rather only through the interaction of masses of men. Tradition and custom are as powerful in the economic sphere as in any other phase of human social life. Consequently, business organization and industrial management are as clearly socio-psychological problems as any we know."

Since it would be impossible to describe in detail the economic factors involved in the entire Moravian movement, a description of those occurring in Nazareth and Bethlehem, Pennsylvania, will exemplify the early economic aspects of Moravian life.

The Moravians are known to have been diligent record-keepers in all phases of their early Colonial life in America. These records are now...
the Moravian Archives at Bethlehem and are the basis for most modern translations. The translation of records from German script into English is of comparatively recent origin so that the dissemination of published Moravian literature in the English language has been retarded considerably in the past. Because of their insistence on keeping religion foremost in their writings, earlier translations have been confined largely to religious treatises. The younger generation, however, are giving more prominence to the other phases of Moravian culture. Evidence of this may be seen in the activities of the Moravian Service Guild that sponsors the Bethlehem Museum, so that material objects of historical value may be preserved for future study. Local news agencies place great stress on the socio-economic phase of early Moravian life in their publications covering anniversary events of the Moravians. Such publications show the connection between past events and their specific significance for the present. The part which Moravian industries have played in the development of Bethlehem is just being given the prominence it deserved long ago. Without the diligence with which Moravians conducted their industries, it is highly probable that they would not have survived as a cooperative organization; rather they would have evolved as an individualistic people. This would have been detrimental, since cooperative effort was considered so essential in coping with frontier problems.

Historical writers have excluded the Moravian movement from their texts to a great extent. This has been largely due to their early non-participation in military affairs, which in turn resulted in a lack of military lineage seemingly considered essential for historical recognition. The writers of educational treatises have been more con-
siderate however, for they, in discussing early American education, give more than passing mention to the educational accomplishments of the Moravians.

The Pennsylvania German Society of Lancaster; the Bucks County Historical Society of Doylestown; and the Moravian Historical Society of Nazareth, in their transactions and proceedings, give treatment to various phases of the Moravian movement. Their writings consist of short articles and addresses which are periodically bound in volumes. The above sources however, usually revert to the translations of Levering, Reichel, De Schweinitz, Hamilton and others accredited with the more scholarly translations of original documents. A study of the works of these men enabled the collection of sufficient technical, economic, and social data to form the basic foundation for the development of this study.

Methods Involved in the Study. An exploratory trip to Bethlehem and Nazareth was the first step involved in this study. Since the writer was acquainted with the exterior features of each city, a week in the summer of 1939 was spent in the study of museums and building interiors where source materials were likely to be found. A recently organised museum was found in the Sisters' House at Bethlehem. This museum is sponsored by the Moravian Service Guild with Mrs. Henry B. Bau as Curator. Although the museum is still in its infancy, many valuable and interesting objects were found there. Another museum was found at Nazareth, where the Moravian Historical Society has its headquarters. The entire second floor of the Whitefield House is used as a library and museum by the society. This museum is much older than the one at Bethlehem and has a greater variety of authentic Moravian objects. The Reverend G. M. Shults is
the Curator and Librarian.*

After finding suitable illustrative materials for the study, reference sources were the next concern. A prearranged visit to the Moravian Archives at Bethlehem disclosed the most suitable material to be found on the subject. Personal interviews proved to be an invaluable source of material. The files and stacks of the Bethlehem Public Library were examined and disclosed further sources in pamphlet, newspaper and thesis materials. A visit to the news agencies of Nazareth and Bethlehem revealed additional material in the way of anniversary editorials. The Bethlehem Chamber of Commerce supplied much material in the form of maps and advertisements. The files of the Cleveland Public Library disclosed that the major sources found in Bethlehem could be also found in the various departments of the Cleveland library. Additional materials, previously found at the Ohio State Archaeological Society and in the Ohio State University Libraries, were added to the new list and all the mentioned sources went into the development of the bibliography for this study.

The illustrative materials found in the museums and other buildings of Nazareth and Bethlehem had to be photographed, for such materials were not available. The writer prepared for this task by enrolling in an evening course in photography at West Technical High School, Cleveland, Ohio. Collapsible shelves and frames that could be carried to various locations were constructed and experimented upon throughout the course. The Christmas vacation of 1939 was used for museum photography while the

*Throughout the remainder of this study the museum of the Moravian Service Guild located in the Sisters' House at Bethlehem, Pa., will be referred to as the Bethlehem Museum. The museum of the Moravian Historical Society at Nazareth, Pa., will be referred to as the Nazareth Museum.
Easter vacation of 1940 was used for the architectural photography. The film was commercially developed in Bethlehem and Nazareth as soon as the pictures were taken. The contact prints and enlargements were personally made in Cleveland. The system of photograph mounting was selected after experimenting with mounting tissue and various mounting papers.

The completion of the steps mentioned above carried the subject to the selection of content data. This was made to conform with the concrete traces of old Moravian arts and industries which are still to be found in Nazareth and Bethlehem.

Expected Values. A study of the arts and industries of the Moravians should be a contribution to the cultural literature of general education with specific significance in the Industrial Arts area. The study should reveal a knowledge of the problems and conflicts of the pioneer who lived during the Colonial period of our nation. The knowledge of such problems should form a basis for the study of present day social and economic life and afford a better appreciation of our American heritages. A study of these heritages should be of specific value for the enrichment of the Industrial Arts program in our schools.

As a means in leading up to the Moravian activity program in Pennsylvania, the following chapter will give a brief historical background of the European and North American phases of the Moravian movement. The main purpose of the chapter will be to discover, if possible, the antecedent causes responsible for the high degree of industrial efficiency the Moravians displayed in their Pennsylvania settlements.
CHAPTER II

THE MORAVIAN MOVEMENT
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The birth of the Moravian movement occurred in the European countries of Moravia and Bohemia. Often called the "Twin countries," their early affiliations with each other have given them a somewhat common historical background. De Schweinitz says (12, p. 5):

One in their joys and in their sorrows, they look back upon a joint ancestry of Reformers before the Reformation and upon a common but most disastrous Anti-Reformation.

Many volumes would be required to recount the early European beginnings of the Moravian Movement. However, this is not considered essential, for, the major purpose of this study deals with the North American phase of the movement and just those periods in European history which have been of major prominence to this study. No study of a people would be complete without a consideration of recorded origins. It is for that reason that certain phases of ancient Moravian life will be considered, so that the study may flow into its more recent setting with an understanding of what has gone before.

Moravia and Bohemia were two small adjoining countries located in Central Europe with a combined area of approximately 26,000 square miles of productive agricultural, timbered and mineral-laden land. Throughout a somewhat precarious history each country has been regarded worthy of possession by foreign powers.

During the fifth century A.D., a body of Slavonians migrated into the two countries, under the leadership of Czech. Although their origin is lost in obscurity, it is believed they came from Croatia, which was located in the Northern part of the Carpathian Mountains. Without
acknowledgment of any particular tribal affiliation, they adopted the name Moravian, after the river Morava or March, which was a tributary of the Danube and within the confines of Moravia. Commenting on their characteristics De Schweinitz says, (12, p. 6):

During the first five centuries of their history, they were devoted to the pursuits of peace; whenever they took up arms it was in self defense. They tilled the ground, raised cattle and opened an extensive traffic with neighboring nations, in grain and horses. Patient industry distinguished them and a tenaciousness which has become proverbial.

The Moravians of later generations inherited from this economic heritage their genius for the many agricultural and industrial pursuits in which they participated. However, in contrast to this initial economic success and peace, certain of their principles of government and religion tended to undo for a time, much of their freedom.

**Government.** The early Moravian form of government was based upon "the limited sovereignty of the Duke." He was assisted by twelve elders who acted in an advisory capacity. Next in power were the owners of large estates and finally came the clan leaders, who were in charge of the various clan divisions, comprised of freeholders. The country was divided into counties and each had a fortified castle which served the purpose of a capital and residence for the ruling magistrates. Under this regime, serfdom was unknown until early in the ninth century. The investiture of power in the nobles and the introduction of the teachings of Christianity were in a large measure instrumental in the perpetuation of religious wars until the time of Moravian emigration for America. (12, p. 7)

**Religion.** The Moravians originally practiced monotheism as a religion but gradually gave way to polytheism. Christianity was introduced in the ninth century through the efforts of Duke Bastislau, who, eager
to become independent of German influence sent to Constantinople for two missionaries, capable of teaching Christianity. Cyril and Methodius were chosen and the doctrines and reforms they introduced were instrumental in combating the paganism which existed. They gave Christianity its first solid footing in Bohemia and Moravia. ensuing wars however found the two countries, at various times, subjected to the rule of the Franks, Romans, Germans and Austrians. Each conflict brought renewed persecutions, until in the stage of the Reformation and Counter-Reformation eras, the Moravians were crushed as a religious organization. (12, p. 6) The papal powers exerted a tremendous influence upon the people of Europe until the middle of the fourteenth century. At that time the Church showed signs of weakening, due to a decline of scholastic theology. De Schweinitz cites, (12, p. 19):

The authority of the Bible as the only source and norm of belief was set up against the pretensions of the Church to promulgate doctrines of its own creation.

The first representative of the Reformation movement was John Wycliffe in England. His doctrines were adopted in Moravia and Bohemia under the leadership of Huss. Luther followed in the fifteenth century.

The Reformation of Huss saw five crusades directed against the reformers by the Holy Roman Empire. The onslaught was met by the reform patriots for fifteen years but due to the division of the people into two factions; the Utraquists or moderate party and the Taborites or radical party, a final battle at Lipany saw the Taborites defeated, the Utraquists having thrown their lot with the enemy.

In regard to the doctrines in which the Taborites believed Bettershell quotes, (4, p. 15):

In view of the fact that they were so extremely radical, it is interesting to note what the Taborites stood for. Above
all they believed that absolute equality should be introduced; that the church, birth, property, education should no longer create social classes; that there should be no separation of the priesthood and laity; that the form of government should be republican, since in the people resides the sovereign power; that women should have equal rights with men. These ideas do not seem so radical to us today —— but in that day they were denounced as rank socialism and those who held such views were mercilessly prosecuted and exterminated as heretics. So you see, the Taborites or forerunners of the Moravians were the very first to introduce the principles and practice of liberty and democracy in the Old World.

That such ideas should be introduced at such an early date seems incredible, but even more so is the fact that some of the very same principles are to this day being propounded and remain in our culture as conflicting values as they did then.

The story of the renewed Unitas Fratrum rightfully begins with John Huss in Bohemia. Past experience taught the Moravians that they could accomplish little by warfare, so a small group of them agreed to follow the doctrines of Huss as their way of life. They organized in 1447 and adopted the teachings of the Bible as a pattern for their rules of conduct. Their growth as an organization advanced so rapidly that the Church became alarmed, for it disapproved any display of religious independence. At the time, the recognition of a church depended upon Apostolic succession. Bishop Stephen was induced to give them that requisite by consecrating three priests of their Unity. This act made possible the first fully organized Protestant church. Persecutions followed and after unsuccessful attempts of establishment, the organization was finally crushed as a result of the Thirty Years War. Those who survived the ordeal were thoroughly scattered but a few fled to Lissa, Poland, where they carried on secretly. John Amos Comenius was their last Bishop and was among their number in Poland. He cherished the belief that someday a reorganization would occur. (15, p. 3, 4, 7, 8)
The predictions and provisions Conenius made are given in the following citation, (15, p. 3):

Faith and Discipline of the Brethren were as a hidden seed in the earth but destined to bud once more; he believed that fathers would secretly transmit to sons a love of the Unity for which they had suffered. He believed that the Unitas Fratrum would have need of its Episcopate and he provided for consecration of new bishops who should preserve the Episcopate of the Unity against that day.

Conenius never lived to see his predictions realized but he is now celebrated not only as the Father of Education but the one who made possible the revival of the Moravian Church. Before considering the next phase of the movement it would be well to know the influence Conenius exerted upon the Moravians.

John Anne Conenius. Conenius was the forerunner of Basedow, Pestalozzi and Froebel. His career in teaching began in a Moravian school at Prerow, Moravia. He eventually became a preacher among the Brethren and was accredited with the writing of many pedagogical works regarding the education of the young. His "Didactica Magna" is a reference which contains a great deal which is claimed as original today. (44, p. 140-49)

His best known works, the "Orbis Pictus" was done in 1557 and was based upon object lessons. The words of each lesson in this book were illustrated with pictures, the object being to bring the chief things of the world into the realm of the perceptive faculties. This was a primer illustrated with pictures and the first such book for the benefit of children. It was divided into 151 chapters whose purpose was to impart information about what he considered useful subjects. (10, p. 410-13) That industry ranked high in his selection is shown by such chapter headings as, Metals, Husbandry, Butchery, Cookery, Weaving, Tailor, Shoemaker, Carpenter, Potter, Printing and Merchandizing.
The Moravian teachers incorporated into their teaching many of the
principles advocated by Comenius. They have distinguished themselves
in the founding of schools for their young. The first instruction was
accomplished by collecting the children in the minister's home, and
this practice brought about the church schools in which the children
were boarded from infancy to approaching adulthood. To accommodate a
latter period of school life colleges and theological seminaries were
a final development. That education was open to all ages and both
sexes is shown by the "Choir" system the Moravians used in their
plan of social organisation. Their industries were housed in the
Brethren's House, Sisters' House and Widow's House, where various
types of instruction were provided the adult members of the community.
The nursery school gave instruction to the child until he was trans-
ferred to the "boarding school." In America, the nursery school was
abandoned in favor of the "parochial school," where they would have
the benefit of better methods of instruction. (44, p. 146-49, 152)

Through his ever increasing fame, the services of Comenius were
sought by educators in all quarters. He had offers from England and
Sweden for the direction of the reformation work in education. America
is known to have bid for his services through Harvard College. Cotton
Mather is said to have bid for his services through sending him an
invitation to, "Come over into New England and Illuminate this college
and country in the quality of President." His acceptance of the Swedish
offer prevented his coming to America.

The Period of Moravian Reorganization. The cruelties which the
contending parties suffered throughout the religious wars in Central
Europe during the early part of the 17th. century, practically elimi-
acted the Moravians as a contending party. Their church remained "a hidden seed" as Conrads phrased it, for a period of a hundred years, but the movement in 1722 again showed signs of life. That year brought to the front another of the new Moravian greats, Count Ludwig von Zinzendorf. A brief sketch of Zinzendorf's life is essential to an understanding of the period of re-organization, for he was one of the outstanding personalities of that era.

Count Ludwig von Zinzendorf. Zinzendorf is known as the "Founder," generous patron, and bishop of the re-organized Moravian Church. He was the Ordinaris of the Unitas Fratrum and considered by such contemporary evangelical leaders as Isaac Watts and John Wesley as a most distinguished servant of Jesus Christ.

Zinzendorf was of noble birth and ancestry, was wealthy, independent and enjoyed a high social rating in Europe. He held the important office of State Attorney at the Court of Saxony. He came from an old South Austrian family and his ancestors were among the earliest exponents of the Protestant Reformation. His affiliation with a Separatist movement resulted in his surrendering his court office, after which he devoted his full time to missionary work. Zinzendorf first became interested in missionary work while at the University of Halle, and at fifteen instigated an organization there which was called "The Order of the Mustard Seed." Each member of the organization pledged to send the gospel to the neglected and needy in the uttermost parts of the world. In 1732 he redeemed his pledge by his affiliation with the Moravians. While in America in 1741-42 he made a futile attempt to bring together into one organized fellowship the various Protestant communions among the German colonists. Conferences of the Lutheran, Reformed, Mennonite, Schwenkfelder, Quaker, Baptist and
Adventists were of no avail for the fulfillment of his designs. (25, p.15)

In his attempt at unity, twenty six synods were held beginning in 1742.

Zinzendorf was present at seven. The other nineteen took place in the
years following. The following quotation shows the purpose of Zin-
nendorf’s proposed plan for unity, (19, p. 69-70):

Through these synods Zinzendorf made an honest appeal
 to unite all the various German settlers into one rel-
igious organization, which he called “The Congregation
 of God in the Spirit,” in which all the various churches
and sects, without giving up their creodal differences
might live and labor together in a high unity of the
spirit.

Zinzendorf’s first meeting with the Moravians, occurred subse-
quent to his marriage in 1722 when he took his bride to his Berthel-
dorf estate in Saxony and came upon a chance meeting which resulted in
his joining the Moravian cause. Price gives the details of the meet-
ing referred to above, (14, p. 44):

On December 22, taking his bride to Berthelendorf for
the first time, he saw a new house near the highway, learn-
ting it had been built by the Moravians, stopped to call,
and knelt with them in earnest prayer.

Some time previously he had been at the home of the
Chief Master of Horse, in Upper Lusatia, and had heard
Christian David, tell of a wish of certain families in
the Province of Moravia to emigrate to a Protestant land
where they might worship God after the fashion of their
forefathers of the Unitas Fratrum. As Zinzendorf’s own
grandfather had left Austria for religious liberty this
story touched him and he told Christian David that the
emigrants might come to Berthelendorf until they could
make other arrangements —— never dreaming that his
real life work was at the moment beginning.

When word of this haven was made known, the Moravians flocked to
Berthelendorf in defiance of the Austrian government. Eventually
exiles from other provinces joined the movement and the population
increased to such extent that it attracted the attention of govern-
ment officials. In 1727 due to both Lutheran and Papal intolerance of
this band, who would accept neither creed, as a religion, Zinzendorf
looked to another land where they might find haven in event of adverse circumstances with the two powers. (14, p. 44) It was by a chance coincidence that the Moravians sailed for America with a group of Schwenkfelder exiles, who because of the "Edict of 1736," were compelled to vacate Saxony. Zinzendorf secured from England a haven for them in the Georgia colony in America. He sent with them escorts. Two were Moravians; George Boehmish and Christopher Baus. The other was Christopher Siegner, a Silesian and friend of the Moravians. They arrived in Philadelphia in 1734. That date marks the first arrival in America of a Moravian from Herrnhut, which was the name they called their settlement on the Bethelsdorf estate. The Schwenkfelders stayed in Pennsylvania and never went to Georgia. Upon hearing that, the authorities of the colony suggested the Moravians go there in their stead. Acceptance of that offer brought to the colony a second group of twenty Moravian volunteers from Herrnhut. They were headed by Gottlieb Spangenberg, a former professor at Halle, who through a disagreement left there and joined the Moravians. They landed at Savannah, Georgia and were given two tracts of land, one in the limits of town and the other a short distance up the river. Spangenberg proved to be a real leader in accomplishing the first tasks toward colonization in America. He transacted all business with local authorities, supervised operations and served as pastor, physician and at times cook. A second group of sixteen men and eight women, led by Bishop David Hutschmann, joined the others in Georgia in 1736. Coming here on the ship "Simeone" they had as fellow passengers General James Oglethorpe, Governor of Georgia and Rev. John Wesley who lived with them in Savannah, until his predecessor vacated the parish he was to take over. During this period a very strong friendship grew between
Wesley and the Moravians. Their doctrines and beliefs were said to have voluntarily brought about Wesley's conversion. (22, p. 31)

The sojourn of the Moravians in Georgia was brought to an abrupt end in 1737. A refusal to bear arms against the Spaniards in Florida during the territorial wars, turned the English colonists there against the Moravians. They were eventually ordered to leave the province. Being befriended by the Schwenkfelders, who earlier parted company with them upon arrival in America, they embarked for Germantown, Pennsylvania. Here they lived with the Schwenkfelders awaiting a decision from Europe upon a definite place of settlement. (29, p. 505)

Pennsylvania. The acquisition of Pennsylvania by William Penn was of major importance to the Moravian movement, for if it had come into the hands of another, the outcome might have been entirely different. The indebtedness of King Charles of England to the elder Penn, a ranking officer in the king's navy, made possible the inheritance of that indebtedness by the younger Penn. Unable to collect the debt in cash, Penn petitioned for land in lieu and he was finally given a grant in America. Penn's association with the "Friends" society in England was a major factor in his quest for land in America. (27, p. 199)

A Quaker desire (evolved under the influence of his Quaker viewpoint and experiences from a germinating idea, as he tells us, of his youthful days at Oxford University), had grown up in him to plant in the New World a colony all his own, where he might exemplify his altruistic ideals of government and development of such settlements and establish under his paternal care, which while essentially Quaker in character, would nevertheless attract other desirable European immigrants seeking religious freedom and economic opportunity. Along with these great purposes, but subordinate to them, William Penn as an Englishman of rank and influence in the realm, with traditions of his class, but also a concern for his material interests and for the perpetuity of an estate for his family.
In Europe, Penn distributed pamphlets in which he advertised for suitable colonists. He diplomatically suggested the qualities one needed for the adventure. It was his aim that he would seek only those who were likely to give character to the colony. An excerpt from one of his pamphlets gives an idea of the type people he considered best qualified. "These persons that provinces seems to have most fitted for plantations are: Laborers, Masons, Smiths, Weavers, Taylors, Tanners, Shoemakers, Shipwrights etc." (27, p. 209) To what extent this advertising affected Moravian traffic is not known but immigrants came in such large numbers that the English became alarmed at the many Germans who settled there. It was feared that they were attempting to plant a European settlement in the New World. Although the Moravians were regarded with suspicion in regards to their true motives of colonization, they eventually came to be considered one of the major elements contributing to the success of the colony. At the outset of Moravian settlement in Pennsylvania, Bethlehem and its immediate surrounding environment was considered a frontier. (Fig. 2)

The Barony of Nazareth. William Penn bequeathed to his stepdaughter Laetitia Aubry in 1682 a 5000 acre parcel of land from a remaining 25,000 acre area (Fig. 3). After Penn's death it was conveyed to her by her step-brothers Thomas and Richard Penn who became the new proprietors of the colony. The parcel was comprised of rich rolling land with numerous springs and creeks. The bequest provided for the privilege of Laetitia's holding court baron for the preservation of peace. It also specified that she pay the heirs of the estate, if commanded, "one red rose on June 24 of each year, in full for all services, customs and rents."
Historical Map of the Barony of Nazareth.

In Northampton County, Pennsylvania,

comprising its five Moravian settlements.

1758.

Dated of the foundation of the five Moravian settlements.

NAZARETH ..................... 1743.
GNADENTHAL or Vale of Grace, 1745.
CHRISTIAN'S SPRING .......... 1748.
FRIEDENSTHAL or Vale of Peace, 1749.
THE ROSE ...................... 1750.

Description and contents of the land at Nazareth, showing how it was divided in 1755.

Christiana Spring, 18 acres. 4 roods.
Gnadenthal, 1010. 0. 0.
Nazareth, (including The Road) 1866, 5. 10.
Friedenthal, 618, 0. 14.

Total 5986 acres 1 rood 64 perches.

Reproduced by and used through courtesy of William F. Mertz, Editor, Nazareth Item, Nazareth, Pa.
A View of
NAZARETH
a settlement of the Brethren
Nine Miles North from Bethlehem
in
PENNSYLVANIA.

Copy of Original, no conscious effort having been made to change or improve
Grace Isabelle Breinig
Jan 28, 1939

Reproduced by and used through courtesy of William F. Mertz, Editor, Nazareth Item, Nazareth, Pa.
William Allen, one of Penn's agents later purchased the Manor for 800 pounds sterling. The privileges of the manor passed with the title and remained effective until the end of the proprietary government made them null and void. Allen in turn sold the land to the Rev. George Whitefield, the famed Methodist minister, for a stipulated price of 2200 pounds. (11, p. 603)

In 1736 Bishop Mitschmann made a tour of Pennsylvania to ascertain the feeling of the German people toward the Moravians. While on the tour he made many friends so that when they were evicted from Georgia the Moravians felt they could proceed to Pennsylvania with the assurance of finding a suitable haven there. Peter Boehler, who knew Whitefield in Georgia where he was a minister, secured passage to Pennsylvania on Whitefield's sloop. Whitefield was making the journey for the purpose of establishing a school for negro children. The school was to be erected on his newly acquired Nazareth tract. While on the journey Whitefield discussed the possibilities of such a school with Boehler, who after some deliberation entered into contract with its construction and superintendence. In return the Moravians were to be granted use of the land. (22, p. 44-45) After a preliminary survey of the land, Boehler and those who came to Pennsylvania with him, encamped at the location where the school was to be constructed and after providing temporary shelter for themselves, proceeded with their task.

When Whitefield returned to Georgia he was severely criticized by his friends for giving the Moravians assistance. The probable cause for such criticism was the ill feeling which still existed in Georgia toward the Moravians, due possibly to the extremating circumstances of their departure from that colony. When Boehler next met Whitefield he evidenced in him a decided display of indifference. So that Whitefield might
return to the good graces of his colleagues, he deliberately involved Boehler in a doctrinal dispute which terminated in an order for the Moravians to vacate his land. With winter gradually approaching they were left in an unenviable predicament, but fortunately were befriended by an agent of Allen, a Nathaniel Irish. Having heard of Whitefield’s traitorous action toward the Moravians and possessing a fine sense of righteousness, though completely indifferent to all religion, Irish gave them every assistance possible. He secured permission for them to spend the winter in their newly built cabin, extended them with credit for provisions and eventually was instrumental in their purchasing a 500 acre parcel of land from Allen. This was located on the banks of the Lehigh River and was later named Bethlehem. Mitschmann, who was in Europe at the time of the Nazareth dispute and hearing of the eviction of the Moravians and the pending negotiations for the Bethlehem purchase, hurried back to Pennsylvania with the necessary funds to consummate the deal. (22, p. 51, 52, 54) The Moravians left Nazareth before the completion of the school. A reverse in financial matters by Whitefield however, enabled the Moravians to purchase the Nazareth tract from him and upon return to Nazareth three years later complete the work they had started there. After completion of their organization, the two tracts comprised what was later called the Northern Province of the Moravian Movement.

The Sea Consecrations. Ownership of the Nazareth and Bethlehem lands brought about the serious problem of Moravian emigration from Europe, for colonizers were the essential factor for the success of any new settlement. Emigration continued for a period of twenty years until the dissolution of the General Economy, which was their form of organi-
sation caused its decline. During that era approximately 700 members crossed the ocean to settle on their estates in America. Just as rapidly as they could the Moravians bought, or had built for them, their own vessels, for booking passage on a strange craft was rather risky at the time. Ocean crossing then meant the endurance of many hardships and a voyage of several months duration. Since the European countries were waging their territorial wars, the illegal capture of vessels, and piracy were common. As for booking passage on strange vessels, the treatment at the hands of the passengers and captain was uncertain. The crowding of vessels to increase the number of fees was common practice. The fees were generally exorbitant, therefore economy became a prime consideration. In addition to the foregoing considerations, the seasonal arrival of people for the cultivation of land and entering the industries was of greatest importance. With their own vessels, manned by their own people, the Moravians were able to sail at any set time. Augmenting this advantage, they were also free to adopt those regulations which were in accord with their own way of life. The Moravians had three ships in service at various times, the Catherine, the Little Strength and the Irene. (36, p. 328-29) These Moravian voyages were called "Sea Congregations" for just as on land, the problem of personnel organization presented itself. Here, as on land, the "Choir" system was used on the basis of social economy. The men and women were divided into six divisions, three for men and a like number for women. The men both single and married lived on one side of the ship while the women lived on the other. (3, p. 110) Drickenstein (5, p. 33) gives this brief description of ship life:

Regular times were set apart in these floating congregations for their various meetings; chaplains, teachers, exhorters and nurses were provided; and the system was carried into the minutest details of life. Each member was assigned a mess and hammock
company and his place and duty in every contingency were designated. The days spent on the ocean were not to be wasted in idleness of inactivity but must be employed in preparing, instructing and invigorating their minds and in promoting growth in grace.

**Bethlehem on the Banks of the Delaware.** The period preceding 1744 was one of great hardship for those Moravians who came to America. With their first two attempts at settlement frustrated, very little was accomplished in the way of permanent establishment. However, the purchase of the Bethlehem tract (Fig. 1) did much to instill new vigor into their future activities. Their first failures were not due to lack of foresight or planning, which was the case in many such movements, for their course was well chartered before they came to America. To refer to their early failures as such, may be incorrect, for the first experiences they had on the continent proved to them that the courage and perseverance so essential to the accomplishment of their manifold purposes was not lacking in their lot.

Spangenberg returned from Europe in 1744 with a "general plan" or basis for future organization of activities in America. The plan encompassed sixteen provisions which Zinzendorf considered essential for the accomplishment of their future aims. The majority deal with church matters but seven have a direct bearing on the future industrial development of the organization. Levering (22, p. 178-79) lists among the sixteen items the seven to be considered of major importance to this study:

1. An itinerant (Pilgermeine) and a local church settlement (Ortsgemeine) are to be established and smaller congregations wherever needful and possible.

2. The itinerants are to have their rendezvous at Bethlehem but are to move about "as a cloud before the wind of the Lord to sanctify all places."
3. There shall be a central household "Haussgemeins" at Bethlehem to have charge of the general establishment, support the itinerancy and abide at the place where the pilgrims are in the field.

4. A house for the single women and one for the single men, and the organization of the older boys and girls into other divisions are to be had in view.

5. The centralizing of large numbers of single persons, remaining single in such establishments is not advisable in America, where there is less difficulty connected with instituting married relations than in European settlements, and married people are more serviceable.

6. Six farms are to be opened on the Nazareth land, on which groups of people are to be located and organized as a "Patriarchal Economy" (The idea was to thus develop the resources of the domain, as the chief supply for the support of everything carried by the central administration at Bethlehem, under a kind of broad family plan.) The building of a manor house, as the seat of a paternal oversight, something in keeping with the associations of the Barony under its nominal privileges was had in mind.

7. "The Large House" — the Whitefield house at Nazareth is then to become an institution for children.

The gradual growth of the "Family Economy at Bethlehem" and the "Patriarchal Economy" at Nazareth saw a development of those communities almost strictly in compliance with the provisions listed by Zinzendorf. Hamilton (16, p. 143-44) gives his viewpoint in justification of Zinzendorf's plan:

Evangelistic and missionary activity so extensive, and carried on by settlements which together did not number more than six hundred people, could have been maintained by no ordinary methods. Capacity to support this work is explained by the adoption of a religio-communal system of life, which was, however, not based upon communal convictions as usually understood by political economists. These arrangements arose gradually, and took special form after 1744. They were not adopted with the design of retaining them permanently, or from the notion that they were the ideal for normal Christian society. They were rather conceived with the view to develop as quickly as possible the resources of the new settlement in a manner coordinate with the utmost employment of the latent power of the congregation for evangelism. Partly from lack of house room
in the beginning, and partly from the necessity of self independence in relation to the church in Europe at the commencement of pioneer life, the family as an institution was made secondary to the requirements of the congregation.

From the very beginning of the Moravian movement in America, one of the greatest and most consistent needs of the people was that of housing accommodations. In order to establish themselves successfully in an unbroken country, it was essential to sacrifice individualism for collectivism. As a result Spangenberg adopted for Bethlehem the favorite motto. Dr. Anton applied to his orphan house and like institutions at Halle, "In commune oramus, In commune laboramus, In commune patimur, In commune guideramus." (35, p. 165) In regard to the "Choir" system Hamilton says, (16, p. 144):

A community of labor rather than of property, coupled with an extreme application of the division of the members according to age, sex and condition of life as married or single, each choir living apart was fundamental. He who had property retained it if he chose; but all placed their time, talents and labor at the disposal of the church. No private enterprises were carried on. Every business and manufacture, and all real estate belonged to the church. Every branch of industry came under the supervision of committees responsible to a board of direction, the Aufgänger College, of which Spangenberg was chairman. The result was the establishment and successful prosecution of at least thirty-two industries, apart from a number of farms, by the year 1747. The duties of each person were assigned to him by the central committee of managers, who made a study of capacities.

The intelligent direction of labor by the Moravian authorities as evidenced in the above quotation resulted in, what at the time was considered, one of the greatest established industrial centers in Colonial Pennsylvania.

The Scope of Moravian Industries Established in Pennsylvania from 1741 to 1749. The maintenance cost of the Moravian Economy in Eastern Pennsylvania was derived from three major sources, namely; the products
derived from purchased lands, the income of industries, and collections
to the Society for the Furtherance of the Gospel. That land
holdings became the most valuable asset was natural. With parcels
suitable for farm, orchard, and pasture, food and clothing were assured.
Timbered, stone and mineral -laden areas yielded the housing and
industrial essentials while navigable waterways afforded desirable
transportation. In addition to supplying their own needs, a yearly
marketing of surpluses added additional cash revenue. Second to land
in earning power were the product sales resulting from the varied in-
dustries, while missionary collections yielded least.

Reichel (35, p. 169-70) lists the various industries established
by 1747. His translation of the Cammerhoff manuscripts made possible
the enumeration below and reveals the scope of the industries carried
on at this early date. The list consists of thirty -two items:

1. The Grist Mills at Bethlehem, Gnadenhut and
Frederick Township.

2. The Saw Mills at Bethlehem, Gnadenhut and Gnadenhutten.

3. The Oil Mills at Bethlehem, under Father Mitschmann's
superintendence.

4. The Tannery at Bethlehem, by far the most lucrative
business.

5. The Smithies at Bethlehem, Nazareth, Gnadenhutten and
Shamokin.

6. The Locksmith Shop at Bethlehem.

7. The Pottery at Bethlehem.

8. The Joinery and Glassery.

9. The Turnery under Father Bechtel.

10. The Wheelwright shop of Henry Antes.

11. The Linen Weaving in Bethlehem and Nazareth, under
special charge of Mary Spangenberg and Anna Cammerhoff.
There were six looms in Bethlehem on which 33,000 yards of linen were woven.

12. The Stocking Weaving and Pulling Mill.


14. The Tailoring and Furrier.

15. The Zeppelin trade under M. Weiss.

16. The Shoemaking at Nazareth, Frederick Township, Gundenhutten, and at Bethlehem under D. Tanneberger.

17. Father Dehmitz's Box and Spindle making.

18. The Coppersage.

19. The Distillery, the products of which however, were not for sale.

20. The Bakery.

21. The Butchery.


23. The Soap boiling.

24. The Chimney Sweeping.

25. The Mason Work, in which more skillful men would have been needed.


27. The Brick Making under L. Hubner and Baemper.

28. The Bristor Work under S. Powell and A. Boemper.

29. The Tavern on the other side of the Lehigh and the Ferry.

30. The Shoe Cleaning.

31. The Tar Making at Gundenhutten.

32. The Button Making.

Reichel in substantiating the importance of the above income sources gives the following statistics for the year 1747:
It was estimated that thirteen of the trades listed above yielded in addition to home consumption a clear profit of £321-14 s-4d., an equivalent of $591. in Pennsylvania currency. A conservative estimate of the annual expenses of the economy would exceed $10,000. Excluding the Nazareth tract, which was purchased from the general funds of the church in Europe, liabilities for purchased lands totaled 4400. The collection source over a two-year period yielded a net of £454-13s-5d.

After a lapse of approximately a decade, which for ordinary purposes is sufficient for the showing of a noticeable industrial growth, the Reu Papers give additional industries in 1759 not included in the Reichel list of 1747. In some instances they cannot be considered as entirely new additions, but may have been omissions in the first named list or the results of industrial branching or specialization of already existing industries. Since the "Reu papers" contains many farm, home, and so-called service occupations a separate column will be devoted to them so that these more industrial in nature may be readily compared with the Reichel list.

<table>
<thead>
<tr>
<th>Trades and Industries</th>
<th>Occupations and Services</th>
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<tbody>
<tr>
<td>1. Bookbinder</td>
<td>15. Cook</td>
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<tr>
<td>2. Chandler and Soapmaker</td>
<td>16. Cattleyard attendant</td>
</tr>
<tr>
<td>3. Cabinetmaker</td>
<td>17. Clerks</td>
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<tr>
<td>4. Gunsmith</td>
<td>18. Gardener</td>
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<tr>
<td>5. Hatter</td>
<td>19. Innkeeper</td>
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<tr>
<td>6. Leather dressers</td>
<td>20. Instructor to boys</td>
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<tr>
<td>7. Locomakers</td>
<td>21. Launderers</td>
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<tr>
<td>8. Limners</td>
<td>22. Mowers and threshers</td>
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<tr>
<td>10. Saddlers</td>
<td>24. Nurses (Male)</td>
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<tr>
<td>11. Silversmiths</td>
<td>25. Stablemasters</td>
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<tr>
<td>12. Silkworm culture</td>
<td>26. Shepherd</td>
</tr>
<tr>
<td>13. Tinsmith</td>
<td>27. Storekeepers</td>
</tr>
<tr>
<td>14. Tobacco manufacture</td>
<td>28. Teachers to Indians</td>
</tr>
<tr>
<td></td>
<td>29. Wood choppers</td>
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</tbody>
</table>
Totaling the existing trades and industries in the year 1759 it is found there were approximately forty-two if the bakery, butchery, drug store and Inn of the Beichal list are removed to the list of occupations and services, of which there were nineteen, making an itemized total of sixty-one separate divisions of labor. Considering frontier difficulties at this early period, the instituting of such an extensive list of labors is astounding for the comparatively short period of eighteen years. Such advancement most certainly warrants tribute to the resourcefulness of the Moravians in the way of accomplishments. Since production and consumption are complimentary economic processes, the one is hardly comprehensible without the other so the Moravians early felt the need of a commercial means of product distribution. This resulted in the establishment of their first trading center.

Bethlehem’s First Store. The first store or trading center of the Economy was begun in 1753 and made a reality the following year, twelve years after the settlement on the Forks of the Delaware. The store, which is believed to have been the first in this locality, concluding those in urban centers, was the outcome of a period of prosperity, in which the plan for the marketing of surplus products would seem to indicate industrial advancement and success. Heretofore, the trades and industries were employed largely to provide essentials for the immediate requirements of the community. Levering (22, p. 256-67) gives an account of the new store venture as starting in 1752, when the masons begun work on an addition to the Timothy Horsefield residence, located opposite the Moravian Graveyard on Church Street. The method of obtaining the store’s first stock is told in the following quotation:

At a meeting of the masters of trades, the previous March, the subject of stocking this store was discussed
and over 400 distinct items in the line of commodities for such a stock were enumerated, that could be produced by the industries then in Bethlehem.

Reichel (34, p. 234-35) gives a similar account of the first store and in addition summarizes the various commodities which Lervering speaks of as its first stock in trade. In introducing the enumeration Reichel states:

The following is an inventory of the domestic staples the Brethren proposed to contribute toward the stock. It serves to show the variety of industrial pursuits in which the community engaged, and their independence of others, in consequence, in providing themselves with the necessaries and comforts of life.

This quotation may lead one to believe the Moravians had a rather haughty attitude toward their degree of independence of others. In many instances they were regarded somewhat as isolationists. However, a misunderstanding of their true motives of settlement in America and unfounded suspicions provoked by jealousies toward them, gave no alternative other than fostering an independent attitude and the promotion of private industry to the extent of their resources. To make possible an association of Reichel’s stock list with the foregoing list of established industries, a classification of commodities will be attempted for Reichel’s enumeration of commodities is given in an unbroken paragraph form, devoid of any classification:

2. Basketry Baskets, Brooms, Brushes.
4. Brewery and Distillery Beer,Currant wine Whiskey.
6. **Brick and Tile Maker**  Bricks, Roofing tiles.

7. **Cooper**  Buckets, Milk pails, Tubs.

8. **Chandler and Soapmaker**  Soaps (hard and soft), Sealing wax, Tallow candles.

9. **Cabinetmaker**  Medicine Chests, Tobacco Boxes, Writing Desks, Guitars, Violins.

10. **Carpenter**  Beards, Boxes, Cans.

11. **Chemical Makers and Distillers**  Ammonia, Lime, Lampblack, Oil of Turpentine, Potash, Pitch, Sulphur-matches, Starch, Tar, Turpentine.

12. **Dairy**  Butter, Cheese.

13. **Farm Industries**  Buckwheat, Barley, and Flax Greets, Flax, Hemp, Millet, Oats, Rape-seed, Tobacco, Wheat.

14. **Gunsmith**  Guns and accessories, Flint and steel.

15. **Household Industries**  Dried peaches, apples and cherries, Preserves, Pickles, Vinaigrettes.

16. **Leather Dresser**  Apron Skins, Deer and Calf skins, (dressed for breeches), Glove Leather.

17. **Mill Products**  Flour, Linseed oil, Linseed meal, Malt, Nut oil, Oil of sassafras, Rape-seed-oil.

18. **Pottery**  Bowls, Pottery, Pipe heads, Pipe stems, Tea pots.


20. **Pewtersmith**  Pewter plates, Spoons.

21. **Razorsmith**  Cord, Linen mats, Rope.

22. **Silversmith**  Buckles, Shirt studs.

23. **Shoemaker**  Boots, Shoes, Shoe lasts, Wooden and horn heel pieces.

24. **Saddler and Harnessmaker**  Girths, Harness, Halters, Horse-collars, Horse-bridles, Knee-straps, Leather buckets, Martingales, Saddles, Saddle-bags, Whips, Bridles.


27. 

Turnery

Spindles, Spinning wheels.

28. 

Wheelwright

Wheelbarrows, Wagons.

Unclassified Items

Blankbooks, Cine, Grindstones, Hair-powder,
Punk, Snuff, Slate pencils, Whetstones, Quills.

Reichel gives the following additional list of products which he says, "were furnished," to the store. The nature of the products would indicate they were imported or in most cases brought in to supplement the stock listed above.

Food

Coffee, Chocolate, Rum, Salt, Spices, Sugar (brown and loaf), Tea, Wine.

Textiles

Blankets, Broadcloth, Camel, Silk, Silk handkerchiefs.

Metals

Copper and brass kettles, Iron pots, Lead, Shot, Steel.

Unclassified

Powder (presumably gun), Paper, Ink.

The above listed store stock had an appraisal value of £277, 3s. 6d. in 1754, when William Edmunds succeeded Joseph Powell who was the first storekeeper. In addition to serving as an indication of the large variety of manufactures credited to the Moravian trades and industries at such early date, they show that effort and cooperation were the major factors in the success of the many ventures undertaken by the Moravians. To date, it would seem that the Moravian way of life consisted largely of matters of church and labor, however, such was not the case, for recreation was given due consideration. An attempt to direct a community such as Bethlehem without regard for the leisure time activities of its members, would have resulted in complete failure. Even the strongest were in need of encouragement for the continuation of their labors. Spengenberg at an early date made application of psychological reasoning, so that his managerial duties might proceed with a minimum difficulty. He considered the need for the promotion
of spiritual growth of men in the fields and industries and he used every means of increasing their love to the Savior. Spangenberg and his wife made frequent visits to the brethren and sisters at their place of toil and encouraged them in their work. It was his idea to impress upon them that the outward activity itself was a means of spiritual edification. This remark was found in one of his letters, (35, p. 175):

They connect the Savior and His blood with all they do or say, they highly esteem their patriarchal economy; they grow in spiritual matters while working bodily. Nowhere else have such beautiful and edifying hymns for shepherds, ploughers, threshers, reapers, spinners, knotters, washers, sewers and others been composed as among them and by them.

The Moravian Love Feasts. Supplementing their spiritual and musical activities, Spangenberg introduced in 1745 what he called the "Love Feasts." They originated in Herrnhut in 1727 but were originally a custom of early Christianity in which ancient Christian Fathers expressed intimate fellowship on an ideal level; all classes, patrician and plebeian, learned and illiterate, rich and poor, even master and slave took meals together from a common store, with the singing of hymns, psalms and spiritual songs. In Bethlehem such feasts, which could be merely the breaking of bread or an elaborate banquet, were at first held each Saturday afternoon and on special occasions. The feasts however became so popular that they were frequently held for milkers, washers, threshers and ploughers. Eventually every accomplishment whether it be the completion of a building, cultivation of poetical or musical talent, or the gathering of a harvest, a love feast was in order. It was through such consideration of individual and social interests and the opportunity for a full participation in their social culture that the success of Moravianism has
been perpetuated. (36, p. 174)

Chapters three and four will deal with the arts and industries of the Moravians. It is hoped chapter two has provided a suitable background for effecting a better understanding of the socio-economic factors involved in the chapters to follow.
CHAPTER III

MORAVIAN ARTS AND ARTISTS
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MORAVIAN ARTS AND ARTISTS

Portraiture, architectural and scenic sketching, drafting and lithography are the major phases of drawing in which the Moravians excelled. Examples of work done in these areas, using charcoal, pencil, ink, water colors, and oils as mediums, may be seen in the museums and other buildings of Nazareth and Bethlehem. That the Moravians were accomplished in the mentioned areas may be seen in a study of the few pictured examples of their artistry. (Figs. 5-9). Although some of the artists of such work remain unknown, it is safe to accredit Moravians with having done the examples, for according to custom, they were averse to self-advertisement or display for any other than their own purposes.

Door and wall panels were often artistically painted to add to the otherwise drab house interiors, as a means of decorative adornment. The attention of visitors, being shown about the Sisters’ House, is usually attracted to one such wall painting on the mid-landing leading to the second floor. A floral still-life was used as the subject and the painting was supposedly done by one of the Moravian sisters. It is natural that floral patterns were a favorite motif for flowers were raised in great quantities and many varieties under the personal care of the sisters in their many gardens.

John Jacob Mueller was the earliest recorded artist in Bethlehem. (22, p. 73) He was a portrait painter in Nuremberg, Germany, and after joining the Moravian church in 1740 became Count Ginzendorf’s private secretary while visiting America. In 1745 both Ginzendorf and Mueller returned to Europe. While in Bethlehem, Mueller dedicated the

--Nazareth Museum
THE BETRAYAL— A Biblical painting in oil by John Valentine Haidt.

— Nazareth Museum
SINGLE MORAVIAN SISTER—A painting in oil from Staten Island, New York, where Moravians were active in missionary work. Painter unknown.

—Nazareth Museum
A SINGLE MORAVIAN SISTER—A painting in oil by John Valentine Haidt.

-- Nazareth Museum
THE DESERT SCENE--A portrayal of the Wise Men traveling to visit Jesus at Bethlehem. One of the three scenes comprising the 1939 Christmas Community Putz which is conducted in the old gymnasium of the Moravian Seminary for Women. This exhibit of the annual Putz was viewed by approximately fifteen thousand visitors.

-- Bethlehem, Pennsylvania
first painting displayed in the chapel of the Gemein House. (22, p. 143)
The painting was a biblical depiction: "Christ Bearing His Cross."
In addition to the painting Mueller also painted a wall border near
the ceiling of the room and encircling it. The border consisted of
inscriptions of hymn words, intended as object lessons for the Indians.
Levering credits this as being the first attempt at artistic adornment
in Bethlehem.

John Valentine Reidt arrived in Bethlehem with Spangenberg in 1754
and, although a Moravian minister, he readily became better known as an
artist. He established a studio in the Horsefield House for a season
and was loaded for his oil paintings. Specializing in the portraiture
of prominent Moravians and the depiction of Biblical scenes from the
Saviour's Passion, his ministerial work became subordinate to his
artistry so that eventually his name was exclusively associated with
the field of art. Numerous paintings, both in Europe and America,
remain as examples of his work.

An old Moravian custom, requiring that every able man in the
community learn a trade, was a causative factor in the production of
many clever architects and draftsmen. The thorough knowledge of design
for technical as well as artistic purposes was a trade requirement.
The various trades and industries, along with the many building enter-
prises, afforded an abundance of material for the application of mechan-
ical and architectural design. Bethlehem with its rolling green hills,
winding creek and river, and thickly wooded areas afforded excellent
compositions for landscape sketching.

Nicholas Garrison Jr., the son of a ship captain who brought many
Moravian immigrants to America, was one of the most prominent draftsmen
and landscape artists in Bethlehem. His sketches of Bethlehem in 1757
and 1785 and one of Nazareth in 1761, (Fig. 4), gained sufficient recognition to warrant engraving and printing. Garrison's technical drafts were said to be unexcelled. (22, p. 518)

Gustavus Grunewald was probably the most outstanding teacher of drawing and painting in the Moravian schools. He came to Bethlehem directly from the Dassendorf school in Germany in 1841 and taught at the Young Ladies Seminary from 1846 to 1866. Drawing and painting have always been included in the curriculum of Moravian schools and the Seminary was probably the outstanding one at the time in producing and attracting young artists. The Globe (39, p. 21) gives the following account in referring to the painting of Grunewald:

His painting "The Sycamore" is acknowledged to be a work of genius. He was in his glory when painting our fine old trees. Grunewald held evening classes also, composed of younger mechanics and apprentices who were eager for instruction in freehand drawing and it profited them for the furniture produced by the cabinetmakers, is met with as heirlooms in every part of the Union.

The effectiveness of Grunewald's teaching may be judged by the progress of one of his pupils. Reuben O. Hackenbach became so impressed in his work of decorative furniture painting under Grunewald's teaching that he eventually sold his furniture establishment and became one of Grunewald's prominent landscape artists. When Grunewald returned to Europe in 1866, Hackenbach was proficient enough to succeed him as instructor at the Seminary. The Lehigh River and Monocacy Creek were his favorite subjects. A succession of instructors after Hackenbach perpetuated the successful production of students proficient in the various phases of drawing so that Bethlehem, since those early beginnings, has always maintained a high place in the realm of artistic accomplishment.
**Graphic Arts.** The early records of the Moravian Economy were kept in script form and practically all were in the German language. A regular force of writers and bookkeepers were quartered in a room of the Brethren's House and recounted in detail all the various transactions, business records, missionary travels, foreign correspondence, and many other colonization activities. The diligence with which they kept their records and the ability of later diarists to translate them into English are the responsible factors for the accurate data now available on the achievements of those early pioneers. At present it seems incredible that the Moravians were not more enthusiastic about the art of printing than their records indicate. Because of the great amount of copy work they did, it would seem that a less laborious method than that of manuscript writing would have been welcomed by them. It is certain that the superiority of script over printing did not delay the adoption of the latter method, for although many beautiful specimens of script are to be found in the archive volumes, there is an equal amount that must have presented a laborious task for the translator. Because the Moravians were foremost in the adoption of new contrivances which would tend to enlighten their labors, an assumption that they were averse to new inventions and techniques would be ridiculous. Lack of incentive and example must likewise be discounted, for printing was in their very midst in both Europe and America. Folk claims (31, p. 3) that the first known work of Johann Gutenberg of Mainz, Germany "The Bible of 42 lines" appeared in 1456. Printing was introduced into Pennsylvania by William Bradford in 1637 and was further popularized by the enterprises of Benjamin Franklin in nearby Philadelphia. It would seem that with such illustrious predecessors
its adoption would have been inevitable. Levering (22, p. 414) gives an explanation of the Moravian attitude in regard to printing in this quotation:

It is singular that a printing press did not figure among the numerous industries of Bethlehem in those days. There is reference in the records to a proposition in the spring of 1755, to purchase a press in Philadelphia but in June, Brandmiller found that it would not suit and the matter was dropped. Printing was done for Bethlehem by the Sears of Germantown and at one time an agreement was made with the Ephrata Brotherhood to have a hymn book published there but for some reason they threw up the contract. The most of Bethlehem printing was done for many years, in the office of Henry Miller in Philadelphia.

This tends to show that the press in use at the time was either inferior for Moravian purposes, or the purchase price was prohibitive. Since they contracted to have some work done by outside printers it may also be assumed that this may have been the more economical method of securing such work as they wished to have in print. Since duplication was one of the major considerations for printing, they may have reasoned that since only a few copies of records were needed for their purpose, the script method was as expedient as any.

Although printing in Bethlehem made a rather late appearance, an associated phase of the art was commendably carried on by their craftsmen. In 1748 a book store was being operated in the Crown Inn. The books at this time were the old, calf-bound, hand-tooled volumes which to this day are in excellent condition. In 1789 Joseph Gorter, a son of Christian, who was one of the "Economy" bookkeepers bought the book-binding business of the early craftsmen and established it in the Horsefield house on Market Street, as Bethlehem's first circulating library. This early business of the Gorter's is said to have been one of the very last to have been discontinued.
Architecture as it is known today was non-existent in the early American colonies. The home builder was also the architect and designer. His early academic education, if he was fortunate in having one, included a mere smattering of the architectural principles as practiced at the time. Brumbaugh (6, p. 55-66), in an article on the architecture of the Pennsylvania German sects, credits the guild system as having been particularly strong in medieval Germany and coming from there, were well trained masons and carpenters, all having similar ideas and documents. Since the early structures were of their own making, they were built either from the memory of similar structures in the homeland, or from copies of inherited documents which were part of their trade equipment. That the early colonist built his home after the pattern of those he had known in Europe is substantiated by a statement made by Kimball (21, p. 10).

Colonists, be they Greeks at the Pillars of Hercules, Romans in the forests of the Rhine or Europeans on the opposite fringe of the Atlantic, strive first to make their new home like the old. To create in a new continent a new civilization and new art is farthest from their thoughts. All their effort is to secure, and then hold against all odds of difference and distance what they knew in the mother country at the time they left.

The early architectural examples of Moravian design are restricted largely to the smaller class of building of two stories at most. Their religious views and non-participation in politics eliminated the need for large public buildings devoted to that purpose. Such structures were in most cases the largest of the period. Brumbaugh (6, p. 6) describes the "status quo" of Moravian architecture at the time;

The Germans in Pennsylvania (the Moravians being included) did not build many pretentious structures until relatively late when their identity and traditions had both absorbed some outside influences. In the first place they were farmers and upon arrival moved quickly into the outlying districts where they found plenty of occupation with the soil and forests. They had no
proprietary interests in the colony and so most of their public buildings were erected by the English and finally their religious ideas prevented display. But most important of all, these simple German peasants had a background of their own which found expression in plain almost austere architecture of great solidity and primitive detail.

Such was the case of the Moravian colonists, with possibly the one exception that their buildings were largely of their own original design, with a minimum of absorption of the ideas of neighboring colonists. New York was foremost in architectural development in this era, for it was the landing place of most immigrants entering the country from Europe. A stay there, coupled with the slow trek inland from that point, gave travelers time for the study and absorption of the major architectural features in practice at the time. This however, was not the case with the Moravians for their entrance into the country was by way of Georgia, then along the Atlantic seacoast to Philadelphia and hence to Nazareth and Bethlehem. Their travel was direct and their immediate need of housing facilities necessitated the prompt construction of homes from plans and ideas already at their disposal. This quick rate of travel made the absorption of architectural ideas prohibitive.

Newcomers to Pennsylvania continued to weave the architectural pattern precisely where they left off in Germany - Moravians, Germans, Swiss, Hollenders and Huguenots, worked side by side - New materials, new conditions and new thought to express, but the results were medieval regardless of the Renaissance pattern and English appearance. (6, p. 20)

That the medieval aspect should remain so tenaciously in their architecture, while the Renaissance so completely dominated and transformed the ideas of most Europeans, seems incredible. However, a partial explanation of their non-conformity to change is offered by Kimball,
In rural England and in Germany the peasant and ordinary dweller of the rural town built on for generations after the spirit of the Middle Ages. It is not surprising that in America, on the outskirts of European civilization, the Renaissance should be slow; insinuating itself felt. Even for rich, even for gentlemen who came, the decent satisfaction of needs was all that could be secured. Under these conditions the Gothic stock of North European art flourished on here for a time before receiving the grafts of the South...  

In the first building of frame and masonry, indeed in all those constructed down to the end of the 17th, century, we see a survival of the art of the middle ages. Steep roofs, leaded casements, cloistered chimney stacks and exposed construction, the most striking features of those buildings, all have come down from the Gothic...  

The figures used to illustrate the common architectural features to be found in this study, reveal certain characteristics which revert to that early European origin. Steep roofs with a slight kick at the eaves, two stories of dormers, central chimneys, cornices with double barge boards and scrolled ends, great unbroken wall surfaces sparsely punctuated with small windows, plain framed doorways with both stone and joint lintels, brick relieving arches over doorways and windows, single and double diagonal boarded doors with huge hand-wrought hinges and locks, and square tiled floors beareal of a period of medievalism seemingly transplanted into a modern atmosphere.

Since the function of any form of protective building is that of housing, an attempt will be made to include in this area all pertinent information having a bearing on that subject. A general treatment of Moravian housing would mean getting lost in a maze of building exchanges caused by a steadily increasing population divided into choirs by age and sex. For this reason a short description of the major Moravian buildings, past and present, in Nazareth and Bethlehem, Pennsylvania, will better facilitate understanding than would general treatment.
Log Buildings. The first building constructed was by the Moravians took place in their original settlement in Georgia. Due to a rather brief stay there, and a forced evacuation of their settlement, not much was accomplished in the way of architectural development beyond the construction of a small number of log houses. The first building program of the Moravians in Pennsylvania took place in Nazareth, where they were given temporary refuge by the Rev. George Whitefield. In return for the use of his land there, the Moravians contracted to build for him a proposed school for Negro children. Before starting on that building, immediate shelter was needed and a crude framework covered with closely thatched tree branches, served the purpose. A crude log house was built next but that eventually went out of existence so that a second similar though more satisfactory structure built during the same year may be said to be their first commendable building of account in this area.

The Grey Cottage (Fig. 11) was built in 1740 and is now the oldest remaining Moravian building in Pennsylvania. Three sides of the structure have been given a shell of weather boards as a means of modernization but the real wall remains in its original form and if viewed from that angle betrays its unfortunate camouflage. Many contrasting beliefs are forthcoming in regard to the origin of the so-called early American log house. Kimball (21, p. 19) offers the following theory,

The log house, of horizontal logs notched together at the corners and chinked with clay, which has ignorantly assumed to have been borrowed from the aborigines by the first settlers, was unknown to either the Indians or the early English colonists. It seems to have been brought from the continent by the Swedes of the Delaware, the first settlers from northern Europe and the Germans who followed.

--Nazareth, Pennsylvania

THE GREY COTTAGE—The second house in Nazareth, built in 1750. Used for many years for school purposes and from 1755 to 1768 as a home for Moravian Widows.

--Nazareth, Pennsylvania
The Moravians had a thorough working knowledge of log house construction before embarking for America. Their first homes at Herrnhut, Saxony, were built from the trees resulting from land clearance for their settlements, on the estate of Count Zinzendorf. It is highly improbable that this phase of their architecture required any absorption of ideas.

The Gemein House (Fig. 13) at Bethlehem is the only other authentic Moravian house of log construction remaining in the area. The first house (Fig. 12) no longer exists. Like the Grey House at Nazareth, the Gemein House has been given a shell of weather boards for modernization purposes, but being completely covered, its log construction is not betrayed, and would remain unknown unless the observer is informed. The house was originally 50 x 45 feet, with the height remaining the same as at present. The roof ridge, however, was at that time truncated at the gables. The foundation was built from stones extracted at a newly opened quarry in 1741. The logs were of hewn oak. During the first year of the settlement it was used as, "hospice, manse and church, administration office, academy, dispensary, and town hall."

The first chapel of Bethlehem was in this building in its original interior form until 1750. At that time the rough logs forming the walls and the joists and flooring of the floor above were visible in their unfinished appearance. Since its first enlargement in 1743, the Gemein House has undergone many changes, but it still maintains its medieval appearance and at present it serves at least one original purpose, that of residence. (22, p. 68)

The Whitefield House (Fig. 10) was originally planned as a school and home for negro children. The famed Methodist minister George
THE FIRST HOUSE IN BETHLEHEM, PENNSYLVANIA, 1741

THE GEMEIN HOUSE—The second house in Bethlehem. Built in 1741, it was used as the first house of worship. The first floor contained a mess hall where the community ate at a common table.
Whitefield was its sponsor but his plan never materialized. The Moravians, headed by Peter Boehler, entered into contract with Whitefield for its construction, but because of a dispute, suspended building operations after the masonry progressed to the level of the first floor windows. Although the structure was started in 1740, it was not completed and occupied until 1744. During that interval Whitefield, because of financial difficulties, was forced to sell the property and the Moravians acquired the deed to it. After completing the building, it was used as a residence for thirty-three couples who participated in a mass marriage before embarking for America from Germany. In 1745 a girl's school was started and carried on in the Whitefield House until 1748. At that time it was removed to Bethlehem as the "Girl's Boarding School." In 1747 it became a "nursery" for fifteen infants between the ages of five months and five years. They were accompanied by their attendants and instructors. It was used intermittently as a school and as a home for Moravian preachers from 1764 until 1871. At the latter date it was purchased for the Society for the Propagation of the Gospel by John Jordan Jr. of Philadelphia. It was henceforth used by the Moravian Historical Society and as a home for retired ministers. The second floor houses the museum of the Society. Because it was too small for such a purpose, a new wing was added to the building in 1907. The building is now used as museum, library, and home of the Curator and Librarian (Fig. 14) the Reverend Schultz. (39, p. 31)

The Single Brethren's House at Christian's Spring (Fig. 15) was constructed about 1747. It was used as a home for the single men of that colony. The water from a spring three quarters of a mile distant
THE SINGLE BRETHRENS' HOUSE--Built at Christian's Spring in 1747. This was a settlement on the Barony of Nazareth named in honor of Christian Renatus, the son of Count Zinzendorf.

-- Christian's Spring, Pennsylvania

THE SPRING HOUSE--Adjacent to the Single Brethren's House. The spring in the rear of this house ran through the ground floor and provided the water supply and cooling system.
was run through the basement of the building by means of an underground tunnel. The reason for this was to prevent ambush by Indians lurking in the neighborhood. The waters of the spring which ran through a ditch about four feet wide and five inches deep created a natural cooling system for the dairy products which were kept there. At present the house is being used as a private residence.

The Spring House (Fig. 16) was built at a slightly later date than the Brethren's House and also had a spring run through its ground floor. In a dilapidated condition prior to 1939, it was recently restored for its historical interest. Its restoration was probably brought about because of the Bi-Centennial celebration which occurred in Nazareth in 1940. (41, p. 6)

Nazareth Hall. The Moravians constructed this building (Fig. 18) as a home for Count Zinzendorf who, although in Europe at the time, was expected to return and make his home in Pennsylvania. He stayed in England for a time, but finally returned to Herrnhut where he went into retirement.

The foundation ground for the building was broken and the corner stone laid in 1755. A company of men, along with a group already living at Christiansbrunn, was delegated to quarry stone and fell timber preparatory to construction. The building was completed in 1756. It was used as a residence for a short time but in 1759 was used for school purposes. The boys' school, housed in the Family House in Bethlehem at that time, was transferred from the Bell House. 111 boys and 19 tutors and 103 girls under the guidance of 16 sisters were involved in the transfers. Although seemingly insignificant now, the personnel involved in those changes and the buildings which housed them brought fame to both Bethlehem and Nazareth for having pioneered
The original and main building of the historic Nazareth Hall Military Academy, as reproduced from the original wood engraving by Landerbach.

Reproduced by and used through courtesy of William F. Metz, Editor, Nazareth Item, Nazareth, Pa.
NAZARETH HALL—Built in 1755, this was originally intended as a home for Count Zinzendorf. However, since he did not return to America to live, it became famous as a boy's school. The most inspiring feature of this old building is its cupola.

— Nazareth, Pennsylvania
the Moravian boarding school movement for boys and girls. (22, p. 280-282)

The Sisters' House. After the completion of the Gemein House, the next building to be constructed in Bethlehem was planned as a housing project for the single brethren of the community. The house was used for that purpose until 1748. At that time it was given to the Sisters, for the men moved to new quarters now called Colonial Hall, the middle building of the Seminary group. The site for the original building was selected in 1742, in an uncleared, wooded section a short distance from the Gemein House. After staking off the foundation lines, the men were ready to proceed with the cellar excavation. Count Zinzendorf, who had planned the location of the various buildings, was in Bethlehem at the time and according to custom conducted a short discourse and the singing of a special hymn prior to the breaking of ground. (22, p. 144)

The original section of the house to have been built is shown in (1, Fig. 19). On the second floor was a private chapel for the Sisters. The necessary music was supplied by their own orchestra. An infirmary was located on the third floor and next to it was a large dormitory. Other rooms in the house were devoted to the feminine crafts of the community and the teachers in charge of them. A stewardess and deaconess jointly managed the affairs of the establishment. (39, p. 30)

The section (2, Fig. 19) which formed the connection between the Sisters' House and the eastern end of the Bell House, then the girl's school building, was completed in 1752 and contained a dining room, new dormitory, and later a chapel for the school. The large eastern wing (3, Fig. 19) added to the original Sisters' House was built in 1772 and was formally occupied in 1773. The entire building as it is
1741 - MORAVIAN BETHLEHEM - 1940

Social Institutions ---- Key to ---- Business Establishments

A- Brethren's House* H- Annex to G*
B- Boys' Institute I- Sisters' House*
C- Widows' House* J- Annex to I*
D- Moravian Church* K- Boys' Economy
E- Gemein House* L- Cemetery*
F- Old Chapel* M- Indian Houses
G- Bell House* N- Dwellings

1- Crown Inn 16- Wheelwright & Wagemakers' Shop
2- Wash & Soap Boilers' House
3- Saw Mill 17- Blacksmith Shop
4- Coopery 18- Grist Mill*
5- Carpenters' Shop 19- Fulling & Clothiers' Mill
6- Waterworks* 20- Stables
7- Artesian Well* 21- The Old Sun Inn*
8- Dairy 22- The First Store
9- Turnery 23- Brick & Tile
10- Oil Mill 24- The Linen
11- Pottery 25- Kils
12- Pharmacy* 26- Bleachery
13- Slaughterhouse
14- Tannery

Note - Map indicates an approximate location of old Moravian buildings in relation to a modern city plan.
* - Still in existence

Compiled by F. A. Banjes
at present may be seen in (Fig. 20). Special features of door and balustrade construction may be noted in (Figs. 22 to 25). Like in the past, it is still being used as a residence for Moravian Sisters.

(22, p. 144)

The Bell House. The foundation lines for this building (G, Fig. 19) were staked off in 1746 and the building was completed in the following year. It was originally intended as a refectory and dining room for single men. It became known however, as 'the Old Seminary' for it was used as a boarding school for girls from 1749 to 1790. The bell turret was erected in 1746. A clock built by Augustin Heisser of Germantown was placed in it a year later. A large and two small bells were made for it by Samuel Powell, one of the first braziers, and the weather vane with the historic emblem of the church, a lamb with a banner, was constructed from an original drawing made by Cammererhof. Although the building had gone through several transitions, the original size may be seen by the vertical lines dividing the two qualities of masonry. The spacing of windows is also indicative of its original size. Directly in front of the now center, second story window, was once a door which lead to a small balcony from which musicians would play melodies at the beginning of some special holy day or festival. On such occasions, the people of the community would gather in the square in front of the building to participate in the activities. (Fig. 21)

It is told in Bethlehem that the Bell House was originally built so that it transversed one of the main streets. In order that people might use the street, an archway was built through the center of the building so that a right of way could be maintained. Although the building is now divided into private apartments and the archway has
THE SISTERS' HOUSE—Built in 1743, it was used as a Brethren's House until 1748. At that date it was given to the Sisters as a housing project. The East wing was added in 1773.

Bethlehem, Pennsylvania

THE BELL HOUSE—Built in 1745 and used as the first seminary for girls.

Bethlehem, Pennsylvania
SISTERS’ HOUSE—A lower street entrance showing the external appearance of a single, cross-hatched door with batten wood frame and soldiered brick arch. The landing is of dressed stone and the balustrade of wrought iron.

—Bethlehem, Pennsylvania

GEMEIN HOUSE—A street entrance showing the unusual exterior construction of a cross-hatched double door with transom.

—Bethlehem, Pennsylvania
SISTERS' HOUSE—Inside appearance of a door showing the board base for the outside paneling. The bent-over nails may be seen showing through a thick coat of cream paint. The hardware is of hammered wrought iron.

—Bethlehem, Pennsylvania

SISTERS' HOUSE—Inside appearance in a first floor hallway, showing a balustrade treatment.
since been enclosed with doors, that right of way still exists. The doors remain unlocked from 7 A. M. to 10 P. M. To rent an apartment in the building, one must first be a Moravian and then make application to the Board of Elders of the church. The applicant is investigated and if his credentials are satisfactory he is placed on an eligible list and waits his turn for a vacancy. (22, p. 191-92)

The Brethren's House. The overcrowded condition of the original Brethren's House, now the western section of the Sisters' House, made necessary the construction of a new building to house them and their industries. Tailors, bakers, weavers, and cabinetmakers as well as workers in iron all had their respective establishments in the new home, now the center section of the Seminary for Girls, (Fig. 26.) Each industry was conducted by a master craftsman, with learned tradesmen and apprentices to assist them. Although the building now has a smooth appearing surface, it was originally constructed from unhewn stone. (39, p. 31)

The greatest fame bestowed on the building was due to an incident occurring during the Revolutionary War. During that era, it was twice appropriated for a hospital for the Continental Army. The surgical room of that time, has been restored and endowed with funds by the Commonwealth of Pennsylvania, so that it may be perpetuated as a memorial of service, (30).

The site for the Brethren's House, their second choir house, was staked off and excavation started in 1748. After completion of their regular day's work the single men would proceed with their task far into the evening when they worked by the light of the moon. The essential lumber for the building was cut at Gnadenhutten and floated down
THE SEMINARY AND COLLEGE FOR WOMEN--Built in 1742 as a Brethren's House. Transformed into a Seminary in 1815. The central unit was used as a general hospital for the patriot army during the periods, December 4, 1776 to March 27, 1777 and September 20, 1777 to April 14, 1778.

--Bethlehem, Pennsylvania

THE OLD CHAPEL--Built in 1751. The second place of worship.

--Bethlehem, Pennsylvania
the Lehigh River to Bethlehem. The shingles were produced from straight-grained blocks of wood in nearby Frederick Township where men worked at the task with "frow and mallet, shaving horse and drawing knife." Other men worked in the quarries across the river where enough Potsdam sandstone was obtained to complete the job. Although much of the stone was used in unknown state, that used for lintels over the main doors, was squared and dressed. After the framework for the roof was raised, a customary love-feast was held on the ground floor for all who participated in any way. After final completion, the men received communion at their old home and were led in a procession headed by the musicians to the new house, where final occupation took place. The building was eventually made into the Moravian Seminary for Women and brought added fame to it as an educational institution of that type. It still remains as one of the foremost women's schools in the country. (22, p. 196-99)

The Old Chapel. Plans for a stone wing (Fig. 19), to complete the connection between the Gemein House and Bell House, were made and adopted in 1751. The timber for the building was floated down the Lehigh River from the saw mill at Geisingeritten. The roof was constructed of tiles, but due to their excessive weight, had to be replaced with shingles in 1753. The building succeeded the second story chapel of the Gemein House, as the second place of worship in the community. Beneath the church was a dining room for married people. The facade shown in (Fig. 27) was a later addition to the building, for originally it was entered through the front eastern doorway of the Gemein House. The buttresses on the chapel, as well as those on the adjoining buildings, were also a later addition. The entire slope upon
which the buildings are built, consists of a limestone formation which caused them to settle in the direction of the slope. To check that condition the buttresses were erected as a means of strengthening the structure, and not as many people erroneously believe, as a means of causing the building to have a medieval appearance of Germanic origin.

Today, the main use of the church is for marriages. It is also used for social affairs by the members of the church. Originally there was a corpse house near the church and all burials were conducted from there. This practice has since been discontinued and the corpse house demolished. (22, p. 255, 571-2)

The Family House. Mentioned in relation to the paragraph on Nazareth Hall, the Family House was built in 1754 and was demolished in 1859. Its fame is largely due to the fact that it was one of Pennsylvania's first "boys' institutes." It was also used as a prison for British prisoners during the Revolutionary War. Originally it was intended to serve the increased need for craftsmen such as tailors, shoemakers and weavers. The workshops in the Brethren's House were becoming inadequate to meet the needs of the community. It was also to be used as living quarters for a number of married men who, due to arrangements at that time, lived in room companies while their wives were quartered elsewhere. (22, p. 283)

The building was of stone and three stories high. The dimensions were 30' X 33'. A large attic was lighted by means of dormer windows. The first floor was divided into three rooms by long passages running from the front to the rear of the house. The center section was a Warden's and conference room, while the end rooms were devoted to the cabinet makers, joiners and shoemakers. The second floor was divided
into four dwelling rooms while the third floor was a dormitory, with the attic available for storage. The basement was devoted to one of the major industries, linen weaving. (22, p. 294)

The boys' school was originally located in a room in the Brethren's House however, as the organization grew and a need for larger quarters became apparent they vacated that place for the more commodious Family House, which in turn gained fame as one of the first industrial schools for boys.

The Widow's House. Originally, Moravian widows were quartered in one of the log houses at Nazareth. As their number increased and facilities there became inadequate, an appeal was made to the Superintendent of Widows and in 1766 action was taken to select a site for a new building. The final selection was a garden (C, Fig. 19) opposite the Bell House. The completed building (Fig. 29) was dedicated in 1769. An addition, which is readily apparent because of the difference in masonry and spacing of windows (Fig. 29), was constructed at the east end in 1795. A large and comparatively modern annex was built to the rear in 1889. It was intended as a home for the widows and daughters of Moravian ministers and other women engaged in church work. The now deceased John Jordan Jr. of Philadelphia made a gift of $10,000, in 1860 for the maintenance of the building for that purpose, for which it has since been used. (22, p. 410-11)

The Moravian Church. Although comparatively modern in construction and design and built with the assistance of outside labor, the Moravian Church (Fig. 31) presents an interesting historical background. At the time of completion (1806) it was supposedly the largest church in Pennsylvania. It had a capacity sufficient to seat the population of the
THE WIDOWS HOUSE—Built in 1768. Used as a home for the widows of Moravian ministers since 1863. Interesting architectural features may be noted in the dormer treatment and massive central chimneys.

-- Bethlehem, Pennsylvania

THE WIDOWS HOUSE—Front view showing two qualities of masonry marking the old and new sections of the building.
THE MORAVIAN CHURCH--Built in 1803 as the third place of worship in Bethlehem. The famous Moravian Trombone Choir play hymns in the tower whenever a death occurs in the congregation. Different hymns indicate the sex and approximate age of the deceased.

-- Bethlehem, Pennsylvania
entire town for years to come. That factor was preconceived in the
original plans for it was customary in many European villages to have
only one church which served the entire village. In the case of
Bethlehem it was estimated that eventually 1500 people would have
to be seated. In regard to cost, it was first estimated that $11,000
would be sufficient for its construction, but that figure finally
mounted to $55,000, which was considered a tidy sum in that day.

The site upon which the church now stands was originally occupied
by the water tower and two log buildings used as family houses. In
1863 the excavation for the cellar was undertaken by men and boy
volunteers. The stone for the building was blasted from a nearby
mountain-side and seasoned mortar was taken from a pit where it was
prepared over the winter months for use by the masons.

In contrast to other construction at Bethlehem, much outside labor
and material was used on this building, however, a great deal was
accomplished by Moravian craftsmen, now indoendent in trade. William
Boehler Jr. was master carpenter, while John Frederick Bourquin, a
cabinet maker, did the finer work of trimming, door carving, and
pulpit construction.

The outside of the church has undergone considerable alteration
since it was first built. The annexes at either end of the church
were originally flat roofed and each had a turret and a balustrade
around the three exposed sides. Because its copper roof leaked it
was necessary to run the gable roof to both ends of the building as
shown in the photograph. The original entrance was by center steps
at the Church Street side of the building. A long porch or balcony
extended the entire length of this side and entrance to the church
proper was by means of doors leading into each annex. The building,
said to have been built of stone, has been modernised by means of a
stucco coating, which now makes it appear smooth. (22, p. 569-71, 575-6,
579)

**The Moravian Cemetery.** One of Bethlehem's oldest historical
sites is the old Moravian Cemetery, (Fig. 32). A picturesque sim-
plicity is one of its most interesting features. Since the first in-
terment in the cemetery in 1742, it has undergone many improvements.
Today, it is divided into rectangular areas which are separated by
paths. The graves are arranged in long parallel rows and their fair-
ly uniform stone markers indicate who is buried in each grave. The
earlier stones were engraved with only numbers which were catalogued
to indicate the dead. Later stones (Fig. 33) had more elaborate in-
scriptions. Men and women were buried in separate plots. This was
probably in keeping with the Choir system of organization in life.
Since no race or creed restrictions were placed upon church membership,
many graves of Negroes and Indians may be found among those of the
Moravians. Burials in the various divisions were made in sequence
and because of this the various members of a family might be found in
widely separated graves. The traditional family-plot method of burial
was not employed by the Moravians, for the entire congregation were con-
sidered as one family. The simple gravestones, in contrast to those
of the traditional cemetery, signified a common brotherhood with
rich and poor being buried alike.

**Moravian Hostelry.** The need for a hostelry was felt in Beth-
lehem in 1745. "Die Krone" or "The Crown" was the first in the area
at that date. The building was located in a position across the river
indicated by (1, Fig. 10). A "squatter" originally lived in the log
house which he built on part of a 274 acre tract later purchased by
THE MORAVIAN CEMETERY AT BETHLEHEM, PENNSYLVANIA

THE TOMBSTONE OF JOHN FREDERICK CAMMERROFF,
Assistant and successor to Bishop Spangenberg
the Moravians. Exercising "squeater's rights" it was necessary for
them to buy him off before they could turn the house into their first
inn. Reichel (34, p. 262) gives a description of the inn's first
stock:

It was stocked in May of that year with gill and
half gill pewter measures, with two dram glasses, two
hogshead of cider, one cask of molasses, one cask of
rum, six pewter plates, iron canning стоcks, and whatever
else could minister to the comfort of the tired travel-
er. Here he was served with breakfast of tea or coffee
at four pence, dinner at six pence, a pint of beer at
three pence, a supper at four pence or if hot at six
pence; with oldings at two pence and nights hay and
oats for his horse at twelve pence. Jost Vollert was
the first landlord for the Brodren.

Reichel further adds that a large signboard "emblazoned with the
British Crown" was removed from the Inn in 1794 when the building was
turned into a farmhouse. It is said "the sign was frequently used as
a target for the arrows of the Indian boys of Toodysung's company."

The tavern's busiest era was probably during the Indian War peri-
iod. At that time expenses incurred by friendly Indians and the
soldiers of the province were recognized and paid by the proprietors.
Bills of that kind were presented to the province by the Moravians for
service rendered. One such account gives an idea of the clientele
at that time, (34, p. 342):

| Province of Pensilvania to Bethlehem Tavern Dr.          |
| For sundries delivered Tatiskumi, 13 soldiers,          |
| Captain Arnit, with 2 wagens pr. order of Colonel       |
| Weisser, vic.                                           |
| 1757                                                   |
| Aug. 9 To supper, 16 half gills rum and 16              |
| pints beer for 16--------------------------------------|
| 15  4                                                  |
| " supper for Capt'n Arnit and 1 pint                   |
| wine---------------------------------------------------- 2 |
| " breakfast, 16 half gills rum, and 16                 |
| pints cider for 16 do-----------------------------|
| 13  4                                                  |
| " dinner and 15 pints beer for 15 do.                  |
| 10                                                    |
| ____________________________________                    |
| 1  16  8                                               |
The constant business growth of The Crown made larger quarters necessary in 1758. The "Old Sun Inn" (21, Fig. 19) was built at that time. Portions of a mailing pamphlet-advertisement used by the present proprietor gives a sketch of the Inn (Fig. 34) with some explanatory material on its early history. The inn was built by the Moravians for their own use and the entertainment of their guests. It was operated by them on that basis until 1761 when it was licensed as a public hostelry. Henceforth, it was operated by appointed landlords who made a thorough periodical accounting of their stewardship to the brethren. The inn eventually came into private ownership but its fame may be attributed to the hospitality and excellent service rendered by the Moravians throughout the Colonial era. The clientele listed in the pamphlet (Fig. 34-35) indicate the type of people who frequented its environs. The business has been in operation from its beginning down to the present. Although the building is now encased in a modern setting, enough remains in the interior to remind one of a bygone day, (Fig. 36).

This chapter deals with an understanding of the artistic characteristics of the Moravian. Although the solution of their many art and architectural problems is a tribute to the artist and designer, those who indulged in the production of raw materials and the details of construction, are of equal importance. The next chapter therefore, will be concerned with the part the Moravian crafts and industries have played in the Moravian movement.
THE OLD SUN INN, BETHLEHEM, PENNSYLVANIA

Figures 34-35-36 used through the courtesy of Mr. Arthur Dauchy, Proprietor
IT was in 1761 that this Inn received its license as a public hostelry, by grant of his Britannic Majesty, George III. Soon it became famed throughout the colonies as "the equal to the best of the large inns in England." It was named "The SUN INN"; and an emblem of the sun "in its meridian splendor" was painted on a sign-post and erected before the entrance.

Then came the American Revolution. Throughout the years of this titanic struggle many of those whose names have been entered on the immortal rolls of American history paid their tribute of praise for the savor of the SUN INN'S dishes, the delicacy of its wines and liquors, its overall refinement. Governor Hamilton, Sir William Johnson, Richard Penn, Benjamin Franklin, John Hancock, John Adams, Lyman Hall, General the Marquis de Lafayette, General Schuyler, Pulaski, Gage, Green and Sullivan. M. Gerard, the French Minister Plenipotentiary to the Colonies, the Marquis de Chastellux—all these and more slept in the beds and ate from the tables of the SUN INN.
Washington

BUT yet greater ones were to come. On June 13, 1779, Lady Martha Washington, escorted by General Sullivan and some twenty staff officers, was a guest here, en route to her home in Virginia after spending a season at General Washington’s headquarters. Three years later, on the afternoon of July 25, 1782, the great leader himself quietly rode into Bethlehem, accompanied by two aids, and dined and spent the night in the SUN INN of which his wife had spoken so highly.

Not only to the great white leaders of the time did the SUN INN provide rest and food. In March, 1792, some fifty chiefs and warriors of the Six Nations Indians, on their way to Philadelphia to confer with Washington, lodged here with their teacher, the Reverend Samuel Kirkland. Among them were the proud, austere Red Jacket, Otsiquette, and The Cornplanter.

Thus, down through the years to the twentieth century, the same old SUN INN has lived and played its destined part in the making of a great nation. Every president from Washington to Buchanan has stayed within its walls. Thousands of less famed but equally sturdy patriots have shared in the warmth of its hospitality, until — today.
CHAPTER IV

MORAVIAN CRAFTS AND INDUSTRIES
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MORAVIAN CRAFTS AND INDUSTRIES

One of the major concerns of the early colonist in the location of his home or town was a convenient and relatively pure water supply. This is said to have been the deciding factor in the early growth of Bethlehem around the enclosed area in (Fig. 2). In 1741 this area represented the very heart of the community and to this day its relative position remains unchanged.

Shortly after the building of the first house, which was on the brink of a hill above the spring near the Monocacy Creek, it was necessary to build a fence around the spring to keep the domesticated animals from polluting the water. That job was assigned to one Matthew Weiss who was assisted by Joseph Powell.

As the settlement grew in population and the number of buildings to be supplied with water increased, the trek up the hill with water buckets suspended from shoulder yokes became too laborious and was replaced by carting as soon as a roadway was built. This type of transportation was used until 1754 when a millwright by the name of Hans Christiansen conceived the idea of making the waterwheel of the seed-oil mill, located near the spring, do the additional job of pumping water to the dwelling area at the top of the hill, where it was distributed from a water tank. This would have been an easy accomplishment, but for the little matter of suitable piping and a water pump.

John Boehner, a West Indian missionary on a visit to Bethlehem, was said to have had experience in the mechanics of water pumps and assisted Christiansen in making a crude working model for experimental
purposes. Carefully selected trunks of hemlock were floated down the Lehigh from Quadenbutten to be made into pipes. The sections illustrated in (Fig. 39) are parts of the original pipes which were excavated in the vicinity of the old spring, (Fig. 39). The section at the left shows a wrought iron collar or union for the coupling of pipe lengths. The tight fit of the collar around the remaining fragments indicates that they were heated and shrunk on the pipe ends. The right section shows a charred, irregularly shaped hole through the center, supporting the theory that they were evidently burned through with hot iron rods. At that time, this was the usual method when boring was to be done.

After completion of the pump, pipe line and a log building for housing the apparatus, a demonstration was performed on June 21, and water was forced as high as the houses located in the town square. That initial success encouraged the development of machinery and the construction of a separate water wheel, along with a complete system of pipes, a water tower, and a new building for housing, (Fig. 37). On May 27, 1755 the water was forced up the tower and into the tank located where the present church now stands. From there it was distributed by bucket and later by pipe lines running to the various houses.

The second waterworks (Fig. 38) was built in 1762 to meet the demands of an ever increasing population. In due time lead pipes replaced the old hemlock ones and a system of tanks, placed in various sections of the town, completed the finest water system in the country. The original plant later used as a model by some of the largest cities in the United States. The Moravian water works was supposedly the first practicable system in the country.
THE FIRST WATER-WORKS IN THE UNITED STATES --1754

--Bethlehem, Pennsylvania

THE SECOND WATER-WORKS IN BETHLEHEM--1761
FIRST WATER PIPES—Segments of water pipes from the "Old Waterworks" at Bethlehem. The left figure shows a wrought iron collar or union for the coupling of pipe lengths. The figure at the right shows a cross section of a pipe.

—Bethlehem, Pennsylvania

THE ARTESIAN WELL—Located on the banks of the Monocacy Creek. Constructed of stone with mortar shell and flagstone capping. This well was the reason for the construction of the first house and waterworks in their respective locations.

—Bethlehem, Pennsylvania
The Wood-Working Industries and activities of the Moravians thrived amid the ring of the broad-bladed axes and the dull crunch of the hungry sawmill. That rasping background only accentuated the dull rapping thud of the mallet in the carpenter's shop, and the soft hum of the wood-turner's shop. Another characteristic was the pungent smell of charred wood as a hot iron-band shrunk to make tight and strong a leg or wheel in either the cooper's, the wheelwright's or the wagonmaker's shop.

The Moravians, like other settlers of the time, first had to clear land for tilling. The heavier timbers resulting from that task were graded as to size, notched at the ends, and fitted together to form the basic construction of the first full-log houses. An abundance of timber and the need for immediate shelter was instrumental in the development of that type of house. The original houses were crude but after the shelter had been provided, more time was allotted to the refinement of the constructional details in other buildings.

Later timbers were hewed square with the ax or adz; this enabled closer fitting of joints and required less chopping than the "full-log" construction. The first house in Bethlehem (Fig. 12) is an example of the first type while the Grey Cottage in Nazareth (Fig. 11) is an example of the latter. The most notable building of log construction in Bethlehem is the Gemein House (Fig. 13), but unfortunately modernization of that building has covered the constructional details with a shell of weather boards which makes the detection of the original construction impossible to the casual observer.

A description of the Crown Inn (39, p. 32), one of the earliest log houses in Bethlehem, gives a good insight as to the exterior and
interior construction of a log house.

The building was built of white oak logs, two stories high; and a gable roof, four rooms to each story all floored with one and a half inch white-oak planks; the studding of the partition walls were posts of white oak grooved to receive cross pieces with a snug filling of cut straw and clay; the casing of the doors and windows was of solid timber, wooden latches and bolts were used and every nail in the carpentering had been made by the blacksmith at Bethlehem.

Proceeding the use of nails, dowel pegs inserted in holes bored in joists and beams, were the means of joining timbers. An example of these pegs may be seen in (3, Fig. 41). A peg hole is clearly shown in (1, Fig. 42).

The first saw mill in Bethlehem was built in 1744. The first boards from it were used in the construction of the first Brethren's House, at present the west section of the Sisters' House. Levering (32, p. 173) claims that the mill greatly accelerated building construction and in relation to the construction of this building says:

The work had proceeded more rapidly than on previous buildings, for now there were more mechanics, and all the timber did not have to be hewn and split.

Regarding the mill's construction and material production he further adds:

On the massive stone foundation yet to be seen, (1892), it was raised on May 26 and on June 26 the first sawing was done. Timber cut in February and March by squads of Bethlehem axe-men far up in the forests...was being floated down the river; and in converting it into the beams and posts, rafters, joints and boards, the measured rasp and crunch of the long saw and the rumble of the water wheel driving it, succeeded, to a great extent, the ring of the broad axe on the white oak logs.

Examples of early building materials of the Moravians are shown in (1, Fig. 42), 1, illustrates a piece of hewn timber; 2, a beam, a product of the sawmill; 3, scrolled balusters cut from flat boards; 4, random width, tongue and grooved floor boards. An interesting
Cabinet-Maker's Tools—A set of hand planes and a brace belonging to Benjamin Eggert, a cabinet-maker (1792-1860).

--Bethlehem Museum
ARTICLES OF MORAVIAN MANUFACTURE—
1. Hollowed, octagonal wooden plate, candle or lamp
   shade, wooden candlestick.
2. Hand carved clothespins (about 1840).
3. Dowel pegs and wooden door latches.
4. Old hand saw, wooden door handle, hand-wrought
   nails, home-made auger, pie decantur, plane and
   home-made whip.
MORAVIAN BUILDING MATERIALS—Reading from top to bottom:
1. Section of a beam from the first house in Nazareth, showing a mortised end with bored wooden peg hole.
2. Section of a beam from the Crown Inn, Bethlehem, showing mortised ends.
4. Tongued and grooved floor boards from the Moravian Church, Bethlehem (1806).

—Nazareth Museum
feature of the last item is that each board contains either grooves or tongues and not both as is the case of modern standard flooring. The varied widths also contrast with the standards of present day specifications.

Because of a scarcity of labor in Pennsylvania during the early period of homesteading, practically all the building done by the Moravians was on a cooperative basis. Those involved in any phase of the work were organized into crews who moved about to the locations where work was to be done. If the distance was such that commuting was impossible, boarding arrangements were made until completion of the project. Today, motorized transportation and competitive construction companies have minimized this cooperative spirit of the early colonists, except possibly in farming districts and there cooperative labor is restricted largely to the processing of farm produce rather than some type of construction.

The earliest evidence of specialization in the wood industries in Bethlehem came with the building of the first carpentry shop in affiliation with a small cooper's. Fig. 19 shows the approximate location of each and of them Levering (22, p. 363-89) says:

...On the slope of the hill where the present Main Street makes the turn, was the log house built in 1742 for the carpenters and joiners, connected with the first little log cooper's shop. In the new one further north at this time John Hecker was learning to make barrel, the first was new used by the turners under the direction of "Father" Reitnau, for the joiners had moved to other quarters. There spinning wheels were made in considerable numbers, there being a constant demand for them throughout the surrounding country, and many being needed for the Sisters' House and for the use of the girls in the school in those days of much spinning.

The above quotation indicates that increased demand created a need for larger quarters in some industries and this caused a frequent trans-
for of industries. A degree of specialization may be noted in the creation of new industries which resulted from the original carpentry house. It is interesting to note that when the need of a certain product was made known and a craftsman for its making was lacking in the community, someone would take the responsibility of experimentation in the making of the product, so that it could eventually be realized. Such was the case of the making of cedar tubs undertaken by "Father" Bechtel.

During the "hewing" era, when work was done on location, the only housing need was probably that of a shed in which to keep tools. However, with the development of organized shops came the construction of home and industrial needs which could be made indoors during seasons when outdoor construction was impossible. The craftsman who was highly skilled in the finer phases of woodworking entered into the making of furniture, musical instruments, and all types of inside construction not delegated to the rough carpenter. Some examples of the products of the early cabinet and furniture maker are shown in Figs. 43-50. A set of tools developed between the mid-eighteenth and nineteenth centuries are shown in Fig. 49. Additional tools and products dating from the "whittling" era to that of the "wood-turning" era are shown in Fig. 41. One of the most used adoptions of the so-called "period styles" of furniture manufacture may be noted in the wide use of "Windsor" a design of early American origin. Many variations have been added to the basic design of Windsor pieces but its popularity with the Moravians may be noted in its widespread use in Bethlehem and Nazareth and their near conformity to original construction. Cornelius (9, p. 255) claims the manufacture of Windsor pieces began in Philadelphia as early as 1725.
DESK AND CHAIR—Believed to be from the old Nazareth Hall Military Academy (1850).

--Bethlehem Museum
LADDER-BACK ROCKER (1776-1836)—This belonged to Johanna Maria Heckwelder (Polly), who was the daughter of John, missionary to the Indians in Ohio.

—Bethlehem Museum
SISTERS' BED (made about 1800)—Found in the attic of the Sisters' House. The pillow slips on the wall belong to the quilt shown in Figure 86.

--Bethlehem Museum
WHEEL CHAIR (1820-35)—A converted Windsor chair, found in the attic of the Sisters' House. It is believed the chair was made for an invalid Sister who resided there during the above period.

—Bethlehem Museum
WINDSOR CHAIRS—Fan and comb-backed and saddle-seated chairs. Found in one of the rooms of the Moravian Church. Made about 1750-1790.

—Bethlehem, Pennsylvania

FLANK AND WINDSOR CHAIRS—Flank chairs were one of the earliest type used by the Moravians. Unfinished except for a natural luster given through frequent and hard wear. The tulip and heart are used as design motifs. Windsor chairs, armless and with a comb back, were from the early eighteenth century.

—Nazareth Museum
AN ARROW-BACK SETTEE—Found in the main hall of the Sisters' House. Painted in the customary green and decorated with a fine pin stripe of a contrasting color.

—Bethlehem, Pennsylvania

SERVING TABLE—An early rectangular, two drawer, stretcher type table, found in a room of the Moravian Church.

—Bethlehem, Pennsylvania
constructional details are shown by Cornelius in this quotation:

These chairs were usually made of combined woods, the seats of pine or soft wood, the spindles of hickory or bent-wood, portions of hickory or white oak. They were commonly painted grey or green. They bear peculiarly the indigenous quality of American handicraft, the virtue of practicability and lightness, and that much sought after solution of the designer, the maximum strength with the greatest economy of material. The turned spindle chair was not usual in the eighteenth century.

The middle chair in (Fig. 49) and the settee in (Fig. 49) are green painted pieces of a supposedly early make. The plank chairs of (Fig. 49) date from an early European period and examples of these may be seen in many historical buildings in Eastern Pennsylvania. They are of typical German origin.

No examples of the cooper’s trade were to be found in the museums of Bethlehem or Nazareth and the products of this trade are merely given mention by name. The only possible example of the wheelwright’s trade may be seen in the invalid chair pictured in Fig. 46. If by chance, the wheelwright was employed in the making of the wheel unit for spinning wheels, as Raabon claims was one of his major tasks, then many of the examples shown in the textile unit may be of his making. However, no definite proof of this is to be found, but on the contrary it was said that the spinning wheel was the product of "Father" Bechtel’s turnery.

That very important means of identification, "the trade mark," was for some unknown reason completely disregarded by the Moravian craftsmen; as a result the only positive means of tracing the origin of the early products of the industries is through the present owners. For this reason many assumptions must be made regarding things not proven by the "hand-me-down" method of identification.
The Ceramic Industries were of great importance to Bethlehem. Pots and urns were needed for the dairy, spring houses, and larders; tiles and bricks for the hearths, flooring, roofing, and other constructional purposes. The pioneers of the industry according to the "Tom yores" were Daniel Miller assisted by Jacob Kahn and Frederick Artes. Their original building was a 10 x 25 foot house of logs. This was built in 1744 but was vacated in favor of a new two story, brown stone building in 1756. Its approximate location is indicated in Fig 19.

A Michael Odensold managed the business from 1852 to 1864 when Ludwig Huederoner assumed the responsibility. The "Tom yores" says of Huederoner:

His deft fingers turned out milk pots, pie dishes, pipkins and pipe heads. The most important branch of this manufacture was the making of tile stoves of which only a few exist today.

Huederoner was evidently the most outstanding potter in the community and is given greater mention than others, probably because of the manufacture of his tile stoves which now due to their rarity are regarded with a great deal of curiosity and interest. From all indications Huederoner was one of a family of potters for Barber, in his "Pottery and Porcelain in the United States," refers to a George Huederoner who was also a potter in Upper Montgomery County, which was but a short distance from Bethlehem. Mercer (24, p. 128) claims that before going to Bethlehem, Ludwig Huederoner made his tile stoves "in the Swamp" near Hanover, Montgomery county. Levering further identifies the location as being called Fulmer's Swamp. Any relationship between the two has not been positively substantiated. George Huederoner is lauded as one of Pennsylvania's early greats in this industry and much of his sgraffito
work may be seen in Pennsylvania museums. It is unusual that authentic pieces of Moravian pottery are not to be found in either the Bethlehem or Nazareth museums. This may be due again to that lack of marking for identification purposes. Robert G. Alleman (1, p. 12) in a thesis on ceramics done at Lehigh University, reports that no sample of pottery, which could be positively identified as having been made in Bethlehem, could be found. Although this lack of information exists Barber (3, p. 40) gives a description of the German potter's methods:

The processes of the old slip potters in Pennsylvania were practically the same as those which obtained in the valley of the Rhine in the seventeenth and eighteenth centuries. They made no improvements and never deviated from the time honored methods of their ancestors.

Since the Moravian potters were considered members of this group in Pennsylvania and pottery illustrations in Barber's book resemble some ceramic pieces found in the Nazareth museum (Fig. 51), though their provenience is unknown, a general description of such work will give a better understanding of this industry. According to Barber (2, p. 51) two processes were employed in the decoration of their wares: slip tracing was accomplished by running on to glazed ware a fine stream of slip or liquid clay through a quill attached to a small cup like container. The slip was of a consistency equal to thick cream and applied much in the same manner that a modern baker decorates a fancy cake. The cups often contained several quills, depending upon the number of lines desired. Being evenly spaced the resulting lines were fairly uniform. In (Fig. 51) the large pie plate illustrates a four quill decoration while the smaller one was evidently made with three quills. In some slip cups the quills were removable so that any desired number could be used. If a quill was removed its hole in the
SPECIMENS OF EARLY PENNSYLVANIA POTTERY—Large pie plate, preserve jar, small pie plate, pickling jar.
Note—Although of unknown provenience, it is said the wares of the Pennsylvania potters bore marked similarity. The examples shown here are used mainly to illustrate decoration techniques explained in the context of this study.

——Mazereth Museum
container was plugged with a bit of clay. The slip method of decora-
tion was usually employed with a light ornamentation on a dark back-
ground.

Slip engraving or sgraffito was accomplished by covering the ware
with a coating of slip and through this, scratching the ornamented
design with a pointed instrument; this produced dark designs on a
light field.

The tulip floral patterns were the most popular motifs. Barber
(3, p. 27) days of the potter's art traditions:

They adhered closely to the traditions of an art
which flourished in the fatherland for centuries, using
the same time honored methods and decorative motives in
this, their adopted land, as had been employed by their
forefathers for generations... and on their earthenwares
they inscribed in the dialect of the people, the homely
proverbs and mottoes and rude rhymes, quotations from
the Bible, lines from old German hymns, which had orn-
mented the coarse pottery of their ancestors.

The first log pottery referred to above was located near "Father"
Bochtel's turnery and his transfer to the stone house was necessary
because of an increasing demand for his wares. Levering (22, p. 388)
claims much earthenware was bought by the owners and workers at the
Durham furnace, a great deal was sold in Philadelphia and much to the
farmers in the surrounding counties.

In regard to Huebener's stoves a great deal more information
is to be found. Mercer (24, p. 127-29) offers an exceptionally good
description of their construction and mechanical features:

The tile stove (Fig. 52) is made in the style of
similar stoves in Germany, Holland and Scandinavia, in
use in the middle of the eighteenth century. It consists
of a fire chamber & iron, with the upper heat retaining
story perforated by two heat radiating holes and is made
of cornice shaped and panelled stove tiles, dished or
hollowed inside, broad rimmed and probably punctured
for wires to facilitate setting them up like so many
TILE-IRON STOVE--This is the only known specimen of tile-iron stoves made by Huebener. Other specimens of tile-iron stoves may be seen at the museum of the Moravian Historical Society at Winston-Salem, North Carolina and that vicinity.

--Nazareth Museum
bricks with lime and sand mortars. These tiles are in simplest form, in one plane with two stamped panels seven inches high and eight and one half inches wide, or longer with three panels, when they return in a single piece around the corners, and are all glazed on a red clay body. The fuel door is at the lower right corner above the iron extension and the smoke pipe appears above. The whole lower iron box is a fire chamber, from which thru a hole in its left smoke and heat circulate around the radiating holes and thru the center interior of the heat retaining structure of tile.

The interesting feature of the tile stove was the heat retaining factor. In the modern fuel burning stove it is a known fact that a great percentage of heat goes up the chimney in smoke. These early stove makers took advantage of the heat qualities in smoke and utilized a heat retention principle in their construction. That the tile stove was popular at one time is shown by a damage claim against the government by Huebner for eight new tile stoves placed in the Brethren's house while used for an army hospital during the Revolutionary War. The tiles referred to by Mercer are illustrated by a front and obverse view in (Fig. 53) and further description may be found in the caption beneath.

Brick and tile were not manufactured in Bethlehem until 1750. Previous to that date the first tiles were imported to this country as ship's ballast. The tiles in a section of the flooring in the Sisters' House are supposed to have had such origin. The first tiles made in the Moravian area came from the Nazareth kilns. The "Bau papers" say the ovens in Bethlehem were located on the east banks of the Monocacy Creek and were ran by Jacob Rabel, the master mason. The kilns were later moved to the west bank as indicated on the map (23, Fig. 19). The last batch of bricks were supposed to have been burned there in 1810. Samples of various Moravian building bricks are shown in (Fig. 53)
BULLOYS AND CERAMIC PRODUCTS—Samples of bellows, bricks and stove tiles.

—Maxreth Museum
Roofing tiles were another product of the kilns which had varying degrees of success. They were suitable for small roofs, but due to their great weight, were unsuitable for roofs covering large area. The roof of the "Old Chapel" which was originally of tile had to be replaced with lighter shingles a short time after it was completed.

The making of roofing tiles is described by Barber (2, p. 49) in an account given by him by an eye-witness to their construction at Wurzburg, Germany. An iron form of the desired tile outline was the major piece of equipment involved. A woolen cloth was nailed to one edge of a table and an iron rod inserted into a seam at the other end, enabling the cloth to be held tight and lifted from the table with the nailed edge acting as a hinge. The rod end which hung over one end of the table held the cloth smoothly over its planking. After placing the frame on top of the cloth, it was packed with clay, pounded with a wooden mallet and the excess removed with a straight edge, except for a portion to form the knob. This was shaped with the fingers. A square piece of board with a notched portion to receive the knob was placed over the frame. By holding this in place and lifting the cloth the transfer of the mould was made from cloth to board. The rain grooves were then worked into the clay with the fingers and the mould removed. After placing in the sun for the first baking, it was ready for the kiln.

Another witness to the tile making process, supposedly at a later date, claims the rain grooves were made by a section included in the mould and were all uniform, the knob being made separately and attached to the body of the tile. Fig. 54 shows the obverse of a tile and the caption beneath gives a description of the mechanics of installation.
ROOFING TILES -- Made in Nazareth.

-- Nazareth Museum
Farm Industries. According to Count Zinzendorf's plans for Moravian owned lands in America, Bethlehem was to have been devoted to industrial pursuits, while the Barony of Nazareth (Fig. 4) was to have been the farm production area. Since Nazareth was not purchased until 1743, and Bethlehem was their property in 1741, it is natural that the latter should, as shown in (Fig. 19), have taken on the farming aspect indicated, for farm products and cattle were the major means of subsistence at the time. The products of the Bethlehem area however, were mainly used for that settlement while those of the Nazareth tract were placed on a commercial basis. The original purpose of the "Patriarchal Economy" as it was called, was to support the missionaries in the field, through its earned income. Since Nazareth was the major agricultural area of the Moravians, their improvements made there will be described as indicative of their success in the farming industries. A compilation of data given by Reishel (35, p. 273-74) affords an idea of the organization of life on the Barony of Nazareth.

In 1743 the house which Whitefield started to build in 1740 was completed by the Moravians. Additional houses and stables were erected nearby in which the men and women lived and which quartered the animals used for the tilling of the first plantation called "Nazareth farm."

The grange and thorpe was called Nazareth. The manse and chapel however were in the stone house Ephrata, which was overshadowed by the oak in whose forks hung the church going bells.

The second of the farms or "plantations" as they were called was completed in 1745 and was located about two miles from Nazareth. Around a central building were constructed barns, cow houses, sheep houses and milk houses. This was named Gnadenhuttl, "The Valley of Grace." Like Nazareth this was also a thorpe as well as a grange. The red tile
roof of the main building was capped with a turret from which a bell
was rung to call the workers to the services held there.

The third improvement was of a more industrial nature than the
first two. It was adjacent to the Gnadenhal plantation where the
waters of a creek were used to turn the overshot water wheel of a
grist and saw mill. Besides those, a brewery and smith shop were
built after the more essential buildings were completed. This devel-
opment was originally called Albrecht's Spring, but was later changed
to Christian's Spring, in honor of Count Zinzendorf's son Christian
Benatus. A group of single brethren labored at the place, raised
horses and cattle, and ran the brewery and various mills. During a
period in 1796, Levering (22, p. 540) states that the brethren were
struck with a fever of intemperance and had to be replaced by more
trustworthy men, the deteriorated bachelors were given an asylum there
under "watchful restraint." Buildings still remaining at Christian's
Spring are shown in, (Figs.-15-16).

The labors of the Moravians on the "Barony" resulted in a tremen-
dous production of farm products at a comparatively early date. Henry
(17, p. 75-77) indicates the extent in which the "Patriarchal Economy"
was productive by the year 1766;

1. All cereals known at that day were cultivated and in
addition hemp and flax were raised and worked into
clothing and fabrics.

<table>
<thead>
<tr>
<th>Cereal production for the year of 1766</th>
</tr>
</thead>
<tbody>
<tr>
<td>1124 bu. of Wheat</td>
</tr>
<tr>
<td>1144 &quot;     &quot; Rye</td>
</tr>
<tr>
<td>1397 &quot;     &quot; Oats</td>
</tr>
<tr>
<td>462 &quot;     &quot; Barley</td>
</tr>
</tbody>
</table>

2. The stock of the farm included 277 head of horned cattle,
six yoke of oxen employed for work and draft and 46 swine.
 Implements of husbandry included 3 wagons, 5 ploughs, 6
barns, 36 sickles and 25 axes. The ploughing was done by the oxen team but the team was often used in transporting wheat to Bethlehem and Philadelphia. The drivers job and that of the groom were made by appointment.

**Animal produce for the year of 1766**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hutton</td>
<td>1771 lbs.</td>
</tr>
<tr>
<td>Pork</td>
<td>3194 lbs.</td>
</tr>
<tr>
<td>Bacon</td>
<td>246 lbs.</td>
</tr>
<tr>
<td>Beef</td>
<td>10,940 lbs.</td>
</tr>
<tr>
<td>Veal</td>
<td>856 lbs.</td>
</tr>
<tr>
<td>Tallow</td>
<td>1919 lbs.</td>
</tr>
<tr>
<td>Butter</td>
<td>4948 lbs.</td>
</tr>
<tr>
<td>Lard</td>
<td>150 lbs.</td>
</tr>
</tbody>
</table>

3. Tobacco was raised for each brethren's own consumption.

4. Bees were raised and a house for an apiary was built.

5. Enclosed land included 146 acres of woodlands, 97 of meadow and 353 of tillage.

6. In addition to the grist mill and the saw mills, the brewery supplied the beer for Bethlehem.

All the fencing, clearing of land, lumbering, and brick and tile making on the "Barony" was a result of Moravian labor and ingenuity in the use of material resources and labor. Oak timber was felled in the vicinity and processed at the saw mill, shingles were split for the roofs, and tiles were manufactured at the ovens, while lime kilns were used to produce that material. Some of the early wooden farm implements used at the "Barony" are shown in, (Fig. 55). Two other developments were made on the "Barony." The fourth in 1751, called Gnadenstadt or "The City of Grace," was supposed to have been a town settlement for the benefit of the various plantations. Due to reluctance on the part of the people to urbanize the "Barony," the town never materialized and the idea was abandoned after the construction of a few buildings. The largest was turned into an inn and was called "The Rose." The district was referred to by that name instead of the originally proposed one of Gnadenstadt. It is said the place was used as a frontier refuge by nearby inhabitants during the Indian hostilities, and troops were
FARMING IMPLEMENTS—Left to right, apple butter stirrer, flax break, wooden grain shovel, corn grinding mortar and pestle, a shoulder yolk for carrying water.

— Nazareth Museum
said to have used it as a rendezvous during their wars with the Indians.

Without mills for the processing of farm products, a long and tedious task would have been involved in the production of enough essential food staples for the community. Since mills were of such great importance to the farming industries, those established at Nesaroth and Bethlehem will be described as factors pertinent to this unit.

The fifth improvement on the "Barony" is described by Davis (11, p. 605) and was called Friedensthal. It was built on the banks of Bushkill Creek in 1750. Inside a stockade 250 X 400 feet stood a grist mill. Hartman Vendries was the first miller. According to Levering (22, p. 251) the mill was built by Antes in 1751. A description by a visitor in 1751 gives the following account,

It grinds and bolts all at once, there being no trouble in hoisting the flour as in common mills but as the stones deliver it so the bolting cloth receives it, and so it is bolted as fast as ground. Another contrivance which is very extraordinary is that when the wheat is within a peck of being ground out of the hopper, there is a stick so fixed that one end shall strike against the stone as it runs around, which has a bell fastened to the other end, which rattles in a surprising manner, to give the miller warning when the mill is running empty.

The above mill was sold in 1771, and was henceforth known as Mann's Mill.

The other mills related to the farm industries were located in Bethlehem and are hereby described by Levering (22, p. 161, 256, 635):

The first grist mill was built by Antes, assisted by John Adam Schaus and Gotthard Danith, in 1743. Previous to its construction, the Moravian grain was ground by privately owned mills. Probably the most of it went to Nathaniel Irish who had his mill near the Saucon Creek.
An improved second grist mill was built in 1751. It was connected with the fulling mill which was run by the same power. Due to a demand for the services of the mill, a second run of stones were added in 1755. After the dissolution of the General Economy, the Congregation Dioceny kept ownership of the mill until 1830. It was run by a miller on a salary basis. The mill, greatly changed, is still being run today on the same spot where it originated.

A second mill of importance to Bethlehem, in relation to farming, was the oil mill. According to Levering (22, p. 192, 400, 410, 667) the mill was built near the spring on the Moroacy Creek in 1745. Since much flax was raised for the linen weaving industry, linseed oil was the major product. The mill was burned to the ground in 1756 by parties unknown, but supposedly white men from the county, who had an ill feeling toward the Moravians because of their protection of the Indians.

In 1765 a second building, one of stone, was erected in place of the first and it was equipped with two centrally located water wheels. One drove the machinery of the oil mill, with the fulling and stamping machines, and fun in the loft. The other operated the bark grinder and other machinery of the tannery, and in the second story a hemp stomper and a grater for hemp. In 1831 the mill was used to house a new water pump but was still used for the grinding of oats and buckwheat. By 1874 it was used exclusively as a waterworks.

Household Industries. During the Colonial Period in Pennsylvania, the so-called household industries included practically every branch of labor essential to the feeding, clothing, and housing of the family members. Maintenance of life depended almost completely upon the ingenuity of the members in the production of essentials, for at the time communication, transportation, and trade were in their infancy.
The organization of the Moravians into a communal mode of living enabled delegation of specific tasks to the most capable, thereby dispensing with the individual family organization which required the efforts of the entire group in all branches of production. Their industrial specialization enabled the Moravians to advance commercially at a greater rate than was the case with the single family form of organization, for they at least had inter-settlement advantages for the transaction of their business, while the scattered families had to travel long distances before contacting the nearest neighbor.

The cooperative system employed in Bethlehem, coupled with the division of sexes into "choirs" eliminated to a certain degree many of the customary household tasks confined to the home in the conventional manner of family participation. Although the tasks were accomplished in an industrial manner, the materials, equipment, and methods involved were somewhat similar throughout the provinces, so that the major tasks may here be described as those of the household regardless of delegation to the trained craftsman.

The photographs illustrating this unit show only a few of the many implements found in the museum at Nazareth for the performance of household duties. Many finished products such as soaps and candles may be seen on display, but due to inferiority as photographic subjects had to be eliminated. However, the operations involved in the making of household products gave them every right to be enclosed in glass cabinets, for if the modern housewife today had to perform the tasks involved in the production of lighting or cleansing materials, her wares would surely be given pedestal prominence.
Cooking, then as it is today, was one of the major household duties. That the Moravians excelled in the art has been indicated by the many narratives of the now famous guests who enjoyed the hospitality of their homes and hostelries. Unlike those in the colonial home where cooking and baking were performed by the housewife, the Moravians delegated certain individuals to supervise the task. As previously mentioned, they all ate at the "common table" of the various community houses, so it may be implied that the "chef type" of production cooking was employed, especially after the population grew to such extent as to warrant this type of service. The "Rau papers" makes reference to the "cook" as being one of the community occupations and men are listed as having supervised the work, probably with a select group of assistants. After the dissolution of the "economy" cooking was carried on by those who adopted the private mode of life in the manner of the conventional household. It was impossible to immediately dispense with the communal system, for many who remained simple elected to live as they had, hence the system was prolonged as long as that condition existed.

Synonymous with cooking was the problem of heating for the same fireplace, plate stove, wood burner and later the coal range, as each made its appearance, served both purposes. The open hearth fireplace was the original one in the Colonial home and cooking was done in a set of utensils such as shown in (Fig. 56). Besides those mentioned, special appliances such as the coffee roaster in (Fig. 56) were added.

Baking was accomplished in a small heat-retaining oven joined to the fireplace proper, however, in the summer months a large masonry outside oven came into use.
OPEN-HEARTH COOKING UTENSILS—Porridge pot, tea kettle, large preserving kettles, coffee roaster, charcoal burner, pancake griddle and pot hook.

—Nazareth Museum
MILLS—A spice mill of turned wood, a coffee mill of wood with a metal bean bowl, and a copper spice mill.

—Narareth Museum

A WROUGHT-IRON COFFEE ROASTER—On display in a basement room of the Moravian Church. It is part of the equipment of an old open-hearth fireplace.

—Bethlehem, Pennsylvania
The first iron stoves were used for heating purposes only, and were called Five-plate or Jacob stoves. Mercer (24, p. 37) describes them as:

...trailing into the room like a box about two feet square without fuel door and smoke pipe, fed through the wall from the outside and therefore failing to ventilate the room heated.

Plates from which the box-like stoves were assembled are shown in (Figs. 72-73). A second type had an additional sixth plate, a fuel door, and chimney, and although still used for heating only, it enabled them to be moved away from the wall and to be tended from within the house. The next and last improvement on the plate stove was the addition of an internal oven which enabled baking and cooking. This was called the Ten-plate stove and was given the following description by Mercer (24, p. 107-9),

...the not prepared to boil, broil or fry by immediate contact of dishes with the fire, it was equipped to bake meat, cakes, pies and bread on a small scale and thus partly replaced the large household bread oven of masonry. For a long time it was used as an auxiliary to the open fire, near which it stood with its sheet iron stovepipe let into the hole in the chimney above the hearth. But it never superseded the ancestral cooking fire. This latter continued as before stated, until when toward the middle of the nineteenth century the coal-burning cooking range, with removable lids, finally extinguished it forever.

Originally the Ten-plate stove was a boxlike structure, but the introduction of curved casting gave them adornment possibilities which eventually gave them the appearance as shown in (Figs. 74 and 75). This was the stove adopted after the dissolution of the "economy." It would have hardly been large enough for use at an earlier time, and furthermore, did not make its appearance until 1761.

The bakery was established much on the same order as the kitchen. This applied to Moravian communities other than Bethlehem, for each had
their establishment for this purpose. Henry (16, p. 227) gives a description of the bakery business at Old Nazareth:

It was customary to have all the cakes for the establishment supplied at Old Nazareth bakery, and a little girl was charged with transporting them on a wheelbarrow out to the "Rose." On these occasions the Indians, who infested the neighborhood, frequently attacked this "transportation line," seized the wheelbarrow, trundled it some distance, to terrify the little creature, and then restored it to her again.

The "Rose" in this quotation was a Moravian Inn near Nazareth which shared the products of the bakery of that place. It was a common occurrence for the Indians at that time to steal the products of the bakery if possible, for they developed a liking for the bakery's goods. The Bethlehem bakery did not share a like fate for there it was established in the Brethren's house and distribution was made to the various tables, from within the settlement.

Soap and candlemaking were tasks in which great activity occurred in the autumn and fall of the year. Such tasks in the colonial household belonged to the women, but again they seem to have been run as industries in Bethlehem, with men as supervisors. The "Rea papers" list the "Chandler and Soapmaker" as a combined industry with John Schmidt and Samuel Johannes as heads. The map (Fig. 19) gives item 2 under industries, as the location of the "Wash and Soap Boiler's House," but no reference is made to the chandler's activity. However, in knowing that both did exist, a description of their work may be given regardless of their being run on an individual or joint basis, for the methods employed throughout the provinces were comparatively standardized.
Soapmaking in the colonial period (29, p. 13) required two basic materials; grease and lye. Animal fats from butchering, and the accumulated grease residue from cooking supplied the one requirement, while the production of lye from wood ashes supplied the other. The resulting liquid from seepage through the cracks in a wooden tub, after water was poured over its contents of wood ashes, produced the required lye. That process was known as "leaching." The major factor involved in soapmaking was obtaining lye of correct strength. The mixing of both ingredients and boiling in a kettle over an open fire resulted in a jellylike substance called "soft soap." That was the kind generally used in household tasks. So-called "toilet-soaps," were made by mixing additional ingredients to supply the scent and cleaning requirements.

Wax of Bayberry combined both those qualities and was the most popular, although a luxurious ingredient for the period.

The wash house in conjunction with the soap boiling industry seems a natural development since a very large proportion of soap was used for laundering purposes. It is possible that the washing done there was much on the order of the modern "wet" or "dry" wash in which the final operation of ironing is done at home. In relation to the Wash House on Sand Island, it is known that drying lines were part of the equipment. That would tend to substantiate the above assumption. Many old examples of laundering equipment are illustrated in (Fig. 59). Most of them have been early family possessions and were donated to the museum by descendants of old families.

Candle making (20, p. 11) required two basic materials; tallow, and a suitable wick material such as hemp, tow, or cotton. The wicks were usually spun on the spinning wheel. Two methods of candlemaking
PRESSING IRONS AND HEATERS—

1. Crimping iron, a hot insert heated the outside casing for the fluting of ruffles on hennets and caps. Flat iron, a hot insert heated the outside casing for ironing.

2. Fluting iron and insert, the holes in the insert were to facilitate handling with a lifter.

3. Charcoal iron, the casing was filled with hot coals for heating. A large flat iron.

4. Charcoal and hot water heater, usually used in church pews and sleds during the winter months.

—Nazareth Museum
were employed, the earliest by dipping and the later by moulding. The raw materials for both were the same so throughout the year tallow was accumulated until the approach of the dipping or moulding time. It was then rendered for use by boiling in a large kettle over an open fire. This was usually done in the evening for the resulting odors were less offensive than those in soap boiling, and it was possible to do the job indoors.

Dipped candles were used before moulds came into use and were more tedious to make. When the tallow was melted, a solution was made by adding boiling water. This kept the tallow on the surface so that when the wicks, attached to rods were suspended in the kettle and withdrawn, the tallow adhered to the wick and formed a thin coating. The successive dipping and cooling of each layer finally built the candle to the desired proportions after which they were suspended upon racks for hardening.

Moulded candles eliminated the tedious dipping process explained above. Moulds for the making of two to a dozen or more candles were made from tin, pewter or copper. Six and twelve candle moulds may be seen in (Fig. 60). Each candle unit of these moulds was tapered so as to give the candle shape and to facilitate removal when hardened. The wicks were tied to a rod and suspended over the center of each unit. A small hole in the bottom of the moulds enabled the wick to be pulled through, knotted, and in this manner held tight during the pouring operation. Although moulding increased candle production, the dipped candle to the present day has been considered superior and due to the hand processes involved are likewise more expensive. As in soapmaking additional ingredients are added to the manufacture which would give additional qualities to the candles. Beeswax, bayberry wax, and spermacetti were a few of the ingredients employed in candle
manufacturing.

A general misconception concerning candles is the thought that they were the first lighting medium to appear during the colonial era. The pitch dipped pine knot, oil soaked rush, and Betty lamp, proceeded the candle by many years for they were more readily obtained and serviced. A small piece of fat and twisted piece of cotton cloth suitable for a wick were all the essentials needed for the Betty lamp (Fig. 61), while a thrust of the torch into a pitch bucket replenished that light which was usually placed in a holder on the hearth of the fireplace. Later lighting devices are shown in (Fig. 61). Additional objects related to the home industries are illustrated in (Figs. 62-65).

**Leather Industries.** The conversion of animal skins and hides into leather is one of man's oldest known arts. Keir (20, p. 267) claims the Egyptians made leather from the hides of gazelles and oxen and the tools used in the process were very similar to those used by the early American colonist. He further states that the American Indian was in a crude way a skilled worker in leather. After removing the hair from a deerskin he converted it into leather by rubbing the animal's brains into the pores of the skin. As the tanning operation proceeded, softening was done by stretching and handworking the surface.

The industry carried on in the colonies had three main divisions; the preparation of hides for tanning; the tanning and conversion into leather; and drying and currying. After that preparation it was ready for the saddler, harness maker, tailor, purse-maker and shoemaker, who transformed it into the many products of their trades.
LANTERNS—
1. A Stagecoach's lantern used on the old Eastern-Nazareth stage route.
2. An old-fashioned pierced tin lantern.
3. A metal lantern with framed glass front and perforated chimney.
4. An old brass, blown-glass lantern used during the close of the eighteenth century.

--Nazareth Museum
HOUSEHOLD EQUIPMENT—Tailor shears, cookie mould, wooden spoon, brass tea kettle, coffee mill, spice mill, small wooden box, wooden scoops, Schmitz bowl (not Moravian), hand-painted candle screen.

—Bethlehem Museum
All of the above stages in the manufacture of leather products were employed in Bethlehem, and although the exact details of manufacture are unknown, it is said that no major changes have been made in the basic principles of leather manufacturing for the past 300 years. The basic manufacture of leather by the colonist was similar in many respects. Leir (20, p. 267-70) gives a brief description of the trade as carried on in the colonial era. The first operation was the preparation of skins for tanning. The hides were soaked thoroughly for pliability and removal of dirt. They were then placed in a solution of water and lime for the loosening of hair and further softening. After removal from the solution the loose hair and flesh were scraped from the hides. Next thick hides were split into several layers. Each layer was adapted to a specific use.

Tanning was originally done in pits dug in the ground. Alternate layers of skins and bark were piled to the top of the pit and water poured over the whole. Tannic acid was in this way leached from the bark and carried to the pores of the skins. A year was the usual time required for satisfactory absorption of the acid to complete the conversion into leather. Great care was exercised in judging the completion of this operation. The feel of the hides and the tanning liquid was the tanner's sole guide, for chemical tests were unknown. It has not been definitely ascertained whether the Moravians used the primitive pit method just described, previous to construction of their stone tannery (Fig. 64). However, all of their industries were gradual developments from crude beginnings so it may be assumed that such was the case in their leather-making industries.

Currying was the final stage in the processing of leather. After removal from the tanning pits or vats, each skin was stretched and
THE OLD TANNERY AND DYE HOUSE--Located on the banks of the Monroe Creek--Bethlehem, Pennsylvania
dried and then immersed into several solutions which dyed and filled
the pores with preservatives. The final operation was the brushing,
scraping and rolling of the skins with a special set of tools of the
carrier's own making.

The leather products manufactured in Bethlehem are partly summa-

ized in items 16, 17, 23, and 24 of Rechel's store stock list (p. 32),
The list is not indicative of the total number of objects manufactured,
for many were put into immediate use and never reached the store
shelves. Some of the more common articles of home manufacture are
listed in the following quotation by Keir (20, p. 170):

Besides its use for foot covering and harness, leather entered more largely in colonial times than
ever into the domestic economy of the household. Aprons,
shirts, trousers, leggings, thread, petticoats, gloves,
skirts, bedding and even drinking vessels might be made
of leather.

The leather water bucket in (Fig. 65) was the common type used in
early times. They were used in carting water from the well and also
in the case of house fires. In relation to the latter use, it is said
that if a fire occurred after the people retired for the night and the
man of the house had any difficulty getting into his breeches in
time, the bucket on which his initials were painted for return purposes,
was tossed into the street and used by a passerby until claimed by
the owner.

The shoemakers at Bethlehem had their workshop in the Brothren's
house (Fig. 26). According to various accounts they were among the
busiest artisans in the town, for keeping the entire town's population
in shoes, besides helping the needy who came to them, was a tremendous
task. War periods usually created a scarcity of leather for the
layman's use so in addition to working in leather the shoemaker had
LEATHER GOWNS--Rear row, a leather fire bucket used at Nazareth in 1790, a pair of kip-leather, wooden-soled, iron-shod, wire-sewed shoes, worn by a Moravian minister during the Civil War in 1863, a saddle bag used on the Cherokee mission in 1876. Front row, a pair of wooden sabots trimmed with leather and a pair of ladies' leather slippers, both are of unknown provenience.

-Nazareth Museum
to adapt himself in the working of leather substitutes. Riley (57, p. 439) refers to such a period during the Civil War, "As the supply of leather was exhausted, shoes were made either of wood or of cloth fastened to wooden soles." This condition may be applied to earlier wars as well.

The pair of leather-trimmed sabots in (Fig. 65) and also the wood soled, iron shod shoes in the same figure, are supposed to have been made and worn by a Moravian during the Civil War period. In addition to wooden shoes there were other wooden articles which had to be fashioned. According to items in Reichel's list (p. 32) wooden and horn heel pieces and the wooden lasts over which the boots were fashioned were the product of the shoemaker. Since he was not equipped for working in metal, it is assumed that the iron shoe-lasts were made by the smithy from specifications drawn by the shoemaker. Some of the implements used by workers in leather are shown in (Fig. 66).

The saddler and harness-maker, from all indications, operated a joint business in Bethlehem. In the lists of industries (p. 27, 28, 29) the saddler is mentioned but not the harness-maker. The "Rau papers" lists several men in this trade, and it is taken for granted the apprenticeship system assured a ready group who could eventually assume responsibility of operating a shop. The articles of production were by no means restricted to only the objects implied in the trade name, but hanging around the wall of saddler's shops and on many shelves were articles which, in the leather shop of today, would be called "accessories." Those, at that time, would include all the leather gear used to outfit the horse, wagon, coach and horsemen.
LEATHER WORKING—Cobblers' light standard (1740–65), found in the attic of the Sisters' House, the forerunner to the present floor lamp. Saddle-making bench and mending tools.

—Bethlehem Museum
An account by Reichel (34, p. 332) credits John Gottlieb Lange with being the first master saddler for "the Family." He came to Bethlehem in 1750 and at the dissolution of the Economy, bought the saddlery tools and stock on hand at the evaluation price of £ 144.

A bill, in this same reference, as presented to the proprietors for work done in their behalf, gives an idea of some of the duties of the saddler:

<table>
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<tr>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>1757</td>
<td>Bro't forw'd...£</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Aug. 10</td>
<td>To repairing 2 saddles for</td>
<td></td>
<td></td>
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<td></td>
<td>Toteshonosh, (Indian Chief)...........</td>
<td>2</td>
<td></td>
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<tr>
<td></td>
<td>&quot; leather for mending shoes &amp;c. &amp;c.,</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>&quot; one new saddle and bridle for</td>
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<td></td>
<td>Teedysung............................</td>
<td>2</td>
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<td></td>
<td>&quot; repairing bridle</td>
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<td></td>
<td>9</td>
<td>18</td>
</tr>
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</table>

The above account indicates that the saddler assumed part of the responsibility of shoe repair in addition to his regular duties, but again since this took place in that busy period of 1757 it may be assumed that, like the locksmith in the metals area, he had to assume tasks not allotted to him in normal times.

**Brought Iron Industries.** The iron industry in Bethlehem has been traced to the community's "first blacksmith. In conformity with early tradition, the first metal needs of the community were hammered into shape at the smithy's forge and anvil. One of the first mergers to occur in the iron industry at Bethlehem was that of the blacksmith, locksmith, and nailsmith trades. Although they carried on their trades in separate establishments during the early days of settlement, this later alliance can be readily explained. Community growth, which
created an increased demand for their products and services, made their quarters inadequate, and since their common stock in trade was iron, an interdependence resulted which made localization of their industries a valuable commercial asset. The personalities associated with these industries are credited with the eventual founding of an iron empire which has brought world renown to Bethlehem. To better understand the respective iron industries the gradual growth of each will be considered separately. A few wrought iron articles are illustrated in (Figs. 67-68).

The first blacksmith of the "economy" period according to the "Rem papers" was Anthony Schmidt, who came to the town in 1746. His first jobs were the fashioning of the ironwork essential for the various mills being built. His brother George succeeded him in 1750 and it was during his term that a new stone building to house the plant was built. An article in The Globe (59, p. 7) claimed that the building was located west of Main Street, near what was later known as Zinsendorf Square. In that building it is said, "The old oven doors, cranes, bars, oven pots and warming pans of a crude sort were made by the local smithy." Cranes and bars were used in the open fireplace to hold the cooking utensils over the open fire and could be swung out into the room.

The further growth of the smithy occurred under the guidance of Peter Petter who started in 1782. Marcus, his son and successor, moved the establishment to a new location on Main Street where his successor Jacob Fretter operated until 1822 when he was succeeded by Jacob Siegrind, his apprentice. The first metals used in the blacksmith shop were obtained at the Durham Furnace, in Upper Montgomery County, for
METALWORK--A panel display of wood, sheet-metal and wrought-iron objects from the Bethlehem, Nazareth and Christian Springs areas (1740-1796). The weather vanes are believed to have belonged to the Christian Springs plantation. The crown-topped plaque contains relics or 'jewels' as they are termed, from the old Crown Inn at Bethlehem (1743). The scroll hinges and spring locks are relics from old Nazareth and Bethlehem buildings. The saw handle at the extreme left was a part of the saw of John Heckwelder, missionary to the Indians in Ohio.
METALWORK--

2. Jewelers' scale and a bullet mould. The scale was used by John Beitel of Nazareth (1700-1840).
3. Hand-made locks used on private houses and Moravian buildings.
4. Hand-made door hinge and wrought nails. The nails were found in the Sisters' House and were probably used in the construction of that building.

--Bethlehem Museum
that was probably the nearest furnace at the time.

The first locksmith according to an article in the *Bethlehem Times* (40) was Daniel Kliest. The "Bau papers" however, mentions a Daniel Osterbein as having that distinction. In any event, Kliest was installed as the first master locksmith so it may be inferred that Osterbein was his understudy. Upon his arrival from Frankfort on the Oder in May 1749, Kliest carried on the trade for the "economy" until 1762. At that time he purchased the stock and tools for £64. 7s. and was the owner until his death in 1792.

Reichel's memorials contains many credit book entries which give a good idea of the type of work performed by Kliest. The accounts were against the Proprietors for services rendered during the Indian uprisings of 1757. Although the list of jobs was limited to firearms, and a gunsmith plied his trade in Bethlehem, the deduction may be made that due to the times these services were required for this purpose. The following is a partial account as presented to the Proprietors and was affixed with Kliest's signature, (34, p. 315-16);

Province of Pennsylvania to the Locksmith in Bethlehem 2/3 d
1756 Brot for'rd 4 3 6
July 24 To putting a piece on a gunstock…… 4
" repairing 2 old gunstocks and 2
making 2 ramrods……………
" cleaning and straightening 11 2
gun barrels…………….1 2 6
" making 2 new breech pins and 10
renewing several others……
"mending and soldering a gun barrel. 2
"boring a touch hole………… 1
"making 6 new loops to several 1
barrels……………………
"making 2 new brass loops to gun 2
stocks………………….
"making 7 cross screws through the 1
breech pins and 4 plates to the 5 6
triggers……………….
"making a sight and band on a barrel  1  6
" cleaning 10 gun locks .............  5
" repairing 2 plates for gun locks  3  6

... Daniel Kliest
Locksmith

This account may be used as an example of the diligence with which the Moravians kept their records.

The nailsmith in Bethlehem was one of the three occupants of the stone smithy, but according to Levering (22, p. 390) his residence there lasted only to 1734 when he moved to the old pottery. This abrogated his association with the blacksmith and locksmith, but the nearness of the pottery to the smithy kept the localisation of the iron industries comparatively unchanged. Many original nails of his making were on display at the Bethlehem and Nazareth museums. A few may be seen in (Fig. 41). All are hand-forged specimens of various shapes, sizes and head construction. The business was carried on by a succession of managers until 1775 when the last, George Weiss, embarked on a new venture of clock-making.

Two other industries were found in Bethlehem which, not exclusively devoted to working in iron, might be called "associate industries."

The wheelwright and wagon-maker were housed in two small log houses in the rear of the blacksmith shop (15, Fig. 10). Due to the diversity of the job requests which were brought to these workers they had to have a working knowledge of other trades. Although the bulk of their work was done in hard-wearing oak wood, which went into the construction of wheels and vehicle bodies, they also used a large supply of metal parts such as wheel tines, brake fittings, hub collars, axles, strap
iron reinforcements and other minor wagon units. Levering (22, p. 390) lists additional duties of the trade. "Near the stone smith house were two log houses used by the wheelwright and wagon-makers and here freight wagons, ploughs, harrows and lighter farm utensils were kept in repair."

Although separate buildings housed these trades, they were so closely affiliated the only evident difference was that each assumed the responsibility for the construction of specific parts for the various finished vehicles and implements of trade.

The gunsmit had already shown played an important part in the industrial life of the "Moravian Economy." Although non-combatants in the early days of the settlement the Moravians did not completely divorce themselves from the use of firearms, and many skilled workers of the trade were found among them. Besides having firearms for hunting purposes and for use in extreme cases where life was at stake, an often told local tale describes another use for their few firearms.

It is said that during the Indian uprisings in Pennsylvania, a period through which the community was stockaded and a twenty-four hour watch maintained, each watchman was given a rifle and instructed to fire a shot into the air at even the slightest indication of an attack. After the first shot the other watchmen were to discharge their rifles in turn. This ruse was to lead the attackers to believe the town was strongly guarded. As the story goes; one of the brethren on watch was averse to firearms and in nervously handling his rifle pulled the trigger. The other watchmen followed suit as instructed. Pandemonium reigned for a time inside the stockade and everyone, armed with a pick handle, scythe, rake, broom, or whatever he could find, awaited the arrival of the attackers. An apologetic explanation from the guilty watchman restored order, however, it was later learned from friendly Indians
that, in reality, an attack was in progress at the time but the accidental execution of the ruse averted the onslaught.

As a frontier settlement Bethlehem was in the very midst of the Indian and Revolutionary Wars. Continental troops were housed in Bethlehem and the brethren entered into contract with the Proprietors for the repair of firearms. Billed accounts show that the gunsmith and locksmith devoted their time almost exclusively in this task. As previously mentioned, Anthony Albrecht was the gunsmith and Daniel Kliest was the locksmith during the period of greatest war activity. These men repaired firearms for some of the highest leaders of the Continental Army, but some of the descendants of the Colonel Henry family, who became Moravians, became the most famous in this trade.

According to an article in the Globe (59, p. 35) Colonel Henry started the manufacture of firearms in Lancaster county and later in Northampton county, in which Bethlehem is located. At an early age a son William, was sent to the Moravian gunsmith at Christian's Spring to learn the trade. He eventually made his home in Nazareth and joined the Moravian church. William later went to his brother John Joseph's factory in Philadelphia, and further perfected his knowledge in gun making. In 1812 he rejoined his father and collaborated in the founding of the Boulton Gun Factory, in a small Pennsylvania town. The early establishment of the elder Colonel Henry was worked night and day to supply arms and ammunition for the Continental Army. The later venture gained equal fame in fulfilling United States Government contracts for manufacture of firearms for the Union Army.

Sheet Metal. The development of sheet metal played a conspicuous part in Bethlehem's metal industries. Many articles made from that form of metal are shown in (Fig. 69-70). If close scrutiny is
LIGHTING EQUIPMENT—Top, oil and fat burning lamps. The large are the table type while the small, called "Betty Lamps" could be hung in suspension by a hook. The scissor-like objects are candle snuffers and trimmers. Bottom, candle holders, tinder boxes, sulphur-tipped match sticks and candle trimmers.

—Nazareth Museum
LIGHTING EQUIPMENT—tin candle socket, fat burning lamps and a ship’s lamp. Candle molds, snuffer and tray.

— Bethlehem Museum
given the objects, it will be noticed that they all have a varying degree of lustre; toleware (painted tin), tin, copper, brass, and pewter are the represented metals. Since a similarity exists in the development of articles from sheet metal, the fact that they were made from a base or a fine metal will be considered a secondary factor to the processes involved in their fashioning into useful articles by the early craftsman. The tinsmith, coppersmith, pewtersmith, and silversmith of Bethlehem all contributed to the fashioning of articles from the sheets of the various available metals.

The tinsmith in Bethlehem seems to have originated with the blacksmith for the *Bethlehem Times* (49) lists Anthony Schmidt, who came to Bethlehem in 1746, as the first tinsmith. The "Bau paper" however, lists him as the first blacksmith. It is known that the blacksmith often took an ingot of wrought iron and pounded it into a comparatively thin sheet, from which he would make various cooking utensils and the like. Developments such as the trip hammer, and later the rolling devices made possible the making of larger and thinner gauge sheets. The smith no longer had to pound out his own sheets and was able to specialize in the development and construction of projects. His base material was a black sheet of iron or charcoal tin. This was given a shiny coat by dipping into pure tin, from which a suitable product resulted for the making of heavily used utensils. The first sheet metal objects were probably those now called toleware. These objects were made from the black base metal which was later painted and decorated. These were in turn used as decorative pieces and consisted of such articles as bread trays, chambersticks, snuff boxes, oil lamps, and tinder boxes. Articles such as candle moulds, wall candle sconces,
cannisters, and sieves, were made of the tinned metal for its quality at that time was such that articles made from it were claimed to assure everlasting wear.

In Bethlehem the pewtersmith and silversmith evidently had a joint trade. According to Reichel's listing (p. 28) "pewter work was under the direction of Samuel Powell and Abraham Boemer." The "Rau papers" list Abraham Boemer as the first silversmith, with Abraham Andreas, who took over the business in 1793, as apprentice. The trade was housed in the new wing of the Timothy Horsefield house. The business at that time consisted of the repair and sale of small articles of jewelry. Rawson (32, p. 213) writes; "Silver was not in the hands of the ordinary farmer and homemaker, and it was not at all necessary to the comforts of their lives." This would tend to indicate that silver was not used on a large scale in Bethlehem for the Moravians were very unpretentious so far as display of jewelry was concerned. This also may explain in part why the two trades were combined and not carried on separately.

Pewter, which succeeded the old woodenware, was in common use in Bethlehem because it was fairly inexpensive and could be moulded or hammered into the desired articles. Masse (23, p. 117) lists the traditional methods of working pewter as follows:

1. by melting the alloy and casting in moulds.

2. by hammering the metal previously reduced to plate form.

3. a combination of both these methods.

4. by turning on a lathe, a process usually followed by that of burnishing.

5. by spinning - this latter a modern method and used generally for the alloy known as Britannia metal.
Masse (25, p. 118-121) claims the moulds for casting of pewter were generally made of bell metal or bronze. These were expensive and the masters of the craft usually exchanged their moulds. Pewter could also be favorably cast in plaster, iron, stone, sand or wood, but where long life of the mould was desired, a gummetal one was considered best. Probably the first four of the listed methods were employed in Bethlehem. The fifth is a modern development and came into use with the high speed motor. Masse (25, p. 125) claims, "Early in the eighteenth century the lathe began to be developed and has by degrees since 1740-50 become what it is now...."

The lathe was incidentally the most important tool employed in this process. It was run by handpower. The turner was called the "turn-wheel."

The basic alloys in pewterwork were tin and lead, however, others such as silver and copper were used in varying degrees. Moore (26, p. 19) shows the regard in which pewterwork was held in northern Germany from whence many Moravians came to America;

One of the earliest advances regulating the making of pewter in Nuremberg is dated 1576. In this it is expressly stated that pewterers were forbidden to make anything with English or beaten tin, only pure tin being recognized, without the addition of lead.

One piece in the Nazareth Museum, which used a large amount of pewter, is the organ shown in (Fig. 73). All the pipes in that instrument are made of pewter. Today they would represent a small fortune, for at the time they were cast the early Bethlehem craftsman, trained in Europe, used a high grade of pewter. If the above quotation is true, quality must have been a major concern.
CAST AND HAND-WROUGHT BELLS—Top, a cast bell made in 1747; a bell used at Gnadenhütten, Ohio during the Indian massacre of 1782; a cast church bell. Bottom, cast bell used in the Schoenbeck Moravian Church near Nazareth in 1765; a hand-wrought bell, the first used in Nazareth.

--Nazareth Museum
STONE PLATE OF 1749-- Portraying a flower motif of design.

--Nazareth Museum
FIRE PLATE—The Temptation of Joseph, one of the ten plates of this kind known to be in existence. From the fireplace of the old Bethlehem Drug Store.

-- Nazareth Museum
WOOD-BURNING STOVE—Cast at the old Jacobsburg furnace, near Nazareth in 1835 to 1840.

-- Nazareth Museum
WOOD AND COAL STOVES—An Aaron Cooley stove of 1800, a wood burning stove found in the attic of the Sisters' House. The charcoal burning stove was used by the tradesmen when they went from house to house, doing odd jobs.

—Bethlehem Museum
Metal Casting. Early in the nineteenth century the iron industry in Bethlehem began its gradual ascent from the manufacturing of "smith" produced manufactures to those of specialized processes. The greatest aid to the production type of manufacturing was probably that of casting in metal. This development began to displace the slow and tediously made anvil products with those of the more easily accomplished duplication method of casting. This process, however, went through the same developmental stages common to all phases of industrial advancement and dates back to the earliest period of the settlement. Iron and brass were the most commonly used casting metals in the period.

The source of iron for the various Moravian industries has been previously mentioned as the Durham Furnace. Mercer (24) gives a very excellent description of iron manufacture at that place. However, all eastern Pennsylvania furnaces were known to have employed similar methods of manufacture so that a superior product was not so much a matter of the place and process of manufacture, but of the quality of the raw product, expertness of pattern, mould-making skill, and artistry employed in product embellishment.

The first ore used by the colonial iron masters was called "Bog" ore and was stripped from the surface of swamp or marshy areas which had the desired mineral content. Although Mercer's description is concerned largely with the casting of stove plates, such as shown in (Figs. 32-33), a general understanding of iron manufacturing can be gained from his writings.

Mercer (24, p. 144-45), for the sake of clarity in understanding the iron process, shows the difference between the so-called blast furnace and the foundry or "cupolas." He claims confusion exists if the merits of each are not thoroughly understood. The blast furn-
ace is used in smelting directly from the ore, as a result "pig" iron or the raw material is obtained. The foundry is used to remelt the product of the blast furnace or the forge and not for original smelting as sometimes erroneously thought. In regard to the casting of iron at this period Mercer quotes Mr. B. F. Backenthal:

...before 1820 there were no true foundries in Pennsylvania so that during the period of their artistic decoration under consideration, the making of stoves was confined to the furnaces, that is to say, all stove plates here illustrated were cast, not at works and foundries in small smelting furnaces called "cupolas," but direct from the ore at its first smelting, in the original furnace, and close to the site of its excavation into the earth.

From this it may be inferred that prior to 1820, near the period in which Beckel was planning his first foundry, all castings of any consequence were made right at the blast furnaces. Without describing the then ingenious furnace, Mercer (24, p. 36) explains how castings were made:

The glittering metal ran out upon a flat sand bed, near the furnace, generally into a series of gutters, so as to harden into the so called "Pigs" or "Geese" and these trough shaped bars of rough cast iron from four to six feet long and six inches wide, shipped to neighboring forges to be reheated and hammered into "bar iron," as the raw material for all wrought iron manufacture, constituted the principal product of the furnace.

When on the other hand, "pots or so called country castings" or stove plates were wanted, the metal was ladled, this at the first melting either into the roofed or enclosed impression of sand mounds, enclosed in frames, called "Pilfalls" or in case of stove plates into the open impression of flat, rectangular, moulds, stamped on the sand.

Although many such stove plates have been found in Bethlehem and Nazareth, no mention is made of the making of such castings by the Moravians. It is known that a product exchange existed between Durham and Bethlehem, and because they were able to acquire the products of a furnace nearby and cognizant of the huge cost involved in such a
furnace, it is doubtful that the erection of such a plant was considered at that time by the Moravians. Mercer also states that the greatest number of plates were made in 1741. This being the year of settlement in Bethlehem, it is hardly possible that they were able to establish such an industry until much later.

The transition from the small "smithy" to the big industry era in Bethlehem began with the interests of the Beekel family. An editorial in the *Globe* (39, p. 7) credits C. F. Beekel with taking over in 1825, a small foundry started by Joseph Milsch at a Main Street location, and from it establishing the first furnace for the melting of iron in eastern Pennsylvania. Finding power to run the business taxed the ingenuity of Beekel, and compelled him to move to a location along the banks of the Lehigh River. The construction of a canal there enabled him to visualize the added advantage of being located next to its locks, and because of a lack of water power in the Main Street district which necessitated the use of horse power to run his furnace, he sold that establishment and moved to the river district which has since grown to an empire in steel. Had Beekel not made this early move someone else would have done it anyway; however, due to his foresight and energy he has the distinction of pioneering all the iron industries along the banks of the Lehigh River.

The first manufacture of brasses is recorded in the *Globe* (39, p. 7) as having taken place in the basement of the Brethren's house in 1745. At a small furnace there Samuel Powell made the first brasses required for the "Old Grist Mill." With this beginning, brass became a much used metal because it had the combined strength and durability essential for the frictional wearing parts of the mill machinery.
Another activity of Powell's was bell casting. Levering (22, p. 464) states that in 1746 he cast the three bells that hung in the turret of the bell house (Fig. 21) on Church Street. In reference to the larger of the three bells he says:

That historic bells, distinguished through all the years, by having a succession of women as its ringers, hence the more yet, its tones do familiar to six generations of Bethlehemites, yet calling children to school and telling the organist when to begin playing at the evening services in the adjoining "Old Chapel." Its long service as "quarter bell," 11,45 A. M., to cheer the laborer by daily announcing "dinner soon," ceased in 1871.

According to Levering, another tradesman cast bells in the basement of the new Brethren's house. Matthew Toomerup came to Bethlehem from Jutland, Denmark in 1761. His first job was the castings of small bells, one of which was used as a refectory and prayer bell in the Brethren's house and later a similar one used in Sisters' house. His first big casting was the bell for the Bethabara settlement in North Carolina. In 1768 he cast a bell of 236 pounds for the Easton Court House, followed by one for the Allentown Academy. Possibly, his last bell assignment was the recasting of the Powell bell previously mentioned. About a month before the Brethren's house was conscripted as a military hospital for the Continental Army in 1776, Toomerup attempted to overcome a defect in the sound of the bell. After two attempted recasts, he succeeded in remedying the defect by adding silver to the molten metal. This to him was probably the discovery of a new alloy for bell casting purposes. In 1777, Toomerup moved to Christiansbrunn and died there in 1778. Examples of some old Moravian cast bells may be seen in (Fig. 71).

Burgess (7, p. 217) gives an interesting account of the bell founders art:
The metal of which bells are made differs only from that used for other copper wares in its alloy. The ancients made many mysteries about the constituents of the metal by which they were able to produce such beautiful notes and musical sounds. The modern bell founder uses about 75 parts of copper and 25 parts of tin, varying it sometimes with a mixture of zinc and lead and in that he differs from the bell founder of old except that the older craftsman made a secret of his alloy and sometimes added a small quantity of other metals. The theory is that a large percentage of copper gives a deep tone whereas the greater addition of zinc gives a sharper tone.

The use of brasses in Bethlehem was not confined solely to the manufacture of bells and mill castings for the Goshen (39, p. 7) gives outstanding credit for its development of brass and copper household utensils to the enterprise of the Lehman's. Ernest L. Lehman upon arrival in 1832 from Germany, where he was a coppersmith, established a small foundry in the rear of his home on Market and New Streets. His first manufactured products were household articles which he hammered from sheet copper. B. E. Lehman operated the business after the death of his father in 1857. Due to the successful reputation of the elder Lehman, and an increased volume of business, enlargement of the plant became necessary in 1863. The last owner, the third generation, J. George Lehman sold the business to the Bethlehem Steel Company in 1905, and with this incorporation its distinctive character was absorbed into the departmentalized fabric of the associated industries in this company.

Music and Musical Instrument Technicians. Music, one of the most cherished heritages of the Moravians, was an inheritance from their European ancestry, who brought the art as they knew it, to Bethlehem. With the frequent arrival from European settlements of persons well versed in Moravian music, its perpetuation through their teachings was
assured. A talent and capacity for the higher forms of music brought credit and fame to the town whose people were devout patrons of the art. No treatise on Moravian life would be complete without mention of a few of their accomplishments. Although the major consideration of this unit is the part played by the Moravian musical instrument technicians, a brief musical background will better show the relationship between artist and technician.

Musical societies and organizations for the advancement of both choral and instrumental music have been popular in Bethlehem from the very beginning. In fact its very name had its inception in the impromptu singing of a hymn by Count Zinzendorf upon the occasion of his first visit to the original house, which was both a dwelling and a stable. The singing of the hymn which contained the name Bethlehem is described by Levering (22, p. 78):

Acting upon an impulse, he rose and led the way into the part of the building in which the cattle were kept, while he began to sing the words of a German Epiphany hymn, which combined Christmas thoughts and missionary thoughts ....Its language expressed well the feeling of that hour and the place in which it was sung made the vision of the manger seem real.

According to a Globe editorial (39, p. 21-22) a notable feature of the Moravian choirs organized prior to 1806, was that the male and female voices never performed together. Separate organizations were maintained, each with especially arranged music and a separate place for its rendition in the Old Chapel. Occasionally antiphonic arrangements were rendered, but the mixed choir did not become a reality until the opening of the present church in 1806. With the extensive use of the choir system of community organization, it is easily understood how such a choral arrangement originated. It is said that young
boys supplied the soprano in the male choir. Assuming the female choir
was restricted to that range, the mixed choir must have been a welcome
change to the director, who could now include part singing suitable
for the sonant blending of all voices.

Instrumental music in Bethlehem dates from the arrival of the
first colonists, for it is known that they brought with them the
stringed instruments common to Europe at the time. Choral music was
always done to the accompaniment of instruments. For festive occasions
the services of the instrumentalists were usually employed as an
accompaniment for their processional hymns. In an account of one
such festival, Reidel (54, p. 319) says:

Amid the excitement prevalent in view of the impending
Treaty and the passing and repassing of Indians and soldiers,
the Brethren commenced their annual harvest on July 4, with-
out interrupting their annual harvest festivities with which
they were wont to mark the ingathering of the fruits of the
earth. The women with sickles, and under an escort of
Indians in one company and the men in another, moved in
procession, amid the notes of flutes and horns, to the
fields that lay on the East and West of the town.

This action took place during the Indian War period of 1756 at
which time frequent negotiations for peace were being attempted with
hostile Indians. It was a time of danger to the Moravians due to
their friendly attitude toward the Indians and resentments by the
warring colonists.

Another use of music employed by the Moravians was the entertain-
ment of visitors to the town. Reidel further adds an incident in
which Governor Denny of Pennsylvania, was entertained upon his return
to Philadelphia through Bethlehem after a Peace Treaty with the
Indians at Easton:

...Governor Denny and his retinue arrived unexpected-
edly at Bethlehem, crossed the ferry and spent the night
at the "Crown".... The young men accordingly entertained
him with the music of wood and stringed instruments, from
beats on the Lehigh in front of his lodgings. He set out for Philadelphia in the morning.

The playing of musical instruments from beats in the Lehigh River was a favorite entertainment for the people of Bethlehem. This usually occurred in the evening hours and the blending of brasses in the still air was considered a thing of beauty.

The trombone was introduced into Bethlehem in 1754. Traditionally it is claimed that an Indian attack on the community was averted by the timely playing of those instruments from the towered roof of the Brothren's house (Fig. 26) on a New Year's Eve. The Indians never having heard such awe-inspiring sounds and the source being unknown to them became frightened, interpreted them as unforseen powers guarding the town, and fled into the woods, abandoning their intended attack.

Henry (18, p. 272) gives the following description of trombone music in Bethlehem:

The most characteristic of all music among Moravians is that of the trombone, played usually in the open air, in the belfry, in the graveyard, at the church door, and at New Year's Eve, in the orchestra... The trombones are usually played in quartette and when chorals are correctly executed by guiding the crescendo to its proper point, and imparting to the air its finest shades of meaning, the out door impressions are deep and abiding... In their musical history of the past century the trombone had imparted solemnity to the opening and closing of every anniversary; the quartette, with their thrilling tones, adding poetry to the transactions of life, as well as to the religious cultus.

The name "Trombone Choir," has been given to these early instrumentists and since their beginning Bethlehem has always had such an organization. Their musical scores were written largely for ecclesiastical purposes, all hymns and chorals were catalogued and made significant to special occasions. One such occasion, of a more solemn nature, was the ascent to the belfry of the church (Fig. 26) from which
the playing of chorals announced the death of some member of the church.

Bethlehem was fortunate in having among its early arrivals a number of skilled musical instrument technicians, for through their efforts, in instrument perfection, the desire to become proficient in their use was created among likely prospects in the community. With the instruments of their own manufacture supplementing those brought from Europe, Bethlehem had an organized orchestra as early as six years after their arrival. Eventually orchestras of symphonic proportions resulted due to added interest in the art. Having constant touch with the church in Europe, the Moravians were ever alert for the latest compositions of the masters. They were credited with being the first to render certain of Haydn's symphonies in America. The works of other masters were equally popular with them.

William Peter Knolton, according to Levering (22, p. 171), presented the Moravians with their first spinet piano 'Fig. 76' which became a forerunner of similar instruments of their own making in America. Knolton was an English member of the church and a fakemaker by trade in London. He arrived in Philadelphia in 1745 and settled in that town for a short period.

John Gottlieb Klemm, a member of the Herrnhut congregation in Germany, through some difference with Zinzendorf became estranged from him and emigrated to Philadelphia with a group of Schwankfelders with whom he became affiliated. In a footnote, Levering (22, p. 364) credits Klemm with bringing from Philadelphia and assembling in Bethlehem the first church organ, supposedly built by Gustavus Hessilius, a Swedish organ builder and painter, who for a time was affiliated with the Moravians. Hessilius is considered the "first organ builder in America."
CLAVICORD—Brought to Bethlehem from London by one of the Moravian Sea Congregations. This is probably the ancestor to the modern spinet piano. Center, a viola made by Azariah Smith at Christian's Spring in 1765 when he was but eight years of age, a French horn belonging to Bernhard Lehman in 1866, a mandolin brought to America by the Moravians in 1755, a wood clarinet and a trombone of unknown provenience, a violin made by John Antes at Bethlehem, in 1758. Antes was later the missionary to Egypt. Front, two fagets, woodwind instruments used by the Moravians.

—Nazareth Museum
He died in 1755 and during his sojourn in Philadelphia, it is believed that Klieff was his associate in business. This assumption was made presumably because of his employment in assembling their first organ, which was "Messilius." Klemm eventually made application to rejoin the church and upon acceptance was welcomed to Bethlehem in 1757. There he immediately resumed his trade in affiliation with a skillful joiner, David Tanneberger, who became his assistant. After repairing the Bethlehem organ, which was his first assignment, a shop was opened at Nazareth Hall (Fig. 10) in which he built an organ for the chapel of that building. In 1760 the "hall" was needed as a dwelling house and Klemm moved his trade to a new location near the Monocacy Creek at Bethlehem. He continued his trade there, building many organs for the churches of the countryside. Tanneberger who was the recipient of much teaching in organ building by Klemm, was able to continue the business after Klemm's death in 1762.

David Tanneberger came to Bethlehem with the second colony of sixteen men and eight women in 1736. It is said that while with Klemm he made many excursions around Bethlehem in quest of suitable woods for organ building purposes. As Klemm's successor he built organs for many churches in Pennsylvania, New York, Maryland, Virginia and other provinces. In 1765 he moved to Lititz, and while building an organ for the Lutheran Church at York, Pennsylvania, an accidental fall from a scaffold resulted in his death.

John Christian Till, one of the early church organists, was an expert in fine cabinet work and was supposed to have built custom made pianos. Levering (22, p. 716) claims he at one time contracted to build the pianos for the Sun and Eagle Hotels, considered at that time the favorite places of public entertainment.
The making of stringed instruments in the beginning of the settlement was attempted by anyone capable of their construction. It is said that at one time a boy of eight who lived at Christian's Spring showed mastery for the violin on which he played for the entertainment of visitors. The violin was the product of his own making. Some of the early instruments used and in some cases made by Moravians may be seen in (Figs. 76-79).

The Rev. Shults of Nazareth, Pennsylvania claims many excellent instruments of various kinds were made in that town and that at present there exists a guitar factory which had its origin with the earliest Moravian settlers in the community, and is still being operated by the descendents.

Textiles. Probably the most fascinating of all the industries of the Moravians was textile manufacturing. Although they started with the manufacture of crude homespun, the cultivation of new raw materials and improvements in manufacturing equipment resulted in a variety of materials with diversified textures and pattern arrangements.

Today the average consumer of textiles is satisfied to know the material content, commercial name, and cost of a product. With that information and by feeling the material he judges its worth. To the well informed a knowledge of raw materials and the processes of manufacture are added criteria for appraisal. It is difficult today to find persons who have ever seen the cultivation and preparation of flax, hemp, or cotton. It is far more difficult to find persons who have seen the actual making of a bit of textile from the yarn or thread of those materials. A detailed description of all the processes involved in textile manufacturing would require volumes, however, a brief description of the major textile manufactures in our early colonies, will aid con-
HARPSICHORD (1745-47) -- Used at the Moravian Girls School when it was housed in the Whitefield House at Nazareth.

-- Nazareth Museum
GRAND PIANO OF 1850—Built by Jacob Till. Formerly a possession of J. Fred Wells, founder and director of the Bethlehem Bach Choir.

—Bethlehem Museum
PIPE ORGAN—The first pipe organ of the Bethlehem Moravian Church. Built in Philadelphia by Gustavus Hasselius and John G. Klemm. It was brought to Bethlehem by Klemm, who set it up in the Gemeinhaus in July, 1746. Hasselius was the first American organ builder and this is the only known specimen of his work in existence.

—Nazareth Museum
siderably in appreciating the many tasks involved. The early colonist
was a true appraiser of textile quality for he indulged in every phase
of manufacture from beginning to end.

Flax was probably one of the first products cultivated by the
Moravians. This seems confirmed by the early date at which they con-
structed a mill for the pressing of seeds for oil. A brief account of
the processing of flax is given by Keir (20, p. 13-14). The bundles
were brought from the fields, submerged in water, or kept in a cool,
damp cellar until the woody stalk and leaves rotted. A certain degree
of rot was essential or the material was useless. The flax was then
placed on a flax break (Fig. 55), which crushed the stalk without damage
to the fibres. Complete removal of the stalk was accomplished on a
"swingle board," which was a vertical log about waist high, joined to
a horizontal supporting log. The unit resembled the letter T inverted.
The fibres were placed across the butt-end of the upright log, the ends
trimmed, and the remaining stock removed with a "swinging knife." The
fibres were then laid straight and in one direction, graded as to fineness,
and made ready for the spinning wheel. Since there were different
sized wheels for various uses, it is advantageous to be able to dis-
tinguish between them. Marion Nicholl Rawson (32, p. 248) gives some
interesting data concerning spinning wheels:

It is interesting to note that, in those sections
where linen was generally used, the flax wheel was spoken
of as "the spinning wheel" and the wool wheel is specially
designated as such; while in the wool bearing districts and
in those sections where flax was not so generally grown, the
wool wheel is spoken of as "the spinning wheel," while the
flax wheel is always specified.

Judging from Moravian commodity accounts, they must have used flax
and wool in comparatively equal proportion so in speaking of spinning,
the wheels will be referred to as either "wool" or "flax." This must not be interpreted, however, that the wheels were used for only those two materials, for another quotation by Lawson (32, p. 242-43) gives this further data:

For flax, hemp, silk, cotton and the lighter materials, there was a low wheel at which the housewife sat when spinning. This was quite different from the wool wheel, which was about twice the size of the flax wheel at which the spinner stood for her work. Since the growing of flax was early undertaken by our pioneer forefathers, the flax wheel came into use almost at once in this country.

Hemp and tow were employed in the coarse type of spinning. Hemp, a tall annual herb of the nettle family, was prepared for spinning in much the same manner as flax. The uses of both are described by Lawson (32, p. 246) in the following quotation:

Of both flax and hemp for spinning there was an abundance. Flax became linen fine or coarse as was desired, while hemp was spun into thread for use in coarse articles only. Even tow was spun, and while it was usually used for twine, roping or bagging, it did sometimes rise to the rank of a coarse shirt in which did its wicked best to drive its wearers mad with scratchings.

The Moravians used hemp in their rope-making industry, and although no mention is made of tow, the extensive use of both flax and hemp, from which it was derived, indicates that the product probably was made under a different name. The bag in (Fig. 81) is woven of flax tow which tends to substantiate the use of that material.

Woolen manufacture was somewhat different from that of flax manufacture, because the raw material was more readily adaptable to use. Tillinghast (6, p. 124-26) in describing the tasks involved, claims the first job was to shear the wool from the sheep. Other sources, however, claim the sheep were first run into a creek and thoroughly washed and dried before the shearing operation began. In any event
A MORAVIAN COSTUME--Posed by Mrs. Henry I. Jarrett, past president and still active member of the Moravian Service Guild which sponsors the Bethlehem Museum. The costume is a replica of those worn by early Moravian Sisters.

-- Bethlehem, Pennsylvania
TEXTILE EQUIPMENT—Reading from top to bottom: a pair of wool cards, a yarn winder, flax hetchels, a pair of square wool cards without handles, and bundles of tow or hatched flax.

—Nazareth Museum
this was usually done in the spring or early summer, with a pair of shears similar to the hand lawn-trimmers used today. The wool was next laid in bundles, the coarse being sorted for knitting yarn while the fine was used for weaving.

The next operation (20, p. 13-14) was the straightening of fibres, after washing with warm water and soap to remove the dirt and grease. After drying, the fibres were combed and laid parallel with the wool comb, a long steel-toothed implement. A final arrangement of fibres for a greater degree of fineness was accomplished by means of wool cards (Fig. 32). A bit of wool was placed upon one of the pair and the other was drawn over its surface. This pulled the fleece through both sets of fine steel teeth and made the wool ready for the distaff of the wool-wheel on which it was spun into yarn.

Tillinghast, further adds that after spinning a full spindle, it was removed and wound on a clock wheel or by hand, with a "Fiddy-Noddie," (Fig. 33). The clock reel (Fig. 34) clicked when forty threads or a knot had accumulated. On the hand reel a system of count or winds served the same purpose. Each knot was tied with a piece of yarn and seven comprised a skein. To wind the skeins, "swifts," were used (Fig. 32). If knitting was to be done, the yarn was wound in balls, while for weaving it was wound on quills or bobbins for the shuttles used in weaving. It is possible to spin yarn loosely or into fine thread, depending upon the desired cloth texture. The reeling process above, applied to flax as well as wool, and regardless of the difference in the texture, both required approximately the same amount of time for spinning. The completion of forty knots or two skeins by an individual was considered an average day's work. Two wool wheels are shown in (Fig. 63).
SPINNING WHEELS—Large and small wool spinning wheels. Hanging near the distaff at the left end of the large wheel may be seen a "niddy-noddy" or hand winder for yarn.

--Fother Museum
YARN SHELLS AND SPINNING WHEEL--A clock type yarn reel. The mechanism behind the wheel has measured the knots and skeins. A smaller but more elaborately turned YARN REEL. A spinning wheel used for cotton or linen yarns.

—Nazareth Museum
Silk manufacture by the Moravians is marked by four epochs. The first may be briefly described by a quotation from Levering (22, p. 290-91) as made by the Rev. Israel Aorelius, a Swedish Lutheran Provost, in his "History of Swedish Churches":

Upon visiting the industry in the brethren's house, he found the men in charge of the cocoons brood, who were kept busy gathering and spreading mulberry leaves. He was told there were always men available for the performance of this task, not employable at others. $20 was an estimate of the earning from the silk product of that year, 1752.

Silk culture was a result of an abundance of mulberry trees in the district. This growth, however, was not restricted to Bethlehem for in another quotation by Levering (22, p. 291 footnote) shows there was also an abundance in the Nazareth area:

The second epoch of the industry was toward the end of the 18th century. Industrial organizations encouraged silk culture and offered premiums on production. Bishop Ettwein at Bethlehem and Rev. David Zeisberger at Nazareth found the industry profitable. They collaborated with Pres. Stiles of Yale College (1793), who was interested from a scientific standpoint.

The third and fourth epochs are further explained in this same footnote. In 1837-39 the farmers in the locality were victimized by the "Larvae multicaulis" erase during those two years. Confronted with "get rich quick schemes," so often associated with infant industries, a small fortune was spent in buying and cultivating trees essential to worm culture. That such culture took a great deal of time and effort from large numbers, before a profit could be realized, was learned too late. The culture was eventually discontinued and the trees destroyed with a final realization that silk culture could only be profitable in those countries where labor could be procured for a few cents an hour. The final epoch dealt with the importation of the raw product and its processing in the mills throughout the Lehigh Valley.
Weaving, Fulling, and Dyeing was carried on extensively in Bethlehem. Not a great deal could be learned about the actual weaving of textiles not are the old cloth looms to be found in the museums. However, their existence is made certain by records such as shown in item 11, page 27 which states there were six looms in Bethlehem on which 3,508 yards of linen were woven. This presumably over a period of a year. The looms of this period somewhat resembled the old carpet weaving looms which may be seen intermittently today in rural districts. They were made of hewn timber of various sizes, depending upon the size and use of the loom. They varied from widths for ribbon to those for blankets. A tape loom can be seen in (Fig. 85). Besides the large looms, portable lap or table types, were employed in the manufacture of tapes and ribbons of various widths.

Fulling and dyeing were carried on near the Monocacy area. Levering (22, p. 390) claims the "fulling mill" was connected with the "grist mill." That arrangement was probably made so that the same water-wheel could be used. In 1759 the mill was rebuilt of stone and contained four beaters capable of running 300 yards of material at a time. An adjoining room in the mill was used by the clothiers while another building at one end housed the dyers' business. The fuller's job according to Rawson (32, p. 282-83) was an important one. He had to prepare the woolen cloth for hammering by picking out, with tweezers, the knots and fuzz which had been missed in the carding process and he had to do this without damage to the web. The final dressing was also accomplished by him. This consisted of raising the knapp with a prickly plant called the "teasel," and sometimes with the wool cards. The laborious job of beating was done by the mill hammers. Thorough
washing in warm water and dissolved soap or fuller's earth removed the
grease and stains, and shrank the cloth, while the beaters made the
thread more compact in form. After this process the web of the material
was fastened to "tenter-hooks," a device for evenly stretching the cloth,
upon which the drying took place as the final operation prior to
commodity manufacture.

Linen did not require this same preparation, but was bleached.
That was done by soaking it in water and washing in bleached ashes, after
which it was again soaked and spread on the grass to dry in the sun.
To the uninitiated this may seem an easy task, but each operation took
several days before the yellowish flax-color could be finally eliminated
from the material.

Dyeing was generally done after the cloth was woven, but sometimes
it was done while in the yarn stage. concoctions of vegetables, flowers,
and wood were used to make the dyes. Not all materials required dye-
ing however, some were woven natural, such as the black and white
fleeces which produced a popular gray. The dyehouse already mentioned
may still be seen today on the banks of the Monocacy Creek. Although
renovated and put to a different use one can almost visualize the activ-
ity which once hummed within its thick stone walls. The production
of clothing from the manufactured textiles of the Moravians, presents
many interesting features. Both sexes adopted a standard mode of dress
in fitting with their beliefs and traditions. This caused them to be
conspicuously plaintive in habits of dress. The men's clothing was
manufactured from rough textured brown cloth which resulted in the
nickname "brown shirted brethren." The dress of Moravian women is
illustrated in (Fig. 50) which was graciously posed by Mrs. Henry Jarrett.
of Bethlehem, Pennsylvania. The dress she wears is a replica of one worn by the Moravian Sisters during the "Economy" era. Her apron, fichu collar and peaked cap are original accessories. A few examples of Moravian sewing, knitting and weaving, along with sewing equipment, are illustrated in (Figs. 86-87). As a concluding remark in this chapter it may be of interest to know that a Moravian Service Guild exists in Bethlehem. The organization consists of young Moravian women who, attired in replicas of early Moravian Sisters' costumes such as shown in (Fig. 80), sponsor a historic tour service in Bethlehem. The tour is augmented with an educational historic lecture on Moravian culture and has a tendency to inspire fond memories of a most interesting Colonial American era and society.
TEXTILE E UIPMENT—Rear; an adjustable tape or ribbon loom. Front; a padded quilting frame with accessories.

—Nazareth Museum
WARDING QUILT OF 1818—Christina Schleifer Kisshline, who married at age sixteen, spent the first year of her married life making the quilt. The wool for the embroidery was obtained from their own sheep. She also did the carding and dyeing. The birds and flowers in the design, were inspired by those she saw on the farm.

—Bethlehem Museum
TEXTILE PRODUCTS AND EQUIPMENT—Top: a linen napkin, drawstring purse, and knitted cloth caps. Bottom: a sewing kit, pin cushions and apron-type sewing bag.

—Jamestown Museum
CHAPTER V

IMPLICATIONS IN THE STUDY OF MORAVIAN CULTURES

The part the European Moravian has played in the early development of American industry reveals many interesting implications for present day life. The Moravian in Pennsylvania was inclined to overemphasize the religious aspects of his life and regard his industrial and economic accomplishments merely as a means to an end. Due to this, any commercial innovations for which he may have been responsible have been regarded by him in a matter of fact fashion. The essential needs of his home and community were manufactured by him without benefit of a means of identification other than possession. Since he disbelieved in self advertisement, the traditional trademark was not used as a record of personal worthmanship and many instances are known where this has resulted in the plagiarism of credit by shrewd promoter at the expense of the trusting innovator. This unpretentious attitude, on the part of the Moravian, causes the study of his industrial advancement to be confronted with serious difficulties and may be one reason why literature of this nature has received such scant consideration.

The tremendous scope of industries in which the Moravian indulged has been described in the first chapter of this study. A moment's reflection upon the early date of his arrival in America and the little time that was required to establish him industrially tends to enhance the merit of the Moravian craftsman. The antecedents responsible for the development of his high degree of industrial efficiency have been shown throughout the historical phase of this study. He emerged from these antecedents as a tenacious individual not easily discouraged by the many reverses apt to occur in life. The material resources he knew about in his European environment were closely paralleled in his new
home in America. Familiarity with such resources enabled him to transfer to America those skills and techniques which he employed in his work in the mother country. The transplantation of these factors was not accomplished in a haphazard manner for adjustment to his new environment was shrewdly and efficiently planned. Well directed management accounts in a large degree for the Moravian's rapid economic success.

The artistic ability of the Moravian is shown in his production of art, architecture, graphic arts and music. The mediums; charcoal, pencil, water colors and oils were employed in drawing and painting. Moravian architecture is characteristically European. A walk among the old Moravian buildings of Bethlehem today, gives one a feeling that he is in a foreign land. Many of the architectural features of these buildings namely; dormers, cupolas, roofs, doors and windows, are studied and used as models by architects from many quarters of the land. The sound construction and quaint beauty of the buildings indicate an application of sound principles of architectural practice. The graphic arts area of the study reveals that the Moravian accomplished very little in the way of printing until a comparatively late date. Their writings in script and their bookbinding however, are excellent examples of work in this area. Many volumes of their early documents and numerous self-bound books remain in excellent condition today. Study of his musical accomplishments indicates that the Moravian was a master craftsman in the making of musical instruments as well as an artist in the use of them. The early date at which they had fully organized and equipped choirs, orchestras and bands in an indication of their love for music. Their employment of music in festive and religious activities has become traditional and today one of their oldest musical institutions the "Trombone
Choir," still performs as it did in bygone days. All the above mentioned artistry has a definite contemporary value to the artist, architect and musician of today for it affords a means of inspiration extending far beyond the confines of Moravianism.

Study of the Moravian crafts and industries affords a knowledge of their many industrial pursuits and mediums employed in the manufacture of many products. In regard to services, their first waterworks was a major accomplishment in inventive genius. This project is known today as the first waterworks in the United States.

The woodworking industries consisted of a saw mill, carpenter's shop, cabinetmaker's shop, wheelwright and weaver's shop, blacksmith and cooper. All the essential lumber for building materials and household equipment was processed at the saw mill. All of the above mentioned areas entered into the construction of musical instruments, baskets and tubs, wagons, furniture and all the equipment needed for the manufacturing implements of the various industries. The building program of the Moravians was accomplished by groups of rough carpenters and master tradesmen. They moved about in their work and located temporarily wherever work was to be done.

Study of their ceramics reveals that additional building materials were furnished in this area. Bricks, roof tiles, stove tiles and pottery are a few of the ceramic products produced by the Moravian. Where decorative work was to be done, slip tracing and sgraffito were employed in a great variety of traditional motifs.

The farm industries supplied the community with all the essential fruits, cereals and vegetables known at the time. The livestock of the farms were used to supply the meat and dairy needs. The corn mill
and oil mill processed the farm products: wheat, oats, buckwheat and flaxseed. An additional duty of the oil mill in addition to the processing of linseed oil was the grinding of bark for the tannery and the grating of hemp for rope manufacture. All the Moravian mills were located near a water source, for water power was employed in running them. One water wheel was often used to run the machinery of several establishments so that a maximum efficiency could be obtained. This was often the reason for clustered buildings.

The household industries reveal that home duties were run on a cooperative basis and were delegated to various specialists who organized the work on a production basis. The "Choir" system of organization dispensed with the traditional single family mode of life and was the main cause for cooperative management. Cooking, baking, soap and candle-making and laundering were a few of the major household industries run on a cooperative basis. It must be kept in mind that the "Choir" system lasted approximately twenty-two years and shortly after this era, the Moravians assumed a normal community life in the traditional sense of the term.

The leather industries included the areas: tanning, currying, shoemaking, saddle and harnessmaking. Every phase of leatherworking from the raw leather to the finished product was accomplished by the Moravian craftsman. Leather was put to many uses and it is especially interesting to know that drinking vessels and waterbaskets were once made from this medium. It is also of interest to know that in time of war, when a premium was placed on leather, the Moravian leatherworker had to become adept at the working and use of leather substitutes. Wooden shoes were sometimes substituted for those of leather.
The metalworking industries represent one of the most extensive of all Moravian enterprises. The blacksmith was the first worker in iron. Associated with him and working in the same establishment were the nailsmith and locksmith. The products of the latter two are implied in their titles but the blacksmith produced all of the iron needs of the day. He made the first metal fittings for the various mills and also produced the first cooking utensils and lighting needs. The introduction of sheet metals, on a large scale, gave rise to the tinsmith, coppersmith, pewterer and silversmith. Each contributed in the production of kitchen utensils, cutlery, dinnerware and other household needs. The silversmith’s contribution was largely in the production of jewelry and watches. Metal castings was done in the mediums; pewter, brass, iron and silver. The products resulting from these were pewterware, mill fittings, bells, and cooking utensils.

The major outgrowth of the early Moravian metal industries is said to be the Bethlehem Steel Company which is now located in the approximate area where Moravian craftsmen pried their trades.

The study of the textile industry reveals one of the most lucrative of all Moravian industries. Flax, hemp, wool, silk and cotton went into the manufacture of a variety of materials. All but cotton were carried through all phases of production, from the raw to the finished product. Filling, dyeing, spinning and weaving were the main factors involved in textile manufacturing. All the clothing needs of the community were supplied through the effort of the textile workers.

All the above mentioned trades and industries were a result of the combined efforts of craftsmen of many nationalities originating in a
wide area in Central Europe. This affiliation of people resulted in the pooling of many cultures and gave the Moravian movement a rich, artistic and industrial background. A study of the various phases of their workmanship reveals many possibilities of enrichment for various areas of general education. While the study does not pretend to be exhaustive in a historical sense, it does claim the cultural value of broadening out and dipping into certain aspects of history. In conclusion, it is believed that this study has thrown some light upon the cultural contributions of the Moravian Missionaries who seem to have invented or given impulse to manufacturing in Pennsylvania and hence deserve considerable credit as one of the pioneers of industrial progress in America.
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GLOSSARY

Antiphonic. An alternation of responses; generally musical.

Apriary. A place for the keeping of bees.

Barony. The domain of a baron.

Batress. A structure built against a wall as a means of support.

Chandler. One who makes or sells candles.

Chirurgical. Pertaining to surgery, a chirurgeon was a surgeon in the old sense of the word.

Choir. This term was applied to the system of organization employed in the Moreavian community. The people were divided into groups by age, sex, married and unmarried. This offered a means of solving housing problems and also afforded a natural basis for social, educational and religious advancement on the basis of homogeneity. In a musical sense it means a group of trained singers.

Cooper. One employed in the making of casks, barrels, etc.

Curator. A person having charge of a library or museum.

Curry-comb. “comb consisting of series of upright serrated ridges, used for grooming horses.

Facade. The front or chief face of a house or building.

Fichu collar. A collar worn about the neck with the ends crossed in front, generally lace trimmed.

Flax-greets. Ruffled and crushed flax.

Falling-mill. A place where cloth is fulled, to make it thicker and more compact.

Girth. A band or strap for fastening a pack or saddle to a horse’s back.

Glaziery. A business devoted to the repair of windows.

Grist-mill. A mill for grinding grain.

Hatchet. An implement for cleaning flax or hemp, consisting of a set of teeth fastened in a board.

Hewing. A method employed in the dressing of timbers for house construction.

Hogshead. A large cask or barrel.

Hospice. A place of entertainment or shelter.
Hostelry. An inn.

Larders. A depository for bacon and like. The name is often applied to the house in which lard is made.

Hamelot. A wooden hammer.

Haus. A clergyman's house.

Martingale. A forked strap for holding down a horse's head by connecting the headgear with the belly-band.

Metholcin. A fermented drink made of water and honey.

Monotheism. The doctrine that there is but one God.

Polytheism. The belief in and worship of more gods than one.

Rape-seeds. The seed of an Old World annual plant allied to the turnip. The seed yields a valuable oil called rape seed oil.

Rusk. A light, sweetened bread or biscuit.

Solet. A wooden shoe.

Sconce. Ornamental wall brackets for holding a light.

Sloop. A single masted vessel.

Spermaceti. A white, fatty substance contained in the head of the sperm-whale, used for making candles.

Thorpe. A small cluster of houses in the country.

Tinder-box. A portable metallic box containing light-making materials, tinder, and usually flint and steel to ignite it.

Turnery. A place where lathe-work is accomplished.

Turret. A small tower rising or capping a large structure or building.

Wheelwright. A man engaged in the construction and repair of wheels.

Yoke. A curved timber collar with attachments; used for coupling draft animals.