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Author(s): Henry Field

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ANCIENT WHEAT AND BARLEY
FROM KISH, MESOPOTAMIA

By HENRY FIELD

IN VIEW of the interest in the more or less recent discovery of several samples of grain from the excavations at Kish, it seemed desirable to place on record the conclusions of various botanical experts on these specimens. The date of the jars in which the grains were found was accurately determined by inscriptions, tomb-groups, pottery, and other objects which were found in the same stratigraphical level. These grains are therefore the oldest examples of cultivated cereals in Mesopotamia.

The site of the ancient city of Kish is located sixty-five miles south of Baghdad and about eight miles east of Babylon. In Sumerian times Kish was divided by the river Euphrates into an eastern and western metropolis. From the epigraphical records, it was the "first city founded after the Flood." In this connection it is interesting to note that Mr. L. C. Watelin, field director, discovered evidence of two local floods which swept over the eastern portion of the city about 3200 B.C. and 4000 B.C., respectively. The former may well be the traces of the Biblical deluge.

The alluvial plain upon which Kish was built is even today extremely fertile when water is available. There are several large canals which bring water from the river Euphrates and by the most primitive methods of irrigation—neither the *noria* or Persian water-wheel, nor the *sakieh* is used—the soil is intensely cultivated. The crops are not heavy, which is to be expected after six thousand years of almost continual cultivation where the principle of rotation of crops is unknown and the nitrogen content of the soil never replaced.

During the spring of 1928 the writer observed a peculiar scarecrow in the middle of a large cultivated area near Kish. This consisted of the vertebrae of a camel piled on top of each other and held in place by a stick on which each vertebrae was threaded. The local Arabs insisted that not only was this an efficient method for keeping away birds, but that its magical properties increased the quality and quantity of the crop.

From an archaeological and anthropological point of view the Kish area is of considerable importance since the excavations conducted by the Field Museum-Oxford University Joint Expedition during the past eight seasons at Kish and Jemdet Nasr (eighteen miles northeast) have revealed not only the cultural attainments of the Sumerians (possibly preceded by a proto-Semitic neolithic phase), Babylonians, and Sassanians, but also the interesting fact that the physical characters of these Arabs have remained little changed during the past six thousand years. Thus the region with which we

are dealing is the oldest inhabited site from which our civilization has directly evolved.

In dealing with the various reports on the samples of wheat, barley, and spices collected by the writer during two seasons at Kish (1925-26 and 1927-28) it must be stated that these specimens were handed over to Field Museum Department of Botany and Mr. James B. McNair, Assistant Curator of Economic Botany, very kindly referred them to the various botanical experts hereafter quoted.

WHEAT

Early in January 1926 Professor Stephen Langdon, director of the joint expedition, and professor of Assyriology in the University of Oxford, was conducting excavations at Jemdet Nasr, where magnificent examples of painted pottery (type Susa II) and pictographic tablets in linear script were found. The writer was also working at Jemdet Nasr on January 6, and, while clearing out a painted jar, discovered some seeds which were sent to Field Museum for identification. These seeds lay at the bottom of the jar, which had been much blackened by the fire that destroyed the city during the fourth millennium before the Christian era.

According to Professor Langdon, this seed is of particular value since it comes from the very early Sumerian period, *circa* 3500 B.C.

Professor John Percival, of Reading, an authority on the wheat plant, reported to Professor Langdon that the seed was that of "*Triticum turgidum*," Rivet or Cone wheat. Professor Langdon adds:

Thus the statements of Herodotus, Strabo, Pliny and Berossus concerning the astonishing productivity of Babylonian wheat are confirmed. We have at last a discovery from the Sumerian period contemporary with pre-dynastic Egypt. A good many samples have been found in Egypt from the same period, but these are all, I am told, spelt-wheats and a less developed product than the "*Triticum turgidum*" which was found at Jemdet Nasr.

The Sumerian word for wheat was "*she-gib-ba*," a word meaning "the dark grain," which corresponds admirably with the grain found by the Expedition. The Babylonian word "*Kibatu*" was borrowed from the Sumerian word, and is rendered "*Henṭatā*" on Aramic docketts, which is the Hebrew "*ḥiṭṭā*," "wheat." There is no longer any doubt concerning the great antiquity of this species of wheat in Mesopotamia, although the word for Emmer (*Triticum dicoccum*) occurs even more frequently than the word for wheat on the pictographic tablets. Professor Percival, who has also examined most of the cereals found by Sir Flinders Petrie in Egypt, says that the Jemdet Nasr wheat is the first really ancient sample of "*Triticum turgidum*" which he has seen. The discovery confirms the theory, long accepted by historical botanists, that Mesopotamia is the original home of the bread-making wheats.

Professor Langdon stated further:

The Botanical Department of the Field Museum has determined this wheat to be "*Triticum vulgare*" or common wheat, called club wheat or "*Triticum compactum*," and with this analysis O. F. Phillips of the United States Bureau of Agricultural Economics agrees. Dr. O. Stapf, editor of the Botanical Magazine, Kew Gardens, sent me the same independent statement. He informed me that this wheat is "*Triticum compactum*" or club wheat, which is the only good bread-making wheat, and the most developed of all species of the wheat plant. Sir John Russell of the Rothamstead Experimental station, is non-committal between these two views, but I infer that he favors the view of Dr. Stapf and the botanists of the United States. If this be true then the most ancient Sumerians had succeeded in growing the finest kind of bread-making wheat and were far in advance of the agriculturists of pre-dynastic Egypt. If we may depend upon the Aramaic translation of the Babylonian word, referred to in my previous letter, this should determine the kind of wheat grown by the ancient Hebrews also.

In support of his determination of the wheat as *Triticum turgidum*, Sir John Percival states in a letter to the London Times:

I was not surprised to see my letter of February 3 from Professor Langdon regarding my identification of the very interesting wheat which he discovered in Mesopotamia; I also was prepared to find that some botanists, and others not botanists, consider the grains to be those of Bread wheat (*Triticum vulgare*) or Club wheat (*Triticum compactum*). The only surprise is that no one has ventured to name it Emmer (*Triticum dicoccum*). The grains submitted to me are exactly matched in form and size by several varieties of *Triticum turgidum* which are grown annually at the Agricultural Botanic garden at the University here (Reading, Berks, England), and I must respectfully beg to disagree with those who have named them *Triticum vulgare* Controversies of the identification of these highly complex cereals should be left to those who give special attention to them, and not until this is done shall we make any real progress in the elucidation of their evolutionary history and indirectly assist the anthropologist and archaeologist in the problems of the origin and movements of the earliest civilizations.

O. F. Phillips in support of his decision as to the classification of the specimens says:

The botanist or agronomist is governed largely by the plant itself, that is, plant habit, roots, stalk, stem, leaves, flowers, awns, etc., of course giving consideration to the ripened seed. When the seed is alone, having been separated from the plant, many agronomists of my acquaintance are frank to confess that identification then becomes to them more difficult.

In my twenty-five years experience in inspecting and handling commercial grains and particularly during the past ten years as chairman of the Board of Review of the Grain Division, Bureau of Agricultural Economics, United States Depart-

ment of Agriculture, which Board is charged with the interpretation of the United States standards for grain, and in that capacity, annually reviews from 40,000 to 60,000 samples of grain from all over the United States, I have not only made a careful study of the kernel characteristics of all known varieties of wheat grown in the United States, but of the principal varieties and classes grown all over the world. My collection of the world wheats, I believe, is one of the largest in the country.

In the above capacity I have been consulted at times by agronomists of our various agricultural colleges relative to classification of our different wheats. In view of the above, however, I am quite ready to yield from my personal opinion when a kernel can be grown and the botanist or agronomist prove the facts or classification from the growing plant. Unfortunately in this particular case that cannot be done.

You will recall that upon my first examination of Professor Langdon's wheat I expressed the opinion that it was a "club" wheat (*Triticum compactum*), but in referring to it in an article which was published in our Department letter, February 4 (1927)—a copy of which I gave you—I stated that it resembled either our "club" (*Triticum compactum*) or "Pollard" (*Triticum turgidum*) wheat, which would seem to indicate a doubt in my mind between the two classifications. It would be a very wise man, indeed, who could state definitely, after 5500 years and in their present condition, the true classifications of these kernels. It will be noted in many of these kernels that the crease is very narrow, tight and slightly crooked, and that the brush ends show a cheek smaller in size than the other, all of which are more characteristic of "*Triticum compactum*" than of "*Triticum turgidum*." True, the kernels have a dorsal hump, but this is also characteristic of "*Triticum compactum*."

In comparing these kernels with samples of Rivet wheat grown in England and submitted to me by Dr. John Engledow of Cambridge, England, it is noted that Rivet wheat, and other varieties of Pollard wheats for that matter, have a more open straight crease, some of them pitted, the cheeks are more even and uniform and the kernels more uniform in size. The fact that Dr. Franz Unger, Austrian botanist and scientist, who, as a result of his research work in Egypt, claims that the early wheats grown there were "Pollard" wheats and that they were known to ancient Egyptians, being figured on their monuments and found in graves of great antiquity, would seem to give credence to Dr. Percival's claim, but these kernels come from another country of equal or greater antiquity with no definite knowledge of intercourse between the two countries at that time.

While I appreciate the significance of a statement emanating from such authority as Dr. Percival, a further examination of these kernels convinces me that my original opinion is more nearly correct, that they are of the "*Triticum compactum*" family; it seems that Dr. Stapf is also of this opinion. . . .

I am sure you will pardon the personal reference to my past experience in this letter, as it is given at your request to establish my qualifications in passing on this wheat.

A photograph of some of these grains may be found on plate 12 in Field Museum Annual Report for 1926.

BARLEY

During the season 1927-28, Mr. Watelin continued excavations down to water-level below monument "Z." One meter below the "red-earth stratum" and three meters northeast of the "witness," or portion of monument "Z" temporarily left standing by Mr. Watelin, the writer found two small unpainted jars containing seeds. These grains were sent to Field Museum for study, and have been identified as barley.

The two samples and a third from Jemdet Nasr were sent for identification to the Bureau of Agricultural Economics of the United States Department of Agriculture in Chicago. The report, dated November 6, 1929, reads as follows:

Reference is made to the three samples of ancient grain which we examined in the laboratory the other day. For purposes of identification, the samples were contained in three small bottles, (a) and (b) from Kish, and (c) from Jemdet Nasr.

While time and the elements have charred and blackened the kernels to the extent that positive identification is rather difficult, we are of the opinion that each of the samples is of some form or type of barley. We are influenced in arriving at this conclusion by the appearance and shape of the crease (slightly twisted in some kernels), flattened backs, boat-shape of kernels, and germ shape, all of which are more or less common to our modern barleys.

Time, abrasion, and possibly method of threshing, all have had a part in accounting for the apparent absence of the outer husk or hull of the kernels.

The grain in bottle (a) from Kish is apparently a different type than that in the other two bottles, as the kernels as a whole are much smaller. The barley characteristics are much more pronounced in bottle (b) sample.

There can be but little doubt, however, that each of the three samples is of some species of barley.

Samples of these seeds were also sent to Mr. H. V. Harlan, Principal Agronomist in Charge of Barley Investigation in the United States Department of Agriculture in Washington. Mr. Harlan reported on November 8, 1929 as follows:

I am able to make only a partial determination of the barley in the samples which you recently forwarded. All three samples contained seeds of 6-rowed hulled barleys. This does not preclude the possibility of there being hull-less or 2-rowed sorts present. I could, however, find no kernels which could be identified as either. The grain seems to be slightly smaller than that coming from Egyptian excavations, and I think it is safe to say that it represents different varieties.

These grains of barley are figured in Plate VI of Field Museum Annual Report for 1929, and on page 54 is the following account by Dr. Berthold Laufer, Curator of Anthropology at Field Museum:

An interesting discovery was made this year in tracing three lots of barley in some of the pottery jars excavated from the low strata of the ruins of the ancient city of Kish. Botanical investigation disclosed the fact that this barley is of the six-rowed variety, and this, as far as is known here, is the first actually brought to light in Mesopotamia. Barley seeds of the four-rowed variety were formerly discovered at Nippur. The six-rowed type is the characteristic prehistoric barley which was known to the Indo-European nations, numerous examples of which have been found in the Swiss Lake dwellings. It is this species which was taken along by the Anglo-Saxons on their migration from their original home to the British Isles and then cultivated by them in England. In view of the discovery of the six-rowed barley at Kish the conclusion is now warranted that this cereal, so important in the development of agriculture, was first brought into cultivation at a prehistoric date in Mesopotamia where the wild species also occurs, and that the cultivated species was diffused from that center to all other countries of the Near East, Egypt, and Europe.

OTHER SEEDS

During March 1928, while Mr. Watelin was conducting excavations at Jemdet Nasr, the writer found an unpainted jar which contained seeds, which were sent to Field Museum for identification. The seeds were also dispatched to Mr. H. V. Harlan, who reported on February 7, 1930 as follows:

I have received the sample of seed which you sent late in January. I have been unable to determine or to have the seeds determined with certainty. Both Mr. Brown and I feel that the major number of seeds included in the sample are from some umbelliferous plant and were probably used for seasoning. A smaller number of seeds are very similar to those of certain species of *Panicum*. I am unable to guess what this may mean, unless it is a case of misbranding. Possibly some condiment vendor at Jemdet Nasr was adulterating his spices. I hardly expect you to take this hypothesis seriously.

In a communication dated January 21, 1930, from Mr. O. F. Phillips, who is chairman of the Board of Review and Federal Grain Supervisor to the Bureau of Agricultural Economics of the United States Department of Agriculture in Chicago, he says:

Reference is made to your small bottle sample of grain taken from the ruins of Jemdet Nasr, near Kish, in March 1928, and which you recently submitted to us for identification.

This is without doubt the most difficult sample which you have submitted for identification from that period, due to the smallness of the kernels and their badly charred condition. In my examination of them under the microscope I am convinced that most of the kernels are some species of barley, although there appears to be some other seed present which I am unable to identify.

It would seem to me very plausible to suggest that the small room lying toward the northeast end of Jemdet Nasr was used by a grain merchant, since barley was found in one large jar and spices or their equivalent in a second jar. In the market (*suk*) at Hillah or any town in Iraq today, the grain merchants sell many varieties of seeds, the only difference being that the containers used are sacks instead of pottery vessels. Furthermore, this small room was found within fifty feet of the large bakery kilns standing in the largest room discovered at Jemdet Nasr.

These discoveries throw an interesting light on the early domestication of wheat and barley in the Kish area and proof is thereby established of the cultivation of cereals in Mesopotamia as far back as the beginning of the fourth millennium before the Christian era.

In conclusion I should like to thank the various experts who have contributed their valuable opinions to this paper.

FIELD MUSEUM OF NATURAL HISTORY
CHICAGO, ILLINOIS