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KOREAN BOATS AND SHIPS

BY

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PREFACE

The preparation of the present preliminary study of Korean ships has occupied a good deal of my spare time for over two years. It is now presented in printed form not as a complete work but in lieu of such a work which we hope some day will be given us by a Korean.

The work involved has been a pleasure, but would have been impossible without the help of a large number of individuals. The original search for source material was made by Mr. Pok Tong Kim, then a student in the Chosen Christian College. Later Mr. Han Chul Shin also of the Chosen Christian College Literary Department '33 spent many hours working with me, both in reading and translation.

Professor In Po Chung and Dr. L. George Paik are both walking encyclopedias on Korean history and have most patiently answered my questions, searched for material and checked data. The informational material in the Bibliography has all been supplied by Dr. Paik. Prof. Nam Woon Paik and many others of my colleagues have also assisted me in many ways.

My debt to Mr. Kwang Soo Lee, author of "Yi Sun Sin," and to Mr. Immamura, author of "Boats of Korea," is plain and I appreciate greatly the research which made my path so much easier. Mr. Koizumi of the Government General Museum and Mr. Hirata of the Prince Yi Household Museum have both been most kind in permitting photographs to be taken. The Tong-A Daily of Seoul has kindly permitted the use of their excellent portrait of Admiral Yi and the Editor-in-Chief, Mr. Chin Woo Song, graciously permitted access to some most valuable books. Mr. Oda of the Foreign Affairs Section of the Government General, the librarians at the Chosun Christian College and many others have been most kind. Both my wife and my son Horace read the entire manuscript through and made most valuable suggestions.
while my son John provided the metrical version of the Korean boat song.

Last but not least thanks are due to the Publication Committee of the Society and to Mr. Thomas Hobbs who has undertaken the wearisome and thankless task of seeing the work through the press in my absence. I can only hope that the reader may appreciate how much these friends have contributed to any value which may be found in this sketch.

HORACE H. UNDERWOOD

Seoul, Korea
September, 1933.
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KOREAN BOATS AND SHIPS

I. INTRODUCTORY

Korea is a peninsula—an "almost island" as the French say, and while to the islander boats are essentials, to the inhabitants of a peninsula they are more or less incidental in character.

All Korea's coast line, her bays, harbors and coastal islands have never counterbalanced the fact of the broad, safe, land route to China by which came Kija, and most of her civilization. This combination of physical and cultural factors is doubtless responsible for the fact that Korea is not and never has been a maritime nation.

On the other hand, boats have been used by the Koreans for at least 3,000 or 4,000 years and for how much before that we do not know. We hear of Admiral Yi Sun Sin and his famous Turtle-boat; and even the most unobservant of us have exclaimed over the brilliant orange sails seen on river or bay and are therefore aware that boats exist in Korea. But there are many things we want to know. What kind of a boat was the Turtle-boat? What were its predecessors? How do Korean boats of today compare with other Oriental craft? What do or did the Koreans know of sailing, of pilotage and navigation? No one has yet attempted to answer these questions for English readers except by the most casual references and comments. What little has been said is full of surprising errors. Some of these are due to that carelessness of observation to which we are all prone, and others come from ignorance of nautical matters. While we cannot expect any author to be an authority on every subject we do have a right to demand that he shall not make authoritative pronouncements on subjects of which he is ignorant, especially when such statements are of a critical and derogatory nature. We may perhaps hope that the phrase "thrice a day a ebb-tide" used by one author is due to a misprint. It is difficult to find any
excuse for the statement that "Korean sea-boats are merely modified and enlarged river boats;" that "Korean sails are of the square variety;" that "Koreans do not understand the art of tacking", etc., etc.

A few scraps of information come to us from Hendrik Hammel, a word or line here and there from Capts. Hall and Belcher, from McLeod or Oppert. Our confidence in Griffis is shaken a bit by his reference to Yi Sun Sin as "a Chinese admiral" but we accept gratefully a few crumbs from his table. Aston, Lowell, Hulbert, Gale and other writers each have a few words to say, usually of a derogatory character, and mostly wrong. This is the sum of the English sources available on this subject. Valuable information having an indirect bearing on the subject is found in the papers of Purvis and Bonar on "Ship Construction" and "Maritime Enterprise in Japan" read before the Asiatic Society of Japan and in a paper by Dr. Edkins on "The Chinese Names for Boats and Boat Gear" in the Journal of the North China Branch of the Royal Asiatic Society.

The material available in Korean or Japanese is not much more full. The Marine Products Bureau of the Government General made a very thorough and scientific investigation of present day Korean fishing boats which has been published in three volumes.\(^1\) This will doubtless remain as the authoritative work on Korean fishing boats of today. There is also a work called "Boats of Korea" by a Mr. Immamura which gives a good deal of information. Unfortunately the author spends a great deal of time on such topics as government organization, titles and ranks of officers, rules of precedence, etc. and leaves many questions unanswered. It is none the less a valuable contribution and almost the only modern work on the subject. The magazine "Chosun" in 1931 published a series of articles by Mr. An Whak entitled the "Ancient Navy of Korea." This also is

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\(^1\) "Report on Investigation of Korean Fishing Boats."
rather disappointing and spends much space on the coast-
defences without touching on many topics that one would
look for in such an article.

More recently, the well-known writer Yi Kwang Su has
brought out a volume entitled “Yi Sun Sin” which is a semi-
historical story of the Japanese invasion of 1592-98. Mr. Yi
spent some months in southern Korea on the scene of the
events of which he writes. For historical data on the Turtle-
boat, Admiral Yi and the naval campaign, he has followed
the “Chung Mu-Kong-Chun-Soh” very closely. Although
he does not give his references or pretend to the name of
historian I have found him more trustworthy in many details
than some who claim a more dignified title. It seems a pity
that the artist who did the illustrations did not make an
effort for greater historical accuracy in naval matters. To
such few as are sincerely interested in the appearance, rig,
and size of these ancient ships the pictures actually mar the
value of the book. Much valuable information both as to
the famous admiral and the whole invasion is to be found in
this fascinating story which evidently is the result of con-
siderable historical if not nautical research.

However, before beginning to study the subject, I felt
much more inclined to criticize these writers for the paucity
of their data than I do now. That the information we need
lies buried in the depths I do not doubt. It is a fact how-
ever that it will be found only as a result of the most pains-
taking and laborious page by page search. This has been so
in almost every land, though in Europe maritime matters as-
sumed sufficient importance by the end of the 14th century\(^1\)
to stimulate the writing of books devoted entirely to this sub-
ject. This does not appear to have been the case in Korea.

We may be told that in such and such a year so many war-
ships were built; but when we ask as to their size, their
equipment, armament, rigging, the nautical knowledge and

\(^1\) Some works date back beyond this period but I think it a fact that few
nautical treatises or books on maritime matters existed before this
time.
training of their commanders, the materials of construction, etc, we find that such details are not even mentioned.

Even in such a work as the book entitled "The Complete Writings on the Loyal Minister Yi," published in 1796 in commemoration of the deeds of Yi Sun Sin we find a great deal of space devoted to poems written about him, titles conferred on him, his youth, his proficiency in studies and sports, etc. but only a few pages to a rather sketchy and confused description of the famous ship.

It seems more than probable however that even hundreds of years ago accounts were kept when money was spent for cannon, for sails, for a new rudder or oars etc. These accounts were not published and most of them have probably been destroyed or lost. Some however doubtless remain to be "dug up." For the rest we shall have to depend on casual references found in the most unexpected places.

Still another source from which something more may be hoped is in the field of art. Much of our knowledge of the ships of Egypt, Phenicia, and Greece rests on no firmer foundation than that of illustrations on coins, vases and statues. The creations of an artist are not necessarily authoritative, as we all know. But despite this fact the work of contemporary artists, taken in conjunction with other evidences, is of considerable value. Unfortunately the ship "motif" seems to be comparatively rare in Korean art. However a vase or urn from the Silla period, a bronze mirror of the Koryu dynasty and some screen paintings give us some help, and diligent search will doubtless bring others to light.

It will be evident from the above remarks that the present work is indeed only a preliminary study. It has seemed best however to present the material now in hand with a frank statement as to its limitations rather than to await the problematic "some day" of a more complete investigation. The works consulted in the preparation of the present paper will be found listed in the bibliography. To discover and scan them has been a large task
and one which would have been impossible except for the aid of my colleagues at the Chosen Christian College and the help of a number of student assistants. In addition to those books from which information was actually gleaned, a still larger number was fruitlessly perused.

For Korean boats of today I am indebted for lines, drawing and all technical information and statistics to the investigation made by the Marine Products Bureau. This I have supplemented by information gathered from personal observation largely on the Han River and the coasts of Kyungkui and Whanghai provinces with brief visits to points on the coasts of North and South Kyungsang, South Chulla, Kangwon, South Hamkyung and the Taidong River.

A word more is necessary to explain the plan of presentation. It is probable that the ships of Korea have not altered appreciably in many essential details for some hundreds of years.

It has seemed best therefore to deal first with the boats and ships of today thus placing before the reader a general description which will probably be of assistance in picturing the ships of more ancient times and at the same time taking up certain questions in regard to rigging, construction and navigation which are pertinent to all periods. With this foundation and working thus from the known towards the unknown we will proceed to the historical material. Here we shall of course deal with the data chronologically. Beginning with such references as exist concerning the most early times, on down things the naval history of the Three Kingdoms and Koryu to the relatively fuller data concerning the Yi Dynasty.

**II. KOREAN BOATS OF TODAY**

A. *River-craft.*

For purposes of convenience I am going to divide the ships of Korea into river boats and sea-going boats, taking up first the smaller and less important class, designed for the shallow and relatively calm waters of the river.
Dugouts. It is commonly stated, and it seems reasonable to believe that the dugout is the earliest form of boat made by man. If, as is supposed, he first voyaged out across lake or stream on a chance log it seems natural to suppose that he next smoothed it off and that hollowing it out was not then a great step. Such boats have been dug up in various parts of the world. One of the largest was found at Brigg, England, in 1886 and is now in the Hull Museum. Its dimensions may interest and surprise some of us who perhaps think of a dugout as a sort of enlarged horse trough.

The Brigg boat was 48 ft. 6 in. long 6 ft. wide and 2 ft. 9 in. deep. It is also interesting to note that it was apparently fitted with a mast and sail. ¹ A similar craft measuring 37 ft. 5 in. in length by 4 ft. 8 in. in width was dug up near Osaka in 1878 ² Such boats are still used where suitable timbers exist and are to be found in Korea. Fig. 1 shows such a boat in use as a ferry on the Tuman River. I have not the exact dimensions of this boat but Mr. Morris who kindly furnished the photograph estimates it as 35 by 5 ft.

They are made in all sizes and I saw one on the upper reaches of the Yalu that in size and shape approached the canoe type. They are found on the Yalu, the Tuman, the Kangkei rivers and other places where large trees are abundant and other methods of construction difficult. It is interesting to learn that in the ferry boat shown in the illustration ribs or thwarts are provided by the simple means of hollowing the boat out in sections leaving a certain thickness of wood uncut between each section. These are of course the ancestors of the ribs of a modern boat which were put in when man wanted to make his boat lighter and therefore hollowed (or built) it so thin that it demanded artificial strengthening. The West has gone another step away from

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1. “Sailing Ships and Their Story” by E. Keble Chatterton, p. 96.
2. “Maritime Enterprise in Japan” Bonar
the original and now builds the ribs first putting the skin of planking on later. The East still clings to the old system (at least for boats of a moderate size) and builds the outside first adding the ribs later.

The Skiff. (Korean: Mehsangi 메싱이)

Many generations must lie between the primitive dugout and the light and delicate little skiff known as "Mehsangi." These small boats are found on most of the rivers of Korea and are usually kept for fishing by persons of some means, being too small to be practical for passengers, freight or commercial fishing. Larger Mehsangi are sometimes found but in the main they do not exceed an over-all length of 12 to 14 feet. They are flat-bottom but the bottom board is so narrow as to form really a flat keel plate. From this the sides "flare" out in a surprising manner giving it an extreme beam of well over a third of its length. They are intended and fitted for, one, or at the most two persons, though bad little boys, "borrowing" a Mehsangi for their own evil purposes, will crowd 8 or 10 into it and in some marvelous fashion still escape death. It is propelled by a small oar fastened by a thong about 2 feet from the stern on the port side. This oar is used in a manner that is a compromise between rowing and sculling and is almost entirely a wrist motion. Fig. 2 shows a typical Mehsangi on the Han River. The Pyeongyang Mehsangi are usually given a peculiar "twist" by allowing the board on the port side to extend at the stern—little aft of its fellow on the starboard and the starboard one to extend a little forward of the port one at the bow, the two boards which form the bow and stern in lieu of stem post and transom thus slope slightly one toward the port and one toward the starboard. This is not accidental but of design and is said to add to the ease of handling.

Ferry Boats.

Naturally almost any kind of a boat might be used to ferry people or goods across a body of water. The typical
Korean ferry boat is however a type by itself. Fig. 3 shows such a boat. It is of very heavy construction, very broad in the beam, low in the bow to allow loaded ponies or oxen to come on and off; with a relatively high poop to allow the use of the huge sweep required to handle so heavy a load. The Korean boat does not usually have ribs but is held together by a series of cross timbers known by the Koreans as “Mongeh” (yokes) and others called “Changson.” As these break up the boat into sections, take up space and are very difficult for cattle to step over, the ferry boat dispenses with them as far as possible. The result is that after some years of use these boats loosen up in an alarming fashion. The general type of construction is more similar to the sea-going boat than to that of the boats which ply up and down the rivers. They are still to be seen at many of the larger ferries but wherever jitney lines operate they have been replaced by boats more suitable for carrying autos. In a few years these boats will disappear altogether.

River Transport.

Korea enjoys a number of rivers of considerable size. The Yalu and Tuman at the border, the Taidong, the Han and the Naktong are known to Koreans as the “Five Great” rivers; to these are added five smaller streams making what are called the Big Ten. None of these, except the Yalu, is navigable for any distance by anything except boats of the shoalest draft. Tugs or heavy junkas can go up the Taidong to Pyengyang, about 60 miles, up the Han to Seoul, about 40 miles, and less distances up the other rivers. In the Han even this is accomplished with difficulty and at neap tides I have counted 200 boats aground till the spring tides should float them. Above the head of navigation for such boats the river stretches on into the mountains for many miles in a series of rapids and shoals interspersed by deep stretches. The rapids however are neither very long nor very terrible; the general trend of most of these rivers is from East to West assuring the help of the W. wind in
ascending the stream. These conditions have developed boats to meet them. (Fig. 4) Very long and narrow, they carry a maximum of freight with a minimum of resistance to the stream. The load draft is usually about 1 foot. The high prow offers a convenient point for the tow line and from its summit the polers walk down with the pole to their shoulders and their bodies almost horizontal putting their full strength and weight into the work. Being built for freight they do not wish the small available space cluttered up with masts and rigging. Hence the sail area is all in one huge sail on a tall mast stepped a little forward of amidships. The location of the mast and the pronounced rake aft which it is given is intended to give a lift to the bow, or at least to avoid the depression of the bow which comes when running before the wind if the mast is forward of amidships. Like all Korean boats a balanced lug sail with transverse battens is used, and the sail is attached to the mast by parrals, attached to the bamboo battens. As these boats sail almost entirely before the wind the sails are broader in proportion to their height than are those of the sea-going boats. The sail area is great, a boat 60 feet over all carrying approximately 600 square feet in this one large sail. The sail is hoisted by a single halliard which is sometimes made fast on the windward side as a stay. A topping lift is used, especially to support the boom when several reefs have been taken and this added weight is resting on it. Lanyards lead from each batten in a fan shape coming together into a single sheet. There is no other rigging. The rudder post projects through a hole in the transom and slopes forward thus bringing the tiller down at a convenient angle; this naturally places the rudder at such an angle that if it strikes bottom it merely tilts up, doing no damage. As the lower or outer end of the rudder is free it is necessary to have the inboard end of the rudder post pass between two uprights which thus prevent lateral motion while allowing the vertical motion. (Fig. 6) The bottom is flat and the sides instead of sloping out stand at right angles to the bottom, the whole forming a long
narrow box held together by the heavy cross pieces typical of all Korean boats. The mast is stepped just aft of the heaviest of these “yokes” and sets into a tabernacle in the same; from this project notched partners of hard wood and into these notches is set a short stout cross piece of hard wood to hold the mast in place.\textsuperscript{1} Wedges may be used to hold it more tightly forward or to either side. (Fig. 5) On the downstream trips the mast is nearly always unstepped and towed along side. The gunwales are built up of two or sometimes three boards. In the smaller boats one long board will extend from stem to stern but in the larger boats two boards will be scarfed together, the scarfing being done usually toward the stern. This is because these long narrow boats have a tendency to “hog,” especially toward the bow where the weight of the high prow exerts an upward leverage. To join the boards here would therefore be to invite trouble. Even so “hoggging” at this point is noticeable in a large number of the older boats. The usual crew is three; two to pole, tow or row and the helmsman. These boats are equipped with two very heavy oars which are used at the bow and fit into notches cut in the side, though sometimes a thong is used, either alone or in addition to the notch. A long scull is also used in the stern but the steering is entirely by rudder in boats used in the Han, the Naktong, and other rivers in the south. At the swifter rapids three or four boat crews will go together and pull each other through. I recently measured a good sized river boat and found the dimensions to be as follows:—Length over all 60 feet, beam 10 feet, depth (rail to bottom) amidships 3 feet, Beam at stern 3\frac{1}{2} feet, Beam at prow 3 feet 9 inches. This is a large boat but by no means phenomenal, some or them running to 70 or 80 feet.

I have stated that these river boats sail almost entirely before the wind. This is true and while it is almost impossible to bring these long ships about they can and do

\textsuperscript{1} Sometimes lashings are also used as shown in the illustration.
“wear ship” to bring the wind first on one quarter and then on the other. Having a perfectly flat bottom they then tend to make a great deal of leeway, to prevent which it is usual to improvise lee-boards by holding over the side, just forward of the mast one or more long heavy boards.

On the Taidong river quite a different type has been evolved. The rapids are swifter, the upper reaches of the river shallower and the prevailing winds less helpful. (Fig. 7-8) Great length with relatively narrow beam are required here also but in these boats the ratio of length to beam will be found to be slightly less than 5 to 1 while on the Han 6 to 1 is probably the average. This is due to the flaring sides intended to give it equal cargo space for less draft. Towing is more important than poling so the polers, “walk” and high prow are not needed and the tow rope is usually attached to the mast or to a towing post. The unkindness of the winds and the greater number of rapids diminishes the hope of sailing so we find a smaller mast, set further aft. On the other hand it is almost impossible for a rudder to be used and the helmsman must have sufficient leverage to handle his craft quickly in the swift rapids. This indicates an enormous steering oar, and a high stern as a point of leverage. This in turn means that the helmsman must have a bridge or platform to enable him to reach the oar as well as to make it possible for him to pick his course through the rocks and swirling waters. Figs. 7 and 8 shows all these points. Many of these boats are built with the same kind of “twist” to bow and stern as in the “Mehsangi.” It is interesting in connection with the eternal oppositeness of east and west to note that where as in the west the right side gets its nautical name of “starboard” because the “steerboard” was on that side, in the east the steering oar is always on the port or left side.

None of these river boats are decked or have enclosed cabins. A small section is used for galley where the crew

1. Fig. 8, Photo by kindness of C. A. Sauer.
cook the rice. This contains a place for a jar of the Korean pickle or "kimchi"; a moderate sized water jar; a small supply of fuel, and space for the few dishes required. Except on moonlight nights and in the safer sections of the river no attempt is made to travel at night, the boats tying up to the banks at dusk. Rolls of a kind of thatched-matting called "dheum" are spread as a shelter against the weather and when loaded the cargo is often stacked to provide a sort of cabin.

It seems probable that except as land transport supplements the water borne carrier, these boats need fear no rivals on the water for it is difficult to see how they could be improved on except in minor details. Certainly, if they are to go, I hope there may arise some artist who will study them and give us not only the beauty of orange, red or white sails against the blue of river and sky but show us the boats as they are.

Big boats and little boats there are, boats used for this or that purpose but the river craft of Korea will all fall into one or other of the types we have described. We may therefore leave them and turn to the more important class of sea-going ships.

B. Sea-going Vessels

Korean sea-going craft of today are practically limited to small fishing boats. In preparation of the "Report on Korean Fishing Vessels" the Marine Products Bureau of the Government General of Chosen actually measured and reported the dimensions of 489 Korean boats. As they represent 12 different provinces it seems probable that they form a fair sampling of Korean fishing craft. Taking length as the most easily understood dimension these boats were divided as follows:

1. Fig. 19 shows this type of awning on sea-going vessels.
2. There are small boats which are neither "Mehsaingi" nor sail-boat. They have however no features distinctive enough to merit separate treatment. Such small craft are lumped by the Koreans under the term "koru."
Length Group | No. of Cases
---|---
10 ft.—14 ft. 11 in. | 13
15 ft.—19 ft. 11 in. | 168
20 ft.—24 ft. 11 in. | 94
25 ft.—29 ft. 11 in. | 122
30 ft.—34 ft. 11 in. | 40
35 ft.—39 ft. 11 in. | 23
40 ft.—44 ft. 11 in. | 19
45 ft.—49 ft. 11 in. | 10

This gives an average length of 23 ft. 6 in. with 80% of the total under 30 feet and a bare 6% over 40 feet.

Figures 9 to 12 will give the reader a fair idea of these sturdy little craft, of which as late as 1925 there were about 12,000 on the West and South coasts of Korea.

Figure 11 is probably typical of the class of boats which form the vast majority of the present day sea-going craft of Korea. They carry one tall main mast stepped about amidships with a small fore-mast in the extreme bow. This may be as large, proportionately to the main-mast and sail as in the illustration but is frequently very small and raked forward. This is the Greek "artemon" and is the kind of sail hoisted on St. Paul's vessel when they decided to run her ashore. It is also the ancestor of the bowsprit on Occidental ships. Even after it "lay down" and became a bowsprit it was common to carry a small square sail here as you have doubtless noticed in illustrations of medieval ships. The rig is the same balanced lug used throughout Korea and China, the Korean sail differing from the Chinese in cut, size, and many other minor details but not in type. It is an interesting vindication of the Orient that after China and Korea have been using transverse battens for some thousands of years the modern science of aerodymanics now discovers them to add considerable efficiency to a sail.\(^1\) The rigging is the same as in the river boats consisting of a single halliard, topping lift, and the same kind of multiple sheet.\(^2\)

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1. Advantages of Transverse Battens—Dr. Manfred Curry, "Yachting" May 1932.
2. Some vessels now stay the mast but it is not common.
The sails are taller and narrower than the Chinese sails but the amount of sail carried is surprising when we consider that they are keel-less flat bottomed boats. The table given herewith shows the length, beam and sail area in square feet of 10 Korean fishing vessels reported by the Marine Products Bureau and similar data for 10 American yachts, the latter data taken from "Yachting," the yachts being selected so as to compare in dimensions as nearly as possible with the Korean boats.

<table>
<thead>
<tr>
<th>KOREAN BOATS</th>
<th>AMERICAN YACHTS</th>
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<tbody>
<tr>
<td>Length</td>
<td>Beam</td>
</tr>
<tr>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>10</td>
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<td>21</td>
<td>6</td>
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<td>36</td>
<td>1</td>
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<td>40</td>
<td>4</td>
</tr>
<tr>
<td>49</td>
<td>9</td>
</tr>
</tbody>
</table>

Average 15.73 16.72 3.052 3.259

For the vessels shown on this table the sail area for American boats is only about 1 sq. ft. more per foot of length than on the Korean boats and the ratio of beam to length is 3.00 for the Korean boats and a little over 3.2 for the American. I am quite aware of the fact that no general comparisons of American and Korean boats can be based on the comparison of 10 arbitrarily selected yachts, but it will serve to show that American yachts in the smaller cruising classes do not carry much more sail for their size than does the Korean fisherman and that the Korean boat is not so terribly "tubby" as has been claimed.

How close will these boats sail to the wind? That any

fore and aft rig will go closer to the wind than a square sail is common knowledge and in this lies the superiority of the Chinese and Korean sail over the Japanese. It is stated that a square sail ship will sail no closer than 7 points at the best while a fore and aft will sail as close as four.\textsuperscript{1}

It is doubtful if either the Vikings, or the Japanese, whose sails so greatly resemble the ancient Viking rig, could do anything unless the wind was pretty well abaft the beam. In regard to this Bonar says "The single square sail of the Japanese junk is virtually of service only in a fair wind; consequently at least three-fourths of the vessel’s effectiveness is impaired, for it is impossible to manœuvre and handle her except under limited conditions, under others the vessel is virtually as unmanageable as a floating log."\textsuperscript{2}

This is too extreme a statement of course, since both Vikings and Japanese took these supposedly "unmanageable logs" on long and famous voyages. But it is none the less true that this type of square sail is not to be compared in efficiency with the fore-and-aft rig of either Korea or China. The favorite craft of today attempts to combine the good features of the Japanese and Korean hulls and rig this with purely Korean sails. All this however does not answer the question as to how close to the wind a Korean boat will sail. I regret that I have never gone out with a good Korean skipper on a crack boat to actually test this out with a compass but I am convinced from considerable observation that they will sail at least as close as 6 points or even a little better. How is this possible with a flat-bottomed craft without either keel or center board? A glance at Fig. 13 or 14 will show at least part of the reason—the long deep rudder extends beneath the boat in such a manner as to serve as a center board. The rudder post is held in place by one or more jaws. (See Figs, 9, 10, 29) These jaws prevent any lateral motion but permit the whole rudder to be raised or

\textsuperscript{1} Sailing Ships and Their Story—E. Keble Chatterton, p. 45 and other authorities
\textsuperscript{2} Marine Enterprise in Japan—Bonar.
lowered according to depth of water or as the ship may be running free or close hauled. As raising the rudder would take the tiller out of the helmsman’s reach the rudder post is fitted with a number of sockets into which the tiller may be put to suit the position of the rudder. The skippers are also quite aware of the fact that such a boat sails best on her side and will shift the crew to the leeward side to make her heel and give her a better grip on the water. Rolled down they are likely to ship water amidships so, from a little forward of the mast aft to the cockpit, they are equipped with matting screens or washboards which act as bulwarks and keep out the spray. These are very ancient and can be seen in pictures of Greek ships hundreds of years before Christ. They were also used on the Viking ships and are common to this day on Norwegian boats. The anchor is the usual Korean anchor of hard wood, frequently weighted with stone, with very long shank and flukes and with a short stock crossing the shank near the crown of the anchor and not at the end of the shank as in Europe and America. (Fig. 20) As Capt. Hall writing over 100 years ago describes the Korean anchor and windlass exactly as they are today we can be sure that this is not a modern type. The cable is frequently made of straw rope in which case it is both large and heavy, the cable for a 40-50 foot boat being sometimes 4 inches in diameter. Cheap hemp rope and, for the larger boats, wire cable are now replacing this old rope, especially as straw is no longer a waste product to be had for the asking. This cable is led between two hard wood pegs in the bow, which serve as chocks, and is wound round a large reel to the ends of which two wheels with handles are fitted. This sort of windlass can be plainly seen in Figs. 19 and 20.

Usually even the larger boats carry only one anchor,

1. See Figs. 9 and 19.
3. A Voyage to the Loo-Choo Islands and the West Coast of Korea—Capt. Basil Hall, 1818.
KOREAN BOATS AND SHIPS

though now that Japanese made metal anchors are gradually replacing the old type, some boats carry an extra one as well as a small kedge. They will carry from 30 to 100 fathoms of anchor cable according to the depth of water in the locality where they ply. This is ample for most parts of the west coast where 20 fathoms is deep water for many miles off most of the shore. I do not know what may be the practice on the east coast.

For propulsion when the wind fails they carry one or more immense sweeps and once in a while even today we may see what Capt. Belcher saw almost 90 years ago "as many as ten men working at one enormous scull." Two or more poles for use in the shallow inlets and bays and a sounding pole of bamboo marked with a tuft of straw at what is considered a safe depth for that particular boat are also carried.

For a wind gauge it is the almost universal practice to fly a long narrow pennant, white, red and white, or black and white from a small bamboo staff set on the starboard side in the extreme stern. (Fig. 11) This pennant is frequently decorated with the Chinese meaning "up" or "above."

As a rule neither fishing boats nor cargo vessels carry charts, but depend on the knowledge and skill of the skipper and the "yeuncha" or look-out who takes his place in the bow at critical points. Today many fishing boats and nearly all the larger boats making long trips along the coast carry at least one compass and frequently two, one in the bow and one in the stern. The question as to the antiquity of this knowledge and practice must be referred to another section.

An interesting adaptation of these boats is worth a moment's notice. An immense amount of brushwood is consumed as fuel in the city of Seoul and boats bringing this up the river in the fall have on either side a built out framework approximately equal to the beam of the boat, thus enabling them to carry three times the normal deckload of this

light but bulky freight. A craft fitted with such a frame is shown both with and without load in Figs. 16 and 17. To secure the needed stability a heavy log is suspended from the outer edge of the framework on the starboard side. When the vessel heels to starboard this must be forced under water, and when she heels to port its weight must be lifted. It thus functions exactly as the outriggers on the craft of the Indian and Pacific oceans. It is just visible in Fig. 16.

The boats are usually of extremely heavy build. In this as in their other features they are built to meet special conditions. Extremely high rise and fall of tide, wide stretches of mud-flat and the short, sharply breaking seas and the tide rips of the west and south coasts of Korea demanded a boat that could take a pounding, would carry both freight and sail and could be depended upon to ride the seas it had to meet and which would stay right side up when left by the tide as well as when afloat. These things the Korean boat does very well and while not as fast before the wind as the sampan type or as heavy and sea-worthy as the great Chinese junks it is still a very able little craft and well adapted for its work.

It would be wrong to leave the impression that all Korean boats are little 20-30 footers. The shrimp fishing vessels with their huge booms and enormous nets are seldom less than 45 feet and sometimes 60 or 70 feet long. Also, while taxation, land transport, steamers and motor boats as well as more modern types of sailing vessels have sadly cut the coastwise freight trade, once in a while a 60 or 70 foot in old-style Korean ship can still be seen. Fig. 17 and 18. In these the sail area is carried on two very tall masts and the artemon mast already referred to. No sail is shown on this mast in the illustration because the ship is "wung out" running before the wind and the main and mizzen sail would blanket the little fore-sail. The rake of the masts is shown

KOREAN BOATS AND SHIPS

a little in Fig. 18 but still better in Fig. 19, where two of these boats are shown at anchor in port. The pronounced rake to the mizzen mast is supposed to have a lifting effect to counter balance the downward push of the main. This could perhaps be secured by stepping the mizzen mast fur-
ther aft but this is difficult because of the desire to utilize the amidships "mongeh" or yoke in stepping the mast, and also due to the Korean conviction that the two masts must converge toward the deepest part of the boat. This in turn is probably due to an empirical knowledge that the center of effort should be the center of resistance. Foreigners who never heard of either assume haughty airs on seeing such a craft and talk about it being "just like a Korean to set his mast any old way." Fig. 19 also shows the matting splash boards, the windlass and the thatched-matting called "dheum" which is used as an awning.

This type of freight carrier used to be built in large sizes and boats carrying 1,000 sacks of rice (about 200 tons) were not uncommon. Today however a compromise type in which the hull more nearly resembles the Japanese sampan type is coming into more common use though the Korean rig and sail plan is retained.

Just a word more which should be unnecessary but is required because of the average person's peculiar ideas about the possibilities of wind propelled vessels. The landsman is at first very much surprised to learn that it is possible for a boat to sail in a direction contrary to that in which the wind is blowing. Having once found that this is possible he flies to the other extreme and expects the vessel to plow grandly on the teeth of wind and wave. Now when wind and tide oppose each other the sailor can "lee-bow the tide" and by using its force to counteract that of the wind make surprisingly good progress but when the tide combines with the wind he is helpless or nearly so. One writer says contemptuously that "the average Korean boat can do little against a four or five knot tide." Neither can any other kind of sailing ship, unless she has a half a gale to help her, and
even the motor-boats which now ply these coasts prefer to anchor rather than buck such a current. It is always difficult for us to realize that the ocean has not only surface motion which makes us extremely unhappy but that it is in almost constant motion in great tidal currents. At Mokpo and at least one other place on the south coast of Korea the tide pours in and out of great basins at the rate of 7 to 10 knots; at the Chasansaktot and the Tungsansaktot it rushes round those points at from 6 to 8 knots and currents of from 3 to 5 knots are the rule rather than the exception. Against these the Korean boat is indeed almost helpless but the Korean sailor has learned to know and use his tides with great skill. He will cock an eye at the sun, figure what day of the moon it is, take a glance at a far away mountain and tell you that in two more pipes the current here will change and run so and so. This is perhaps no more than he should know from life-long experience but let us both give him credit and if possible be led by his experience.

So great is the similarity between Korean boats wherever their home port that little more need be said. Some slight difference will be noted between the lines of the boats shown in Fig. 13 and Fig. 14. The east coast boat has a tendency to a sharper and lower prow. The stern construction and the angle at which the rudder is set as well as the rudder itself show minor differences.

It is possible that here and there along the coast there are other boats devised to meet special local conditions and therefore peculiar to a given locality but in the main the preceding pages may be taken as fairly descriptive of all Korean river and sea-going craft. The rig is more or less peculiar to Korea and indeed the rigs of the three countries are sufficiently distinctive so that they may be distinguished at a glance as far as they can be seen.

The pure Japanese rig is a square sail with vertical seams hung from a single yard. There may be two or three

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masts but each carries a single square sail, the idea of topmasts and topsails being apparently unknown in the Orient.

The Chinaman may come from Shantung or Canton and his rig or rather the cut of his sails, the rake of his mast and even the type of ship will vary according to the port from which he hails. In general however he will be found to carry a balanced lug with transverse battens which is a close relative of the Korean. The Chinaman’s sails will generally be wider in proportion to their height than the Korean, and the battens are closer together. Again, the Chinaman peaks his yard up till at a little distance it looks like the gaff on an Occidental ship. To do this he necessarily has both throat and peak halliards which is entirely unknown (and unnecessary) on Korean boats.

The Korean boat and rig has already been sufficiently described but is distinguished at a distance by the fact that the yard (or gaff) is not peaked up at all but hangs horizontal and at right angles to the mast and for this reason a third or more of the yard will project beyond the mast at the top, whereas with the Chinaman only a very small proportion of the yard is forward of the mast.

The Government General survey goes into the technical questions of angles of rail immersion, metacenters and other measures of stability. Of these things I am not competent to judge. Certainly no boats, of such shoal draft as the Korean, can have the stability of deep draft keel boats. On the other hand their beam and lines give them a truly amazing degree of stability. It is difficult to see how deep draft boats could be used at least on the west coast of Korea or how anything but a flat-bottom boat could be practical. All in all they have for some hundreds of years proved their usefulness and value in the conditions for which they were built. It is probable that the modern combination of a compromise Japanese hull with a Korean rig will prove better

2. Fig. 33 gives the lines of a typical west coast fishing vessel.
than the purely Korean style. In any case the government is convinced of this and is gradually bringing pressure to bear to discourage the building of the native type of hull. It is therefore more than likely that in another decade this kind of vessel will disappear from the seas it has served so long.

In the next section we shall attempt to give a brief and non-technical description of the methods of construction of these vessels.

III. CONSTRUCTION

For one who is not a marine architect and has very little knowledge even of carpentry to attempt to discuss or describe methods of ship construction is doubtless presumptuous. I must frankly confess that such things as block coefficients, longitudinal and transverse metacenters, moment to change trim, righting moment in foot tons, areas of wetted surface etc., are utterly beyond me. I will go further and admit freely that I have only the barest and most recently acquired acquaintance with scarfing, notching, tenoning, cogging and their brethren of the carpenter’s art. With this acknowledgment of my disabilities for which I crave your forbearance I will do the best I can without the aid of technical terminology to describe Korean materials, means and methods of ship construction.

Ship-building in Korea has never been reduced to a science and apparently has always been done by rule of thumb rather than to exact specifications, plans or lines. It appears to have been and to be today largely an hereditary trade of which the secrets are handed down from father to son and absorbed by the toddlers along with the smell of fresh cut pine and the sawdust and chips of the shipyard. In the big yards at Noryangchin (Fig. 21) just across the river, where they have been building boats for 500 years, three or four generations may be seen working and playing among the ships. The old gentleman who is in charge and his forbears before him seem to have worked entirely without written specifications, plans or drawings, as did ship-
builders all over the world for many hundreds of years. Indeed there are still old shipwrights in both Europe and America who can and do build good boats with little or no knowledge of the technical science. How early the art began to be reduced to a science in Europe it is difficult to say but the Pepysian ms. contains an illustration dating from the latter half of the 16th century, in which a ship designer is shown at work with his assistants. His plans are laid out on a drawing table and he is at work with compass and rule on the plans for a ship.¹ It seems evident, however, that no such development existed in Korea for there are numerous memorials to the king on naval matters in which one of the chief complaints is that Korean ships are built by no rule but according to the whim of each builder. I have found only one rather indefinite reference which might indicate the existence of plans or uniform specifications. In 1686 Yi Chi Won made certain criticisms of the Korean navy. In answer to this Kim Su Hung in addition to other arguments, stated that the dimensions of Korean naval vessels had been fixed by official order in the days of Admiral Yi Sun Sin and that changes in these approved dimensions could result only in confusion and disaster.² How definite or detailed these specifications may have been we do not know, but other references would leave us to believe that they were most indefinite. In any case the ordinary ship-builder seems to have gotten along without any at all. This does not of course mean that design or construction was faulty. Mr. Immamura himself admits the superiority of Korean design when he tells us that shipwrights were sent from Silla to teach the art of ship building to the Japanese.³ It did however prevent the scientific development which always ensues when results are accurately recorded and thus made available for study and comparison.

For material the Korean shipwright naturally chooses

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2. Mun-hon-pi-go, Continuation, Vol. XXIV, No. 120, p. 12.
3. Ships of Korea—Immamura, Chap. VI.
pine. In addition to its availability, it is excellent material for ship-building. While the Korean pine is not the same as the American yellow pine it has many similar qualities. It is strong, medium hard, very resinous and very durable. Patterson says of its relative, the American yellow pine "Except for the lightest hulls it is the best wood for keelsons, stringers, and the like, and when weight is not an objection it is a splendid planking material."¹ Trenails are used almost exclusively in Korean boats even today and these are almost invariably of oak, as are the anchor chocks, the pegs for the sweeps and other fittings where a hardwood is required. The wood is not usually allowed to season thoroughly as it thereby becomes too stiff to bend easily. In the use of pine and of only partially seasoned timber the Korean follows the same usage as the ancient Greeks and Phoenicians, who were equally ignorant of the use of the steaming box.² To bend the heavier timbers the plank is wedged firmly under a stone or root of a tree and a support placed close to the inner end so that the plank projects up at quite a sharp angle. The outer end of the plank is weighted and a fire kindled under the inner end close to the support. (Fig. 22) At the same time that the fire is doing its work on the under side water is poured on the upper side of the plank. As soon as sufficient bend has been secured the fire is moved on out toward the outer end. Sometimes when a bend is desired at one spot a higher support is used and a pan of glowing charcoal placed under the plank at the desired place and left to do its work. For lighter planks one end may be firmly fixed in its place on the boat and the other then forced into position while boiling water is poured over the plank at the place where the bend is most pronounced.

The Korean shipwright uses much the same assortment of tools as his brothers in other countries. The ubiquitous Korean saw, in a variety of sizes and forms; the adze,

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¹ Small Boat Building—H. W. Patterson, p. 23.
² Sailing Ships and Their Story—E. K. Chatterton, op. 62.
especially the large, long handled adze, in whose use the Koreans are so skilful, chisel, maul, and augers make up the list. Today he uses a number of modern clamps. Formerly he had some crude metal clamps but a good deal of this work was done by rope or vine made fast and then tightened by twisting or by the judicious use of levers. (Fig. 27A)

In putting the bottom together the joint used is most commonly that which I believe is known as “ship-lap,” the fastenings being oak trenails. Fig. 24 shows the bottom-timber of a large fishing-vessel already laid down and some of the side planking in place. Fig. 23 shows the bevel for the joint and the shipwrights at work on the trenail holes.

After the bottom has been completed the sides are put on. It is necessary to remember that there are no ribs or frames as in an Occidental boat. In building up the sides a sort of modified ship-lap (Fig. 27B) is generally used though a tongue and groove-joint is not unusual and can be seen in some of the illustrations. (Fig. 25) Where possible in the smaller boats each plank extends from bow to stern but if a joint is necessary sometimes a tongue and groove is used and sometimes they are scarfed. To draw the planks together before the trenails are driven, a rope is fastened under the lower and over the upper plank and then drawn tight by pressure exerted on a lever that has been inserted under the rope. (Fig. 27A) The trenails are driven diagonally down from the outside of the upper plank and project on the inside of the lower plank. These ends are later sawed off, and the outer end countersunk.

It is common though not universal practice to step each plank out a little so that Korean boats from a distance frequently have the appearance of being clinker-built. (Fig. 27B)

The bottom and sides completed, the craft roughly resembles a box or trough without the ends. Fig. 26 shows the appearance at this stage. The next operation to the construction of, what for lack of a better name, I must call the bow and stern planking. There is of course neither stem
nor stern-post. Very heavy planks, or logs, frequently left round on the outside are fastened across the bow, projecting slightly beyond the sides. At the top a very heavy piece is placed across the bow forming the first of the heavy cross timbers which hold the boat together. This particular timber is called the "tok-pan" (톡반) or "chin-plank," the others being known as "mongeh" (몽예) or "yokes." In the stern the method is the same as in the bow except that the timbers are flattened both inside and out. The angle which the stern makes with the water is much sharper than in the bow and the stern is not curved as is the bow. Figs. 28 and 29 show respectively the bow and stern of a large fishing-vessel and will give a fairly good idea of the method of construction as well as of the appearance when finished and show a number of other details of interest. The long rows of countersunk trenails, the projecting ends of several of the cross timbers and the easy lines and entrance are all shown in Fig. 28. Fig. 29 shows the jaws which are to hold the rudder-post in place, and, in the projecting shelf-like after-deck, the hole through which the head of the rudder-post is to emerge may be seen. The immensely heavy stern yoke (Korean: koh-mul mongeh 고풍몽예) will later be sawed off about a foot beyond the gunwale. It is not only the large cross pieces or yokes (Fig. 27C 1) which hold the boat together. Below each "yoke" is a series of 3, 4 or more lighter timbers extending from side to side of the ship and each slightly bowed up as shown in Fig. 27C 2-6. These are called "changson" (장손) and their tendency to spring out holds the sides out against the pressure of the water. Though in no sense ribs it is really these changson which perform the work of ribs. These "changson" and the yokes are put in after the sides, bow and stern are completed.

Fig. 30 is a photograph taken just aft of the step of the main mast looking forward. It shows several "changson" one above the other, the topmost cross piece of "tok-pan" in the bow; and the Kodung and Chak mongehs, the two heaviest yokes in the ship. In these will be seen
sockets for the heavy partners into which the mast will set where it emerges from the deck. The mast-steps themselves (Koreans: Tôt-kop) can also be seen in this picture. "Changson" and "mongehs" in place the rest of the deck beams are laid as shown in Fig. 31 in which the rail is also seen. This will later be filled in with the matting bulwarks or splash-boards already referred to. Little now remains to be done, aside from decking, flooring and the fitting of windlass, rudder etc. Of course masts must be stepped, sails made and bent to the spars and a hundred other details completed but the hull is now finished. She will be caulked with cotton, bark fibres or bamboo shavings or perhaps today it is more likely that oakum which is now available will be used. In ninety-nine cases out of a hundred the wood will be left without paint, varnish, stain or decoration. It is true that hundreds of years ago it was customary to decorate Korean boats with pictures of dragons and water fowl.¹ But today with very few exceptions the hulls are left without any decoration. From time to time as necessary she will be careened and the marine growths on her bottom burnt off with a pine-torch and then scraped but it is improbable that her bottom will be treated or painted to prevent or check such growths.

The interior arrangements of such a vessel are fairly conventionalized. In the extreme stern is a small half-deck democratically shared by captain and crew. Just forward of this is another space which may serve either as an after-hold or as a passenger-cabin according to circumstances. Beyond this is a galley and storage space for the ship's stores. Between the main and mizzen mast is cargo space and beyond this an undecked space most of which will probably be used for cargo.

As mentioned in the previous section, less and less of these boats are being built each year. For this reason I have taken more space than would otherwise be justified for

¹ Koryu To Kyung—Sohkeung.
the description both of the boats themselves and for the builder's methods. For this reason also those who are interested in the sea and the history of shipping should avail themselves of any opportunity to study these sturdy and picturesque craft. The opportunity to see them will not be for long.

IV. RITES AND CUSTOMS

So immense is the sea and so varied are its manifestations that man seldom conceives of it as under one single sea-deity. Tides, the configuration of the bottom or other physical features give to certain localities special characteristics. These manifestations are attributed to the action of local gods, spirits or demons. Tylor in his Primitive Culture says "Divine springs, streams, and lakes, water spirits deities concerned with the clouds and rain are frequent and many details of them are cited here, but I have not succeeded in finding among the primitive races any divinity whose attributes fairly criticized will show him or her to be an original and absolute elemental Water-God."

This would almost serve for a statement of the beliefs or ideas of the Koreans with regard to the sea. There is, it is true, a term used for the Spirit of Water as a whole. Again in the famous story of Sim Chung, the filial daughter, the heroine appears before the King of the Sea. The average fisherman or sailor however knows nothing of any such god. He is chiefly concerned with the local spirit or god of his port; the spirits presiding over various dangerous places on his course, or the god of the fishing grounds.

Little or nothing can be found in print on the subject of spirits of the sea, or the beliefs and superstitions of the seafaring population. Even the works on Korean superstitions recently put out by the Keijo University have nothing

2. There are three books in this series Chosen-eui-kusin (Spirits of Korea); Chosen-eui-Mu-kyuk (Shamans of Korea); and Chosen-eui-Pung Su (Local Spirits of Korea).
on this subject as such, though referring to various local spirits and the legends connected with them. The "Choson Sin Ka Yu Pyun" or Traditional Spirit Songs of Korea compiled by Mr. C. T. Sohn contains a chant or incantation used by the "Mudang" at the sacrifice held before setting out on a voyage. Dr. Jones’ paper on "Korean Spirit Worship" (published by the Korea Branch of R. A. S.), Dr. H. G. Underwood’s "Religions of Eastern Asia", Dr. Clark’s "Religions of Old Korea" and Hulbert’s "Mudang and Pansu" in the Korea Review give some general information on the subject but little specific in regard to the sea. Nor is it easy to get information from Korean sailors. Some have a superstitious objection to talking to a Christian about such things and others are half-ashamed of these old beliefs and fear that what they say will be used to ridicule the Korean people.

Such information as I have gathered has come partly from the publications referred to and partly from personal interviews and observation.

There appear to be six occasions on which the Korean sailor offers more or less formal sacrifices to the spirits.

1. Immediately after the launching of the ship.
2. On setting out on a voyage.
3. At certain especially dangerous places along the coast.
4. On the fishing grounds, before beginning to fish.
5. On the return from a prosperous voyage.
6. During a storm.

To this should possibly be added a seventh, sacrifices offered to avert the consequences of special omens of bad luck. In these sacrifices the services of a "Mudang" (sorcereress or Shaman) may or may not be secured. Where there is a Mudang of some reputation, or one who has certain semi-proprietary rights in the shrine her services will be

1. Prof. Hulbert's article gives the most detailed information I have found. See Korea Review Vol. III p.257-360.
required. Thus, on the Yonpyon Island in the middle of the large fishing grounds off Haiju Bay, there is a resident Mudang whose influence with the Spirit is very great and there are few skippers who dare to dispense with her services. On the other hand, it would seem that at landings, the outset and return of voyages, very often no Mudang is called. Once at sea the sacrifices must of course be performed by the skipper and crew themselves.

Sacrifices may be held either night or day, though the night is preferred because it is the time more favored by the spirits. When they are held at night a candle or light of some sort is set by each "table" of offerings during the sacrifice, and some captains think it best to leave these lights burning all night.

As would seem natural there is more of ceremony, more of fixed and formal rite when the sacrifice is conducted by the Mudang or Shaman, the custodian of traditional and written spirit lore than when carried on by the laymen. This is indicated in the chant to which I have referred. Beginning with references to Inwang who created man, it goes through the other benefactors of the human race especially addressing Hanwon who first made boats; it then says "Placing the Fish to the East, the Meat toward the West, Fruit in the South and Vegetables in the North, tie up the pig and pile high the sacrificial offerings and loudly beat the drum."

This is followed by an appeal to the following deities or powers in order:—

1. The Dragon Kings of the Four Seas.
2. The Chilsong or Dipper.
3. The Spirits of the Five Great Mountains.
4. The Sun, Moon and Stars.

The chant is very long and full of beautiful poetical figures of speech: the flutter of land birds over the bay; the mingled sorrow and anticipation as the sailors bid farewell to blue mountains and rocks and trees; the sea whitened with gulls; the distant sound of monastery bells,
and much more, in a most attractive swinging meter. Apparently the poem is intended to describe the whole voyage to China and return and closes very beautifully "as the wing-weary wild geese drop down to rest and the moon sets over the fishing village, the boats come home on silver seas."1

A good deal of this is pure Chinese, but a word or reference here or there make it plain that it has at least been reset and adapted for Korea.

It is interesting to note that immediately after the apostrophe to the Dragon Kings of the Four Seas, the Dipper, which points us to the Pole Star, is addressed.

All this however is very formal as compared to the sailor who, as far as I can find out, lays out his sacrifice, makes his libation of liquor (this last in truly Caledonian amounts) and at once proceeds to put the balance to a more practical use by getting as drunk as possible.

The cost of such a sacrifice, whether conducted by a professional Shaman or not, is usually borne by the owner-captain of the ship, though sometimes shared by the crew. Where the ship is a cargo vessel it often happens that the shipper of the goods will pay for a "Kohsa" or sacrifice as a form of marine insurance. Here again a part of the expense may be borne by the captain so that the ship may share in the protection secured. At the time of the sacrifice there are various customs intended to emphasize the idea of personal purity. These customs are not particular to marine sacrifice but are said to be common to all spirit sacrifices. For at least two days before the ceremony the participants and their families are supposed to eat no "unclean" food; on the night before the ceremony they are to bathe in cold water. In common with nearly all peoples, it is usual at the time of religious ceremonies for the men to live separately from the women of their families and it is also usual that any women of the families concerned whose menstrual

periods come at such a time shall temporarily leave the
house.

According to the wealth and tastes of the individual
concerned, there is a wide range in the materials offered as
sacrifice; the form of offering; and the decorations: Pork is
considered the best, and the pig must be all black or all
white, mixed colors being considered unpropitious. Fish,
cooked rice, bread, cakes and liquor are all used, as are
fruits and vegetables.

The ship is decorated with a variety of flags, Dragon,
Tiger and the General. (Fig. 34) The Dragon would seem
to have a good right to share in such ceremonies but it is
a little more difficult to understand the claim of the Tiger
and the General. As explained to me the wood of which the
boat is built is all taken from the mountains which are the
Tiger’s special domain, while “General Im” is apparently a
Korean general who won fame in the Manchu invasion, was
deified as a sort of patron saint of sailors and has inherited
some of the attributes of a Chinese general of a much earlier
date.

In addition to these flags there are a variety of others,
one inscribed with the Chinese character “上,”¹ and others
in various shapes and forms. The Tiger banner and
a small green pennant dedicated to the “Soh Dang”
are flown from the little foremast (Fig. 35, 36) but the rest
are raised on special bamboo staffs in the stern. In addition
to flags a number of very long and flexible staffs or canes
decorated with tufts of grass and rosettes are erected and
allowed to bow and wave gracefully in the wind. (Fig. 37)
Drums are frequently used and at a large Kohsa which I
witnessed on Suop Island the crews made night hideous with
the screech of the Korean “Peereh” or pipes.

The ceremony performed at the launching of a ship is in
many ways most interesting; though often so simple and
informal as to hardly merit the title of a ceremony. Each

¹. This is a ceremonial flag, not the pennant referred to in a previous
section.
vessel is supposed to carry two fetiches, one placed amidships and one in the stern and the places where these are located are known respectively as the Soh Dang and the Ryuk Dang. The name "Dang" is rather deceptive, to the foreigner who is accustomed to translate this as "shrine." There is usually nothing whatsoever which could possibly be called a shrine. It is at best the place where the fetich is. This consists of nothing more than a piece of blank paper, folded and hung up so that the open or unfolded end is down, such as may be seen hanging from the rafters of many Korean houses. The ship is decked with the flags and streamers to which we have referred, the folded papers are hung up, and offerings of food placed before them. The "Sohdang Son-ang" is asked to come and reside in the fetich and the same appeal is then made to the Ryuk-Dang Son-ang.

My informant was quite sure that the Sohdang Son-ang was the spirit which abode in and protected the destinies of that particular ship. As to the Ryuk-dang Son-ang he was very vague. It differed in some mysterious way from the Soh-dang, and there must be a Ryuk-dang as well as a Sohdang. Also, where sacrifices or appeals are made it is always to both. From the name "Ryuk-dang," its location at the stern and the positive statement that the "Sohdang" represents the spirit of the ship itself I have ventured to conjecture that the "Ryuk-dang" might represent the shrine and "land" spirit of the home port. It would seem reasonable that when in trouble both the spirit of the ship and the spirit of the home port should be appealed to for aid. Rather against this theory is the fact that it is quite common to find both a Soh-dang and a Ryuk-dang as the first and second ranking spirits in the village spirit grove. The whole question awaits more careful study.

The sacrifices at the outset and return from a voyage are roughly similar except that the one of course is chiefly a service of supplication and the other one of thanksgiving. At the outset the flags are flown at the top of the staff while
on the return from a prosperous voyage some time before the home port is reached the ship is dressed with flags but this time at half-mast. As a sailor said to me "Why, of course, if she comes dragging her flags, she must have had good luck." It seems probable that this is intended to simulate the difference between an empty ship high out of the water and one loaded to the gunwales.

We have said that sacrifices are offered at dangerous points, and the coast of Korea is a dangerous one for mariners. Rocks, islands, shoals, swift currents, fogs, and typhoons combine to make the sailor’s life "chancy at best." I have seen both the Teungsankot and the Chang-sankot in action and it seemed as though those waters must indeed be the home of some Evil or at least Uneasy Spirit. I am not ashamed to confess that I offered a silent prayer as we plunged into that seething mass of confused waters. Instead of oars worked by human arms we had a sturdy little motor but as the whirling current seized us and flung us first one way and then another it seemed as if malignant hands were gripping at our keel and trying to prevent our passage.

At such points on the coast, the Korean skipper anchors just before entering the danger zone and offers sacrifices to the Dragon or other spirit who rules the locality. Sometimes he may go ashore and sacrifice at the "Dang" or shrine which is almost certain to be found there. Sometimes he holds the sacrifice on board. If he is poor or if he considers the risk not too great there will be only one "table" of offerings placed in the bow. If his circumstances permit, or local circumstances demand there will be three: in the bow, amidships, and at the stern, but all on the port side. Some offerings and prayers will be also made to the Sohdang Son-ang and the Ryuk-dang Son-ang. The sailors then beg the spirit to grant them safe passage and proceed

1. This word pronounced "Son-ang" is really "Song-Whang" or king of the city, locality or special place.
to throw a portion of the food, liquor, or other offerings into the sea, also always on the port side, adding to their prayers the words "Kohsuray Kohsuray." My informant had no idea what these words meant but was sure of the importance of repeating them. After all sacrifices except those on a safe return, if the time or the weather prevent an immediate departure it is considered necessary to at least shift the anchorage. This is probably intended to simulate the beginning of the passage for which prayers have been offered.

On the fishing grounds, it is frequently the custom to patronize some well-known and potent spirit on a nearby island. If such a shrine is not within reach, before the nets are cast or any fishing of any kind is begun, the ship will come to anchor and a sacrifice similar to that made at dangerous points will be offered. The prayers here are of course for a good catch but the form of the sacrifice and the use of the formula "Kohsuray Kosuray" is exactly the same.

As to sacrifices during a storm, I have no evidence except Dr. Gale’s statement that he witnessed such a sacrifice offered by the crew of a boat on which he was a passenger. ¹

In the "Account of a Shipwreck in 1636" it states that on the evening of the eighth day of storm they saw a seal, which the scholar, who writes the story, interpreted as a sign of good-luck. On this they all joined in saying in concert "Kwan-se-eum Posal, Kwan se eum Posal." This of course is pure Buddhism.² Later they cast lots to ascertain the future and again on the ninth day they all prayed to their fathers’ and mothers’ spirits.³ But in all this there is no mention of spirits or gods of the sea or of sacrifices to them.

2. Perhaps I should say "Confucianism and Buddhism mixed," since the interpretation was from the "Book of Changes."

4 Vol. 23
I have mentioned occasional sacrifices to avert bad luck. Of these I can at present give only one example. It seems that dogs are bad luck on a ship and that sailors are loath to carry them. If then, while a ship is tied up in port a dog should chance to run up the gang plank and come on board it behooves the crew to search out the dog’s master and purchase the animal from him even at an exorbitant price. The Tiger flag is then raised on the foremast and the dog is sacrificed before it.

In addition to such sacrifices as these which are directly connected with ships and their welfare it will be plain from what has already been said that there are shrines on islands and promontories at which sacrifices are offered to the tutelary deities of the adjacent sea, whether conceived as dragon or spirit. Such sacrifices are similar in all essentials to those which we have described. In ancient times and, indeed according to some, down to the early part of the present dynasty once a year it was the custom at certain points on the coast to offer, a human victim, a young girl, who was thrown into the sea to propitiate the sea-dragon. In the south this was done at Po-ryung in Choong Chung Province, and in the north in Whanghai, some say at the extremity of the Changsankot, and some claim from the cliffs of Chodo Island. On this custom is based the famous story of Sim Chung, the filial daughter who, to save her father, sold herself for such a sacrifice. This story is in Vol. IV of the Korean Language Readers. In this version the sacrifice was at night and she leaps from the land, presumably a cliff, into the sea. Miss Metzger and Mr. Taylor’s English version make her leap from the ship into the sea.

There are many places especially along the coast where the name of village or bay; rock or whirlpool; includes the

3. Tales Told in Korea—Berth a Metzger.
character for "dragon" indicating that at some time it was considered to be the abode of such a being. King Munmu of Silla is said to have become a Sea-dragon after death but was later persuaded to return to his tomb. Further study of the subject of dragons would doubtless bring out a great store of local traditions as to sea-gods and spirits. In addition to dragons and other spirits there are the ghosts of the dead who haunt the scene of their death. A case in point is the famous Son Dol Mok in the river Han, presided over by the spirit of the boatman Sondol who was unjustly beheaded by the King. ¹

Closely allied to the more formal worship of sea-gods are various superstitious ideas of good or bad luck of which I will mention only a few.

During the first month of the year the captain of a ship and his sailors should eat no meat which has been shot, the meat of the Noru (the Korean deer) being especially unlucky. During this first month it is also very bad luck to carry any women passengers.

One should not begin a voyage on the first of any month, or on any of the eights—(8th, 18th, or 28th).

Should a child be born in port on the day the ship is to sail or even on the day previous, the crew should go together and buy a present of rice for the baby to insure their own good luck. The present may be large or small but a present must be made.

Such then are some of the ideas, superstitions and beliefs which held sway in the minds of Korean sailors for hundreds and perhaps thousands of years. In the next section we shall glance as briefly as possible at the naval or marine history of Korea and we should remember that the history of which we shall speak both created some of these ideas and was conditioned by them.

V. HISTORY

Traditions and the Three Kingdoms

What history lies back of these boats which we have been describing? Have they always been what they are today? Has there been either progress or degeneration; and if so which?

How interesting it would be if we could unearth accurate records which would answer these questions!

For the present I can only ask you to accept such facts and evidences as I have been able to gather as preliminary to a more through and exhaustive study to be made in the future.

The Korean is steeped in Chinese mythology and from his point of view to begin at the very beginning we should go back to days somewhere in the dawn of the oriental world. Then Suin, the Chinese Prometheus, produced fire; Yusoo made houses; Sillong taught farming and the use of medicinal herbs; Pokheui instituted buying and selling; Todang made a calendar by which we might record the passage of time and Hanwon went upon the high mountains, cut wood and built and launched the first fleet of some seven or eight boats.

Interesting as this may be, it is a little too vague to satisfy the passion for historical accuracy; and to the occidental it does not seem very pertinent to Korea. To the stickler for meticulous precision Tangun of some 4,000 years ago is only one degree more real than Hanwon, but tradition tells us that Tangun sent his three sons and his daughter to the island of Kangwha, to reach which they obviously must have had boats. Furthermore, they built here a great sea-fortress on the site of the present Cheungdung Monastery, the sister carrying the stones for the walls in her apron while the brothers built the ramparts. Tangun was not content with land-defenses and made one of his sons Admiral of the Southern Seas to protect himself against naval attack.¹

¹. Ancient Navy of Korea—An Whak, Chosen 1931.
Tangun’s navy and its admiral seems to have been rather too much for Dr. Gale so he knocks off almost a thousand years and tells us that Korea made her first ships about 1500 B.C.\(^1\) Even this is more than Hulbert cares to vouch for and he says nothing about the first boats but tells us that “in 748 B.C. naval matters received some attention and a number of war-vessels were launched” and on the same page he states that in 710 B.C. a great famine occurred and a large fleet of boats was sent to China to purchase rice for the starving Koreans.\(^2\) Coming down a little later to about 150 B.C. Mr. Hulbert speaks of “the sea-faring propensities of the people of the three Hans.”\(^3\) (The three petty kingdoms of Mahan, Chinhan and Pyonhan) Unfortunately Mr. Hulbert here as elsewhere fails to give his authority so that it is impossible to check these statements or to search his sources for other items of related interest.\(^4\) According to the same writer Tsushima Island became a dependency of the Kingdom of Silla soon after that kingdom was founded under King Hyukuse (57 B.C.), and there was constant intercourse between the island and the mainland.\(^5\)

It is probably safe to admit that the people of the Korean peninsula were familiar with the use of boats even before the dawn of history, and that they early became sufficiently proficient in their use to venture not only to nearby islands but across the Yellow Sea to China.

The above paragraph brings us to the period of the Kingdom of Silla (57 B.C.—935 A.D.) and to the realm of comparatively accurate recorded history. This accuracy is attested by the care with which eclipses and other astronomical phenomena are recorded and the correctness of such

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1. History of the Korean People—Gale, Chapter I.
3. Ibid—p. 33.
4. Prof. Hulbert states in the preface the main sources on which he drew, but specific facts or dates are nowhere referred to their sources. For history he states that he followad the Tong Sa Kong-yo, the Tong-guk-tong-gam, the Kukcho Pogam “and many other works.”
records. The chief sources for this period are the Sam Kuk Sa Kui and the Sam Kuk Yu Sa as well as other histories which are known by quotation or references in later works. There are also extant and to be seen in the museums of Seoul, Kyungju and Tokyo a large number of relics of the civilization of this period. Among these is a most interesting and beautiful little boat (Fig. 39)\(^1\) dating from sometime between the 4th and 7th centuries of our era.\(^2\) From the scale of the helmsman seated in the stern-sheets it would seem to represent an 18 or 20 foot boat. The lines and proportions are good and the original must have been both a dainty and a sea-worthy little craft. It is in any case the oldest representation of a Korean boat which I have found and if we accept the earlier of Father Eckardt’s dates it is 1,500 years old.

However, we are not limited to this pretty little toy for our knowledge of the period, nor were Silla’s ships confined to small boats such as this. We have already stated that she maintained intercourse with Tsushima across the stormy straits of Japan. There are numerous records of naval and maritime activity throughout the history of Silla and the Period of the Three Kingdoms (Silla, Paikche and Kokuryo). Thus in 467 A. D. inroads of Japanese pirates became so severe that a number of war-vessels were fitted out to chastise them.\(^3\) On one of these punitive expeditions against the pirates of Dagelet Island (Korean Oulungto) it is said that the prows of the vessels were decorated with lions’ heads, the fearful appearance of which was calculated to overawe the sea-robbers. In any case the pirates were overcome, whether because of or in spite of the lions. It is claimed that a naval school was begun under King Chijung (500-514 A. D.) \(^4\) and it seems certain that such a school

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2. History of Korean Art, Eckardt, Fig. 361, Plate CXIII (Eckardt’s illustration is of a man on horseback found at the same time and place as was the boat.
as well as a Bureau of Naval Affairs existed under King Chin-Pyung (579-632 A. D.).\textsuperscript{1} We are told that "navigation" was studied in this school. As almost nothing has been found to tell us how much the Koreans knew of navigation as a science, what would one not give for a peep into the class-rooms of that school or for even a single line to indicate something of their knowledge of either pilotage or navigation!

King Munmu (661-681), whose magnificent tomb near Kyungju is one of the wonders of Korea, appointed a Minister of Marine Affairs\textsuperscript{2} and took a good deal of interest in the navy, sending a fleet of 100 vessels up the western coast of Korea to look after the interests of the country.\textsuperscript{3} Perhaps this interest in the sea was continued after death for it is said that he became a sea-dragon and caused considerable trouble before the exorcists could persuade him to return decently to his grave.\textsuperscript{4} King Kyungdok seems to have extended the sphere of the Marine Affairs Department and made certain changes in it in 746 A. D. The name of the department at this time might almost be rendered into English as Department of Communications. In all these references there is only one which gives us any idea of the size of the ships of those days. It is said that in the reign of King Sundok (780-785 A. D.) a number of very large warships each carrying a crew of 300 men were built. The record as to the size of the ships is not clear but apparently means that they were from 80 to 100 feet in length. It is further stated that horsemen could ride about on board.\textsuperscript{5}

As the dynasty draws to a close we find Wangken, who was to found the new dynasty serving as Admiral of Silla and leading his navy against the pirate-infested islands.\textsuperscript{6} The glory that was Silla ended in 935 A. D. when Wangken

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5. Munhonpigo, No. 120, Pyungko, p. 1.
sent a war-ship to escort Kyunwhun the last king of Silla to asylum in the capital of the new kingdom of Koryu.\textsuperscript{1}

Aside from such brief items we know almost nothing of the ships or maritime knowledge of the men of Silla. We do know that their boats must have been of considerable size since both Silla and Paikche on several occasions sent presents of camels to Japan, and boats which could safely carry even one such clumsy beast across the stormy straits must have been much larger than the fishing-boats we are accustomed to see today. We also know that both Silla and Paikche maintained intercourse by sea with Japan, with Southern China and in some way with Siam.\textsuperscript{2} Such voyages would have been impossible without some knowledge of navigation and the ability to steer a course by the stars.

**Koryu.** Since the founder of the Koryu dynasty had himself held naval command one would think that his reign would usher in a period of naval and marine development. But if this was the case there remains no record to tell us of it.

We hear nothing of maritime affairs as such for some time, though it appears from various sources that there was considerable intercourse with the Sung Dynasty of China most of which must have been by sea.\textsuperscript{2} It was also apparently during this dynasty in the reign of King Mun-Jong (1047-1083 A. D.) that government ships were provided for the transport of the government rice. One hundred and six ships were built for this purpose thus beginning a custom which was continued on down through the Yi Dynasty to modern times. Mr. Hulbert tells us that these ships made six trips a year.\textsuperscript{3} It is a little difficult to understand the reason for this as the chief purpose was the bringing of the tax-rice to the capital after the rice harvest and during

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2. Immamura Op. Cit., Chapter I and VI.
the Yi Dynasty this was done once a year usually in the 11th month.¹

We have mentioned the relations of Koryu with the Sungs in China and to this relationship we are indebted for a very interesting description of Korean boats. In 1124 a gentleman by the name of Sohkeung was sent as Chinese envoy to Korea. He took ship at Ningpo, landed at Kunsan and proceeded to Songdo overland. He found his voyage and the Kingdom of Koryu so interesting that he wrote a book entitled "Koryu To Kyung" or Pictures of Koryu. In this he gives a very interesting description of the ships which he saw.

The whole of his section on boats is too long for quotation but he gives us a number of interesting facts.

"The police or guard boats at Kunsan are relatively small with one large mast in the center and no deck cabins. The rudder projects through a shelf in the stern. The sail is made with twenty pieces of cloth .............. On the Guest-Boats the roof of the pavilion is covered with bamboo mats which are rolled up in good weather and spread out in bad weather ............... In the prow was a wheel on which the anchor cable of wisteria-rope was wound. This rope was thick as the smaller logs used in the ceiling of a house. It was 500 feet long and at the end was the anchor stone with hooks on each side of the stone. When the storm was severe a floating anchor was used ............ At the two sides of the ship there were bamboo bags or baskets to stop the waves and not let the water go through the bags. By these bags were scuppers to let the water drain off .... ......... When sailing on the sea the sailors are not afraid on account of the great depth of the water but rather for the shallowness. Therefore they always use a leadweight on a rope to sound the depth of the water."²

It is interesting to note how much of this might be

2. Koryu To Kyung, Sohkeung.
quoted word for word to describe the ships of today. It is plain that the construction of the stern with the projecting after deck which he describes as a "shelf," and many other details are just as we may see them now. In view of the statement of a number of occidental writers that the Koreans had only mat-sails it is interesting to note that they were using cloth sails over 800 years ago.

Sohkeung was an observant gentleman and his travelogue has helped to solve the vexed question as to when the compass was first used in China as an aid to navigation. He tells us that the captain of the ship on which he made the voyage had a needle which he floated in a bowl of water by means of which he was able even when the stars were obscured to tell north and south and determine the direction in which he should sail. This is said to be the first reference in Chinese literature to the use of the compass in navigation though it had been used in geomancy for many years.¹

In 1128, shortly after Sohkeung’s visit the government apparently was impressed with the importance of marine communications and transport: for a large force of men was set to work in an attempt to dredge the entrance to Hongju harbor so that large vessels could enter that port.²

During the reign of King Chungyul, whose queen was a Mongol princess, occurred the two attempts which were made by the Mongols to invade and conquer Japan. Both of those expeditions used Korea as a base of operations and for the first, in 1275, Korea built some 300 transport vessels. It is said that the expeditionary force of 40,000 men was transported across the straits in 900 vessels, which means that each vessel carried 40-45 men with all their arms, accouterments and stores.³

In 1282 came the second attempt. The first division of the force consisted of 20,000 Koryu men and 50,000 Mongols

who were taken to Japan in 1,000 ships, 900 of which had been built by Koryu for the Mongols. Perhaps the experiences of the first invasion made the leaders feel the need of larger boats such as these which carried 70 soldiers each. It is possible that these boats were even larger than the above figures indicate, for it is stated that the King of Koryu furnished 15,000 sailors for the expedition. If these were in addition to the force of 20,000 men mentioned above, it of course means that each vessel had on board not 70 but 85 men.

As the dynasty was drawing to a close we find General Yi Hyun in 1374 urging the need of a real navy. He drew up plans for such an organization including a plan by which the island population should be enrolled as naval militia and given special training. Mr. An tells us that this was done and a navy consisting of 1,000 ships with a force of 30,000 men was brought into existence.

Shortly after this time we find two items of great importance in naval warfare. In 1378 Im Sun Mu learned from the Mongols the art of making gunpowder and a bureau for its manufacture was established though there were as yet no fire arms. But a few years later under the last king of Koryu, Kongyang, (1389-1392 A.D.) a new type of war vessel was built and on these "a firetube" was tried out. This is approximately 50 years later than the introduction of cannon on warships in Europe, where they were first thus used in 1338. It seems strange to us today that, although cannon were introduced in 1389, the Japanese invasion two hundred years later in 1592 found the Koreans without any kind of guns for their infantry and thus at so terrible a disadvantage against the Japanese land forces. We must remember that in Europe also it was long after the first use of

3. An Op Cit.
cannon before any fire-arms of a portable type were introduced.

Toward the end of the dynasty we find history repeating herself in that a famous general, soon to found a new dynasty, takes the lead in all affairs and for some time supports the royal house which he is soon to overthrow. Instead of Wangken, we now have Yi Son Keh building a fleet to repel the Japanese pirates in 1378 and harrying them from the coast. Nine years later in 1387 he fits out 100 warships and carries the war into the enemy’s country by attacking Tsushima Island and burning 300 Japanese pirate ships\(^1\) and five years later in 1392 General Yi of Koryu became King Taijo founder of the Yi Dynasty.

**THE YI DYNASTY (1392-1910)**

For the five hundred years of the Yi Dynasty there is a mass of historical material available. It is, therefore, the greater disappointment to find so little which throws any light on the nautical questions in which we are interested. In explanation of this phenomenon we must remember first that the whole profession of arms was greatly looked down upon, even the highest military men being ranked by the civil officers of government. Second, the magic spell of the Chinese classics and their ideas relegated practically all technical matters to so low a place that literary men considered them beneath their notice. Exceptions must of course be made for such subjects as astronomy and music which were connected with philosophy or with ceremonials, but, these aside, I think the above statement will hold true. Third, as Korea’s prosperity did not depend upon the sea and as her coasts were constantly harried by both Chinese and Japanese pirates the sea and its affairs were gradually relegated to the ignorant fisher-folk. Fourth, the Japanese invasion of 1592 accounts for the loss and destruction of numberless records of the past. This was followed less than

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forty years later by the fire and sword of the Manchu invasion after which a lethargic peace enveloped the country which was hardly disturbed until in 1866 the French guns were heard off Kangwha. During this time existing warships were left to rot and a useless navy practically passed out of existence except on paper. At the same time the laws against all intercourse with the outside world were made more and more stringent, thus making impossible the development of a merchant marine. The Shogun Iyemitsu’s edict of 1639 brought about a similar paralysis in the Japanese marine which lasted until after the Restoration.¹

As this dynasty lacks the interest of great antiquity and since, with one glorious exception, its naval records are dull I shall abandon the chronological treatment and take up topically such information as I have gathered, leaving to the last the history of that great man Admiral Yi and his famous turtle-ship.

The general organization of naval and maritime affairs is plain. In the old Korean government there were three great ministers or counsellors under the king forming a sort of Supreme Council. These were known as the Song-Oui-Cheung or Admirable Counsellor; the Chwa-Oui-Cheung, Counsellor of the Left, and Ou-Oui-Cheung or Counsellor of the Right. Under these were the six ministers or department heads, who held the title of Pansu and under each Pansu was a Champan (substitute or vice) and a Chamouï or counsellor. All 21 of these officials were called “Taisin” or ministers, and nominally formed the Grand Council of the King. Practically however the Supreme Council held all authority. The six departments are worth a moment’s notice so that we may understand the place of military and naval affairs in the scheme.²

I. The “Yi-jo” or Department of Offices and Appointments which controlled all examinations, appointments and promotions including the military.

¹ Bonar Op. Cit.
² L’Eglise de Coree—Dallet, p. XXXIII ff., see also Immamura in Japanese; and Kuk-cho-tai-chun for original.
II. The "Ho-jo" or Department of Finance under whose direction came all questions of taxation, census, land, etc.

III. The "Ryei-jo" or Department of Rites and Ceremonies. This covered a far wider field than might be supposed by a modern occidental since in the ancient orient all things were governed by precedent and done in accord with carefully prescribed customs.

IV. "Pyeng-jo," the War Department which included both army and navy.

V. "Hyung-jo," Department of Justice, or more literally of Crimes.

VI. "Kong-jo," Public Works, including all public buildings, roads, communication and commerce.

From the military point of view there were many defects in this system. To give an exaggerated illustration. Captain So-and-So would owe both his appointment and promotion to the Department of Offices. The money to pay his salary, the expenses of his ship and the like came through the Department of Finance. His uniform, the length of his sword, the decoration of his scabbard and a thousand other details were fixed by the Minister of Ceremonies. In a campaign he and his superior officers were of course under the direction of the Pyong-jo or Department of War, except when the Supreme Council interfered, as non-military ministers have loved to do in all countries. Capt. So-and-So's Naval Station with its barracks was built by the Kongju or Department of Public Works. Lastly, while his superior officers might behead him for insubordination or cowardice in battle, for offenses at other times he was tried and punished not by a Court-Martial but by the Hyung-jo or Department of Justice.

In addition to this, no organic distinction between Army and Navy was made and hence no special training for naval service. Nor to compensate for this was there any path by

1. The most careful and minute description of arms, both military and naval which I have found is contained in Vol. VIII of the Oh-Ryei-Eui or Record of the Five Rites.
which a real sailor could rise to naval command. Mr. K. S. Yi contrasts the effete naval appointees of the central government with the "sunburned sailors of Yohsoo" but I can find no evidence of any path leading to advancement beyond what would in other countries be called the "non-commissioned" ranks.

Similar laws paralysed the French and Spanish navies for hundreds of years and even in England it was not till the time of Sir Frances Drake (Yi Sun Sin's contemporary) that the gentlemen soldiers were forced to recognize the place of the real seamen in the English navy.¹

As the army and navy in Korea formed one service and not two there is nothing distinctive in the naval hierarchy to demand our attention. Each of the eight provinces was divided into a Right and Left Section and each section had its naval station with an officer in command. His title is translated "Admiral of the Right" or "Left;" for such and such province, but the use of the English word "admiral" must not be understood to imply that even this officer was distinctly a naval man. Yi Sun Sin himself had some military experience on the northern border and had served in a number of military posts but seems to have had little or no marine experience before his appointment as Admiral of the Left for Chulla Province.² During his lifetime, and due to the signal service which he performed, the office of High Admiral for the three provinces of Kyungsang, Chulla and Choongchung, was created and bestowed on him. This was apparently the nearest to a Naval High Command that existed, all authority being concentrated in the capital in the Department of War or actually in the Supreme Council. In his own district the local naval commander seems to have had supreme authority, and we read of his appointing and degrading officers and in cases of insubordination having them beaten or beheaded.

¹ Sir Francis Drake—J. Corbett, p. 66 ff.
² Yi Sun Sin—Yi Yun Chai, p. 8 ff.
When we come to the naval force under these officers we meet with further difficulties. Chief among these is the difficulty in defining the terminology used. For instance the word "Su-kun" or "sea-soldiers" is differently interpreted. Mr. K. S. Yi apparently takes it to mean "sailors" "naval men" in a sense which would include both fighters and seamen. After considerable reading and a comparison of the uses of the word I am convinced that it refers to what we would now call "marines" or the force of soldiers placed on board a ship to do the actual fighting. Mr. Immamura clearly differentiates between the "Sukun" whose force he places at 49,800 and the "sailors" of whom he only reports 5,960. More definite evidence is furnished by the fact that there were certain very small boats used for scout and messenger duty carrying no "sukun," but which must have carried "sailors." It is however not plain as to whether the men listed as "armorers" "standard bearers" "naval police" and "men under the flag" (whatever that may have meant !) were reckoned as sailors, "sukun" or as in addition to both of these.

Both the sailors and the "sukun" wore identification tags. These were no less than 3 inches in diameter and were made in two pieces and then sealed together with the man's description on the inside. According to some the "sukun's" position was for life—(from 20 to 65) and was hereditary. In peace times they were supposed to serve 20 days out of each month. (Mr. Immamura says they served half of each month). They were employed on various public works in times of peace and a certain number were apparently carried on the grain boats as protection against pirates.

I have mentioned the figure of 49,000 "su-kun" or fighters. Mr. An states that at one time "there was said to be a total naval force of 112,000 men." The Kyung-kuk-tai-chun (c.1744) gives us a force of slightly over 26,000 "su-kun" with no statement as to the number of seamen and others enrolled in the naval force. Another work written about 1675 states that under the "old system" there were
48,808 sea-soldiers and under the "new system" 16,920. It is extremely probable that the numbers varied in different periods but the above figures will serve to give us a general idea of the nominal size of the naval force on a peace footing. It must be remembered that all writers agree that toward the end of the Yi Dynasty and even as early as the period of the Japanese invasion the naval force in both ships and men existed largely on paper. Thus Mr. K. S. Yi, speaking of conditions which faced Yi Sun Sin when he took office at Chwa-su-yong (Naval station of Chulla Left Province), says "of 580 sea-fighters less than 300 able-bodied men were found. Of the remainder about 100 were men over 60 years of age no longer fit for service and the rest were merely names, no such men existing."

This naval force was distributed along the coast in a number of naval stations. All such military posts were divided into the three classes of Yong, Chin, and Po, which may be rendered as Garrisoned Stations, Fortresses and Military Posts. The number varied in different periods. During the Koryu dynasty there are said to have been 29 large sea-fortresses. Under the Yi dynasty there were over 200 defence-posts of which 33 were large permanent works. Of all these the most famous is the fortress of Kangwha whose history began as we have said with Tangun 2,300 years before Christ and whose last chapter deals with the successful defence of the Chung Dung monastery against the French in 1866 and with the American expedition of 1871. The Korean navy was concentrated on these large naval stations and seems to have consisted of from 600 to 800 or more ships for active warfare besides auxiliary vessels.

Mr. An states that under King Tai-Jong (1401-1419)

3. Ancient Navy of Korea—An.
the old and new ships in each province numbered 543,\(^1\) distributed as follows:

<table>
<thead>
<tr>
<th>Province</th>
<th>Old</th>
<th>New</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyungsang</td>
<td>137</td>
<td>50</td>
<td>187</td>
</tr>
<tr>
<td>Chulla</td>
<td>81</td>
<td>30</td>
<td>111</td>
</tr>
<tr>
<td>Kyungkui</td>
<td>51</td>
<td>25</td>
<td>76</td>
</tr>
<tr>
<td>Choongchung</td>
<td>47</td>
<td>15</td>
<td>62</td>
</tr>
<tr>
<td>Whanghai</td>
<td>26</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td>Pyengan</td>
<td>30</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Kangwon</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>388</strong></td>
<td><strong>155</strong></td>
<td><strong>543</strong></td>
</tr>
</tbody>
</table>

No mention is made of Ham Kyung and no explanation of the omission. It is possible that the poverty of the province and its inhospitable coastline made naval concentration less necessary there.

In a book written in 1675, seven years after Hendrik Hammel escaped from Korea, the total Korean navy is given as 538\(^2\) ships. These were divided as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Fighting Men</th>
<th>No. of Ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Tai-Maingson</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>2nd Chung-Maingson</td>
<td>60</td>
<td>92</td>
</tr>
<tr>
<td>3rd Soh-Maingson</td>
<td>30</td>
<td>216</td>
</tr>
<tr>
<td>4th small ships</td>
<td>10</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>180</strong></td>
<td><strong>538</strong></td>
</tr>
</tbody>
</table>

According to the Kyungkuk Tai-Chun at a later period (1744) the distribution of the different types of warships varies somewhat from the earlier date though the concentration especially of the 1st class ships is still in the two rich and strategic province of Kyungsang and Chulla.

**Distribution of Korean Fleet about 1744\(^3\)**

<table>
<thead>
<tr>
<th>Province</th>
<th>Cheunson 1st class</th>
<th>Pangson 2nd class</th>
<th>Pyungson 3rd class</th>
<th>Small 4th class</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyungsang</td>
<td>20</td>
<td>66</td>
<td>105</td>
<td>75</td>
<td>266</td>
</tr>
<tr>
<td>Chulla</td>
<td>24</td>
<td>43</td>
<td>33</td>
<td>86</td>
<td>186</td>
</tr>
<tr>
<td>Choongchung</td>
<td>11</td>
<td>24</td>
<td>24</td>
<td>40</td>
<td>99</td>
</tr>
<tr>
<td>Kyungkui</td>
<td>16</td>
<td>20</td>
<td>14</td>
<td>7</td>
<td>57</td>
</tr>
<tr>
<td>Kangwon</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>86</td>
<td>119</td>
</tr>
<tr>
<td>Whanghai</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>37</td>
</tr>
<tr>
<td>Pyengan</td>
<td>4</td>
<td>15</td>
<td>4</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Hamkyung</td>
<td>0</td>
<td>2</td>
<td>10</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>82</strong></td>
<td><strong>180</strong></td>
<td><strong>233</strong></td>
<td><strong>317</strong></td>
<td><strong>812</strong></td>
</tr>
</tbody>
</table>

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1. Ancient Navy of Korea—An.
The above tables with their naval nomenclature bring us to the place where we must, however, hesitatingly, attempt a description of the Korean war-vessel. Most of us are at least vaguely familiar with the older occidental classification of men-of-war into ships of the line, frigates, sloops of war and other smaller vessels. This classification and terminology emerges in the 18th century from the medley of names still prevailing in Elizabethan times. Even the experts are not agreed as to the exact delimitation of carracks, cogs, dromons, caravels, galiots, galleasses and the like. Fortunately for us the Koreans seem to have early chosen the word “maing-son” as the general noun for war-ships and to have classed them as Big, Middle and Small. Later the type of vessel was changed, though how or in what particulars we are not told and with this change came a change in terminology. From about the middle of the 17th century the 1st class ships are known as Cheunson; the 2nd class as Pangson; the 3rd class are called Pyungson and the tiny 4th class vessels are known as Sah-ho-son. Mr. K. S. Yi in his novel uses all of these terms interchangeably with the word “Maing-son” but it is possible either that this is an anachronism such as slips into many historical novels or that these words were current as general terms in the 16th century and were given their specific meaning at a later date.

According to one work the largest class vessels were those which were over 60 ft. long “not counting bow and stern.” This would give an over-all length of at least 80 or 90 ft. and since the Korean ship seems to have long maintained a 3 to 1 ratio of length to beam we shall probably not be far wrong in saying that the 1st class men-of-war of the old Korean navy were ships of from 80 to 90 ft. in length with a beam of from 26 to 30 ft. I have yet to find any clear statement of the difference between the Taimaing-son of the earlier period and the “cheunson” of the later. It would appear from certain criticisms and comments that the attempt was to secure a lighter and speedier craft. Thus it is stated that in 1734 “the clumsy three-
decked-war vessels were done away with and the ‘sea-Falcon’ type substituted for them.” The dimensions given in certain works for the “new type” vessels vary only slightly from such measurements as we have for the older models. It seems probable therefore that the modifications were in lines, draft and hull construction. A few pictures of the older type of vessels have come down to us, one of which I reproduce for what it may be worth (Fig. 40). It will be noticed that the masts have been lowered, presumably for going into battle. This was the almost universal practice in the Mediterranean in ancient times but the average Korean man-of-war was as much if not more a sail ship than galley and there is evidence to lead us to believe that they used their sails for manoeuvring in battle.

Writting in 1668 Hendrik Hammel, who was a European sailor well acquainted with different types and sizes of ships, refers to the Korean men-of-war as “frigates.” In another place in speaking of an accident which occurred on a man-of-war he says “The Governor being on a very pretty vessel some fire accidentally fell into the powder, blowing up the prow and killing five men. Here it must be observed that those people keep their powder in a powder-room before the mast.” In his “Description of the Kingdom of Corea” he refers briefly to the Korean navy as follows. “Corea being almost encompassed on all sides by the sea, every town is to maintain a ship ready rigged and provided with all necessaries. Their ships have generally two masts and 30 or 32 oars, to each of which there are five or six men so that each of this sort of galley carries about 300 men for rowing and for fighting. They carry some small cannon and abundance of artificial fireworks.”

A Korean work tells us that for the three “cheunson” at a certain station there were 900 men to row and to fight. Mr. K. S. Yi states the crew of a “Tai-maing-son”

to have been only 80 apparently overlooking the fact that in addition to 80 "sukun" or sea soldiers she carried a crew of sailors and oarsmen.

Putting all this information together, we can roughly reconstruct the 1st class Korean man-of-war of the Yi Dynasty. Such a vessel was probably not less than 70 feet over all in length and probably went up to 100 feet with a beam of about one third the length. The bow and stern construction and general appearance were almost certainly very similar to what we see today. Along the sides were heavy bulwarks of thick planking loopholed for archery and fitted with ports for small cannon. On some vessels shields were hung along these bulwarks as was the custom in ancient times in the Mediterranean and with the Vikings.

Some of the heavier ships were known as "Pan-ok-son" from which we are led to believe that they carried roofed deck-houses of heavy timber. The anchors, windlasses, and rudders all seem to have been such as we see today though on a scale appropriate to the greater size of the ships.

It is interesting to note that this vessel was essentially a sailing ship though the floating battle platforms such as those illustrated are a partial exception to this statement.

Phoenicians, Greeks and Romans, stripped their ships of masts and sails on going into battle.\(^1\) The Japanese man-of-war of Hideyoshi's (Fig. 4) period carried a single mast and the typical square sail and in consequence we are told that a 1st class man-of-war with a total complement of 181 men carried no less than 90 oars.\(^2\) The Korean vessel on the other hand was a two-masted sailing vessel with sails almost exactly like those of today. This is clearly seen in a screen painting of a naval engagement at the time of the Japanese invasion, to be found in the Prince Yi Household Collection. (Fig. 50).\(^3\) From this illustration and other

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1. Sailing Ships and Their Story—Chatterton, p.65, 71.
2. Maritime Enterprise in Japan—Bonar
3. Photo by courtesy of Prince Yi Household Museum.
evidence we are led to believe that it was customary for the Korean ship to use its sails and sailing ability for manoeuvring in battle. For additional speed, for getting under way, entering harbor and for use when the wind failed she carried from 20 to 32 oars which were worked by 2, 4, 5 or even 6 men to an oar. There is every evidence to believe that these oarsmen were on a lower deck leaving the main deck free for the fighting men. Bonar claims that there was only 1 ft. 8 in. between oars in the Japanese galleys and this may have been due to the attempt to crowd so many oars onto one ship. The larger Korean ships with a smaller number of oars probably spaced them not less than three feet apart as was the custom in the Greek and Phoenician galleys. On the Greek galley with its low free board the oar port was closed by a leather bag fitting tightly around the oar which prevented the ship from taking water through these ports. I have found no description mentioning such details or telling us whether thongs or tholepins were used, though present day usage would indicate thongs.

What was the speed of these ancient ships of Korea? It is very difficult to answer this question except by comparisons which are always dangerously uncertain. The ancient trireme is said to have done as high as seven and a half knots (8.6 land miles an hour) and 110 nautical miles between dawn and dark. The merchant ships of Greece and Rome did well when they reeled off five knots and might with favoring winds do as much as one hundred and thirty nautical miles in 24 hours.¹ In the trans-Atlantic race of 1932 some of the yachts did as much as 9 knots for a number of consecutive hours but this was very unusual. Mr. K. S. Yi claims the Turtle boat could do 500 li in a day.² This vessel was admittedly much faster than the average Korean ship so that this may be taken as the highest speed claimed for any Korean vessel. Now assuming 10 li to equal 3 miles

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¹ Sailing Ships and Their Story—Chatterton, p. 70.
² Yi Sun Sin—K. S. Yi, p. 18
this makes 150 miles a day. If we further assume "one day" to mean 24 hours we get a speed of slightly over 6 statute miles or about five and a half knots which seems quite reasonable. On the other hand if we are to interpret "one day" as the period between dawn and dark even, allowing 14 hours of daylight we should have to credit her with a speed of almost 10 knots which is extremely improbable. It seems unlikely that the Turtle boat or any Korean boat of those times even in a short burst or speed did better than seven knots, while the speed of the fleet can hardly have been more than three or four knots at the best.

You will perhaps wish to know how these boats compared in size with Occidental ships. Tonnage comparisons are difficult if not impossible since the tonnage depends so much on the type and form of hull construction. Thus Columbus’ flagship was 90 feet long and 20 feet beam, carried a crew of 52 and is estimated to have been about 100 tons. On Drake’s first great expedition against Nombre de Dios his ship the “Pasha” was of 70 tons with a crew of about 50. The “Golden Hind” in which he went around the world was of 100 tons and 18 guns. The “Royal Charles” built at Portsmouth in 1672 was 136 feet long, 46 feet beam and was rated at 1531 tons. The frigates of the late 13th and early 19th century were around 120 feet long with 35 feet beam and averaged 600 to 700 tons. It will be plain from the above that it is the merest guess work to attempt to estimate the tonnage of ancient vessels without any more data than the approximate length and breadth. We have a little further guidance in the amount of freight carried. Ships carrying as much as 1000 bags of rice or a load of 200 tons¹ in addition to gear, supplies and crew were not uncommon, and we are told that some carried as much as 2000 bags. If, after considering such dimensions and such other data as we have, we say that the Korean Tai-Maing-son ran

1. Even this measure depends on the size of the “bag” being the same as today. Some claim that it equalled only about 75% of the present bag—15 mal as against 20 mal today.
from 100 to 200 and possibly 300 tons I do not believe that our guess will be very far off.

We cannot leave the description of these vessels without a discussion of the armament they carried and the arms used by their fighters. Dr. Boots' excellent paper on "Korean Arms and Armor," read before the Korea Branch of the Royal Asiatic Society makes a lengthy treatment unnecessary here. There are however some differences to be noted and some additions to be made.

The crews were dressed in sea-blue uniforms with the black felt hats known in Korea as "ponggaji." The armor worn by some of the crew was the same as that provided for the land forces. Their swords and spears, tridents and the like were also the same as those used on land and described by Dr. Boots. One book specially mentions the battle axe, mace and scythe as used on ships. The axe had a 5 feet handle and an 8 inch blade. The mace also had a 5 feet stock while the scythe was from 10 to 20 feet long. We also see pictures of long hooks with which the enemy ships were grappled or unfortunate adversaries dragged overboard. In addition to these hooks regular grappling irons were used by both Japanese and Koreans. Of the hand missile weapons the bow naturally comes first but I was greatly surprised to find the sizes given as 6 feet; 6 feet 3 inch and 6 feet 6 inch. The arrows were of various forms or shapes especially on the ships, included a large assortment of fire arrows and darts, the extreme effective range of the war-arrows being given as about 400 yards. Their Japanese adversaries agree that the Koreans were fine bowmen and especially at sea where they could command the range the bow and arrow did deadly work. That cross bows, both hand and the "Kangno" or "strong bow" which was wound up with some form of wheel, were used is plain but I have found no descriptions of them. Poisoned arrows as

1. Yi Sun Sin—K. S. Yi, p. 2. See also Korean Paintings.
well as heavy iron darts were fired from these cross-bows.¹ Among hand missile weapons it is interesting to note a tiny hand-gun or pistol. It consisted of a minature cannon and a pair of pliers with which to hold it. (Fig. 43 B)

The larger missile weapons naturally consist of catapults of one form or another and cannon. Of the catapults Griffis gives a detailed account.² I have found no mention of such engines in use on ships. They are eminently suited to fixed platforms on land but even the Romans who developed their use on land to a high degree seldom attempted to use them on the rolling, pitching decks of a ship. It is always dangerous to state a negative but I shall have to find some definite historic reference to the use of these engines in the navy before I place much credence in them.

Longford in his "Story of Korea" says of the Japanese invasion "neither side possessed cannon." This seems to be an entire mistake for Bonar says "at the time of Hideyoshi a ship of more than 78 oars carried one gun." He goes on to say "a ship of 90 oars carried one gun, 2 captains, 3 helmsmen, 90 rowers, and 86 fighting men of which last 22 were armed with fire-arms." The Japanese thus had plenty of muskets but few cannon. The Koreans on the other hand had no muskets but plenty of cannon.

A large number of small cannon are listed, each under its own technical name, in a work of the period.³ These names are even more unintelligible today than the English words demi-cannon, culverin, saker, falconet, etc., are to most of us. When however we find these names referred to in accounts of Admiral Yi’s naval battles it settles definitely the fact that such and such a type of gun was used.

The heaviest piece of the period is the ingenious and yet clumsy gun shown in Fig. 42 D. This was made of brass and was in two pieces, the magazine and the barrel. Powder was placed in one end and the huge stone ball (which

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1. Pyung Hak Chi Nam. No. 5, 19th section.
3. Oh Rei Eui—Military Rites Section.
weighed over 70 keun or about 90 lbs.) in the other. They were then fitted together, lashed with leather thongs, and fired. Incidentally this ball was as heavy if not heavier than any shot fired by the ordnance of the Elizabethan navy.¹ Most of the cannon were very small, the next size being less than 2 feet long. (Fig. 43 D) However they were cannon and proved most effective against the enemy. Bombs of various sorts were used. These are described as—

1. “Thundering,”
2. “Lighting,”

When used on ships small iron caltrops or crows’ feet were issued with them to prevent their rolling about the deck. (Fig. 42 C).

Both Japanese and Koreans realized the importance of fleet formation and of using a number of ships as a single unit. The conventional formations evolved by both nations seem however to have been based on the idea of piercing a battle line by a wedge of ships. According to Bonar the conventional distribution of a Japanese fleet consisted of two advance wedges of eight ships each, on the right and left. In the center and slightly to the rear of these two squadrons was a third wedge of 10 ships and behind this central wedge the main fleet arranged in converging lines parallel to the wings of the advance squadron. (Fig. 44) The Korean formation was simpler but would seem equally efficient, consisting of three wedges one behind the other with a reserve force in the extreme rear. (Fig. 44) For communication between these ships the usual types of signalling devices were used, drum, trumpet, guns, flags and lights. I have found no reference to anything that might be called a well developed code of signals but different flags had certain fixed meanings for retreat, advance, assembly, recall, etc. (Fig. 45) Similarly it would appear that various trumpet calls were used as they are used today to signal the will of the commander. Beyond the simplest and most com-

¹ According to Chatterton the heaviest shot fired in the Elizabethan navy weighed 63 lbs. “Ships and Ways of Other Days,” p. 191.
KOREAN BOATS AND SHIPS

mon eventualities and commands the signals seem to have been arranged for the occasion. Like the ancients of the Mediterranean the ancient Koreans had small love for night sailing along their dangerous coast. They anchored for the night usually in a hollow square formation known as a "chin" or fort. Over and over again it is said of the Korean fleet "They formed a 'chin' and spent the night." This and a number of battle formations are given in elaborate diagrams in books on military science.

Men-of-war however were not the only ships of the period nor were men-of-war only men-of-war. We have already mentioned the fact that as early as the reign of King Mun-Jong (1047-1085) of the Koryu dynasty a fleet of 106 government vessels was built for the transport of the government rice. The annual collection of this tribute rice was a great problem in transportation and the men-of-war were commonly used for this purpose. We do not hear of their being rented out to private parties as were the English men-of-war but such a plan was advocated as the best means of keeping the ships in repair. Other government ships were those used for the annual embassy to Japan and at times for that of China. In addition to this the ferries on the main roads were maintained as part of the post service, and there was also the famous bridge of boats across the Han where the present steel passenger bridge now stands. Besides the government boats, there were also private freight and fishing vessels and privately maintained ferries.

The transportation problem involved in bringing the tax rice to Seoul or other assigned depots was a serious one. Early in the Yi Dynasty this tax in kind amounted to 400,000 bags annually while in the time of King Cheung Jong (1777-1801) it is said to have risen to 2,300,000 bags. Of this, Mr.

1. Pyung-Hak-Chi-Nam, etc.
2. Sailing Ships and Their Story—Chatterton, p. 177.
3. Ships of Korea—Immanura, Chapter IV. (Immanura gives the Man Kui Yo Ram at authority for most of this chapter of his book.)
Immamura estimates that 2,000,000 bags were moved part or all the way by water and at least 1,000,000 by sea. Mr. Immamura further estimates that this must have required at least 600 large boats. This would mean that each boat carried over 1,500 bags, and is almost undoubtedly too large an average load, for the same author tells us that from Yengnam and Honam the boats carried 800 to 1000 bags each, while another section of the Mankui Yoram says that on the stormy and dangerous passage from the north only about 500 bags were carried.

There were certain drawbacks and inconveniences in using war-vessels for rice transport and to overcome at least one of these in 1467 Shin Suk Chin, then “Cheun-Ham-Sa” or national “Ship Master” built war-vessels with removable shields and bulwarks so as to facilitate the loading and unloading of rice when they were used for freight. This same Shin made a special trip to China, Japan and the Loo-Choo Islands to study ship construction and came back full of many new ideas. He endeavored to demonstrate these in a sham battle just off Yangwhachin (where the Seoul Foreign Cemetery is located). The King went out to see the affair and was so pleased that he removed his own cloak and gave it to Shin. But aside from conferring this personal honor we hear of no practical steps to put the recommendations into practice.

The time chosen for the transport of rice was obviously fixed by sleek officials sitting on warm floors in Seoul for the movement was supposed to begin at the 1st of the 11th month, the last to get under way were to start not later than the 25th of the 3rd month and it was supposed to be all delivered by the 15th of the 5th month. It seems certain that nothing can have moved during the 12th and 1st months for the river Han is usually frozen hard at this time. The ships travelled 30 in a squadron with a commodore in command. Elaborate preparations against loss were made.

1. Ships of Korea—Immamura, Chapt. IV.
2. Mun-Hon-Pi-Go, continuation, Vol. XXIV, No. 120, p. 4.
A preliminary report on local conditions along the coast was sent in before each squadron weighed anchor. Markers were erected at dangerous points and local pilots were to be secured for each stage of the voyage. The officers were empowered to commandeer any men or vessels in case of need and all prefects and coast officials were ordered to hold themselves in readiness to render assistance in case of danger and to aid in salvage work in case of wreck. Rewards were given for safe and speedy passages and for the plunder of 10 bags of rice from a wreck the penalty was death. Despite all these precautions the losses were heavy. This was chiefly due to three causes, the responsibility for which must be laid on the officials in Seoul and not on the Korean sailors and captains. First, the season was probably the worst that could have been picked. Second the boats were overloaded, partly by official regulations and partly by the graft of local officials who found it convenient in addition to the regular load to transport their own goods free on government vessels. Third, the ships were required to hug the coast when they would of course have been much safer in the open sea. In addition to these reasons Mr. Imamura alleges that red-tape, graft and natural conditions all tended to keep the government vessels in bad shape. He also claims that the Koreans' ignorance of navigation and the poor quality of the boats were contributing causes. I do not consider either of these to have been major causes of disaster.

Rice transportation on the rivers was done by private boats hired for the purpose, the only government maintained river craft being the ferries on main roads and the boats kept for the pontoon bridge across the river Han. These ferries were of great importance as links in the government system of post-stations with relays of horses. The ferries were maintained in two ways, by the income from certain fields set aside for the support of the ferry, and by devoting a part or all of the taxes levied on privately owned river boats to this service. Ferries across minor streams and on
other than the main routes were usually private money-making concerns. The famous pontoon bridge across the Han is said to have been first contemplated because King Se-Jong (1419-1451) after a trip to Suwon was prevented by a violent wind from recrossing the river and was forced to spend the night at Noryangchin. I believe that the project for a bridge of boats was not actually carried out till almost one hundred years later in the reign of King Chung-Jong (1506-1545). The pier to which it was anchored stood almost exactly where the first pier of the present passenger bridge stands and was to be seen till it was destroyed to make way for the present structure. The bridge itself consisted of 38 boats; 240 more were moored to form a “rail” on each side while 12 guard boats protected it. Elaborate descriptions and regulations for its construction and use are to be found but it seems sufficiently far removed from ships and boats in their normal uses to make a description here unnecessary.

As to the embassies we have a great deal of material on a variety of details but only a few references to the ships which carried the ambassadors. The embassy to China usually travelled overland but at various times when war or banditry closed this route they were forced to travel by sea. Thus we read that for some time after the fall of Koryu the land route was blocked on account of disturbed conditions along the border and all communication with China was by sea. Again in 1622 we are told that the envoys and their suite went by sea in a fleet of five ships, one for each of the three envoys and two more for the rest of the retainers and their baggage.

Marine details as to the trip to Japan are even scantier nor was it ever regarded as of the same importance as the Embassy to China. We find an interesting instance of this

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1. It seems that this must refer to a solid line of small boats moored on either sides of the main bridge to prevent other boats drifting into it.
3. Munhonpigo—Chungpo No. 177.
in regard to the material used for the sails of these ships. Thanks to the pen of that old Chinese envoy "Sohkeung" we know that the Koreans used cloth for their sails at least as early as 1124, for he distinctly says "The Korean sails are usually made of 24 breadths of cloth." Of course matting sails were used by some of the poorer fishermen up to quite recent times, as they are used in parts of China today. It seems strange therefore to read that in 1683 the artistic eye of the Japanese was offended by the mat sails of the ships in which the envoys came to Japan and that at their request cloth sails were thence forth used. Considering the long standing enmity between the two countries one can only wonder if a deliberate affront was intended.

As to the regulations and customs concerning private boats I have depended chiefly on Mr. Immamura who in his turn seems to have gotten his data largely from the Kyung-kuk-tai-chun and Man-kui-yo-rum. All boats seem to have been registered. The name and address and business of the owner, the size of the boat, its purpose, and the type of freight carried, if a cargo boat, were recorded. All new boats were to be reported at once as was the wreck or loss of a boat. Unregistered boats were liable to confiscation and owners are warned to report transfer to another province so as to avoid double taxation.

Taxes naturally varied at different periods but the following classification and amount of taxes may be of interest.

<table>
<thead>
<tr>
<th>Class</th>
<th>River Boats</th>
<th>Sea-going</th>
<th>Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>50 x 11</td>
<td>42 x 19</td>
<td>3 bolts cotton cloth</td>
</tr>
<tr>
<td>Middle</td>
<td>46 x 9</td>
<td>33 x 18</td>
<td>2 &quot;         &quot;</td>
</tr>
<tr>
<td>Small</td>
<td>41 x 8</td>
<td>18 x 6</td>
<td>1 &quot;         &quot;</td>
</tr>
<tr>
<td>Smallest</td>
<td>All under these dimensions</td>
<td></td>
<td>½ &quot;         &quot;</td>
</tr>
</tbody>
</table>

In some places the tax was in fish, 20 cod being paid annually on a new boat, and 10 cod on a boat supposed to have depreciated 50 per-cent. In other cases the boats were divided into six classes which were taxed 100, 90, 45, 40, 23 and 20 Ryang each. Japanese vessels fishing in Korean waters
were also subject to taxation. At first this was very high but was later greatly reduced after several petitions had been received.

Taxes on Japanese Vessels in Korean Waters under the Yi Dynasty

<table>
<thead>
<tr>
<th>Class</th>
<th>Early</th>
<th>Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>500 Cod</td>
<td>200 Cod</td>
</tr>
<tr>
<td>Middle</td>
<td>400 ,</td>
<td>150 ,</td>
</tr>
<tr>
<td>Small</td>
<td>200 ,</td>
<td>100 ,</td>
</tr>
</tbody>
</table>

The regulations in regard to shipwrecked foreign vessels were very generous. Vessels in distress were to be aided, and assistance given in making repairs necessary for departure. Crews were to be fed and clothed and sent home. An office called Hong-che-won for the relief of shipwrecked mariners was maintained from which the village near Seoul takes it name. Wethervree and the crew of the Sparrowhawk were kept here as prisoners but the crews of a number of other vessels were well taken care of and sent overland to China for return to their own countries.

As to the customs or common law practices regarding ships and their crews the sailor of today knows only the customs of today which have been influenced by almost 50 years of direct contact with other countries. It is therefore very difficult to estimate the degree of outside influence in these matters. Under the old Korean government an investigation of common law and ancient customary usage was begun which was finally completed and published by the Government General in 1913.¹ From this work we gather a few facts, though we have no means of estimating the age of the customs.

Sailors were usually engaged and paid for the voyage and the captain was required to pay return expenses if a sailor was dismissed in a distant port. Two thirds of the profits of a voyage went to the owner and one third was divided between the captain and crew who had to provide

their own keep out of this. It was customary to pay half
the freight in advance and half on delivery. The captain
was furnished with what corresponded to a bill of lading
and was required to secure and bring back a receipt for
the goods delivered. No regular passenger lines of ships
seem to have existed, travellers taking passage on whatever
boat was sailing; the fare being arranged between the
captain and the passenger. Other regulations concerning the
jettisoning of goods in case of necessity, loss or damage
of freight etc., exist in very brief form but the above com-
prises the greater part of the information given in this book.

The work quoted is silent as to Korean marine rules of
the road. I know from inquiry and observation that some at
least are the same as in the Occident. A vessel running free
must give way to a vessel that is close hauled. The ship on
the starboard tack has right of way over the one on the port
tack and the boat being rowed, has right of way over the
ship under sail. But whether these are modern rules or
whether similar conditions have evolved similar rules I can-
not now state positively.

This brings us to the important question of the Korean
knowledge of navigation. Perhaps it would be as well to say
a few words about navigation and the instruments needed
by the navigator. The science of navigation has three
general branches: Piloting, Dead Reckoning and Nautical
Astronomy.

Piloting is the navigation of a ship alongshore or into
harbor by bearings of landmarks, soundings, etc, Dead
Reckoning is the deducing of a vessel’s position from the
direction and distance sailed from a previous known posi-
tion. Technically dead reckoning involves a knowledge of
plane trigonometry. Nautical Astronomy has to do with the
determination of a vessel’s position by the observation of
celestial bodies. The most essential instruments are a com-
pass, a log, patent or chip, or some means of estimating
the distance travelled, an azimuth circle for taking bearings
of objects and azimuths of the sun; a lead and line or other
sounding instrument; a sextant and a large number of other instruments such as the barometer, thermometer, dividers parallel rulers, etc. etc. In any proper sense of the word charts are of course indispensable to all branches of navigation.1

Now it would be easy to dismiss the whole subject and merely say the ancient Koreans knew nothing of navigation and in any technical sense I fear that this was and is true. The Korean sailor lacked and in the main still lacks practically all the instruments for navigation and any comprehension of the use of such things.

From a practical point of view he is quite skillful in piloting and dead reckoning in a crude way. He thoroughly understands his craft and has learned to estimate its speed under varying conditions, not necessarily in terms of scientific units of distance but as to the time required to make certain passages. Long experience has taught him the ways of the tides. From fishing experience he has a fair knowledge of the character of the bottom. Some use a lead or line and understand “arming” it with grease to secure a sample of the bottom to aid in determining their location and we know the lead and line to have been in use for over 800 years.2 One old man expressed great surprise that my chart knew the correct depths and insisted on testing its knowledge. Lacking a sounding line many use a sounding pole 14 to 20 feet long which is quite efficient for the shallow waters of most of the coast. The Korean sailor has no log but does as Columbus did and throws a chip overboard to estimate his speed,3 or after experience he gains as we have said a “speed sense.” His coast was until recently entirely unmarked. The fact that the government ordered markers to be placed on dangerous rocks, etc., each year at the time

1. For any who are interested in Navigation I would suggest Lieut. F. W. Sterling’s “Small Boat Navigation” as a simple and interesting introduction on the subject.
2. Roryu To Kyung—Sohkeung.
when the grain fleets sailed would seem to indicate the absence of permanent markers.

Did the Korean know and use the compass or not? We have already seen that a compass was used on the ship which brought the Chinese ambassador to Korea in 1124 and that this record is said to be the first reference to its marine use in Chinese literature. As to its use in Korea however I have yet to find more than indications and hints. It is possible that sailing directions issued to the captains of the grain fleet may be found which will afford positive evidence. It might reasonably be supposed that the instrument on Sokeung’s ship must have aroused the interest and curiosity of the Korean captains who visited the Chinese vessel. That the Japanese quickly seized on the Chinese idea, improved on it and quite ungratefully used it to guide their raids on the Chinese coast we know. It may therefore be imagined that the Koreans must have had ample opportunity to copy from the Japanese if they had not already copied it from the Chinese. All this however is no more than inference and guess-work as to probabilities and possibilities.

Mr. K. S. Yi in what appears to be a quotation from Yi Sun Sin’s diary speaks of the ships’ “Chim-no” or direction. Now this word literally means “needle-road,” but can mean merely “pointing road.” Are we justified in believing that the use of this word indicates a knowledge and use of the compass by Admiral Yi? It is certainly quite possible but I must confess that it is equally possible that it implies no such thing.

More positive evidence comes to us in poetic form. An old song, just how old in its present form I am unable to determine, makes definite and unmistakeable reference to the use of the compass.1 I give herewith an English translation of part of the song. My son, J. T. Underwood, who translated it was hampered by my insistence that he stick as close as possible to the original.

1. I am informed that some versions of this song go back a thousand years and that the present version is probably not less than 400-500 years old.
BOAT SONG

Korean Poem translated by J. T. UNDERWOOD

To all beneath the skies sedate
Their duty, with its work and ties,
To each his calling, place, and state.
To me, before my youthful eyes
The oceans, ports, and rivers wait.

But those on ships who sail the sea—
Their food the very convicts scorn;
Their craft a coffin soon to be.
Their clothes, all rags, are wet and torn;
Toil at the oars, their liberty.

For them, spring’s gentle airs are fled;
To them, the cutting winds strike home;
Come now fall’s leaves of gold and red—
While here and there, ’neath heaven’s dome
They drift, not knowing where to head,

With a yo and ho, pull o’er the blue.
Where lies the north? Where lies the south?
Set forth the tiny iron true;
Find out where lies the Taidong’s mouth—
Ask guidance of the iron true.

The last verse is an almost literal translation and the
confusion as to direction, the order to bring out the “iron”
and seek the guidance seem to leave no room for doubt that
the reference is to a compass. This is all we know at
present. It does not mean that all or even many Korean
vessels used the compass but it does definitely prove that it
was known and used in navigation.

That the Koreans knew how to determine latitude is
shown by the correct placement of the beautiful sun-dial
in the palace grounds, but what kind of a sextant they used
we do not know. It is in any case highly improbable that
they ever used such an instrument in navigation. On the
other hand we know that at an early date the Koreans
voyaged to China and as far as Siam. We are told that in
the early school in the days of Silla they are said to have
studied "Navigation" whatever may have been included under that head. We are further told that naval books of the early part of the Yi Dynasty dealt with navigation and the laws of storms.\(^1\) Nothing along this line seems available at present though further research may bring them to light.

Down through the ages from Hanwon and Tangun to the present day, the Korean has developed sturdy sea-worthy boats suited to his circumstances. These circumstances, geographic, economic and political, have for the greater part of this time prevented him from earning the title of a "blue-water sailor." Back in days when the European peoples were distinctly land and not sea-faring he made long and dangerous voyages, if Bonar, Brinkley, Sansom and other historians be credited, he was, until days which are comparatively recent, far in advance of his Japanese neighbor in this as in so many other things. But as with printing press, and other inventions, so with navigation where and when Europe went forward the Korean sailor was kept back and forbidden on pain of death to try his wings. In addition the Korean lacked both a minstrel inspired to sing his saga of the sea and a Haklyut to collect and treasure the record of his voyages. We can only hope that we may gradually be able to piece together more of these lost and fragmentary pages of Korean history.

VI. YI SUN SIN AND THE NAVAL CAMPAIGNS OF 1592-98

It is strange that, despite the difficulties and handicaps to which we have referred, and despite the consequent lack of maritime development, the Koreans should have been so uniformly victorious in the only real naval campaigns of their history. It is the story of a man Yi Sun Sin and his ship the famous "Kohbokson" or "Turtle-boat."

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1. Ancient Navy of Korea—An.
Perhaps we should refresh our memories as to the main historical events of which these naval battles were so important a part. Hideyoshi, who had brought practically all of Japan under his control determined to extend his conquests to the mainland. A large force was assembled on the western coast of Kiusiu and the first division of 24,000 men sailed in May of 1592 in 800 ships, and landed almost unopposed at Fusan. This first division was under the command of Konishi, the Christian general and is said to have been composed almost entirely of Christians. The second division under Kato, an ardent Buddhist followed soon after. How the two divisions swept everything before them and raced each other to Seoul, entering it only 20 days after the first landing at Fusan you know. You also know how Kato went northeast to harry Hamkyung Province while Konishi took the road to China, sweeping on as far as Pyongyang. Further he dared not go till his communications were assured behind him and reinforcements and supplies at hand. He therefore ordered the Japanese fleet to sail up the coast to the Taidong and effect a junction with his forces.

This they were preparing to do when Yi Sun Sin, Admiral of the Left Division of Chulla Province, assisted by the Admiral of the Right Division of the same province sailed out of the port now known as Yohsoo and attacked their advance division at Okpo, utterly destroying it. This was on the 7th day of the 5th month of the Korean calendar. This was followed up by another major engagement off Dangpo early in the 6th month and still another off Hansan Island in the 7th month, in both of which the Japanese squadrons engaged were practically annihilated. He then returned to Yohsoo to refit and rest. He now attempted to arrange for a united land and sea attack on the Japanese base at Fusan. On this understanding he took the entire Korean fleet of about 180 sail, large and small, to Fusan.

1. These men are known to Koreans by the Korean pronunciation of their Chinese name characters. Thus Hideyoshi is Pungsinsukil; Konishi is Sohsohaingchung; and Kato is Kadeung-chung-jung.
unconscious imitation of his great contemporary Drake at Cadiz, he took his fleet right into the harbor and successfully engaged the 500 Japanese ships lying at anchor. In a desperate engagement he burned or destroyed more than half of these, and then receiving no support from the land forces, he successfully drew off his battered ships and weary men.

This series of engagements is considered one of the most important in the history of the world. It shattered all Hideyoshi’s hopes and dreams of the conquest of China. These victories and not the Chinese force outside Pyengyang drove Konishi back first to Seoul and then south to his line of fortified camps near Fusun. These four engagements were naval battles on no mean scale, almost 700 ships on both sides taking part in the battle in Fusun harbor and from 100 to 200 or 300 in each of the other battles. In addition to these major engagements there were many minor skirmishes, which history passes over with hardly a word.

I have no intention of dragging you through the weary years of the war. Suffice it to say that Admiral Yi was honored and rewarded by the King. Jealousy, party spirit and the wiles of the enemy did their work. He was arrested, taken to Seoul in chains, beaten, tortured and degraded. His successor Won Kyun was ignominiously defeated and slain and his fleet destroyed. The gates were again open and new troops of the so-called second invasion poured freely into Korea. This was in the spring of 1597. In disaster all eyes turned to Yi Sun Sin. He was restored to command, but of what? Just 12 ships could he muster. With these, by a remarkable combination of strategy, utilization of natural advantages of tide and wind, and indomitable courage as well as by the terror which his name inspired he put to flight a fleet of over 300 enemy vessels which was again attempting the enveloping movement of the first invasion.

1. In the English engagements with the Spanish Armada the two fleets together probably numbered less than 400.
Soon after this the admiral was technically superseded by the Chinese admiral Chil Lin. By a display of rare tact and rarer self-effacement he completely got around the haughty Chinaman and while nominally second in command was the real leader. Their combined attacks on the Japanese fort off Soonchun, the remains of which are still to be seen, and other exploits may be read in the admiral's diary, or more easily in Mr. K. S. Yi's story to which I have referred so often. In 1598 Hideyoshi died and his armies were recalled. The combined Chinese and Korean fleet swooped down on the fleet of transports and men of war and almost annihilated one division. The destruction might have been even greater but the efficiency of the Chinese admiral and fleet had been greatly impaired by silver bullets. In this last great battle Yi Sun Sin was shot down in the moment of victory and died, like Nelson, on the deck of his ship.

This success is usually attributed to the invention and possession of the Turtle Boat, and around it have gathered such roseate mists of fable that it is now commonly said to have been a submarine and the man Yi has been almost completely hidden in the vessel. In so far as he is recognized, it is as the inventor of the ship which is supposed to have sprung direct from his brain into the waters of Yohsoo harbor.

It is necessary therefore to look for a moment at the history of the invention and the distinctive features of this famous ship before we turn to a more detailed description of it. The Chinese had long since found the value of raising and strengthening their gunwales against the attacks of Japanese pirates who found their low free-board delightfully convenient for boarding parties. The Koreans had ships called "Pan-ok-son" which apparently carried covered "castles" or houses to protect the fighting men. We are also told that in 1414 the King inspected a new type of war-vessel called a Turtle boat. It would therefore appear that the ship was not the result of a single flash of inspiration but, like most great inventions, a development or combination of pre-existing ideas. Nevertheless as developed
and used it did constitute an entirely new departure in naval warfare. Its success, its fame then and now, and the terror which it and its commander inspired in the enemy, witness to its novelty and to its superiority over any pre-existing ships.

1. It was larger than most of the ships of the period.
2. Its lines as far as we can determine them were better, giving it greater speed.
3. It afforded complete, not merely partial, shelter to its crew.
4. It afforded the least possible opportunity for the time-honored system of boarding.
5. It seems to have carried an unusually large number of guns and to have been furnished with sufficient ports for archery so that an almost continuous fire could be maintained.
6. The sulphuric fumes poured from the mouth of the Turtle's head were not only useful in inspiring terror in the minds of the superstitious but also served as the modern smoke screen to cloak the movements of the ship from the enemy.
7. She may or may not have been ironclad. Mr. Hulbert is the only English authority for this claim but popular tradition makes the same claim and it may be said that to invent such a tradition would be almost as great a feat as the invention of the ironclad itself. Nor is this tradition of very recent date. In the days of the Tai-won-kun when the French expedition was expected an unfortunate official was ordered by that autocrat to "build an iron-clad ship like the Turtle-boat" and in desperate fear for his head, literally spent all his substance in the attempt to build ironclad boats, which very unobligingly refused to float.1 Further evidence in favor of the tradition is the fact that fire arrows failed to set it on fire and Japanese bullets failed to penetrate the Turtle's shell. It is probable that the heavy planking offered a sufficient protection against the guns of the period but it is not so easy to understand its fire-proof qualities if it

1. The official was a relative of Prof. I. P. Cheung of the Chosen Christian College who himself told me the story.
were only of wood. Against all this is the fact that neither the "Chung-Mu-Kong-Chun-Soh" nor any other book that I have been able to find makes any reference to this feature. Prof. I. P. Cheung, who has read more widely on Korean history than almost any other man in Korea, tells me he has found no reference to armor-plate on the Turtle boat. The lack of written evidence does not prove anything but certainly casts some doubt on the Korean claim to the world's first iron-clad.

The ship was nevertheless a very remarkable vessel for the period and has been the subject of sufficient discussion to warrant a detailed description. The authority for all existing descriptions and pictures is the "Chung-Mu-Kong-Chun-Soh" which was published almost 200 years after Yi Sin Sin's death. This work acknowledges the lack of full and definite data even at that time. The details given are therefore scanty and some of the statements are mutually contradictory. Others bear internal evidence of truth in that they fit in with our knowledge of Korean ships, or with the logic of circumstances. I have spent many hours working over this data and putting it on paper to scale. I have finally drawn a "Turtle Boat" which tallies with the specifications and dimensions, transgressing none that are not mutually contradictory, that satisfies the logical demands of other data, and that if not exactly like Admiral Yi's flagship is at least nearer to it than any pictures or description yet given.

Like any other Korean boat she had no keel but a flat bottom of ten heavy boards. This bottom, from which rose the sides, the bow and the stern, exactly as we saw in our section on boat construction, was 64 feet 8 inches long, 12 feet wide at the bow, 14 feet 5 inches wide amidships and 10 feet 6 inches wide at the stern. The sides of the ship were built on this and consisted of seven strakes each slightly longer than the lower one. The lowest was 68 feet long and the topmost was 113 feet long. Bottom and side timbers were all 4 inches thick. The beam at deck level in the stern was
14 feet 6 inches. Working from this data and allowing for the curvature of the topmost plank we get a ship 110 feet long, 28 feet beam and 7 and a half feet from the bottom to deck. Above the deck rose heavy bulwarks to a height of 5 feet (4 and a half above the topmost plank of the sides). The bulwarks on each side were fitted with no less than 12 "mun" or ports and 22 "pohyul" (loopholes or small ports for cannon). In the bow these bulwarks were shaped "like the chest of a horse" having a port on each side of the breastbone and a loophole by each of these ports. From the top of the bulwals a sloping roof of 11 boards on each side extended inboard covering the entire ship except that in the center there was a slit or opening one and a half feet wide extending aft from amidships, to facilitate the raising and lowering of the mast. It is possible that when the mast was lowered for battle this opening was closed by a sliding hatch. This arched and sloping roof was studded with spikes and knives which were covered by some kind of straw or grass so as to give an entire surprise to boarding parties. In the bow was the Turtle's head four feet three inches long by three feet wide. In this a combination of sulphur and saltpetre was burned which emitted great clouds of smoke "like a mist so that the enemy could not see the ship." This also was Yi Sun Sin's idea and seems to have been the first use of a smoke-screen. Twelve loopholes in the "roof" on each side made it possible to still further discourage any boarders who might gain and hold a footing on its spikes, and immediately above the Turtle's head were two more loopholes, probably for observation as much as for offense. The rudder post projected through a hole 1 foot 1 in. in diameter in the 6th board of the stern. The main deck seems to have been left free for the fighting men and unencumbered except for the mast and two cabins, one for the Commanding Officer and one for the Ship-Master. Below decks the central part of the hold was occupied by a double row of 12 cabins. Of these 24 cabins, 5 were used for powder-magazine, arms, gear, etc. and the remaining 19
were for the sailors and soldiers. There were 10 oars on a
side which I have put in the only place which seems possible
for them to have been. Lower they would take in too much
water, higher the handle would strike against the deck.
There were two men to each oar. It has been suggested that
these constituted 2 shifts of 20 men each. As these oars
must have been at least 20 feet long it is doubtful whether
one man alone could handle an oar, even with counter-
weights such as were used on the Greek galleys, nor does it
seem likely that with only one man to an oar she could have
attained her reputation for speed. The rowers have been
placed one sitting and one standing for the simple reason
that this is the only way in which they can be gotten into the
dimensions specified. The only alternative would be to place
the oarsmen on the gun deck. Not only would this interfere
with fighting the ship but we should then be forced to either
make the oars impossibly long or immerse them at a
ridiculously sharp angle. The accompanying illustrations
are to scale and follow as closely as possible the specifications
given in the first volume of the Chung-Mu-Kong-Chun-Soh.
They show the amidships section, outboard profile and
accommodation plan for the lower deck or hold.

Some confusion has arisen because the "Chung-Mu-Kong-
Chun-Soh" describes two Turtle boats, one the original as
far as it was known at the time and another, the Turtle boat
then (1796) at Yohsoo and said to be much like the original.
It is this second ship 200 years after the original which had
two heads in the bow, a cat walk lengthwise and across the
turtle's back and no mast at all. You may ask where the
anchor, windlass, cable etc. were carried. In the bow of the
hold there would be ample room for windlass, anchor cable
and other ship's gear. In peace or when cruising the anchor
was probably allowed to project from the bow as in some of
the old illustrations and as is the practice today. (See Figs.
11 and 17) When going into battle it must have been brought
inboard through one of the large bow ports and probably
stowed below. The illustrations show a type of rudder such
as is used on river boats today and the location of the hole for the rudder-post in the sixth plank of the stern planking seems to favor this theory. The screen painting already referred shows the typical Korean rudder on all the sailing vessels but is not clear as to the Turtle. She probably carried 40 or more guns\(^1\) such as are shown in Fig. 43 C. and D. These guns were 3 in. guns about 3 feet long and fired either shot or steel headed darts. It is also possible that she carried one or two heavy guns such as are shown in Fig. 42 D. Bombs were thrown and war and fire arrows were shot from the "mun" or ports.

This then was the famous Turtle boat with its crew and armament. We are not done with her yet for we must next see how Admiral Yi handled her and the other ships of his fleet if we are to understand a part at least of the secret of his success.

Whether Yi Sun Sin’s brain really conceived and put into practice the idea of armor plate more than 250 years before the Occident we cannot be sure. But a careful study of his campaigns show that he practically abandoned all accepted methods of naval warfare and at once seized on ideas toward which Drake and Howard were moving at almost the same time on the other side of the world. It seems to me that the building of the "Turtle was itself the first step in the great experiment which was to prove his theory. Arrows alone sink no ships. Catapults of sufficient weight to do real damage are not practical at sea. Hence, from the earliest times till the days of Drake and Yi Sun Sin, ship grappled ship and fought out the issue with sword and battle-axe. Plutarch tells us that the Athenian galleys at Salamis carried 18 fighting men of whom only 4 were archers. It is a long cry from Salamis 400 years B.C. to Lepanto in 1571 but for this whole period naval engagements were fought in the old, time honored style.

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1. K. S. Yi speaks of 72 guns but as 24 of the loopholes were in the roof of the boat, I cannot see how she could have carried more than 48 at most.
Yi Sun Sin faced a difficult problem. The enemy were armed with the new and deadly musket. This weapon did not have the range of the bow and arrow but possessed greater penetration. The enemy were also expert swordsmen wielding long two handed swords, as famous in the Orient as the blades of Damascus and Toledo in the West.

I will not attempt to interpret the Admiral's thought processes but ask you to note what he did.

1. He built a ship in which his men were completely sheltered from arrows and the deadly musket fire.

2. He made this ship as nearly proof against boarders as was possible.

3. He built for speed so that he could command the range.¹

4. He cloaked its movements in smoke so that the enemy did not know where to meet him.

5. He proceeded to arm this vessel with some 40 cannon as compared to the one with which Bonar says the Japanese were armed.

6. When he met the enemy he proceeded to stand off at his own range and hammer them with shot, steel and huge fire arrows.

When chance offered opportunity to bring that 110 feet of heavy timbers crashing into the side of an enemy he rammed; and when the enemy vessel was on fire and its crew dead or struggling in the water he sometimes stopped to board.

His system of warfare was, however, not that of Salamis or Lepanto but more like that of Jutland. It was not necessary for him to make his ship iron-clad for he needed protection only against musket-balls and arrows. This he had in 4 inch timbers. The impossibility of boarding the ship turned the splendid swordsmen who crowded the

¹ The Turtle was 110 ft. long with a beam of 28 a ratio of 4 to 1. Bonar says a Japanese warship of this period which was 47 feet long had a beam of over 20 feet! Is it any wonder that Yi could fix the range to suit himself?
Japanese decks from invincible fighting men into so many targets. It seems strange that no writer, Korean, Japanese or occidental has called attention to the extraordinary genius which seized on the only tactics which could have defeated the Japanese and which were so far in advance of the times.

He even seems to have had some idea of the line-ahead formation by which all the guns of all the ships are brought to bear on all the enemy ships. At one place where they went into a harbor to attack the enemy it says "the ships went in each holding the other's tail." When the enemy opened a heavy fire Yi drew off till just out of their range and continued to pound them. He certainly understood the idea of continuous and orderly fire, for his guns fired at command and in order. Again, on one occasion when the enemy lay in port in water too shallow for his big ships he sent the smaller vessels in 5 or 10 at a time. These delivered their fire, turned and came out and their places were taken by others.

At Fusun his closest friend and most trusted officer rammed and pushed his way into the very midst of the Japanese vessels and in consequence he and almost all his crew were killed. To rescue the ship and his friend's body, Yi took his ship in, grappled the other vessel, and successfully brought it off but this is almost the only instance I can find where he risked the old style fighting. At this same battle some of his more impetuous captains wanted to disembark and storm the castle. He very wisely refused to risk the fruits of victory and the lives of his tired men in a hand to hand battle with the entrenched swordsmen.

A naval history of the war is beyond the province of this paper and the ability of this writer but no discussion of Korean maritime affairs would be complete without thus calling attention to the genius displayed in evolving an entirely new system of naval tactics.

We know almost nothing of the men who sailed and
commanded the ships of Korea. Their names are unrecorded and their exploits unchronicled. The one exception to this statement is Yi Sun Sin. Perhaps a few words about him may not be inappropriate in closing this study of the ships of Korea.

Born in 1545, the same year as Sir Francis Drake, there is a curious parallelism between the lives of the two famous admirals. Both were called on to defend their country against foreign invasion. Both were hampered and hindered by their governments, Drake till almost, Yi till quite too late to prevent the landing of the enemy. Both were removed from command for refusal to obey orders which meant disaster for their countries. Drake was merely sent in disgrace to his country estate. Yi was dragged to Seoul in chains, tortured, beaten and barely escaped with his life. Both were restored to rank, Drake to accomplish little more before he sickened and died on the only one of his expeditions which was a complete failure. Fate, which had been less kind to Yi than to Drake in the early part of their careers, levelled the balances in the end, for Yi saw the enemy driven from his shores and died a Viking's death in the full knowledge of victory.

When commandant at Plymouth Drake set the unemployed population to work on water works for the city, and various harbor works. At Yohsoo Yi saw the same need for employment and set the people to making salt. Drake was undoubtedly the greater as a sailor and navigator, in fact Yi can hardly be called a sailor. But as a naval commandor Yi was at least Drake's equal if not his superior. I like to play with the fantastic and impossible idea of what might have been if Drake in 1579 had headed north rather than south of the Phillipines and had stopped in at Yohsoo. You have to upset some chronology and disregard the question of language to do it but think for a moment of the "Golden Hind" and the "Turtle" lying together at anchor while Drake and Yi visited each other and swapped stores.

There is however neither imagination nor room for doubt
in the statement that Yi Sun Sin was one of the world’s really great men. In a day and place where pride of position and rank was everything, he worked with his own hands. When men were not Korean but West-party men or East-party men he paid not the slightest heed to party but thought only of Korea. When ninety-nine out of a hundred Orientals would have killed either themselves or someone else to wipe out the terrible disgrace he had suffered, he went quietly and humbly about his work as a common laborer and neither then nor later took or attempted to take revenge. When Won Kyun tried to take the lions share of glory Yi said that so long as the victory was won nothing else mattered. Add to these traits the tact that won the heart of Chil Lin the Chinese admiral, the dauntless daring that took him into Fusun harbor as Drake went into Cadiz, chivalry rare in that war, and genius of a high order and you have a man worthy to take his place in the world’s Hall of Fame. Yet so enamored of Pen and Poem is the Orient that men like Yi Hang Bok, who in these same days trotted around after the king writing pathetic poems and uttering philosophical platitude, when not engaged in party politics, is held up as one of the Korea’s great men. Yi on the other hand has been grudgingly allowed fame as a “loyal” soldier but his really great characteristics have been entirely overlooked. The recent revival of interest in Admiral Yi is therefore most gratifying and it is to be sincerely hoped that he may be more deeply and truly appreciated.

In the preceeding pages we have looked at Korean ships of today, their construction, and the superstitions, and history which surrounds them. We have theorized a little. We have done a good deal of piecing. We have been forced in most cases to deal with wood and iron, with dates and places. We know little of the men who toiled at oar and sweep, who held the tillers, wound up the cross-bows or loaded and fired the ancient cannon. Yet, fragmentary as the pictures may have been and perhaps distorted for lack of essential parts I hope that through it all you have
seen brave men, mostly poor fisher folk building ships and sailing the seas for 4,000 years and above them all at least a faint outline of Korea’s great admiral. His day will not come again. We shall never see his Turtle ship sailing these seas but we may sincerely hope that not only on ships of Korea but on the Korean ship men may be found with something of the spirit of Yi Sun Sin.
GLOSSARY AND KOREAN VOCABULARY OF NAUTICAL TERMS

1. Aft—toward the stern.

2. Amidships—the middle part of the vessel. K. Horee 비리

3. Amidships-hold. K. Horee-kan 비리간

4. Anchor—a device of iron or wood so shaped as to grip the bottom and hold the vessel by the rope or chain attached. K. Taht 닫
—flukes—projections at lower end of anchor to grip bottom. K. Taht-kaji 닫가지 (anchor branches)
—shank—long central bar to which flukes and stock are attached. K. Taht-chai 닫채
—stock—shorter cross-piece, set at right angles with flukes to present anchor lying flat on bottom. K. Taht-jang 닫장

5. Artemon—an ancient foremast, raking forward and carrying a small sail serving the same purpose as a jib. K. Ee-mul-tai 이물대
—sail. K. Cho-pung-tot 조풍돛

6. Balanced lug rig—a fore and aft rig common or almost universal in China and Korea. The sail sets from a small yard which projects slightly forward of the mast, it carries a light boom which may or may not also project beyond the mast.

7. Battens—long slender strips of wood or bamboo to support and hold the form of certain types of sails. K. Whal-tai 씨태

8. Beam—the greatest breadth of a ship.


10. Boom—a spar to which the foot of a fore and aft sail is laced. K. Chil whal 칠할 (this is much lighter than a Western boom and is really little more than a heavier batten)

11. Boom-crutch—a movable support which is placed under the boom to hold it up when not in use.

12. Bow—the forward part of a vessel. K. Ee-mul 이물


14. Bulkhead—vertical partitions, either athwartship or fore and aft. K. Pyung-cham 병창

15. Careen, to—to turn a vessel as nearly as possible on her side for the purpose of cleaning the bottom.

16. Carvel—smooth sided, as opposed to clinker.

17. Caulk, to—to drive oakum, cotton or other material into the seams of a vessel to prevent leaking. K. Pak-ul-chida 박울치다
18. Chocks—a device of wood or metal with horns turned inward between which lines may be led. K. Sah-jin-mal 사진함
19. Clinker—a method of planking in which the lower edge of one plank overlaps the upper edge of the one below it.
20. Close-hauled—sailing with sails trimmed in to sail as close to the wind as possible. K. Param ul tai-uh kada 바람을 매어가다
21. Come about, to—to turn with the vessel head into the wind, till the wind is on the other side. K. Too-roo da 두루다
22. Compass—in the modern Occidental mariners' compass the card turns, not a needle. Card rests on sapphire pointed spindle and "floats" in a bowl containing distilled water and alcohol.) K. Chi-nam-chim 지남침
23. Con, to—to direct the helmsman, or to scan the course carefully.
25. Draft—depth of water required to float a ship.
26. Ebb, to—to flow away from the land, of tide. K. Sseu-da 소다
27. Ebb-tide—the period when the tidal current is flowing from the land. K. Sseul-mul 수풀
28. Entrance—the part of a vessel which cleaves the water; the forward part especially at the water line and below.
29. Fair wind—usually a wind well abaft the beam. K. Koh-mul-param 고물바람
30. Fathom—a measure of depth—6 ft. K. Keel (this approximates a fathom but is indefinite, 길 about 5 ft.)
31. Ferry. K. Naroo 나루
32. Flood—to flow toward the land, of tide. K. Meel-da 멜다
33. Flood-tide—movement of tidal current toward land. K. Meel-mul 멜물
34. Fore-and-aft rig—a method of setting sails from a vertical mast or stay instead of from a horizontal yard.
35. Gaff—a spar hoisted on after side of mast and supporting head of sail. K. Sang-whal 상활 (It is a question whether this is technically a gaff or a yard.)
36. Halliard—ropes for hoisting sails, yards and flags. K. Maru-jul 마루줄
37. Hog, to—Hogging occurs when the center is supported and the ends are not, resulting in an upward strain of the frame. This, equally with "sagging" may break a vessel's back if strain is severe and construction faulty. A British destroyer raised
high on a great wave with ends unsupported hogg'd so that she broke in two and sank with all hands.

38. **Leech line**—a piece of rope binding along the leech of a sail; in the Korean sail this line extends around the whole sail.

K. **Tot-ssey** 독세

39. **Mast**—vertical spars set in ships for setting sails. K. **Tot-tai** 독대

**Main-m.**—K. **Hori-tai** 홀리이

**Mizzen-m.**—K. **Koh-mul tai** 고물대

**Fore-m.**—K. **Ee-mu-tai** 이물대

**M. step**—a structure or socket prepared to receive the **bael of m. step** K. **Tot-kop** 독컴

40. **Navigation**—The art of conducting a vessel from one part to another by means of landmarks; and especially by observation of celestial bodies.

41. **Neap-tides**—Those tides that occur near the moon's quadrature. They have less range at this time, the high water being lower and low water higher than the average. Opposite of Spring tides.

K. **Cho-keum** 조긍

42. **Oakum**—a caulking material made of tarred rope fibres.

43. **Oar**—implement used for propelling a boat, especially by pulling.

K. **Pak** 박 (this is only for an oar used like Western oars for rowing, not sculling.)

44. **Parrails**—rope rings or lines going around the mast and holding sail to it. K. **Ahn-we-ju** 안의줄

45. **Partners**—planks or timbers fitted around the mast where it emerges from the deck. K. **Kureh-jak** 구레膈

46. **Port**—the left side of a ship. K. **Mee-ap** 미압

47. **Port-tack**—sailing with the wind on the port side; boat on such a course must give way to boat on starboard tack, this is Korean rule as well as Occidental.

48. **Rail**—(of a boat). K. **Whal-a-ji** 월아지

49. **Rudder**—a device of wood or metal for steering the vessel. K. **Khee** 기

—**blade** or main part—K. **Khee-pon** 기봉

—**jaws**—K. **Kowee-pol** 꼬발 (crab-claws)

—**post** (stock)—K. **Khee-dal** 기달

50. **Sag**, **to**—A boat sags when the two ends are supported and the center left unsupported sinks down. If severe she may break her back.

51. **Scarf**—joining of two timbers by beveling.

52. **Scuppers**—drains or holes to allow water to run back into the sea.

K. **Susong-kung-ee** 수송궁이
53. Sheathing (outside)—an outer covering, in West usually of copper, in
Orient often of wood. K. Sahm 성

54. Sheet—a rope used to control a sail—it is never a sail.
K. Adheh-jul 아데품

55. Single-masted vessel (small). K. Yah kori 아마리

56. Splash-mats—matting or wattle work along the gunwales amidships to
prevent spray from coming inboard. K. Oo-bee 우비

57. Spring-tide—the tides which occur near the time of full and new moon.
They have a greater range than at other times. The high
tide is higher and the lower tide lower. K. Saree 사리

58. Starboard—the right hand side of a ship. K. Mee-twee 미טי

59. Starboard-tack—sailing with the wind on the starboard side; the ship on
this tack has the right of way in Korea and in the Occident.

60. Step (mast)—Socket or framing for the heel of the mast.
K. Tot-kop 톡

61. Stern—the after part of the vessel. K. Koh-mul 고물

62. Stern-hold. K. Koh-mul-kan 고물칸

63. Sweep—originally any long oar, but now more commonly used for a
long oar used for sculling over the stern, the commonest
method of boat propulsion throughout the Orient. K. Noh 노
Blade—the flattened part that is in the water. K. Noh-keet 노젓
Handle—the part actually held in the hands, on some
Oriental oars this is set in and at right angles to the loom.
K. Noh-pyung-aih 노평에
Lsom—the round part between the blade and the handle.
K. No-hsang-chok 노상척

64. Tabernacle—a socket (Korean boats) in the thwartship timber or
mongeh into which the mast may rest. K. Kure-chak 쿠레각

65. Tack, to—to go about by going into the wind. To sail first on one tack
and then on the other in order to progress in a direction
contrary to the wind. K. Too-roo-da 두루다

66. Thatched-awning—a kind of matting to which a thatch or covering of
heavy grass is added, used as water-proofs, tarpaulins and
other uses in the Orient. K. Dheum 락

67. Tide. movement of the water due to the influence of the sun and moon.
K. Cho-su 조수

68. Tiller—a bar of iron or wood fitting into the rudder stock by which the
rudder is controlled. K. Chang-namu 장나무

69. Topping lift—a tackle by which the outer end of a boom is supported.
K. Chong-jul 종줄
70. Transom—athwartships timbers or timber at the stern.

71. Trenail—a wooden pin for securing timbers together. Pronounced “trunnel.”

   K. Sweh (Note: there are a number of kinds of “Sweh.”)

72. Two-masted ship. K. Tangdori 담도리

73. Wear—to turn the ship by turning the stern into the wind.

74. Well, bailing. K. Tu-say 두쇠

75. Windlass—a machine for hoisting the anchor, usually a wheel or drum of some sort.

   K. Hweh-rong or Tat-jul mulleh 해롱, 타물물레

76. Wing and wing—sailing with the boom of one sail on one side and the other on the opposite side of the vessel.

   K. Sah-chil ero-kada 사칠너가다

77. Wung-out—same as wing and wing.

78. Yoke—translation of the Korean word “mongeh” used to name the heavy athwartship timbers which are used in Korea to hold the sides of the ship together and give it necessary rigidity.
FROM KORYU TO KYUNG BY SOH KEUNG,
IMPERIAL CHINESE ENVOY TO KOREA 1124 A. D.,

Translated by Prof. L. G. Paik,

Chosen Christian College

Boats. I hear that sailing on the water is in the
Divination Diagram “Whan.” The purpose of boats is for
communication and it is said that the original idea for the
shape of the boat was taken from this diagram. Later, wise
men continued to make boats and various craftsmen added
ornaments. Therefore, we have those boats having figures
of dragons or the heads of swift-flying birds which can
conquer wind and waves and can sail a thousand li in a day
and can cross great rivers and seas. The Korean people
have lived on the sea and have themselves crossed “the
whale waves.” They should therefore make boats of prime
importance in their country. When, however, I saw their
boats I found that they were crude and not very elaborate.
I do not know whether this crudeness of shipbuilding is
due to their exceeding mastery of the water or because of
their backwardness and lack of ability. I merely present in
pictures what I have seen.

Police Boats (or Soon Son). Koryu is on the shore of
the eastern ports but the boats of that land are very crude.
There is a single mast in the center but there is no cabin or
deck house on the deck. There is a rudder which projects
through a sort of shelf in the stern. When I reached Kunsan
I saw more than ten such boats. All were flying banners
and their sailors wore blue clothes. They approached us
blowing horns and banging gongs, each boat carrying a
small flag at the top of the mast bearing inscriptions such as
“Chief of Police of Hongju,” “Chief of Police of Youngsin,”
“Police Force of Kongju,” of “Porung,” “Hoi-in,”
“Anheung,” “Kaichun,” “Yangsung,” “Nai-jin,” and
“Kengwon.” The inscription characters meant “officer”
and these were evidently police officials. At the time of our
entrance and later, on our departure these boats came out as far as Kunsan Island. When they met the Sacred Ship (the boat on which the Envoy was) they sailed a little past us out to sea and then turned to go back to the shore.

**Official Boats (or Kwan Son).** In the construction of an official boat the upper deck is provided with a roof and there are windows or ports in the lower parts with railing around the deck. The floor is made of boards laid crosswise and the beam on the upper deck is much wider than on the bottom. The boat itself is not built with boards but rather with whole pieces of timber or logs, both straight and bent, which are fastened together. In the bow there is a wheel for the anchor. On the large mast there is a sail which is made of more than twenty breadths of cloth. In the lower fifth of the sail these breadths are not sewed together so as to allow the wind to blow between them. When the envoy entered the Korean territory there came from the east more than ten such boats for reception, for a guard of honor, for supervision of harbor traffic and for kitchen and dining facilities. They were all about the same size and type except that there was a special room and special hangings on the reception boat.

**Song-Pang.** The Song Pang is a boat from Kunsan. There are five rooms or compartments from the bow to the stern. These rooms are covered with mats. There are two very small rooms in the bow and stern where there are benches and where screens are hung. The two rooms in the center were furnished with silk cushions and are very elegant. The Chief Envoy, the Vice-Envoy and other high officials for our reception were on this ship.

**Curtain Boat (or Mak Son).** Curtain boats were found in all three islands. I note that officials and attendants of the middle and lower ranks were on these boats. There are rooms decorated with blue hangings, and long poles were used for pillars. The four corners of the tent were fastened with red rope.

**Sacred Ships (or Shin Son).** I have heard that when
the Emperor Shin Jong was dispatching his embassy to Korea he ordered the proper authorities to build two large ships. The first Sacred Ship was called "Space Ruling and Far Sailing." The second was named "Light Flying and Smooth Sailing." They were most magnificent ships. The Emperor being a great person and a man of filial piety like the great Emperors of Yo and Shoon bestowed abundant grace on the Korean people. The great achievements of the Emperors Yongchung (1068-1077) and Won Pong (1078-1085) coming down through the Emperor of Sungyang (1102-1106) has reached to the present time. When the embassy was dispatched a special edict was given to build two ships. They were larger than the previous ones and had new and splendid names. One was called "The Sacred Ship of Settling-a-new," "Fine Sailing," "Far Going and Safe Crossing." The other was called "The Sacred Ship of Smooth Floating," "Absolute Safety and Perfect Crossing." They were as large as a mountain and could be sailed in any storm. They had silk sails and were decorated with the head of a swiftly flying bird. They awed the monsters of the sea, and added luster to the glory and dignity of the Emperor and they terrified the barbarians. Never have such great ships been seen. No wonder that the whole kingdom of Korea was stirred on the day when the bearer of the Emperor's message and edict was received!

**Guest Boat (or Kak Son).** According to ancient custom when the court (of Korea) sent the embassy the court instructed the governors of Euken and Tse-kiang to get together the guest boats and instructed the head of Myungju district to decorate these ships somewhat like the Sacred Ships. The bodies of these ships were narrow, being not more than 100 ft. long, 30 ft. deep and 25 ft. wide. These ships can carry 2,000 bushels of grain. They are built of whole timbers, one placed on top of the other. The upper part of the ship is as flat as a scale, and the side (bottom?) is as sharp as a knife blade. The merit of these ships is in their ability to sail against the wind. They
are divided into three parts. The front is used largely for storage and has no flooring in it. Between the two masts are places for the cook and the water jars, and underneath these rooms there are sleeping quarters for the soldiers. The second section is divided into four rooms and the last section in the stern is called the pavilion room. The height of this room is more than 10 ft. and it is surrounded by four ports or windows as a house, with a railing around the top. The ceiling is done in costly silk and beautiful decorations. The embassy and his train have their places in these rooms according to their rank. On the roof of the pavilion there are bamboo mats which are rolled up when the weather is good and unrolled to cover the roof when it rains. The sailors however do not like to have the pavilion part high lest it catch too much wind. Between the two sides of the bow there is a wheel on which is wound wisteria rope. The rope is as large as the smaller rafters or ceiling beams of a house and is 500 ft. long. At the end of it the anchor stone is provided with a hook on each side of the stone. When the ship is not in the open sea but near the shore the anchor is thrown into the water to reach the bottom of the sea and hold the ship. When the storm and is severe a floating anchor is used. This floating anchor is used like the large anchor and they are both hung from the sides. When the ship is ready to put to sea the wheel is wound up and the anchor raised. There is a regular rudder in the stern. The rudders are of two kinds, one is small and the other large and they are used according to the depth of the water. In addition to rudders two great oars project from the upper part. These are placed just behind the pavilion in the stern. These with the small rudder are called the three minor rudders and are used when the ship puts to sea. There are bamboo baskets or bags at both sides of the ship. These are used to stop the waves not letting the water go through the bag. By the bag there are scuppers. Ten boats made a squadron of guest ships. When the ship enters a
harbor it usually does so with the incoming tide and then the men use long poles. These polers jump and shout and exert themselves to the utmost but the ship cannot go as fast as when sailing under a good wind. The great mast is 100 ft. high and the small one is 80 ft. high. When the wind blows favorably they raise the sail of 50 pieces, (of cloth), but when the wind blows from one side they use very fine mats which are stretched at the side of the ship according to the wind. On the top of the large mast a small sail of 10 pieces is provided. This is called the "wild fox sail," and is used when no wind blows (in light wind). When the wind blows from all directions the ship cannot sail. There are a few bird feathers placed on top of an upright pole and this device is used to indicate the direction of the wind and is called "Five Tales" or "O-Yang." It is not easy to get just the right wind. Therefore it is more difficult to use the great sail than it is to use the small mat sails which can be easily adjusted. When the boat is at sea the sailors are not afraid of the great depth of the water but rather of shoals, for since the bottom of the ship is not flat, it will turn over and cannot be saved if left aground by the ebb-tides. For this reason they always use a lead-weight on a long rope to sound the depth of the water. There are about 60 men in the crew of a ship and the Master Shipmen are so familiar with the sea route, so well guess the weather conditions and other affairs that they are able to overcome the most unexpected accidents, and one at each end of the boat work the crew like one man. The length, width, height and size, the equipment and the crew of the Sacred Ships are about three times greater than that of the guest ships.
Dugout in use as a ferry on the Tuman River
(Fig. 1)

Korean light skiff or "mehsaiungi"
(Fig. 2)
Detail of method of supporting mast on Korean river boats.
(Fig. 5)

Detail of rudder and stern of Korean river boat
(Fig. 6)
Taidong river boat, from above

(Fig. 7)
Fig. 9
18 ft. fishing boat, west coast.

Fig. 8
Triang River boat.
Stern view of Fig. 9

Fishing vessel, about 30 ft. (near Seoul) (Fig. 11)
Fishing vessel, about 35 ft., (near Seoul)
(Fig. 12)
Drawing and plan small fishing boat, east coast

22' x 8.29' x 3.06'

(Fig. 13)
Korean boat with built-out platforms for brushwood freight.
(Fig. 15)

Korean boat loaded with brushwood.
Note man on top of load and outrigger-log on starboard.
(Fig. 16)
Large cargo vessel under sail, bow view
(Fig. 17)

Korean anchor.
Note "spirit" decorations on vessel in background
(Fig. 18)

Large cargo vessel under sail, stern view
(Fig. 19)
Korean anchor.
Note "spirit" decorations on vessel in background
(Fig. 20)

Cargo vessels in port.
Note windlass, thatch awning, and rake of masts
(Fig. 19)
Korean shipyard, Noryangchin, near Seoul

(Fig. 21)

Bending timber for ships

(Fig. 22)
Cutting trenail holes and beveling
(Fig. 23)

Bottom and side construction, note projecting trenails
(Fig. 24)
Side-planking, note groove for tongue and groove joint
(Fig. 25)

Partially completed small boat
(Fig. 26)
Looking forward at deck level. Note mast step and sockets for partners

(Fig. 311)
Ready for deck planking

(Fig. 31)
Korean hailing vessel in broad outline
Lines of Korean fishing vessel (Fig. 33)
Flags used at spirit ceremonies "Above," "General Im," "Tiger."
(Fig. 34)

Modern compromise type cargo-vessel decorated for sacrifice.
(Fig. 35)
Fig. 36
Banner in bow and special pennant for "Sodank" Crew of vessel shown in Fig. 33. Note "Tiger"
Boat vase found near Kyungju 4th-7th century A. D.
(Fig. 38)

Boat design, bronze mirror, Koryu period
(Fig. 39)
Ancient Korean Men-of-War (Yi Dynasty?)

(Fig. 40)
FIRST CLASS JAPANESE MAN-OF-WAR, 16TH CENTURY
Sword

1. Hand-gun
2. "Holder" for gun

Small Cannon, Cannon.

Dart fired from D.  (Fig. 48)
(A) Korean Fleet

Naval Formations

(B) Japanese Fleet

(Fig. 44)
Signal Flags
(Fig. 45)
The "Turtle." Korean Drawing
(Fig. 46)
The "Turtle," amidships section
(Fig. 48)
The "Turtle", accommodation plan, lower deck.

(Fig. 49)
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Philadelphia, Pa., U. S. A.
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Kensington Gore,
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New York, Broadway at 156th Street,
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Annual Report of the Smithsonian Institution,
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Transactions of the Asiatic Society of Japan
Osaka Building, 3 Uchisaiwai Cho,
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Journal of the North China Branch of the Royal Asiatic Society
5 Museum Road, Shanghai,
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Archiv Orientalni, Orientalni Uslav N Praze
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TRANSACTIONS
OF THE
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VOL. XXIII. PART II.

Seoul, Korea
DECEMBER 1934
The author, in the garden of the Kudan Military Museum, Tokyo, holding the first matchlock used in Japan.

All Korean matchlocks were patterned after this gun.
Plate 2.

Prehistoric Korean Stone Hatchets described in text, page 3.

From the author's collection.
PREFACE

During the two years which have elapsed between the time of reading this paper and its publication, many additions and corrections have been made. There will be opportunity for many more, no doubt, but I am now willing to have it published, in order to bring out such mistakes as it may prove to have and to stimulate other research workers in these interesting questions of old Korea.

Most of the original translations were done with the aid of the old Chinese scholar, so well known to many foreigners in Korea as Mok Sunsaing. Mr. H. Hong, of the Government Historic Compiling Department, checked many of the details of Korean history. Mr. Koizumi, of the Archeological Department of the Government-General, not only loaned pictures and books but reviewed the article and gave much time to advising and to making available for study the extensive material in the Government-General. The authorities of the Prince Yi Museum made the material there available for study.

Mr. Martin Wilbur of the College of Chinese Studies at Peiping helpfully criticised my work, and checked it with Chinese writings, and with the opinions of well-known sinologues in Peiping. Mr. F. S. Miller, Mr. W. W. Taylor and Mr. A. W. Taylor were of considerable help in the gathering of the pieces of my private collection. My Secretaries, S. H. Ahn and M. Y. Lee, have translated, interpreted, rewritten and rechecked the material many times before its final arrangement. Mr. Hugh Miller, Dr. W. M. Clark, Mr. G. Bonwick and Rev. Chas. Hunt, of the Society's Publication Committee, have given valuable aid in the arrangement for printing and the proof reading. To all of
these friends I am grateful for their part in adding this bit of knowledge of things Korean to our English libraries.

I am indebted to the authorities of the Kudan Military Museum in Tokyo, and to Mr. T. Oshima in Osaka for their helpful advice in my Japanese notes and comparisons.

J. L. Boots.

Severance Union Medical College,
Seoul, Korea.

December, 1934
Left: Stone Dagger found in Silla Tomb near Kyungju. From the collection of the Government General of Chosen.

KOREAN WEAPONS AND ARMOR

Right: Stone Knife. From the collection of the author.
KOREAN WEAPONS AND ARMOR

Introduction

The story of Korean arms is a tragedy. It is a story of the life struggle of a people geographically hemmed in by larger and more powerful nations, maintaining for thousands of years their national integrity. Overrun by one country, pillaged by another, their country was used as a battleground for all the Japanese-Chinese-Mongolian-Manchu wars. It is a story of a people driven in desperation to a task for which they had no heart, forced to learn an art for which they had no natural aptitude. It is the story of a people who repeatedly had to lay down their honored pen and brush to defend their lands and their homes against those who loved the sword. In the end they succumbed to the inevitable forces of international trade and relationships and today their swords are truly beaten into ploughshares.

Sources

There remain living today only a very few Koreans who have intimate knowledge of the old military things. None of them are writing their memoirs and soon they will be gone. Museums contain surprisingly few pieces to tell the story to posterity. In the Prince Yi Museum in Seoul are two or three guns, half a dozen swords, and two suits of armor. In the Government General Museum are some prehistoric stone and bronze relics and in the store-rooms there are some tens of guns, cannon, bows, spears and swords.

Following the suggestion of a note in Griffis’ book on Korea, that a large collection of military antiques taken back to Japan by Hideyoshi’s officers were in the possession of the Imperial Household, I made a trip to Japan and found that the entire lot had been destroyed in the great earthquake of 1923. In none of the Japanese museums were more than one or two Korean pieces. None of the recognized authorities profess to know anything of
Korean arms, beyond the suggestions given by Japanese historians.

Careful and repeated house-to-house searches to procure the old pieces to melt down for the metal, and, later, the general and complete disarming of the people, have left little for study. Such pieces as have come to light through curio dealers and foreign collectors I have gathered together in a collection which is small but probably the most comprehensive one which remains today.

There is little available for practical use in Korean literature. Although Courant lists 52 books on military art, few of these are available and most of them deal with tactics rather than with arms. They are written in an old style Chinese character that is becoming more and more difficult of translation.

Influences

We can safely assume that the people of the Korean peninsula have always had some trade and intercourse overland with the Chinese, Manchus and Tunguses, and by their small boats, with the people of Japan. Naturally, then, their military habits were copied from or influenced by those of their neighbors. In rare instances these more warlike people may have copied the Korean models. All things were probably tried. Those that were easily made and which seemed efficient were adopted.

Few things of our concern were originally invented by the Koreans themselves and it is sometimes difficult to tell whether the pieces are of Chinese or of Japanese derivation, although certainly the stronger influence was Chinese. Coins found in mounds and the recent discoveries of the Rakuro* tombs prove a strong Chinese (Han) influence from nearly a hundred years before Christ. The Rakuro settlement numbered more than four hundred thousand Chinese and spread its culture for four hundred years no doubt throughout the Korean peninsula and to Japan.

* I use the Japanese name. It is also known as Nakniang and Lo-lang.
PLATE 4. ARROW-HEADS

Found in Shogen, South Keisho Province.
Smooth and well made. Scale is Japanese inch.

Photo by courtesy of
The Government General of Chosen.
PLATE 5. PRE-HISTORIC WEAPONS

Above: Bone handles to which iron knives were attached. Found in a tomb at Kinkai, South Keisho Province.

Below: Bone arrowheads, found in a Silla tomb at Kinkai, South Keisho Province.

From the collection of
The Government General of Chosen.
Prehistoric

Neolithic tombs in various parts of Korea have disclosed various stone, bone and horn weapons which strongly resemble the Neolithic findings of the Yayoi type of western and southern Japan.

Stone axes, which were probably tied to a short wooden handle by leather thongs, have often been found. They correspond exactly to those of Neolithic Japan, but not to those of China. The four in the writer’s collection are those most commonly found, common granite, dark quartz granite, smooth black quartz and grey calcite. They average 3 to 5 inches in length by 1 to 2 inches in width and $\frac{3}{4}$ to 1$\frac{1}{2}$ inches in thickness and are edged on one end and rounded on the other.

Another common stone piece is the knife, flat, rather thin, and sharp on the rounded edge; but this was probably used for scraping hides and not as an actual weapon. Arrow-heads of bone and of deer horn, together with iron knives with bone or horn handles have been found in tombs, both near Fusan in the extreme south and near Yuki in the north-east. These mounds were prehistoric and contained stone implements. Thus we have iron together with bone and horn weapons in what is considered the later Stone Age; and these were only near the seashore, never inland, and in areas nearest Japan and furthest from Chinese influence. Iron was found and used very early in Korea while the Chinese were developing bronze to the high degree shown by the Han specimens. Professor Torii thinks the iron culture was derived from Tungusic sources in eastern Siberia.

WEAPONS

The Bow and Arrow

As the sword is the typical weapon of Japan, so is the bow and arrow typical of Korea. In the oldest books of China, the people of Korea were referred to by the use of the character 夷, which is made up of the character for “great” 大 and the character for “bow” 弓 which is now
translated “barbarian”.

Koreans think that in early times their people had evidently achieved a skill with this one weapon beyond that of the surrounding tribes, although this Chinese word was indiscriminately applied to all foreigners.

Down through the centuries the people of Korea continued the development of this weapon, holding it above all others. They perpetuated the use of it alone in peace times, as a sport and personal accomplishment, until at the close of the last dynasty it still stood gallantly beside imported muskets, honored and revered. It was the one military practice in which Korean boys longed to become proficient, the one token of martial skill which ever held its own among a people who for thousands of years have preferred silks, pictures, poems and music, the stately crane in the paddy fields and the knarled pine on the mountain side.

The common Korean bow is not of a single piece of wood but is technically known as a composite reflex bow, and is made of mulberry wood, bamboo, water buffalo horn and cow sinew spliced together. It is not so long as the Japanese bow, being usually about 4 feet, and is more difficult to string, to shoot and to keep in order than the simple “self” bows of other races.

The question of the origin or derivation of the composite bow in Korea will be difficult to prove. A book on archery in Korea (朝鮮의弓術) recently prepared by the very active archers association claims that the middle kingdom of Kokuria used a composite bow in B. C. 222 and that in ancient Korea up to the division into four provinces a wooden bow was used.

“In the Silla (新羅 B.C. 57–935 A.D.) records” this archery book says, “of twenty-three kinds of armies, some were named for the bow,” and of the seventeen “officials” the bow maker was number eight, and was highly respected. Also that the Emperor of the Tang dynasty hearing that the Korean bows shot a thousand po (5,000 feet) sent to Silla for a bowmaker to go to China and teach the secrets of Korean archery. He went in 669 A. D., but his bows carried their
PLATE 6. CROSS BOW

Piece of wood holding bronze mountings of cross bow. Found in tomb of Rakuro period near Pyengyang.

From the collection of The Government General of Chosen.
PLATE 7. CROSS BOWS

Above: A drawing from the old Korean book, 武經節要

Below: Two crossbows, of carved wood. The bow inserted in the one on the left should be placed in the opposite direction with the ends of the bow forward, so that they would be back in their present position when drawn for firing.

From the collection of
The Government General of Chosen.
arrows only thirty po. He sent back for different materials, but could not get more than 60 po, "for he evaded giving any information to China on the secrets of Korean archery".

It is said that Silla and Pakche used a bamboo arrow, but that Koukuria used arrows of the 코시 reed.

The archery book claims the bows of the Chinese settlement of Rakuro 樂浪 (B.C. 108–313 A.D.) were of sandal wood (박갈나무). Subsequent to the publication of this book, one of the most interesting discoveries in all the archeological work in Korea throws direct light on our problem. In September 1933, a tomb of the Rakuro period was opened by the Government General Archeological Department. The tomb is thought to be that of the Provincial Governor and his wife, dated about 150 A. D. Among the many things found well preserved is a wooden cross-bow with bronze mountings. The wood had been covered with black lacquer and is intact. The bow is about two feet long, symmetrical in design, altogether beautifully made and as finished a piece of workmanship as any weapon of Korean history.

Bronze pieces of the same kind of crossbows were found by Dr. Sekino in a Rakuro tomb dated 7 B.C. This Rakuro Chinese settlement in northern Korea was within the Han period.

Lauffer states, *"As to offensive armor, M. Chavannes correctly emphasizes the fact that the Chinese soldiers of the Han time availed themselves of crossbows, not of bows. This is confirmed by his documents as well as by the Han sculptures, on which men are usually represented as shooting with crossbows, not, as has been said by some observers, with bows."

*"The crossbow is properly claimed as a contrivance of the aboriginal tribes of southern China."* Werner has found the invention of the crossbow ascribed to Huang Ti (黃帝) (B. C. 2698–2598) (古史考).

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Professor du Bois Reymond * has pointed out that we have in Homer a description of the bow used by Odysseus which leaves no doubt that there at the dawn of European history the composite reflex bow had been developed to the highest stage of mechanical improvement which has never been improved upon to this day. This bow closely resembled the Chinese and Korean bow, the most valued arm of a generation which has not yet passed away.

The word for bow in the earliest Chinese writing (the Yin bones,) means a composite bow, but it is not entirely accepted as of Chinese origin by foreign sinologues. Bishop says we have no means of knowing whether or not the Chinese Neolithic bow was the composite one of later years.** Where it began will probably never be known. Whether it spread from those warriors of Asia Minor through Chinese Turkistan into China and Korea or whether westward from the Chinese under the Chau (周) dynasty (B. C. 1122—255) when their ancient histories say archery was developed to its highest perfection, no one can say. Therefore, without fear of successful contradiction the Korean has claimed it as his own.

Back, far beyond recorded history, clouded in tradition, it began somewhere on the Asiatic Continent. Centuries of years later here in Korea alone, the skill in its manufacture and use is perpetuated by several hundred archers who daily and enthusiastically follow its lure on the hillsides, within the sound of thousands cheering a baseball game.

Because of the difficulty of stringing the bone bow and the necessity of keeping it absolutely dry, actual fighting

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** Foot Note, Chinese Clay Figures Part 1, page 189:—
In Ch. 49 of Hou Han Shu the story is told of how in the 75 A.D. General Keng Kung and his troops, being at war with Kucha, were at the point of starvation, and cooked cuirasses and crossbows so as to feed on the leather and sinews contained in them (CHAVANNES, T'zung Pao, 1907, p. 228),—a case sufficiently convincing as to the material of which they were made.
KOREAN WEAPONS & ARMOR

BY

JOHN L. BOOTS, D.D.S., F.A.C.D.

Read before the Society

February 13th 1931

and June 8th, 1932.
PLATE 8. BOW

Above: A photograph of a modern Korean archer showing the method of holding and drawing the Korean bow. The arrow passes to the right of the bow and the bow string is pulled well back of the ear and held by the thumb, not by the fingers.

Below: Old Korean bows in the author’s collection. The top one is for a cross-bow.
2. The ordinary bow, shooting the long arrow, 34 by 3/8 inch with a 2 inch flattened iron head, with three bladed 3/4 inch feathering and used in the ordinary way.

3. The ordinary bow but requiring grooved stick or barrel back to prevent it from breaking.
brows were often of the same design and shape, but of wood, lined with sinew from the back of the cow. There are few to be seen now. One in the writer’s collection is very heavy. It is said that these were used by especially picked strong men, (별부) “shock troops,” as it were, of which each province had a corps. Some of these bows were so strong as to require two men to string them, and they were drawn by being braced with the feet, against the ground, then quickly raised and shot. The long bow was occasionally used and such as they had were made after the Chinese fashion, composite, 5½ feet long, of bone, wood and sinew.

The ordinary short bow was used in three different types, shooting three different arrows:

1. 손획궁 Cross bow or box bow, held horizontally, shooting a short 11 by 5/16 inch arrow, with 2 inch head, and without feathering. The bow is of mulberry wood (영나무) faced with cow sinew and wrapped with sinew thread painted black. This was the forerunner of the machine gun, for the purpose was not accurate aim but to lay down a quick barrage against closely advancing troops.

2. 활 the ordinary bow, shooting the long arrow, 34 by 3/8 inch with a 2 inch flattened iron head, with three bladed 6½ inch feathering and used in the ordinary way.

3. 편전 (片箭), an ordinary looking bow but requiring a grooved stick or barrel held by a string tied to the third finger of the hand holding the bow-string. A middle-sized arrow, 18 inches, slightly over 1 inch thick, with 1½ inch head and 3 bladed 7 inch feathering was used with this bow and when released it sped out of the grooved stick. The purpose of the grooved stick was to provide a rest for the short light arrow which is less than half the length of the distance from the bow to the pulled string. An officer of the old Korean army explains that “the grooved stick can be seen by the enemy, who thinks that the arrow has not yet been released so that he continues to watch the bowman when suddenly the arrow coming unseen from the sky pierces him.” The arrows for this bow were frequently poisoned. I cannot find
accurate information on what material was used for poisoning. "They got it in the fall from trees."

The method of stringing the common bow and the method of arrow release, that is holding the string by the thumb and using a thumb ring, was the same in both Korea and China.

In the fourth volume of 武藝圖譜通志 (written 1791 A.D.), the most explanatory of all Korean books on arms, we read: "In the three countries there is, in each, one best weapon. In China, it is the long spear. In our country it is the bow with the aiming groove and in Japan the matchlock gun (literally, bird-gun). The Orient is famous for these three." But the author contradicts himself by going on to say, "The long spear is king of all weapons and the war club is in Korea the best or first. The club is half as efficient as the long spear. The Chinese use a long pole with the end like a duck's bill, so that the club becomes like the long spear,—one cannot do without the other. The manner of using the club is the same as that of all the weapons, and involves the same use of the body and the feet. One thrust with the spear or pole is better than striking a man 1,000 times." And this quotation shows the unfortunate thing in all our investigations—the men who knew-fighting lacked skill and accuracy in writing and the writers were not fighters.

Nevertheless the bow was generally accepted as the most reliable of all weapons and the arrow of this 쪽 쪽 was the swiftest and straightest of all. The arrow from this bow which was the favorite Korean weapon of the time of the Japanese invasion of Hideyoshi in 1592 A.D. is said to have carried 500 yards * while the arrow from the Japanese long bow carried only 350 yards. I quote this from a Japanese authority and mention it especially as one of the few things in which the Korean arm was superior to the arm of his adversary.

* The regular American target distances are from 40 to 100 yds.; Japanese, 30 yds; Korean, 173 yds.
accurate information on what material was used for poisoning. "They got it in the fall from trees."

The method of stringing the common bow and the method of arrow release, that is holding the string by the thumb and using a thumb ring, was the same in both Korea and China.

In the fourth volume of 武藝圖説通考 (written 1791 A.D.), the most explanatory of all Korean books on arms, we read: "In the three countries there is, in each, one best weapon. In China, it is the long spear. In our country it is the bow but the aiming groove and in Japan the matchlock gun (literally, bird-gun). The Orient is famous for these three." But the author contradicts himself by going on to say, "The long spear is king of all weapons and the war club is in Korea the best or first. The club is half as efficient as the long spear. The Chinese use a long pole with the end like a duck's bill and the club becomes like the American Indian's fighting club."

**PLATE 9. ARROWS**

Upper right: Short Korean war arrows with iron points for shooting with the Pyun Chun. The feathering has been destroyed. Length 1¼ feet.

Lower right: Cross-bow arrows. Length 11 inches.

Extreme left: A modern target or archery arrow.

Second from left: An ordinary Korean war arrow. Length 2 feet 10 inches.

From the collection of the author.

Nevertheless, the bow was generally accepted as the most reliable of all weapons and the arrow of this 弩 was the swiftest and straightest of all. The arrow from this bow which was the favorite Korean weapon of the time of the Japanese invasion of Hideyoshi in 1592 A.D. is said to have carried 600 yards * while the arrow from the Japanese long bow carried only 350 yards. I quote this from a Japanese authority and mention it especially as one of the few things in which the Korean arm was superior to the arm of his adversary.

* The regular American target distances are from 40 to 100 yds; Japanese, 30 yds; Korean, 173 yds.
The arrows were all much alike, bamboo shaft, about ½ inch thick with a head of iron, 1.5 inches long, extending into the hollow of the shaft and bound with black thread. The butt of the shaft was of locust wood nocked to receive the cord and set into the bamboo joint and bound with black thread. None of the arrows were varnished or lacquered as were the Japanese arrows, which were beautifully made. Feathering was triple, of the three end wing feathers of the pheasant.

From an old Korean book called 兵學指南, which is one of the famous works on military art, copied from an old Chinese classic, I have translated as follows:

“The Design of the Bow. To make the bow, mulberry wood, the tendon of the cow and horn are used, and it is then wrapped with willow (버들) bark because it is waterproof and the southern countries are always wet. They are 10 자, 11 자 and 9 자 long.

“The Shooting of the Bow. The front hand goes forward like pushing over a big mountain and the rear hand is like pulling the tiger’s tail. Pulling the bow in this way, there is strong power to send the arrow.”

The description is picturesque even if it is not accurate for a modern manual of arms. These dimensions are greater than those of any Korean bows I have seen and those painted on old screens are short like the museum pieces now available. (An old Korean foot (자) was only 7/10 of our foot.)

Japanese Archery

For comparison, I give a brief description of the Japanese war bow. Simple in form, probably of yew wood, up to the beginning of the Kamakura Dynasty (1185), it then became composite, gradually developing into the typical form used for the last 300 years and remaining today as the model for their archery meets. It is 7½ feet long, made of alternating layers of bamboo and mulberry and wrapped with reed or lacquered. The arrow is 3 feet in length, of bamboo, lacquered to keep it from splitting, with an iron head of varied designs. The soldiers commonly carried all
arrows with simple pointed heads except one which was elaborately made, Y-shaped or of open-work design which was to be used only in killing a high officer of the enemy.

When unstrung, the Japanese bow assumes almost a straight position, while the Korean bow bends backward to the full reverse curve of its drawn position.

The unique thing about the Japanese bow is that it is held not in the center but at one-third the distance from the bottom. Japan and Afghanistan are the only countries in which the bow was held at this grip instead of at the middle. The Koreans did not copy this nor any other feature of Japanese archery.

The whistling or Devil Arrow is thought to have originated in Mongolia. The remains of one made of bone has been found in a Silla tomb near Kyung Ju and is the only clue to its path through Korea to Japan, where it is well known. There is apparently no evidence of its use in Korea during the Yi Dynasty, but we may believe that it was more commonly used than our researches would prove. This simple wooden whistle box for an arrow head could not have been difficult of manufacture. Its effective use is easily justified, either as a signal or in being shot into the enemy’s camp at night to frighten and unnerve them. Japan used it so. The Koreans were a spirit worshipping people who especially cultivated the attitude of fear toward their spirits. One of these weird whistling things dropped suddenly out of the black of the night on to a group of superstitious soldiers gathered around a quiet game of chess in front of the campfire must have had about the same effect on morale as a midnight bomb on London.

The Fire Arrow probably came from China and was not used in Japan before 1185. It was used by the Japanese in the crossbow, which they also got from China through Korea and was made by attaching to the iron head a small piece of cotton boiled with sulphur. Later gunpowder was used.

From Hideyoshi to the Meiji era, the front or common soldier used a gun, horsemen the sword and spear and the
PLATE 10. ARROW QUIVERS

Above: From the top down,—

1. Arrow quiver of black lacquered wood; brass mountings, turtle design lock on the lid. Fancy wood loops attached by glue.

2. Quiver of carved bamboo, plain loops.

3. Quiver of carved bamboo with carved dragon loops.

4. Wooden quiver, six sided, covered with shagreen, carved dragon loops.

Below: Enlarged photograph of the upper end of quiver No. 1, showing the detail of the brass mounting, the turtle lock and the carved wooden lid in war-dog design.

From the author's collection.
Plate 11. Archery Accessories

Above:  Boar's tusk arrow point straightener.

Below:  Military officials' bow and arrow holders for carrying on parade. Holders are of black lacquered leather.

From the collection of
The Government General of Chosen.
officer the bow and arrow. Sometimes a short arrow with two-bladed feathering was used by a general who rode in a sedan chair.

Japanese feathering was usually three-bladed, of eagle wing feathers. There was also an arrow with a large Y-shaped iron head and four bladed feathering, called karimata.

Archery Accessories

The very old quivers of China were of sealskin or of tigerskin. There were two distinct types of arrow quivers in Korea and two in Japan. In Japan there was the open basket type, neatly made of woven reed in the shape of a wall flower basket, holding 24 arrows, exposed. Older, perhaps, was the closed quiver of leather, usually wild boar, with the hair on, about 3½ feet long and 4 or 5 inches in diameter, constricted in the center and opening at one end by a hinged leather lid.

Korean quivers were also of open and closed designs. The former were of black lacquered leather with metal mountings, and were in two pieces, one holding the arrows and the other the bow. These were used especially in parade. The second or closed form was a long tube of carved bamboo, lacquered wood or wood covered with shark skin, with a hinged lid of wood carved into the typical war dog-dragon face. All have well-designed brass mountings, with the lid fastened by a brass lock in turtle design. They were carried by a sash cord held by two loops of dragon or fancy plum blossom design, glued to the side of the quiver. It is doubtful, however, if these were ever used in battle. The arrows carried by Korean soldiers in actual fighting were merely tied by interlacing cords into small bundles.

There was a wild boar’s tusk with a brass loop for hanging from the belt and pierced through by two holes, lined with brass eyelets about ¼ inch in diameter. It was used as an arrow point straightener. The archer thrust the bent point of a used arrow into the hole, and, holding the
tusk in one hand, by levering the arrow shaft with the other, straightened the point for use again.

**The Sword**

The sword came to Korea from China during the bronze age, a double-edged straight shaft, a stabbing weapon. It passed through Korea and on to Japan, where it was adopted as the most efficient of weapons and developed into the honored emblem of the Samurai. The Japanese, early finding the double edge clumsy, difficult to carry and awkward for the wielder, conceived the idea of splitting it down the center, making two single edged blades with a heavy blunt back.

This was first done by a blacksmith named Amakuni at Nara 1,700 years ago. By the beginning of the Kamakura Dynasty (1189) they had found that curving the blade changed the center of gravity to cut more efficiently on the strike or slice. The curve was first \( \frac{1}{2} \) inch in 4 feet and was gradually increased until the typical Samurai shape was adopted.

The iron was then mixed with sand, asphalt and charcoal to make the famous Hoki purple steel. This was hammered for two weeks, then welded as an edge into a heavy pure iron backing. The Japanese call their swords of more than 250 years ago “old.” These were very hard and would not bend, but the “new” swords will bend but not break.

A Japanese swordsman, upon entering another’s presence, always carried his swords (usually two) withdrawn from the belt and in his right hand, as a sign of peace. To wear a sword on the left, or to carry it on the left or place it on the left on the floor was a certain gesture of unfriendliness. (A unique advantage to the left handed man).

Physicians and priests carried only a short sword with which to commit harakiri, as they neither killed, nor were killed by, the enemy in war.

The Koreans apparently copied the Chinese two-edged design such as that on the print hanging on the Seoul East Gate Temple of the God of War. They afterward also
Above: Illustration from a Korean book 武藝圖譜通志
Below: Different types of Korean swords in the author's collection.
The longest sword (right) is 3 feet 6 inches long.

KOREAN WEAPONS AND ARMOR
copied the designs of the single-edged curved blade of Japan and used the two distinct types right up to modern times. A picture of the Korean attack on the Japanese Consulate in Seoul in 1882 shows clearly the large two-edged straight piece with the lotus leaf hilt.

The best Korean sword I have seen is in the writer’s collection—a large double-edged blade 3 feet 4 inches long and 2 inches wide, weighing 5½ lbs. (compared with 1½ lb. U. S. A. civil war saber), having on the 10 inch handle an elaborate design in inlaid silver with the characters 三寅銖 and a heavy hilt of lotus leaf design, vertically placed. These same Chinese characters are inlaid with gold on one side of the blade. On the other side, also in gold is the constellation of the Great Bear with two added stars which, with one in the handle of the dipper, the Koreans call the Three Tiger Stars, meaning great good fortune in military things on the day of the lunar calendar when the “Tiger Day” comes on the “Tiger Month” of the “Tiger Year”. I am told on good authority that this sword was of a design given by the King to a favorite officer of his personal bodyguard and was worn slung across the back by this mounted officer, and that this particular piece was ordered to be made on this propitious day in the eighteenth year of Chung Cho (1794). The scabbard is of wood covered with black lacquer, with a copper cap.

The Japanese followed the Koreans and Chinese in worshipping the sign of the Great Bear as the center or spirit of tactics. The “pointers” should always point to the enemy, so the first question of military tactics was to decide when the Dipper passing its arc around the North Star would point to the country they wished to attack. The condition of the field and the consideration of the men were secondary, for Heaven decided the victor!

The more common Korean swords were curved blades in scabbards of shagreen covered wood, with guards horizontal and of either iron or brass. Some are quite crude in scabbards covered with coarse cloth or black lacquered leather.
There were also short heavy swords for close fighting. The two in my collection are each 23 inches in length, the one well made with grooved blade and lotus-leaf, vertical, brass hilt and in a fish skin scabbard. The second is made of one piece of iron, blade and handle complete, with the characteristic 12-sided knob for a guard. None of these in any way compare with Japanese swords in the material and workmanship of the blade.

There were also the dress parade swords for officers! two feet long, with hilt and scabbard of bamboo with foliaged carvings of the ten emblems of long life, mounted with white metal fittings and horizontal metal bound guard of bamboo. These were similar to the one in the Korean collection in the Smithsonian Institute.

In the second volume of 武藝圖譜通志 different swords are pictured. The author writes, "The sword has been used in Korea since the Japanese came to fight the Chinese. When the Japanese used the sword, the light was reflected so that the people almost fainted. The Japanese jumped more than a man's length and whom ever he met he cut in two, the blade was so sharp. They used it with two hands because it was so heavy.

"If they used the sword with only one hand, then they had no way to protect themselves and it was necessary to have with them the men who used the matchlocks (鳥鉄) when the enemy was far.

"Originally that was called the long sword, then the double-handed sword, but now they use only the small belt sword (腰刀), made after the Japanese model. In China they had swords seven feet long in olden times.

"In the ancient times they used the double-edged sword but now the single edge. There used to be many different names."

In the Chinese book 本草綱目, "there are three kinds of iron; first, raw steel or cold steel, second. tempered steel or ripened steel and third, hammered steel. This last is the best."
There were also short heavy swords for close fighting. The two in my collection are each 23 inches in length. The one well made with grooved blade and lotus leaf, vertical, brass hilt and in a nashkin scabbard. The second is made of one piece of iron, blade and handle complete, with the characteristic 12-sided knob for a guard. None of these in any way compare with Japanese swords in the material and workmanship of the blade.

There were also the dress parade swords for officers, two feet long, with hilt and scabbard of bamboo with foliated carvings of the ten emblems of long life, mounted with white metal fittings and horizontal metal bound guard of bamboo. These were similar to the one in the Korean collection in the Smithsonian Institute.

In the second volume are 3 different swords. The author writes, "The sword has been used in war, and when the sword was drawn the light was reflected which was used by the enemy for a momentary advantage."

"Originally that was called the long sword, then the double-handed sword, but now they use only the small belt sword (薙刀), made after the Japanese model. In China they had swords seven feet long in olden times."

"In the ancient times they used the double-edged sword but now the single edge. There used to be many different names."

In the Chinese book, there are three kinds of iron: first, raw steel or cold steel, second, tempered steel or rippled steel and third, hammered steel. This last is the best."
Plate 14. Swords

Above: An illustration in the Korean Book 武藝圖譜通志

Below: From the same book—"A Japanese Sword".
Notice the curve of the blade and, in the sketch on the right, the line showing where the steel edge joins the iron backing.
PLATE 15. FLAILS—CLUBS

Above: Illustration from the Korean book 武藝圖譜通志 showing the use of the flail.

Below, from the left:
1. Hand mace with flail attachment, all made of iron.
2. Wooden club, probably for protection in the home, 12 sided knob on the end.
3. Flail, described in text. Wooden handle, metal pieces of iron, three chain links, flexible end wood painted with red lacquer.
5. Small mace with flail end of iron fastened by one link of chain. Handle of wood with iron butt.

In the collection of the author.
"Every Japanese soldier had three swords: a big one, a small one, and also a thrusting one."

In the Government General Museum are the remains of a sword discovered in a Silla tomb in southern Korea, a straight-bladed iron shaft with highly decorative silver and gilt bronze mountings and scabbard. There is no guard on the hilt. It is dated about 915 A. D. The same design has been found in Japan.

**Flail**

Unique in the arms of Korea is the flail, 쇠도리저, a rounded hard wood stick, painted red, 4½ feet long, with an additional heavier piece 14 inches long, attached by three links of iron chain and covered with heavy iron nails or knobs. It was the popular weapon of the cavalry that met Hideyoshi’s men in 1592 and was frequently carried by mounted archers for use in close fighting after their arrows had all been shot.

In the fourth volume of 武藝圖譜通志 the author says, "The Chinese used it and said they got it from the western barbarians (Koreans). In appearance it was like the flail used in the farmer’s house for threshing grain. Since, in China, the flail was well made with good materials, they could use it more skilfully than the originators of it. Previously the chain connecting the two pieces was long, but now it is being made quite short. When the Koreans were defending the road at Yuk-chin against the Manchus, in the time of 세조, 500 years ago, because the chains were short and the handles weak, they broke when struck only once. Hereafter if they use strong wood and iron and make them carefully, it will be well."

The flail was also used up to the end of the Yi dynasty in military examinations. Artificial heads were placed in a row along a trench. The candidate for military office, (武科) had to ride a horse along the trench and knock over with a flail a certain percentage of the heads. If he failed, he took the examinations for civil office, (文科).
Mace

The flail was further developed into the common Korean hand mace, of which there are many designs, some of them nicely made with silver inlay decorations. The mace was generally used as a defensive home weapon and by police and at times by soldiers, for it is listed in some military books as one of the "short weapons."

The mace was made also without the attached flexible end, a straight club of wood or of metal, sometimes highly decorated, as the iron and bronze specimen with an overlapping lotus leaf design now in the author's collection.

Spear

The spear is one of the most simple and primitive of weapons and was no doubt used here since earliest times. I wish to call attention to several distinctive types which developed.

First, the "long spear" 長槍, a straight simple blade of steel, double edged, sometimes grooved, and sometimes with decorative lotus leaf guard, attached to a long heavy stick with a pointed metal butt.

The manual of arms (武藝圖譜通志) which I have quoted on other weapons, teaches recruits as follows:

"First make an appearance of a big mountain crushing small eggs. Second, change to an attitude of ease like that of a woman sewing. Third, turn it over like an iron fishing pole. Fourth, pull it back. On all sides every man will have the appearance of obeying. Fifth, have the manner of letting it fall into the water. Sixth, with the appearance of the needle that points to the south (compass), with one foot in front of the other, drop it as if to let it fall into the water. Take the second step forward. Seventh, take the position of an iron cow plowing the ground, etc."

Bonar (Asiatic Society of Japan, XI Part II) describing the North Palace in Seoul, March 1883, noted "Chinese train-
ed Korean soldiers armed with Lefaucheux muzzle loading
Plate 16. Spears

Above: Illustration from the Korean Book 武器圖譜通志 illustrating the use of the long spear.

Below: Korean “Long Spears” from the author’s collection.
The one on the right is 1½ inches wide and 16 inches long.
The 2nd and 3rd from the left are the kind used today for killing wild boar and bear.
PLATE 17. SPEARS

Above: Illustration of three-pronged spear from the Korean Book 諳通志

Below: Different forms of Korean spears, from the author's collection.
rifles together with broad lances,” so that the long spear evidently held its place as a practical weapon to the end of the last dynasty.

**The Trident**

This form is commonly seen in pictures and was often used as a symbol in dancing and in parade. It was also used in actual fighting. The first volume of the book quoted above, advises for the trident:—

“First, point to the heavens. Second, put it level and thrust it forward as you take a step. Third, take one step forward and assume the manner of riding a dragon. Thrust it forward, then step backward and make the appearance of a crouching tiger. Repeat that four times, then take the attitude of riding the dragon again.

Fourth, with one step forward, pull the spear tightly. Fifth, make the appearance of marching, hold the spear level and thrust, then advance one step, etc.”

In the 30 historical volumes 燃藜記記述 연여실기술 (1419 to 1725) the trident 三枝鎧 is listed as the fifteenth of the eighteen military arts.

Griffis (page 102) mentions Korean cavalrymen as carrying three pronged spears. The outer prongs were not always curved outward as in the Chinese three-pronged spear, but the weapon itself was without doubt copied from those of the Chinese soldiers.

**Reclining Moon Spear**

This is probably the most unique and typical of all Korean cutting arms. It is often seen in Korean and Chinese military and hunting pictures, and is understood to be of ancient Chinese derivation. Werner lists it as a spear, properly so, although the Koreans called it a knife 鐗. It was made in various thicknesses and weights and was used as a beheading knife for the execution of criminals up until after the opening of the country to Westerners.

Since this spear was comparatively thin and was so
often used as an emblem in military parade it is said to have been only so used. But it is listed as one of the Korean fighting weapons, and I have found this statement, “These reclining moon knives in Korea are thin like the leaf of a tree, but in China they are heavy and fearful things.”

The Korean soldier apparently did not like the battle axe. There are no specimens remaining so far as I can find, and there is little mention of it in Korean writings, although the Chinese used it commonly. There are several pictured in the “Five Ceremonies” (五禮儀), single and double bladed, but they seem to have been emblems, for they are described as made of wood painted with silver.

**Cross-Spear**

The trident was not used in Japan, but the more efficient cross bladed spear was the favorite weapon of General Kato, leader of Hideyoshi’s troops in Korea in 1592. This form of spear was adopted and used by Korean soldiers from that time. Kato’s weapon, which may still be seen (by special permission) in the Kudan Military Museum in Tokyo, is a fine specimen with a shining sharp steel blade 3 feet long with a cross blade longer on one side than the other. There is a story that Kato’s daughter broke one blade off when she got married. The steel is fastened by a 2 feet spike into the handle, which is of wood 11 feet long, covered with small brick-shaped pieces of mother-of-pearl set in lacquer. On the butt end is a 4 inch iron tip and there are brass and bronze mountings.

The advantage of the cross blade was in unhorsing a man on the pull stroke, in addition to its service as a thrusting weapon. The Korean pieces were shorter than the Japanese and the steel of much poorer quality.

**Fire Arms**

The introduction of guns changed all military practices since by making it possible to strike the enemy at a distance,
PLATE 18. RECLINING MOON KNIFE

Above: Illustration from 武藝圖譜通志

Below: Knife blades in the author's collection.
The one in the center is the heaviest.
The one on the right is 28 inches long.
A tassel of colored horse hair was hung from the small extension on the back of the blade.
PLATE 19. SPEARS

Odd types of Korean spears.
by merely "pointing a dog's hind leg at him", as the Koreans said, it necessitated changes in military tactics and it rendered obsolete armor which formerly gave full protection.

**Gun Powder**

There is no doubt about the introduction of gunpowder into Korea from China; the time, the place and the individuals concerned are carefully recorded. The period of two hundred years following the introduction of powder, during which its application to warfare was developed is not so well known.

An Italian letter written in 1326, relating to cannon and mentioning gunpowder, gives the first authentic date for the use of powder in guns in Europe, although Roger Bacon wrote of the curiosity of the mixture of sulphur, charcoal and potassium nitrate causing explosive fire, almost fifty years before.

To trace the origin of gunpowder in the far east is beyond the scope of this paper, but the long period of the knowledge of gunpowder without practical application in a country so closely related to Korea as China, is of extreme interest. The following quotation is from Werner: "As regards gunpowder, Mayers, after a thorough investigation (Journal N. C. B. R. A. S. N. S. VI 103) concludes,—

(1) Gunpowder probably became known to the Chinese—though to a partial extent only, and from foreign sources—about the period 500-600 A. D. (2) Projectiles of an inflammable nature employed in warfare were thrown originally from ballista, the name of which being identical with that attributed to the modern cannon has led to a misconception with respect to the early use of the latter weapon. (3) No evidence exists of the use of gunpowder as an agent in warfare until about the middle of the twelfth century; nor was it used, at this period, with any propulsive effect. (4) The reign of Emperor Yung Lo during the first quarter of the fifteenth century, is probably the period to which a
knowledge of the propulsive effects of gunpowder on the part of the Chinese must be assigned.”

I have translated from the famous history 高麗史記, “In our Chosen from the first there was no powder. At the end of Korai (1392 A. D.) a Chinese (唐) merchant named 李忔 (李亢) stayed in the home of a general in charge of weapons along the river Imchin (림진) near Songdo (the capital at that time). The general told his servant to treat him very kindly, and the merchant showed him how to mix saltpeter. This was the first time we had powder in Korea. It was started at the time of Cho Moo Sin (조무신).”

In the 신기비결 are interesting directions for the making of gunpowder: “Take one pound of saltpeter, one yang* of sulphur and 5 yang of the ash of the willow; grind it together into flour, making it into one mixture. Put it into a big wooden bowl with one rice bowl (주발) of water, and with a wooden tamper strike it ten thousand times. It if becomes dry, add another bowl of water until it becomes very fine.

When it becomes about half dry, take it out and dry it in the sun. Then pound it some more until it becomes like a small bean 粒.

The best powder is pounded about 20,000 times. After that, take it out and with good water take out the strength of the saltpeter. Dip it into water about 20 times, then weigh out one tone of it and, placing it in the palm of a man’s hand, set fire to it. When it burns, if it is not necessary to pull the hand away, it can be used in a gun.”

Cannon

From (燃薦室記述) 연예실기술 “In our country they began to use cannon (火砲) from the end of Korai (1392). The official 조무신 studied it from a Chinese nitrate maker.”

From (高麗史記) written during the time of Sehjong (세종) “Sinoо (辛澕), next to the last king of the Koryu

* 10 tone = 1 yang. 1 tone = 1 Japanese momme = 3.8 grams
knowledge of the preparation of gunpowder on the part of the Chinese must have been.

I have translated a passage from the 8th century Choson (Korea) which states that:

In our Choson from the 9th century, there is mention of a man named 李廷 (Leung) who discovered methods of making gunpowder by the use of saltpeter at that time. He was very kind and taught the art to the Chinese. This was in the 9th century.

In the 11th century, the art of making gunpowder had become very well known in China. In a bowl (或 is a large bowl (or), with a very fine powder (of nitric acid) becomes very dangerous in the hands of ignorant people.
PLATE 20. GUNS

Early type of heavy muzzle loading cannon.
In the Museum of the Government General of Chosen.
PLATE 21. GUNS

Left: Photograph of arrow; for use in the earliest Korean cannon; of wood with iron point and "wings". Length 9 feet 1 inch.

In the collection of
The Government General of Chosen.

Right, Above: Illustration from the Korean Book "The Five Ceremonies" showing the design of the arrow-shooting cannon, and the arrow which is exactly like that illustrated on the left.

Right, Below: Korean Hand-Bomb. Illustration from the Korean Book "The Five Ceremonies".

Described on Page 21
Plate 22. Guns

Above: An illustration of an early form of mortar shooting a stone ball. From the Korean Book "The Five Ceremonies".

Dynasty, who took the name of Sin (辛) because he didn’t like the name of Wang (王), in the tenth month of his third year (1377) first established a department of cannon and manufactured cannon and weapons.”

Undoubtedly the Korean warrior already knew of the military use of powder before he knew how to make it. Therefore, we may presume that some sort of crude cannon were made and used very soon after this fortunate incident near Songdo.

In the fifth year (1474 A. D.) of the reign of the King Sung Chong (成宗), (the ninth of the Korean rulers of the last dynasty,) a few years before the discovery of America, 150 years after the first use of gunpowder in Europe, very soon after its first use in cannon in China and more than a hundred years before the introduction of the Portugese-Japanese handgun into Korea, two Korean writers Sin Sook Joo and Chung Chuk (申叔舟, 鄭陟) completed the publication of an official book on the Five Ceremonies 五禮儀—an achievement, no doubt, for it was not easy to publish a book in those days and, they say, three or four preceding Kings wanted to publish such a book but failed to complete it. This is one of the best of Korean works on our subject, and gives us rather a clear picture of the arms and armor situation at the beginning of the Yi period and of the earliest use of gunpowder in Asiatic warfare. Listed under “flying instruments” are several crude cannon for stones and for arrows and what may be the first hand grenade.

“The strongest cannon is the stone bullet gun which throws a round stone ball of 74 lbs., 3 feet 37 inches in circumference from a copper container 7 inches high. Under this there is a powder box weighing 99 lbs., which has a fuse hole. The round stone after being exploded rolls along and crushes things in its way.

“The General’s Fire Tube 將軍火筒 has a powder container 7 inches high with a fuse hole, with a barrel 2 inches in bore and 1 foot 4 inches in circumference
which holds a big arrow 5 feet 7 inches long, \(9\frac{1}{2}\) inches in circumference with an iron point weighing 4.8 lbs. The arrows have iron wings to help the speed. When the fuse is heated, this mighty arrow flies out of the barrel. Arrows have either feather or skin wings which are placed either in the middle or at the lower end of the shaft. The shaft of a small arrow is usually of bamboo. There are various sizes of containers and arrows. Some tubes shoot ten arrows at a time, and some arrows are cross headed. There are separate powder tubes of various sizes.’’

Examples of the cannon and arrows here described may be seen (by special permission) in the museum section of the Government General.

The Manchus evidently did not copy the Chinese use of gunpowder as early as did the Koreans. ‘‘In the time of King Sunjo (宣祖) (1569) the cannon maker by the name of Chi Su was captured and taken away when the Manchus destroyed Kyungwun (慶源). The Manchus told him to shoot the gun, and they watched him. Chi Su purposely placed the watching Manchus together on one side and shot the gun and killed them all. The other Manchus, angered, tore his body to pieces.’’ This is from Chibong Yusul 지봉류설 (芝峯類說), written in 1614 by Ri Soo Kwang 리수광 (李眸光), one of the famous writers of Korean history.

And from 연여실기속, also written during the time of King Sunjo (宣朝), ‘‘There was made the big cannon which was called 飛擊震天雷 (flying striking earthquake heaven thunder). Up to this time there were no such instruments in Korea.

‘‘The cannon maker, Yi Chang Son 이창손, made this thunder gun like the shape of a cannon, but the mouth was as large as a big earthenware rice bowl. If it were shot once the cannon ball went as far as 500 or 600 po (1,000 yds.) and after it fell to the ground, fire came out. This was the best thing by which to destroy the enemy’s formations.’’

This famous gun is repeatedly referred to and evidently was a crude sort of howitzer shooting a hollow iron ball
which holds a big arrow 6 feet 7 inches long, 9\(\frac{1}{2}\) inches in circumference with an iron point weighing 4.5 lbs. The arrows have iron wings to help the speed. When the fuse is lit, the arrow flies out of the barrel. The fuse for this weapon is a small ball of tinder placed in the arrow tip, which ignites the fuse.
PLATE 23. GUNS

Left: One of the earliest types of breech loading cannon, using a separate iron powder container.
From the Museum of the Government General of Chosen.

Right: The large cannon is one of the type used at the time of Hideyoshi's invasion. Length 2 feet 2 inches.
The two small cannon were used at the South River Fortress.
PLATE 24. GUNS

Above: From the 4th volume of the book 武藝圖譜通志, describing horsemanship and illustrating the soldier riding, standing in the saddle and firing the three barrel signal gun.

Below, right: Two barrel cast bronze signal gun.

left: Three barrel signal gun.
PLATE 25. GUNS

Korean Matchlocks. The ramrod may be seen under the barrel in the two center specimens.

The large gun on the right is a heavy jingal. Length, 5 feet, 5 inches. Weight, 22 pounds.

From the author's collection.
PLATE 26. GUNS

From left:

1. Beautifully made Korean matchlock, of hard wood stock, well stained and polished. Hexagonal barrel with inlaid silver and gold decorations in cloud and dragon design.


3. Three barrelled signal gun of cast iron with wooden handle.

4. Two barrelled signal gun of cast bronze, with wooden handle and ramrod. Flexible lid over the fuse holes.

From the author’s collection.
which was filled with powder with a delayed fuse. The ball exploded and let out sulphur fumes. This may have been the original gas bomb.

The same name is given to the same type of gun used in China (Werner, page 31). I have no means of comparing accurately the relative dates, but Korean historians, I am sure, would insist that the Chinese copied this from the Korean inventors. *

In spite of the generally accepted idea that Korea got guns first from Japan, it is true only of hand guns. Undoubtedly cannon, like the powder, came from China. I have translated "In ancient times a man named Pumyu 병여 范懿 a minister of Wu (越) (a country of China) hollowed out a stone and put in powder and stones. When he wanted to command the soldiers he put in fire and blew out the stones, making a great noise. Then afterward they made the three-muzzle gun for a signal gun. They put the powder in the three holes and when they wanted to make a sound, they fired the fuse, one, two or three shots, which made the command or signal."

This three-barrelled gun was quite commonly used as a signal gun in army manoeuvres. The specimen I have was dug up at the old fortress of Nam Han 南漢. In the fourth volume of the book describing arms there is a series of well done sketches illustrating horsemanship. The text begins, "First they ride standing up on the horse, firing the three-barrelled gun (세구명총) (三穴銃)" and the pictures show it very clearly.

The double-barrelled or "two-eyed gun" is referred to, and of it I have one specimen, of bronze. Like the three-barrelled gun, it is cast, not hammered and bored, and is attached to a short wooden handle which enters a socket.

* Werner's authority for the Flying Cloud Thunderbolt Gun is the Wu Pei Chih, and the date of this work is given as 1621 A. D. My Korean authority, the 燃放史記述 老岳記述 was written during the time of King 宜朝 쌎조 1567-1608. If these dates are reliable, therefore, the Korean record of the gun is earlier than the Chinese.
extension of the barrels. It too was used as a signal gun and not as a weapon.

Small short cannon such as I have (also found at Nam Han) were used as signal guns inside or on the wall of a fort and were not to be carried in march. But these were prepared for actual fighting for they have sights.

The earliest type of cannon of which we know accurately, is a heavy cast iron piece, of which I have one example and of which there are several in the Kudan Museum in Tokyo, where the Japanese authorities say they were cast in Korea (Shogenfu, Keisho Nando—慶尚南道昌原府) from 1522 to 1566 and were taken back to Japan by General Kato. These guns are 2 feet 2 inches long, slightly tapering, 3½ inches across the muzzle, with 1½ inches bore, and have, in raised cast design, Chinese characters as shown in Plate No. 23 which have been difficult of translation but which seem to mean "the original type of cannon" (middle power fundamental gun).

I cannot trace the origin of the principle of breech loading, but there are specimens in Korea of an early type of breech loading cannon which were in common use during the period of the Chinese-Japanese war. The powder carrier is a small separate metal piece which locks into the breech, thus allowing the loads to be separately prepared to give faster firing.

**Hand Bomb**

This early form of hand grenade, which was used so commonly in our recent trench warfare is well illustrated and described. It is a round wooden ball open at the top with a lid and exactly the shape of the common Korean *pot de nuit*. "Powder is placed in the bottom, then two or three of the powder tubes, and in naval warfare an iron cross on top. Leaves are packed inside to hold everything tight, the lid is put on and tied with waxed cord. Wrap it all over with several layers of paper, glued on. There are two fuses used because one may go out. After lighting the fuses
the ball is thrown and in a short while it will burst, blowing off the lid. There are three sizes—large, medium and small.

"There is a fire arrow 4 feet 5 inches long, loaded with a small powder container tied near the end of a crossheaded point. Also there is an arrow which has poisonous wax on the head."

Matchlocks

The hand gun or common matchlock is the earliest to trace of all Korean weapons. The Portuguese gave this type of gun to the Japanese General Yoshimitsu in Kyotō in 1392. What is accepted as the first one in Japan is in the Kudan Museum, of typical length and shape, with silver end brass inlaid work on the barrel, the design including the Christian cross and the head of Christ. It is to be noted that hand guns remained the standard until the importing of the flintlock until the importation of the flint-lock, not until the 16th century. Korea, as is explained in the preceding paragraph, was a century or more behind. Bettering on the Portuguese guns was not considered for another half century or so.

**Plate 27. Hand-Guns**

Right: An uncommon gun,—of matchlock type, but rather small, mounted on wooden frame for holding in the hand and against cheek, and fired by fuse, the same as the early cannon. Length 4 feet 10 inches.

Left: Matchlock, special short type. Length 3 feet. Hammer is missing in this specimen. These guns are in the collection of the Museum of the Government General of Chosen.

Center: Illustrating brass inlay mark on breech end of barrel, denoting barracks to which the gun belonged.

Korea, a hundred years behind in all official relations, had all open negotiations and to help the Japanese in an attack on China. These envoys presented the King with several matchlock guns in 1590. Apparently nothing was done with them, for when the Japanese troops under Generals Kato and Konishi landed at Pusan two years later and started the devastating march through Korea, the Korean cavalymen, who met them with flails and tridents and arrows, were terrified by "the sound of thunder which came from the Japanese foot-soldiers."

By the second or third year of the invasion, the Koreans had begun to copy these guns for their own use. And what a test of their skill and mechanical ingenuity it must have been! The earliest writing on this subject is very interesting and I have translated literally:—
the ball is thrown and in a short while it will burst, blowing off the lid. There are three sizes—large, medium and small.

"There is a fire arrow 4 feet 5 inches long, loaded with a small powder container tied near the end of a crossheaded point. Also there is an arrow which has poisonous wax on the head."

**Matchlocks**

The hand gun or common matchlock is the easiest to trace of all Korean weapons. The Portuguese gave this type of gun to the Japanese General Yoshimitsu in Kyoto in 1368. What is accepted as the first one in Japan is in the Kudan Museum, of typical length and shape, with silver and brass inlaid work on the barrel, the design including the Christian cross and the head of Christ. It is to be noted that hand guns remained the same from this time until the importation of foreign muskets in the 1800’s, both in Japan and in Korea, and in neither country did they use a flintlock. This is explained in Japan by the fact that this period of 500 years was a period of comparative peace, with no incentive for bettering their implements of war.

Korea had had peace for 300 years and all official relations with Japan had ceased 100 years before Hideyoshi sent envoys to command Korea again to open negotiations and to help the Japanese in an attack on China. These envoys presented the King with several matchlock guns in 1590. Apparently nothing was done with them, for when the Japanese troops under Generals Kato and Konishi landed at Fusan two years later and started the devastating march through Korea, the Korean cavalrymen, who met them with flails and tridents and arrows, were terrified by "the sound of thunder which came from the Japanese foot-soldiers."

By the second or third year of the invasion, the Koreans had begun to copy these guns for their own use. And what a test of their skill and mechanical ingenuity it must have been! The earliest writing on this subject is very interesting and I have translated literally:
"The Making of the Matchlock"

"The birdgun is a valuable thing because the iron is many times heated and tempered in a bellows fire. Two pieces are made and welded together. At first there is a very small hole. Then with a hard borer (강철송곳), in one day's work boring about one inch, stop after you get to the end. The ones which have been bored about a month are the best.

"Inside the belly of the gun, if you do not open it wide and even with the hard bit, the shot cannot go to the bottom. If the mouth is not straight or if there is a thick place in the barrel, the bullet will not go through. If there is a thin place, it will burst open when the fire goes out. If you roll only one layer, it will injure the hand and you cannot grasp it in front.

"The large and small shot are not the same. If the gun bore is small and the shot is large, it cannot go in far, and may come out of the hole and fall down. If the shot is small and the gun bore large, the powder leaks out before the shot and, there being no strength to the shot, it cannot go far. Perhaps the shot may remain inside the gun; then it is useless. In regard to this, taking a shot weighing 3 tone as a standard, put in also 3 tone of powder. If the shot is lighter, put in less powder, and if is heavier put in more powder; put the powder in according to the shot and put it in consistent with the bore of the gun.

"If the shot goes only halfway into the barrel, force it in. If the shot is heavy, the bore large, and the powder, much, it is impossible to hold it in the hand and shoot it. If the bore is small, the shot small and the powder little, there is no strength and it cannot go far.

"There are no guns like these in China; we got them from the Japanese barbarians. They are different from all other kinds of fire weapons. The sharp (good) ones will go through armor. If you shoot a person, it hits his lungs. One can even hit the hole of a coin, not only just the willow leaf at 500 feet."
PLATE 28. POWDER BOXES

Typical Korean powder boxes. All of wood, of turtle design, except the lower center one which is of cow horn.

Lower right specimen, with the head removed, shows the hollow bone extension for loading the powder.

Center: attached to the powder box is a small separate container for priming powder and the goat horn end of a short pouch (cloth pouch has been lost).

From the author’s collection.
Plate 29. Powder Boxes

Two beautifully carved powder boxes of turtle design.
The upper one is natural wood finish and has a separate carved stick for fastening in the soldier’s belt.
The lower box is painted with red lacquer.

From the collection in the Prince Yi Museum in Seoul.
“If it is to have the advantage of going through a heavy helmet, the stomach of the gun must be long. If the gun is long and the fire does not leak out, the force of the outgoing shot is strong even though it go far. As for shooting the gun and hitting a man’s lungs, the muzzle must be straight, one hand must be in front of the powder, and it must be held firmly so the powder does not take the strength from the hand. Because of this the grip in the front of the gun is made on the wood and perhaps even if the gun bursts, the hand will not be hurt. If the gun rests on the wood, the jumping strength will be little and weak. If it is fired without dropping the hand and without shaking, one can hit eight or nine times out of ten shoots. If one shoots at a flying bird in the forest it will fall down.

“Because of all this, this advantageous gun is famous. If the hitting is compared with the bow and arrow, the latter is not so good. If the gun (shot) is going through a helmet one cannot stop it. Either from a horse or on foot, as an advantageous weapon for hitting a target, a gun is more than ten times better than a spear and five times better than a bow and arrow.”

I have found only one particular difference between the Japanese and the Korean matchlocks. Those made in Japan have on the top of the breech end of the barrel, a mark which was the emblem of the clan, usually a flower design, made of silver hammered into the steel. In the Korean guns the mark was made in the same manner and place, but was a Chinese character denoting the barracks to which the gun belonged. There were in the Yi dynasty five barracks surrounding the capital. *

The general shape and design of the guns are the same. Some are more decorative than others. The matchlock was not held against the shoulder but forward, with the back inside part of the stock against the cheek. The fuse rope

* 五營 (five barracks) 1. 軍衛營  2. 總衛營  3. 禦衛營
   4. 統衛營  5. 御衛營
was wrapped around the arm and ran over the hammer and was carried lighted but raised up off the firing pan, until released by the trigger. A wooden ramrod was carried under the barrel, inserted into the stock.

There were some very heavy models of exactly the same pattern. The one in the writer’s collection weighs 22 pounds. These were used not only from a fortress wall, but were also carried by especially strong men chosen for that corps—"The thousand po gunmen," 천보병, 千步隊.

**Matchlock Accessories**

The powder box is very unique. I have found only one of horn. The more common ones are of wood, carved to resemble a turtle (a Chinese emblem), for military tactics were learned from the lines of a turtle’s back! Some are crude and simple, some beautifully carved and lacquered. The turtle’s head has an extension of hollow bone which enters the body and not only serves as a stopper but also as a small scoop with which to pour the powder into the gun. There was also a smaller round wooden box for priming powder.

Shot were carried in a small bag about one inch in diameter and four inches long, of coarse hemp cloth, attached at its open end to a horn of the Korean mountain goat. This horn is about four inches long, split at its outer end to allow it to be used as a pair of pincers to hold the shot as it comes from the bag.

**ARMOR**

There are available in Korea neither writing nor materials from which to make a thorough study of Korean armor. In the translation of the old Korean military books I found very few references to armor. To complete this paper, however, and to give our readers at least a cursory idea of the type, derivation and importance of the armor of Korean soldiery, I shall describe such pieces as are available today, and quote from what references I have found, especially from the splendid work of Berthold Laufer on “Chinese Clay
Korean officer's two piece suit of Chinese design. Small carefully made metal plates of two colors, red and gold, placed alternately on the outside of red felt trimmed with fur; epaulettes of gilt bronze in design.

Casque of moulded leather highly decorated with gilt bronze.

From the collection in the Prince Yi Museum in Seoul.

Lauffer begins with the surprising proposition that in ancient times the idea of body armor, and from its simple cuirasses for thousands of years by the fighting men.

Metal work developed through the various primitive forms until in the Tang (唐) era, 618-906 A.D. iron plate armor had reached a stage of technical perfection. Lauffer states this development came about by the necessity, during the Han period, of producing something more effective against the offensive weapons of the two edged sword and crossbow as compared with the earlier spear and common arrow of the Chou (周) period. There was a definite change of Chinese weapons from bronze to iron in 219 A.D.
Figures” from the publications of the Field Museum of Natural History, No. 177.

As in the case of weapons, we are to remember the trade and warfare between the early peoples of China and Korea, the ease of access of one to the other, and the very doubtful and constantly shifting boundary line which separated them. Because of these contacts, and the subsequent historical data, we shall have to accept the Chinese derivation and influence of all Korean armor.

Laufer begins with the rather surprising proposition that in ancient time the rhinoceros was indigenous to China, from it the Chinese naturally conceived the idea of body armor, and from its hide they made simple cuirasses for thousands of years before the use of metal plates.

There are historical references to the use of metal plate armor in Assyria in B. C. 722 and in Persia and Egypt during these early times; and there is a direct path of influence from ancient Iran through the country of the Huns, Chinese Turkistan, to China and Korea. The use of metal plates may have come from this source, for it is recorded that in the Chau period in China, B. C., 1122—255 the use of iron was known but only leather cuirasses were worn by the fighting men.

Metal in the form of iron lamina and an iron helmet came into use in the latter Han (後漢) period, 25—220 A. D., and it is presumed that copper was used in an earlier armor in the latter part of the first Han period B. C. 206—23, copper plates being sewed on to a leather jacket, following the early plan of sewing together leather scales.

Metal work developed through the various primitive forms until in the Tang (唐) era, 618—906 A. D. iron plate armor had reached a stage of technical perfection. Laufer states this development came about by the necessity, during the Han period, of producing something more effective against the offensive weapons of the two-edged sword and crossbow as compared with the earlier spear and common arrow of the Chau (周) period. There was a definite change of Chinese weapons from bronze to iron in 219 A. D.
Metal scale armor of smaller plates individually placed had little development, while the more flexible type of metal plates mutually lashed together in regular rows was continually developed in China and Korea.

Chain mail was imported into China from 713—741 A.D. and again in 1151 A.D. and in 1749 after the subjugation of Turkistan, no doubt coming originally from Persia. The suits were closed in front and slipped over the head and were far too complicated for the Chinese artisans of that time.

Also a ring mail of metal rings sewed on to a leather or quilted garment was imported from Tibet. Neither of these importations was recognized officially.

**Japanese Influence**

Although some occasional intercourse with the mainland was had by intrepid sailors from early Japan, record has been found of a government order in 780 A. D. advising that all armor be gradually changed to metal and Laufer thinks that no metal armor was used in Japan prior to that time.

The metal was probably of bronze or gold, iron plates not having been used earlier than 1050 or 1100 A. D. However, a British Museum publication describes as the earliest specimen of Japanese armor two cuirasses and a helmet which were found in a dolmen of the first or second century of our era. These pieces were formed of horizontal plates riveted together.

We know that at the time of Hideyoshi's invasion of Korea, 1592, the Japanese had reached a state of high technical development, as their suits were then of the typical costume armor, elaborately made of intricately placed small iron plates and rings fastened to silk and leather pieces which separately covered the entire body—jacket, skirt, leg pieces, arm and hand protectors, and ornate iron helmets variously designed, with visors, masks, ear and neck protectors. These complicated, but no doubt efficient models were never copied by the Koreans. Nor do we have any evidence
Plate 31. Armor

Korean officer's armor suit. Plates are of three-ply leather worn on the inside of a highly decorated coarse cloth.

Casque is of iron painted with black lacquer and mounted with iron decorated with silver inlay.

Described in text, Pages 81, 32.

From the author's collection.
PLATE 32. ARMOR

Korean officer's Plate Armor, described in text, page 32. Overlapping iron plates inside with rivet heads appearing as decorations on the outside. Casque is of hard leather with silver inlaid iron mountings. From the author's collection.
KOREAN WEAPONS AND ARMOR

PLATE 32.

Examples of the strange and interesting types of armor that have been found in Korea during the last dynasty. The armor is of bone and leather, and is of the same type as that found in China during the first millennium B.C. The armor is decorated with bone and leather, and is of the same type as that found in China during the first millennium B.C. The armor is decorated with bone and leather, and is of the same type as that found in China during the first millennium B.C. The armor is decorated with bone and leather, and is of the same type as that found in China during the first millennium B.C.
that the Koreans followed the typical Chinese design of separate upper and lower garments.

Korean armor, so far as we know accurately, was only of one model, a square-cut, knee-length tunic with short sleeves opening in front and on the sides and fastened with buttons of bone and loops of leather, edge to edge. There were three separate types of this design, all of them simple and primitive; and however far back they began, they remained in use without change up until the end of the last dynasty.

Examples of the very early leather cuirass, and of that strange and interesting suit of fifteen to twenty thicknesses of paper sewn together, unfortunately do not remain. We only know that paper armor was used in China in the Tang (唐) era, that it was officially recognized in the Sung (宋) dynasty when in 1040 the troops were ordered to fabricate 30,000 suits of paper armor. We know that Korean paper was highly prized for this purpose, and that the records of Silla (新羅) state clearly that Korean armor was the same as Chinese. Griffis reports this paper armor capable of resisting a musket ball but not a rifle bullet. It probably continued to be used from Silla (B. C. 100-935 A. D.) through Korai (918-1392 A. D.) and into the Yi periods (1392-1910 A. D.).

In an undated tomb at Kyungju (慶州) thought to be of the early Silla period, probably the 4th or 5th century, were found remnants of plate armor of two distinct types. The first is of plates of gilt bronze 1½ inches wide and 9½ inches long, with holes for lacing together at each end and at the middle. The second is apparently pieces of a wide breast-plate, also of gilt bronze.

Of the examples of complete suits remaining today, the first, in the writer’s collection, is of coarse hemp cloth lined with blue cotton and covered on the outside with a formal flower design printed with wooden blocks. On the inside of the front and the back, there are cuir bouilli plates 2½ by 3½ inches, each the same size in 8 even rows, each fastened by two iron rivets, the rounded heads of which serve as a decoration on the outside; on the inside, the rivets are ham-
mered over a rough hand cut washer. The plates overlap from above downward and from right to left. The rivets pierce the center of the plates, one at the top and one about halfway down, except those of the rows where the garment opens, which are riveted only at the edge. On the outside is an epauliere of heavy iron, hinged in three sections, below which is a group of ten half-sized plates in two rows protecting the front of the shoulder. The open round neck is finished with white leather sewn with coarse thread.

The casque accompanying this coat is of conical shape, of two iron plates riveted together and banded on the outside. A visor of iron with silver inlay decoration is riveted on, and below it another piece of iron to protect the forehead. Ear protectors and couvre-nuque of the same cloth material as the coat, and filled with smaller leather plates, are riveted to the bottom of the helmet. They hang loose, to be tied with strings of the hemp cloth. The helmet is surmounted by an iron cap which held an iron trident and a tuft of red horsehair (missing in this specimen).

The example of the second type is very similar to the first except that the design on the outer cloth is a formal dragon pattern and the plates are of thin iron covered with a black varnish, but arranged and fastened in the same manner as the leather plates except that no washers were used on the inside.

The casque is also the same in all features, except that its body is of thick moulded plates of black lacquered leather.

The third type is the same in design as the first two but padded with cotton and without any plates, no doubt worn in cold weather, the pseudo-armor of an officer.

The custom of printing figures on the outside of the suit shows a strong Chinese influence. This was not done in Japan, while Werner translates from Chinese records "Armour, in the second year (963 A.D.) of Chien Te of the Sung dynasty, was made with cloth inside and yellow silk outside. Pictures were drawn on the surface."

In addition to these common types, there was also a
The example of the second type is very similar to the first except that the design on the outer cloth is a formal dragon pattern and the plates are of thin iron covered with a black varnish, but arranged and fastened in the same manner as the leather plates except that no washers were used on the inside.
PLATE 33. ARMOR

Left: Japanese armor suit of the time of Hideyoshi's invasion of Korea, 1592. Much more complicated and intricately made than the Korean specimens. In the collection of Kudan Museum in Tokyo.

Right: Korean officer's pseudo armor of red felt, trimmed in fur and decorated with gilt bronze. Probably worn over chain and plate mail.

Photographed by the courtesy of A. W. Taylor.
Korean Helmets of three different types.

Left: Of iron plates riveted together and a decorated brass plate at the top. An uncommon style. (Tridents have been lost.)

Center: Black lacquered silver inlaid specimen of the suit shown in Plate 32. From the author's collection.

Right: A plain iron very modern type—perhaps an imported piece.
Plate 35. Armor
Illustrations of early Korean Armor
from the book "The Five Ceremonies."
Plate 36. Armor

Illustration of Korean Armor
from the book "The Five Ceremonies."
vest of flexible mail made of a combination of small iron plates and iron rings which Griffis says was worn by the footsoldiers. Korean authorities, however, say that all armor was worn by officers and mounted troops and none by footsoldiers and that this cuirass of plate and chain mail was worn under the outer garment of an officer.

I quote from Laufer, "The Tang Epoch denotes only the culminating point in this development,—that period in which we observe plate mail wrought to its greatest perfection. Metal plate mail is a complex affair of difficult and refined technique, a downright product of higher civilization, which is witnessed by the fact that it is conspicuously absent among all primitive cultures of Asia, Africa and ancient Europe. Certainly it did not come into existence all at once as a finished product of industry. It ran through many experimental stages, and took time to develop and to mature. The elegant specimens of the Tang era, granting the muscles free motion and aiming at aesthetic qualities, were preceded by those of coarser and cruder workmanship, as we see, for instance, in the Korean specimen."

Modern Korean historians, however, insist that this type of armor was designed during the early years of the Yi dynasty under Yunsankun (燕山君) 100 years before Hideyoshi.

In The Five Ceremonies are good descriptions of Korean armor of this period:—

"Mercury Armor—made of iron plates woven together with leather thongs and painted silver white with mercury.

"Willow Leaf Armor—of raw pig skin pieces in place of iron plates, painted black.

"Paper Armor—made of twisted paper strings painted black.

"Iron Ring Armor—of small iron rings linked together.

"Mirror Flag Armor—made of iron plates and rings woven in alternating series.

"Iron Studded Armor—with iron plates, studded like stars on a blue cloth, or on a red cloth. The red suit had
separate sleeves tied with a cord. The sleeves were copper studded. The coat was lined with deer skin and had a wide red belt.

"There were two kinds of iron helmets, one with a brim, and one without a brim."

The Chinese, who came to assist the Koreans against Hideyoshi's men in 1594 complained to the Koreans about the clumsiness and inefficiency of their armor. Yet the Koreans, in spite of this complaint and during a period of revived interest in all military things, resolutely held to the same design and type for 400 years, on down to the end of the era, giving us some idea of the qualities which made for their independence and their ability to adapt only whatever they thought best for the style of fighting which they had found efficacious for themselves. That "fire-burning, wooden, dog's hind leg" matchlock they adopted immediately, their copies no doubt being difficult to tell from the Japanese patterns. But the Chinese and the Japanese armor of the same period were neither made nor used.

In the usual development of armor in any country there is, between the period of the primitive leather or padded coat and that of iron plates, an intermediate stage of protective pieces made of bone, reed or wood slates. The present historical authority says that one reference has been found in some old unofficial writing concerning a bamboo armor used by Korean soldiers. However, there are no evidences of this intermediate stage, and it is generally considered to be missing.

The original word for armor in Japan, prior to 900 meant tortoise shell scales*. In China it was no doubt related to the rhinoceros. In Korea, "The armor is made of iron leaves like fish scales. If it is too long it is hard to move the body. If it is too short, it is hard to protect the body."**

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** Explanation of Sokliery (兵學指南).
separate sleeves tied with a cord. The sleeves were copper-studded. The coat was lined with deer skin and had a wide red belt.

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In the usual development of armor in any country there is, between the period of the primitive leather or padded coat and that of iron plates, an intermediate stage of protective pieces made of bone, reed or wood slates. The present historical authority says that one reference has been found in some old unofficial writing concerning a bamboo armor used by Korean soldiers. However, there are no evidences of this intermediate stage, and it is generally considered to be missing.

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Explanation of Soldier (兵甲圖説)
Plate 38. Shields

Korean shield of heavy leather riveted to wood. "War lion" design painted on in bright colors.

2 feet 9 inches long by 1 foot 4 inches wide.

From the author's collection.
PLATE 39. SHIELD—CALTROP

Above: Small Korean iron caltrop. Shown from two angles to illustrate how one point of the four is always pointing upward when the caltrop is thrown upon the ground.
From the author's collection.

Below: Round Korean shield made of reeds.
From the collection in
The Prince Yi Museum in Seoul.
PLATE 40. DESIGN

Upper: War dragon face carved in wood on the lid of an arrow quiver.

Lower: Tiger (or leopard), the official military emblem with the formal cloud design, hand embroidered in silk on brocade, 10 inches square. The breast decoration of a Korean military officer.

From the author's collection.
Shields

Nothing is known of shields prior to the Yi dynasty, but those used were probably of Chinese type. Two distinct shapes are illustrated in The Five Ceremonies (五禮儀). There are fortunately a few specimens preserved. One is round and made of reeds. The only one of this type I can find is in the Prince Yi Museum in Seoul. The other type is rectagonal, of heavy horsehide fastened with large iron rivets to a willow board. On the front surface is an elaborate war dog (sometimes called the lion) design painted in bright colors, which served to frighten the enemy. The shield was held from the back by the arm passing through a rope loop and grasping an iron handle. I think there are only four of these remaining, and all are exactly alike. One is in the Government General Museum, one in the Prince Yi Museum, one in the Kudan Museum in Tokyo, and the fourth is in my own collection. A somewhat similar shield having the same design has been found illustrated in old Chinese military books.

Caltrop

Fortunately there remain for us to see, a few examples of Korean caltrop, a small defensive weapon very closely resembling that used in mediaeval European warfare. It was an iron piece with four prongs, very simply made, and bent in such a way that however thrown the piece would light with three prongs as a base and the fourth pointing upward. It was small, about two inches from point to point, and large quantities of them were thrown on the roadways to slow up cavalry attacks or to protect retreats. It was no doubt directly imported from China, where it is thought to have been invented. Werner has translated several records of its invention and its use back as far as the Han Emperor Wen Ti (B. C. 179-156). It is not very far, both in design and in use, from the caltrop to the barbed wire entanglement of modern warfare.
Walls

No discussion of Korean weapons would be complete without some consideration of the stone wall as a defense for apparently it had a special significance to the Korean soldier, a value in morale as effective as its actual physical worth. Usually they were about 20 feet in height, crenelated, of pyramidal stones, the bases of which were faced and placed outward to form the face of the wall. The tapering points extended into the dirt bank of the fortress and were packed with smaller stones for drainage. The upper six feet was in sections, 6 to 10 feet long, separated by a small space through which the besieged could see. Each section was covered with large well cut roof stones and pierced by three holes for guns or arrows, the center hole about three feet high by a foot wide and the one on either side as wide and a foot shorter. Under the roof stone was a single layer of large flat grey brick. The wall served its purpose well. For economy of materials, lasting strength, simplicity in construction and beauty in design, it probably equals the walls of any other people.

Since the Koreans were geographically and psychologically always on the defense in warfare, the wall naturally came to be their most respected and efficient weapon. Several historians have made special mention of the remarkable bravery, bold courage and skillful daring which characterized the Korean soldier when he was fighting behind his wall, though attacked by superior forces bound to win. Griffis says "The Koreans are poor soldiers in the open field and exhibit slight proof of personal valor,...... but put the same men behind walls ...... they are more than brave, their courage is sublime, they fight to the last man and fling themselves on the bare steel when the foe clears the parapet. The Japanese of 1592 looked upon the Korean in the field as a kitten, but in the castle as a tiger. The French in 1866 never found a force that could face rifles,
Walls

No discussion of Korean weapons would be complete without some consideration of the stone wall as a defense for apparently it had a special significance to the Korean soldier. A value in morale as effective as its actual physical worth. Usually they were about 20 feet in height, constructed of pyramidal stones, the bases of which were faced and placed outward to form the face of the wall. The tapering points extended into the dirt bank of the fortress and were packed with smaller stones for drainage. The upper six feet was in sections, 6 to 10 feet long, separated by a small space through which the besieged could see. Each section was covered with large well cut roof stones and pierced by three holes for guns or arrows, the center hole about three feet high by a foot wide. Each side as wide and a foot above, was a single layer of large stones. For economy, unity of strength, military design, it probably equals the walls of Byjuk. Since it was constructed to the extent of the geography and psychological warfare, the wall naturally was a single layer of large stones. Each group of men working on the wall built its own type, and used its own kind of stone.

Roof stone has been taken away.

Upper: Picture taken from the outside. Height—outside about 20 feet. Sets of three holes at top for shooting can be seen.

Also the different type of stone in the foreground and the distance. Each group of men working on the wall built its own type, and used its own kind of stone.

Lower: Foreground shows wall from inside. Height about 5 feet. Roof stone in place.

Several authors have made special mention of the remarkable bravery, bold courage and skillful daring which characterized the Korean soldier when he was fighting behind his wall, though attacked by superior forces bound to win. Griffis says "The Koreans are poor soldiers in the open field and exhibit slight proof of personal valor, but put the same men behind walls ... they are more than brave, their courage is sublime, they fight to the last man and fling themselves on the bare facts when the foe clears the parapet. The Japanese of 1692 looked upon the Korean in the field as a kitten, but in the castle as a tiger. The French in 1856 never found a force that could face rifles.
but behind walls the same men were invincible...Inside the fort no nobler foe ever met American steel.”

By this mental attitude and the actual physical protection of her walled retreats, Korea was able to maintain for so long her individuality as a nation and to turn her enemies’ assaults into empty victories by holding them for months without the gates until their shortage of supplies and weakened spirit made their “victorious” return home the better part of valor. It is regrettable that the few miles of old walls that remain in Seoul, Nam Han and other places, are fast falling into decay and ruin.

One of the most interesting historical things relative to our subject is the development of the Korean turtle boat and the remarkable skill in naval strategy under Admiral Yi Soon Sin (李舜臣). Dr. Underwood has covered this subject thoroughly in a recent work of this Society under the heading of “Korean Boats.”

And so Korea stands today, safe and secure, her steel doing good service as plowshares. And yet, as she plows the furrow in the rice-field, the eyes of the world are upon her as never before, for she still remains a small spot of the earth’s surface, geographically surrounded by powerful economic and racial forces, antagonistic to each other. If truth and love may rule in the affairs of which Korea is inescapably the center but has no part, she will be progressive and fruitful for the common good of the world. If truth is crushed and hatred bred, she will suffer again in that which is for her a lost art.
KOREA BRANCH OF THE
ROYAL ASIATIC SOCIETY

Annual Meeting, June 4, 1934

The Annual Meeting of the Korea Branch of the Royal Asiatic Society was held in Morris Hall, June 4, 1934. President E. W. Koons called the meeting to order at 4:40 p. m.

The minutes of the Annual Meeting of 1933 were read and approved.

The President read his annual report (See appendix).

The Librarian, N. C. Whittemore, read his annual report (See appendix). It was moved and seconded that the report be accepted, and that the recommendation calling for an appropriation of $150.00 for purchase of books by the Librarian be approved. Carried.

Mr. Thomas Hobbs read the report of the Treasurer. (See report attached). It was moved and seconded that the Treasurer's report be accepted. Carried.

Father Charles Hunt gave a report for the Publication Committee making mention of recent publications of the Society and also papers which are to be published in the near future.

The report of the Nominating Committee was read by Miss Katherine Wambold. It was moved and seconded that the name of Mr. Gerald Bonwick be substituted for that of Mr. Hugh Miller for treasurer. Carried.

On motion the report of the Nominating Committee was adopted as follows:

Officers for the Year 1934-35.

President Rev. Charles Hunt
Vice President Dr. E. M. Cable
Secretary Dr. H. H. Underwood
Corresponding Secy. Rev. W. M. Clark, D. D.
Treasurer  Mr. Gerald Bonwick
Librarian  Rev. N. C. Whittemore
Counsellors  Rev. Henry Appenzeller
            Mr. Hugh Miller
            Dr. E. W. Koons

The following names were presented for membership in the Korea Branch:

Rev. R. M. McMullen, Hamheung
Dr. Paul Oh, Posung College, Seoul
Dr. M. M. Lee, C. C. C., Seoul
Miss Sue DeArmon, S. F. S., Seoul
Mrs. A. W. Taylor, Seoul

Rev. Charles Hunt read a paper on "Sal Ak San." Retiring President E. W. Koons expressed the thanks and congratulation of the Society to Father Hunt for his very interesting paper.

The meeting adjourned at 5:15 p. m.

Earnest Fisher, Secretary,
E. W. Koons, President.
# TREASURER'S REPORT

## Cash Statement 1933-34

### Receipts:
- Dues ... ... ... ... ... ... ... ¥ 263.93
- Cash Sales ... ... ... ... ... ... ... ¥ 313.84

### Interest:
- Fixed Deposits ... ... ... ... ... 88.26
- Current a/c ... ... ... ... ... ... 0.65 ... ... ... ... 88.81

**Total** ... ... ... ... ... ... ¥ 666.58

Balance brought forward from last a/c:
- Reserve a/c ... ... ... ... ... 1,200.00
- Fixed deposit ... ... ... ... ... 793.34
- Current a/c ... ... ... ... ... 466.45

**Total** ... ... ... ... ... ¥ 3,126.37

### Expenditures:
- Printing 600 copies Transactions (Vol. XXII & 250 extra) ... ... ... ... 478.00
- Printing 500 copies Transactions (Vol. XXIII) ... ... ... ... 499.94
- Library:
  - Books purchased ... ... ... ... ... 114.75
  - Rebinding Books, Repairing ... ... ... ... ... ... ... ... 128.05
  - Cost of sending out Transactions ... ... ... ... ... ... ... ... ... 33.36
  - Fee for clerical work (per Treasurer) ... ... ... ... ... ... ... ... ... 10.00
  - 500 Catalogues ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 12.00
  - 500 Folders for advertising ... ... ... ... ... ... ... ... ... ... ... ... ... ... ... 9.50
  - Post cards for sending out notice of meetings ... ... ... ... ... ... ... ... 6.63
  - Postage ... ... ... ... ... ... ... ... ... ... 1.79

**Total** ... ... ... ... ... ¥ 1,179.27

Balance on hand:
- Reserve a/c ... ... ... ... ... 1,500.00
- Fixed Deposit ... ... ... ... 100.00
- Current a/c ... ... ... ... ... 357.10

**Total** ... ... ... ... ... ¥ 3,126.37

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**THOMAS HOBBS,**
Treasurer.
ANNUAL REPORT OF THE LIBRARIAN

I have pleasure in reporting the following list of accessions to our Library, 42 titles in all. A number of these were gifts from the Government General and friends of the Society.

I regret that I was unable to do more while in the United States in the way of purchasing books. My time was so limited that I was only able to visit two second-hand book-stores, but picked up a few books which we did not have in our library.

I would once more appeal to our members for help in the securing of books. I would mention three that I am especially anxious to get and so far, in spite of what I have been able to do, have failed:—

Professor Rufus’ “Monograph on the Kyungju Cave.” Vols. VII & VIII, “Monuments and Ancient Remains of Korea”.

I would also make an appeal to our members when they are clearing out their superfluous books and pamphlets, for back files of Korean publications may often be very acceptable for our library, and I trust they will keep this in mind.

I have also made an effort to secure some of our “shorts” in the files of our exchanges.

I regret that I have not been able to attend to more of the rebinding but it involves so much time for the careful arrangement and accurate lettering on the covers.

The financial report is as follows:

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Recommendation.

I recommend that the Society make the usual £150.00 appropriation for the purchase and binding of books.

NORMAN C. WHITTEMORE
Librarian.
R. A. S. ACCESSION LIST.

June 11th, 1934

The Second Annual Report on Reforms and Progress in Korea 1908-09
The Third Annual Report on Reforms and Progress in Korea 1909-10
Annual Report on Reforms and Progress in Chosen 1910-11
Annual Report on Reforms and Progress in Chosen 1911-12
Annual Report on Reforms and Progress in Chosen 1912-13
Annual Report on Reforms and Progress in Chosen 1913-14
Annual Report on Reforms and Progress in Chosen 1914-15
Annual Report on Reforms and Progress in Chosen 1915-16
Annual Report on Reforms and Progress in Chosen 1916-17
Annual Report on Reforms and Progress in Chosen 1921-22
Annual Report on Administration of Chosen 1924-26
Annual Report on Administration of Chosen 1926-27
Annual Report on Administration of Chosen 1927-28
Annual Report on Administration of Chosen 1928-29
Annual Report on Administration of Chosen 1929-30
Annual Report on Administration of Chosen 1930-32
Tanaka's Secret Memorial to the Japanese Emperor.

Northeastern Affairs Research Society

The Truth about the Mukden Incident of September 18th, 1931.
Northeastern Affairs Research Society

Brick from Grave on the Site of Nak Ryang.

Illustrated Catalogue of Ancient Monuments and Historical Remains of Korea.


Report of the XXI Meeting of the Australian & New Zealand Society for the Advancement of Science.

Foreign Affairs. April, January, July & October, 1932.

Within the Gateways of the Far East. Charles R. Erdman.
Korea & The Sacred White Mountain. Cavendish.
The Pilgrimage of Buddhism. Pratt.
Korean Tales. H. N. Allen, M. D.
Corea, Its History, Manners & Customs. John Ross, Rev., D. D.
The Rebirth of Korea. Hugh Heung-Wo Cynn, LL. D.
In Korea with Marquis Ito. Ladd.
Christian Literature in Moslem Lands.
The Korea Mission Year Book, 1928.
The Development of China. Latourette.
The New Korea. A. Ireland.
The Face of Manchuria, Korea and Russian Turkestan. E. G. Kemp.
Conference of Christian Workers Among Moslems.
THE PRESIDENT'S ADDRESS

Annual Meeting, June 4, 1934

When this Society was organized, thirty-four years ago, it enrolled thirty-four members. It is a long way from that to the one hundred and ninety one listed in our latest volume of Transactions. Even that thirty-four was double the number of those present at the meeting for organization, held on June 11, 1900. A few of those pioneers are living in England and the United States of America, but the only one in Korea is Dr. E. M. Cable. Four others of the early members are still in this country: Dr. O. R. Avison, Dr. W. A. Noble, Dr. R. A. Hardie, all of Seoul, and Rev. H. M. Bruen of Taiku.

You will learn from the reports of my colleagues on the Council, who have really done all the work this year, the accomplishments that our large membership, and wide range of interests, have made possible. I take particular pleasure in calling for the first time for a report from the Committee on Publications, which was authorized at the Annual Meeting of 1933. This one year has established its value, and we look for better and earlier production of our Transactions hereafter.

One enterprise has been proposed during the year, but no one can say when it will be completed. I refer to the offer made by the Council, acting for the Society, to defray the cost of replacing the top on the Marble Pagoda. Your representative was referred to the Social Affairs Section of the Government-General, and learned there that the Pagoda is now in charge of the Committee for Preserving National Monuments. The offer will doubtless be made to this Committee, when there is an opportunity. Surely every lover of Korea's culture will rejoice to see this wonderful structure restored.

Observing that the publications of our neighbor, the Asiatic Society of Japan, appear in board covers, making each number a volume fit for the library shelf, the Council is
prepared to offer those who prefer this style—if there be any such among our members—the choice of board covers, with gilt lettering on the back, for future volumes of the Transactions, at the increased cost of fifty sen per volume, if so ordered in advance of publication.

Papers now in preparation include:—

“Fr. Cespedes and General Konishi” ... ... Mr. Ralph Cory.
“Foreign Names of Korean Cities and Localities” Dr. E. M. Cable
“The American Expedition to Kangwha” ... ... Dr. Cable
“Translation of the Yang Wha Nok” ... ... E. M.

(This was written by Kang Koi Am, in 1440 A. D.).

“Places of Interest in Seoul”
“Further Investigations into Korean Flora” ... Mrs. R. K. Smith
“Korean Weapons and Armor” ... ... ... Dr. J. L. Boots
“Nak Nyang” ... ... ... ... Dr. George L. Paik
“Korean Bibliography” by Courant, translated from the French by Mrs. Royds.

To make our Transactions more widely known, and more used, we have issued a catalogue of the whole twenty-three volumes. Copies have been sent to all our members, and will be gladly furnished to those interested, on application to any member of the Council.

I cannot let pass this opportunity of calling your attention to four monographs, each dealing with a phase of Korean culture that no student of the country can afford to neglect. Out of almost fifty papers we have published, it is hard to select four, but these will be a beginning:

(1) Introduction to the Study of Korean Buddhism—Volume VIII, 1917. This is the work of Bishop Trollope, our greatest scholar in the Korean written language—he read the classics in the original for pleasure—with illustrations and a vocabulary of Buddhist terms.

(2) The Marble Pagoda of Seoul—Volume VI, Part 2, 1915. With unsurpassed devotion to Korean literature, Dr. Gale sought for years the solution of the Pagoda’s riddle, and finally found, and translated for all to share, the inscription that tells the whole story.

(3) Pottery of the Korai Dynasty, 924-1392, A. D., Volume XIV, 1923. The assembler of the best private
collection of Korai Pottery, Dr. Ludlow, gives us photographs of his choicest pieces, an explanation of the makers’ technic, and a guide to classification of this lovely ware.

(4) Some Pictures and Painters of Corea—Volume XIX, 1930. The Rev. Charles Hunt has given us a guide that is invaluable to anyone wishing to understand what has been done by Korean painters. He takes up in order the various schools, identifies many of the paintings now to be seen in the museums, and makes the whole subject alive. I must quote one story:

"Choi Hoi-Yong, born 1528, was noted as a painter of plum-blossoms. On one of his screens, the flowers were so life-like that the screen was kept in the garden. One night in a dream, a Sage appeared to the artist, saying that the plum-blossoms in his garden had mysteriously disappeared from the trees. Evidently, said the visitor, Oo Pong (Choi Hoi-Yong’s artist name) had stolen the flowers for his screen. He insisted that he be allowed to sleep for four nights in the garden beside the screen."

The Index to the Transactions, Vols. I-XVI, prepared by Mr. Harold J. Noble, published as part of the 1927 Volume, should be brought up to date and reprinted.

Nature-lovers will enjoy Volume IX—"Arboretum Coreense" Part One—and Volume XVII—"Some Wayside Flowers of Central Korea." In Volume XXII is the splendid "List of Birds Found in Korea." This, by the way, can be bought by itself, at a reduced price, for use as a field book.

Let me urge each one who has heard this address, to decide soon which of the Transactions holds just the information he has long been wanting, and then proceed to master it.

I thank the Society for the honor it has done me, and wish to my successor the same support and co-operation that the year has brought to me.

F. W. Koons,
President.
BIBLIOGRAPHY

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Trans. Asiatic Society of Japan, Vols. VI, IX, XI 1878-1883

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History of Koryuh (高麗史) —Chung Rin Chi —

History of the Korean People—J. S. Gale 1931

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Military Arts and Atlas (武藝圖譜通志) 1791

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Passing of Korea—H. B. Hulbert 1906

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Primitive American Armor—U. S. National Museum—Hough 1895

Sin Ki Pi Kyul (神機秘訣) 1911

Story of Korea—J. H. Longford 1911

The Five Ceremonies (五禮儀)—Sin Sook Joo and Chung Chuk 1744


Trans. Asiatic Society of Japan—Vol. XI Part II Account of a Secret Trip in the Interior of Korea 1883

Transactions Asiatic Society of Japan—Aston:
Vol. VI Part II—An Outline of Recent Japanese Archaeological Research in Korea in its Bearing upon Early Japanese History—Samson 1929
Vol. XI Part I—Hideyoshi's Invasion of Korea—W. G. Aston 1883

Yeun Kui Sin Pyun (演機新編) The New Book on Military Tactics—An Myung No 1660

Yun Yuh Sil Ki Sool (燃藜室記述) 1419-1725
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EXCHANGES

Journal Asiatique
13 Rue Jacob, Paris VI.

Journal of the American Oriental Society
c/o Yale University Press,
New Haven, Conn., U. S. A.

Proceedings of the American Philosophical Society
104 South Fifth Street.
Philadelphia, Pa., U. S. A.

Geographical Journal
Royal Geographical Society,
Kensington Gore,

Geographical Review
American Geographical Society of
New York, Broadway at 156th Street,
New York City, U. S. A.

Bulletin of the Geological Institute of Sweden
University of Upsala, Sweden.

Journal of the Ceylon Branch of the Royal Asiatic Society.
Ceylon Branch of the R. A. S.,
Colombo, Ceylon.

Journal of the Bombay Branch of the Royal Asiatic Society,
Bombay, India.

Annual Report of the Smithsonian Institution,
Washington, D. C., U. S. A.

Transactions of the Asiatic Society of Japan
Osaka building, 3 Uchisaiwai Cho,
Ichome, Kojimachi-Ku, Tokyo, Japan.

Journal of the North China Branch of the Royal Asiatic Society
5 Museum Road, Shanghai,
China.

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