



FINGER PRINT OF A POTTER

A Manual of
EXCAVATION
in the Near East

*Methods of Digging and Recording of the
Tell en-Nasbeh Expedition in Palestine*



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TO
E. LEB. B.

Antiquitas saeculi juvenus mundi.

BACON

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PREFACE

THIS BOOK has a twofold mission. Its broader purpose is to acquaint the reader with the methods which a modern expedition employs in order to recover from the earth the still fragmentary story of man's past. The days when archaeology could be regarded as a kind of antiquarianism have gone by; yet in the public mind it still is associated much more with a delving for curiosities than with a patient scientific effort to search out and interpret *all* the material remains of man's history left by chance in any given place. An attempt is here made to show how in the endeavor to accomplish this purpose every refinement of organized scientific method must be brought to bear upon the archaeologist's task.

There is also a more restricted purpose which this treatise is designed to serve. It is certain now that the site which the Tell en-Nasbeh Expedition has been excavating for four seasons is the famous Benjaminite city of Mizpah. The next campaign, it is hoped, will see the completion of the task; and the time has now come for a full report embodying the historical conclusions to which a synthesis of the evidence points. The educated reader of the preliminary as well as the prospective final reports is herewith afforded the opportunity to see how the evidence has been gathered and to form his own opinion of the historical verdict. To friends and patrons it is sent as the first volume of the complete publication of methods and results.

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The Palestine Institute
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I. INTRODUCTORY

THE METHODS DESCRIBED in the following pages are, with unimportant modifications, applicable to archaeological enterprises in any part of the world. They are set forth here in a Palestinian context because they were elaborated and applied in Palestine, and because some of the materials which have gone into this discussion¹ have served during recent years for the instruction of students in training for a place on the staff of the Tell en-Nasbeh Expedition. Since the writer has been obliged to bear this purpose in mind for future as well as present use, he has not hesitated to employ a number of convenient Arabic as well as technical English words that are well understood and in common use among persons connected with expeditions in Palestine and elsewhere. For the convenience of the general reader they are listed with their meanings, on page 2.

In using a method whose several activities follow one another in a regular sequence, the size of the staff will have to stand in a certain ratio to the total number of workmen employed, and to the degree of completeness with which a given expedition aims to recover and study the artifacts in the deposits. The scale on which the technical work, described in the following pages, is laid out, contemplates an organization ranging from one hundred

¹ The following abbreviations have been employed: AA = *Archaeologischer Anzeiger*; APB = Albright, *Archaeology of Palestine and the Bible*; JBL = *Journal of Biblical Literature*; OIC = *Oriental Institute Communications*; PEF = *Palestine Exploration Fund*; RS = *Revue Syria*; SPAW = *Sitzungsberichte der Preussischen Akademie der Wissenschaften*; TN = *Palestine Institute Publications*: No. 1, *Excavations at Tell en-Nasbeh, 1926-27*; No. 2, *Some Tombs of Tell en-Nasbeh, 1931*; ZAW = *Zeitschrift für die alttestamentliche Wissenschaft*.

to one hundred and fifty workmen, and a trained staff of ten or more persons.

<i>Antikas</i>	A collective designation for antiquities of any kind.
Artifact	Any object made or modified by human art; potsherds and sickle flints, for example.
Bin	A round barrel-like receptacle built of rock and clay. Used for the storage of grain, usually above ground.
<i>Dunum</i>	A land measure of Palestine: 4-4 <i>dunums</i> are equivalent to an acre. The official <i>dunum</i> is 919 square meters, but in practice it ranges up to 1000 square meters.
<i>Fellahin</i> ; singular, <i>fellah</i>	Arab agriculturists, or farmers. In social antithesis to them stand the nomadic Arabs, the Bedouin.
<i>Reis</i>	Egyptian-Arabic form of the word for foreman. (Pronounced like <i>rāyis</i> , and in Palestine like <i>raiyis</i> .)
Room	In provenience records the word is used not only for rooms within buildings, but also for partly enclosed spaces between architectural structures, wherever such spaces can be treated as a place unit or locus. The latter term is being used in the excavations at Megiddo, and in the American Southwest.
<i>Shikaf</i>	Plural form of <i>shakfeh</i> , a piece or fragment, used quite generally in the excavations as a collective designation for potsherds as they are gathered in baskets and brought down to headquarters from the <i>tell</i> (mound); around Tell en-Nasbeh one often hears the plural pronounced like "shekef." L. Bauer, in his new <i>Woerterbuch des palaestinischen Arabisch</i> (1933), transliterates "shukaf."
Silo	Derived through the Latin from the Greek <i>sirós</i> , a storage pit; describes any pit-like excavation in the underlying bedrock; anciently used in Palestine for the dry storage of grain and other agricultural products.
Strip	An oblong space of ground, laid out in 10-meter squares, which is excavated as a unit through successive excavation levels from the surface down to bedrock, or until no more artifacts occur.
<i>Tell</i>	The ordinary Arabic word for a hill; but archaeologically speaking it is used specifically for a hill or mound that covers ruins of ancient settlements.
<i>Turiyye</i> ; plural, <i>tawari</i>	A short-handled triangular hoe used in the excavations to fill baskets with earth; also used as a scraping tool to clear architectural remains.

II. EARLY EXCAVATIONS IN PALESTINE AND THEIR DEFECTS

IT SEEMS APPROPRIATE to preface this discussion with a brief survey of developmental phases of archaeological methods as applied in Palestine. Perhaps the first writer to discuss most helpfully, from several points of view, the need of an improved technique in Palestinian excavations was Professor Hermann Thiersch, of Göttingen. Attention is directed especially to his article, "Richtige und falsche Palaestina Ausgrabung," in the *Internationale Wochenschrift für Wissenschaft, Kunst und Technik*, May 7, 1910. He pointed out that since excavations carried on up to that time at Lachish, Tell es-Safi, Tell ed-Djudeideh, Tell Zakariyah, Tell Sandahanna, Megiddo, Tell Ta'aneh, and Gezer were undertaken "by persons not schooled for the task, by beginners in such undertakings, . . . their work was necessarily bound to suffer in archaeological respects from serious weaknesses." His criticism of these weaknesses of method and personnel will be found in various issues of *Der archaologische Anzeiger* during the years 1907-1909. He was not concerned at this time with the details of a systematic field technique, but rather with the importance of placing excavations in Palestine under such directive leadership that the methods already developed by classical and Egyptological archaeologists could be carried over and adapted to this new field of research.

While his criticisms were sometimes misunderstood and resented by persons who felt themselves adversely affected by them, there can be no doubt that his discussions and suggestions contributed greatly to the scientific ad-

vance of Palestinian archaeology. When R. A. S. Macalister had concluded his excavations at Gezer, but had not yet published his final report, Professor Thiersch wrote a comprehensive review² of the results on the basis of the preliminary reports which had appeared up to that time in the quarterly statements of the PEF. It appears from this discussion that he clearly discerned what unfortunate and irreparable consequences might have been avoided at Gezer if Dr. Macalister had been provided with an adequate staff of assistants, instead of being expected to do, by himself alone, the work which in a well organized modern expedition would be shared by three or four helpers, whose usually somewhat divergent technical training would have enabled them to cover different fields while assisting in the work of recording. That Macalister accomplished as much as he did single-handed is nothing less than astonishing. But the point made by Thiersch³ is that no man, however able, should in the interest of a false and costly economy have been loaded with scientific responsibilities which it was physically impossible for him to meet adequately.

²"Die neueren Ausgrabungen in Palaestina," AA, 1909, 3.

³I venture to quote here a part of his statement: "Wenn die Grabung auf Gezer einmal fortgesetzt werden könnte, und dieses wäre nur zu wünschen in Anbetracht dessen, was als Bestes und Wichtigstes noch unter der Westkuppe verborgen liegen mag, so wäre im Interesse der gesamten internationalen Forschung zu wünschen, dass diese Fortsetzung mit solchen Hilfskräften ausgestattet werde, wie sie bisher hier vermisst wurden, ausserhalb Palaestinas aber als etwas ganz Selbstverständliches längst bei keiner wissenschaftlichen Grabung mehr fehlen. Sie sparen zu wollen, bedeutet einen sicheren Verlust des Allerwertvollsten und Kostbarsten bei einer solchen Untersuchung; eine nie mehr auszugleichende Einbusse auch an wissenschaftlicher Erkenntnis für uns alle . . . Auf keinen Fall aber darf und kann der oben empfundene, allerdings ganz wesentliche Mangel an Personal dem verdienten Manne [Macalister] zur Last gelegt werden, der als Einziger die Aufgabe nur zu übernehmen, nicht auch zu vergeben hatte." *Op. cit.*

The fact is that neither those who financed nor those who directed the earlier excavations in Palestine had any clear conceptions of the methods to be employed or the records to be kept. No excavator deemed it necessary to give a detailed account of his field technique, if he had one, and his general methods can only be inferred from the reports of his results and conclusions. Yet it is often impossible to know how much confidence may be reposed in an excavator's conclusions unless he has supplied an account of his archaeological methods so detailed that an independent investigator can see how much pains he has taken in getting all the pertinent evidence. If he has not had a staff of trained assistants it is all but certain that a great deal of important evidence, both in the form of stratigraphy and in that of artifacts, has gone into his dump heaps while he was at headquarters, vainly trying to keep up with the routine work.

Not until the year 1908 did systematic scientific methods of excavating and recording begin to be applied in Palestinian excavations, and then only by two expeditions, the Harvard expedition at Samaria, and an expedition of the Deutsche Orient-Gesellschaft on the site of ancient Jericho. The former was in charge of Dr. George A. Reisner, with Dr. Clarence S. Fisher serving as architect. Both men during the years since then have steadily set high standards of thoroughness in method, Dr. Reisner chiefly in Egypt and Dr. Fisher in Palestine. Unfortunately the results of the excavations at Samaria were not published until 1924, so that fourteen years were lost before the pattern-value of the methods used at Samaria could influence a new generation of archaeologists. Even so, rather too much is taken for granted in the presentation of the methods employed. It would have been

better if there had been included a more detailed account of the field technique and the system of recording. As it is, the interested student is left in doubt about many details.

The German expedition at Jericho was not equipped as completely as the one at Samaria, but it also set new standards of excellence in methods. Since no account of them was published, their nature also must be vaguely inferred from the publication of results. Chiefly through the influence of Professor Thiersch, the classically trained archaeologist Carl Watzinger was associated in 1908 with Professor E. Sellin, who had begun the excavation a year earlier. Although two fundamental mistakes were made, one in postdating the Middle Bronze Age wall and stratum into the Iron Age, and the other in excavating by the scientifically worthless trench system, the recording and the architectural drawing were done with care. The prompt publication of the results in 1913, in which the ceramic finds are well illustrated and described, made this publication one of the most valuable and influential of its kind. But until a more accurate chronology for Palestinian ceramics had been established, the use of this work unfortunately caused a good deal of postdating in publications of Palestinian pottery.

III. ELABORATION OF A METHOD AND TRAINING OF A STAFF

THERE IS AT PRESENT a great dearth of authoritative and detailed published descriptions of techniques employed in excavation. This may in part be due to the fact that methods of excavation have in recent years undergone a steady technical development. Among those archaeologists who are really concerned to make the technique of excavation an accurate scientific instrument, improvements in practice are introduced year by year. Under these circumstances there is a natural hesitation to put into print what may in a few years be overhauled by newer methods. The writer and his staff also have in prospect some advances in method which they hope to put to

* Probably the best outline of methods published so far is that of Dr. Clarence S. Fisher in OIC (1929), No. 4, entitled "The Excavation of Armageddon." Some further developments of method at Megiddo are described by Dr. James H. Breasted in his latest book, *The Oriental Institute* (1933), Vol. XII of The University of Chicago Survey, pp. 240 ff.

In Vol. I of *Harvard Excavations at Samaria* (1924), Dr. George A. Reisner published a chapter entitled "Methods of Excavation."

Professor Hermann Thiersch informs me that the best work in German on methods and technique in excavation still is Th. Wiegand, "Untergang und Wiedergewinnung der Denkmäler" (1913), in Heinrich Bulle, *Handbuch der Archäologie*. See especially "Methode der wissenschaftlichen Ausgrabung," pp. 155-176. A serious defect of the method is failure to connect the recording system with accurately plotted areas of the topographical survey.

Under the title "Excavation," Lieutenant-Commander Noel F. Wheeler published a brief outline of methods in *Antiquity*, June, 1930.

Sir W. M. Flinders Petrie offered valuable hints in his *Methods and Aims in Archaeology* (1904). This book has exerted a wide and beneficent influence toward a more general recognition of "the rights of the past." It is an important aid to any young archaeologist who intends to take up archaeology in the Near East, especially Egypt. But it does not present any systematic technique that would meet modern requirements. His occasional use of the job or contract system, in which he agrees to pay a

the test of practice in the near future. Nevertheless we venture to place on record at this time the methods that we have applied at Tell en-Nasbeh to date. In doing this we are fulfilling an expressed wish of Mr. E. T. Richmond, the Director of the Department of Antiquities for Palestine, who has always shown a generous interest in our work. No less does it meet the desires of a number of fellow archaeologists who, while visiting the excavations, became interested in our methods. Beyond this there is, as indicated above, another consideration involved to which many an excavator would do well to give heed, namely, that the reliability of historical conclusions, offered by him as the result of his work, is in the final analysis dependent on the thoroughness of his field technique and the completeness and practicality of his system of recording what he finds. Increasingly in the

stipulated amount per cubic meter of earth moved, should be avoided, for it invites precipitate methods in dealing with antiquities found. At best this system would be applicable only in Egypt when large masses of comparatively barren sand have to be moved.

Of minor importance, but worth mentioning in this connection, are a few other booklets. One of these is *How to Observe in Archaeology* (ed. 2, 1929), published by the British Museum, primarily for travelers in the Near East.

A similar work in German is Neumeyer's *Anleitung zu wissenschaftlichen Beobachtungen auf Reisen*, in which attention should be directed especially to the contribution of F. v. Luschan, who, it is said, once made the remark that there are circumstances under which it is a greater merit to have prevented a bad excavation than to have begun a good one.

Situations arise at times in which the work of an archaeological expedition would be broadened and improved by guidance in making anthropological observations. An excellent little manual for this purpose is *Notes and Queries on Anthropology*, edited by Barbara Freire-Marreco and John Linton Myres, for the British Association.

Geuthner (Paris) announces the publication of a work entitled *La Technique des fouilles archéologiques*, by the Comte du Mesnil du Buisson. In the interest of scientific excavation the entire system of trenching advocated by this author should be abandoned. It is an antiquated and ruinous method. Even the use of steam shovels is advocated!

future, students of archaeological reports will desire information on the methods employed.

From the very beginning of their work in Palestine the director and the staff of the Tell en-Nasbeh Expedition have put much emphasis upon technique and records.

The primary purpose should be the application of a technique that will enable us to unriddle, by the aid of all scientific means and at whatever pains, the meaning of the human materials embedded in the strata. Often the humblest of these materials—ashes, bones, potsherds, carbonized seeds, etc.—are the most revealing. Even a museum specimen is valuable only in proportion to our knowledge of its human background. Every fact turned up by the spade⁵ feeds that knowledge, and any fact overlooked by an excavator, or misread through haste and incomplete study, may be an irreparable loss.⁶

There were several archaeologists who in 1925 and 1926 urged the writer not to choose Tell en-Nasbeh as a site for excavation, alleging that its deposits were shallow⁷ and that it was a place of no importance. All of them had convinced themselves—on poor evidence, as the excavation has shown—that the site could not be that of the

⁵ The reader will understand that as a matter of fact a spade is almost never used for excavations in Palestine. It is therefore only a symbol for equivalent tools—pick, *turiyye*, knife, and brush—the use of which will be described in the following pages. Photographs indicate that at Ras Shamra shovels and wheelbarrows are being employed, which is a departure from the usual way.

⁶ TN, No. 1, p. 7. (Our first preliminary report.)

⁷ During the excavation season of 1927 the writer observed two places where trenches had been dug near the southern end of the mound and filled up again. Under the application of the layer, or "onion-peel," method of removing deposits, disturbances of the stratification are easily recognized. The narrowness of the trenches showed that they had not been made for military purposes. An Arab farmer usually knows what has happened on his land, so I sent for the owner and questioned him. He reported that a *hakim* (wise man) had come from Jerusalem and dug a trench on his land to look for *antikas*. This, he said, had been done

Benjaminite Mizpah (Judg. ch. 19-21). The writer, although equally convinced that the situation of Tell en-Nasbeh fitted the biblical references to this Mizpah much better than Neby Samwil, replied to these friendly representations that his immediate concern was not the enrichment of a museum, but the initiation and elaboration of a technique under the conditions which Palestinian mounds present; that the proximity of the site to Jerusalem was advantageous to concentration on methods through the availability of experienced assistants when needed and the opportunity to confer with archaeologists who had worked out a technique.

How these expected opportunities were utilized has been set forth in the above-mentioned report and does not call for repetition here. Suffice it to say that the alleged unimportance of the site was dispelled immediately by the discovery of a formidable fortification wall whose origins at the south end of the Tell, where we first struck it, may go back to the Middle Bronze Age, but which in all its surviving features elsewhere stands revealed now as the wall with which King Asa fortified Mizpah about 900 B.C. Two Early Bronze Age tombs,* richly stored with pottery, also came to light in the first season. They made such demands upon our staff and our technique that we were forced for a time to dismiss most of our workmen to avoid haste and confusion in the making of our records.

twice; whether by the same *hakim*, he did not know. By a curious coincidence both soundings had been made in spots where domed formations of limestone bedrock came within three feet of the surface. One of the trenches had missed the buried mouth of a richly stored Iron Age cistern by inches; the other would have struck deposits fifteen feet deep if it had been sunk a few yards in any direction away from where it was.

* Briefly described in TN, No. 1. Full publication of their contents was deferred in order to permit the inclusion of Early Bronze Age finds made in subsequent campaigns.

Thus, with the aid of Dr. C. S. Fisher, and with occasional help from Professor John Garstang and Père H. Vincent, we were enabled in 1926 to lay the foundations of a technique to which we have steadily made additions, in part suggested by the study of methods pursued in other parts of the world, but mostly evolved by practical experience on our particular site. It is hoped that the additions in practice, as described in the following pages, may contain suggestions for fellow archaeologists as well as furnish explanations for results achieved at Tell en-Nasbeh. Dr. Fisher's exemplary initiative in this field will always command our admiration.

It will be apparent that the steady, smooth progress of a number of interlocking functions requires a staff whose members have not only been trained *in advance* for the particular work which they are to do, but who have also been so instructed and practiced in the coöperative aspects of the interlocking activities that they can, at need, be shifted to different places in the system. This is always done at times of least pressure to broaden their experience and vary the routine.

The importance of this preparatory training of staff members became apparent to me at the very beginning, for any attention which a director has to give to the technical work of his staff, after excavation has begun, must seriously detract from the more important functions which he should perform. When from one to two hundred workmen are employed on the mound, the systematic examination of artifacts by the system here presented demands the steady, skilled attention of at least half a dozen persons. During our last season there were nine members on the regular staff, aided by twelve assistants.

Finding that Dr. Fisher was as interested as I was in the

preliminary training of a staff, we worked out together the character and content of several courses of study by which this purpose should be accomplished. Since my work alternated between periods of teaching at home and periods of excavation in Palestine, I was the logical person to inaugurate this training. For a number of years now it has been a part of my task, as director of the Palestine Institute of the Pacific School of Religion, to train young men and women in the theory and practice of modern archaeological methods, with the expectation that they will later be able to apply them in the field.⁹ Theological students interested in biblical archaeology are permitted to elect these courses for credit toward their degrees. The courses which deal with the application of our field technique are given in the form of a seminar and are chiefly practical. To them are admitted only those students who have proved most proficient in ancillary courses. The archaeological part of the training of staff members can generally be completed in three semesters. After that the most competent among them are eligible for a place on the expedition's staff if they are able to meet their expenses of travel to the site chosen for the excavation. It has been a rule with us from the beginning that all American members of the staff, as well as the director and his wife, pay their own traveling expenses to and from Palestine. But they are the guests of the expedition while employed and, when the funds permit, receive a nominal monthly allowance for incidental expenses. The duties of each member of the staff are varied, so that he gets practical acquaintance with several types of work.

In the conduct of a course on "Methods and Technique

⁹ Cf. *JBL* (1931), Vol. L, pt. ii., p. 18.

of Excavation" for the Field Sessions in Archaeology and Anthropology under the auspices of the University of New Mexico, and in association with the School of American Research and the University of Southern California, the writer has also been called upon to train students preparing to enter professionally upon archaeological research in the American Southwest. Since a part of the summer-session work consisted in the excavation of nearby ancient pueblos, an opportunity was afforded to apply the methods described in this book to the unearthing of Pueblo Indian cultural remains in the semiarid American Southwest. The summer camp was situated at Battleship Rock, in the Jemez Cañon, New Mexico. In excavating the ruins of Un Shagi and Nona Shagi our methods were found to be easily adaptable to the new conditions.

Before leaving for Palestine in 1925 the writer visited the excavations, then in progress at Pecos, New Mexico, under the direction of Alfred V. Kidder,¹⁰ in order to study the method of ceramic sequence-dating which he had worked out on that site. Since then, further comparative studies of the cultures of the Near East and of the American Southwest have shown me some remarkable parallel developments. Of course, these did not result from collusion, but from the fact that in both places human minds were pitted against problems of subsistence which a semiarid country imposed. The archaeology of the two regions, therefore, has a common physical basis and consequently some problems that are common to both.¹¹

¹⁰ *An Introduction to the Study of Southwestern Archaeology* (New Haven, 1924).

¹¹ The reader is referred to some pertinent remarks on parallel developments of culture between these two regions by Dr. J. H. Breasted in *The Oriental Institute* (1933), pp. 4 ff.

IV. THE SURVEY MAP AS A STARTING POINT FOR THE SYSTEM OF RECORDING

AFTER A SITE HAS BEEN SELECTED, the first task is the making of a contoured control-map of the entire mound. At Tell en-Nasbeh this was done by a professional surveyor assisted by the writer.²² On strategic parts of the Tell, survey stations, or bench marks, with indicated elevations above sea level, were established by cementing nails in drill-holes on outcrops of bedrock. These were entered as surveying and leveling stations on the control map (see fig. 1). The latter was laid out on a grid of 50-meter squares, and the entire survey was duly coördinated with the general survey of Palestine by reference to the nearest official triangulation station. Additional bench marks were established afterwards as required by the progress of the excavation.

Since for many reasons it was found impracticable to purchase the site, we rented by written contract each season from the various owners of the land an area large enough for the projected excavation, with the understanding that at the end of the season the excavated area would be covered up again for agricultural use. Under these circumstances, immovably fixed²³ bench marks acquire supreme importance when the surveyor is called upon to plot the next season's area for excavation, and to connect it accurately with the refilled and previously mapped area. For the information of the general reader

²² For details see TN (1928), No. 1, p. 10.

²³ Goutherds moving about in the gray dawn with their flocks sometimes made trouble for the surveyor by pulling up the wooden pegs of staked areas in order to use them as fuel. Wooden survey-stakes face the risk of removal at any time.

it should be stated here that excavation proceeded by strips and that the excavation of each strip was carried down through the successive city or occupation levels to bedrock, so that the mapped and refilled excavation areas



Fig. 1. Asa's fortification wall, completely excavated, laid out on a grid of 50-meter squares. Contours are at 2-meter intervals. Fixed survey stations are indicated. Highest elevation above sea level, 785 meters, or 2575 feet. Scale, 1:1000. P.I. Photo 1182.

of previous seasons did not need to be reopened, but could be used as a dumping ground when excavation was resumed on an untouched adjacent area.

Before the actual work of digging begins it is customary to select an oblong area, already referred to as a strip, and to divide it into 10-meter squares by subdividing the original 50-meter squares. Since this grid of squares, nine of which appear on each topographic plane-table sheet, form the groundwork for the general topographical map on which all architectural remains are plotted and drawn to a scale of 1:100, the north-and-south lines are designated consecutively by numbers and the east-and-west lines by successive letters of the alphabet. When the limits of the latter have been reached, the series is continued by doubling the letters, as AA, AB, AC. The corners of each of the squares included in the strip are marked by temporary wooden pegs which bear each its own designation with reference to the topographical map. But in our records each individual square is designated by the letter-and-number symbols on its northeast corner peg. By way of illustration let us cite the 10-meter area which, on the topographical map included in our first preliminary report,¹⁴ embraces most of the ancient sanctuary found in 1927. The northeast corner peg of this square bore the symbol AL21, which thus became the means of orienting every object found within that area. Or, let us take as another illustration the entrance court of the East Gate (Heb. *rehob*) is comprised within 10-meter square S23. Since the space was enclosed on three sides it received in addition, when it emerged, the serial room or locus num-

¹⁴ TN, No. 1.

ber 276. Artifacts found within the area before the enclosing walls of the court emerged were tagged simply with the area number S23, Level I. Later the room number was added so that the objects found were then tagged Rm 276, S23, I. Since the artifacts were found in rubbish resulting from destruction and disintegration, or, in other

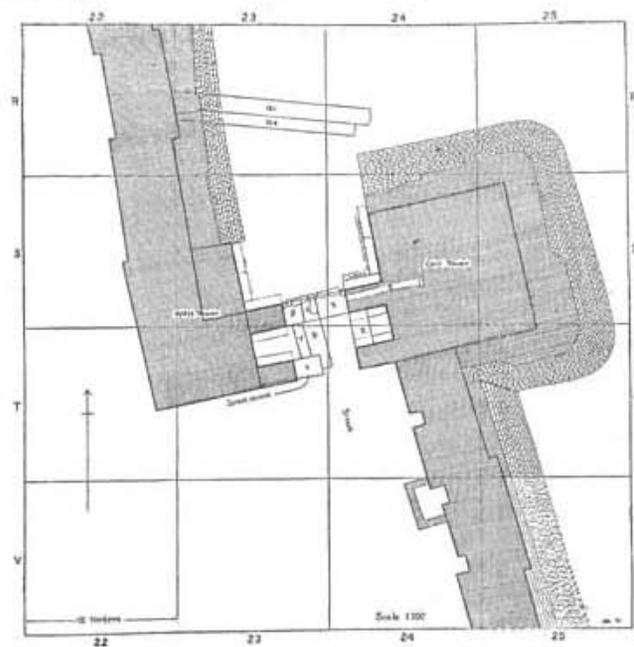


Fig. 2. The East Gate of Mizpah, laid out on a grid of sixteen 10-meter squares. The masonry is of limestone laid with clay. The west tower, originally built as an integral part of the wall, was enlarged by the addition of the quarter-section pier which forms its northeast corner. Successively built parts of barricade walls found in place within the gateway are indicated by a1 and a2 and the unshaded sections marked with Greek letters. Long stone seats lined the walls of the entrance court and the tower rooms. P.I. Photo 1184.

words, not *in situ*, this fact was indicated by prefixing an X to the serial number of the recorded object.

But let us suppose, now, that a millimeter-card drawing of some distinctive pottery fragment, or other artifact, from the above-mentioned court, only farther down, bears the provenience symbols $\frac{\text{Rm } 276, \text{ S}23, \text{ II}}{\text{X}32}$. Interpreted,

these symbols mean that the object was found on a given date in room 276 of 10-meter square S23, second level; that it was found in jumbled débris and that thirty-one other objects from the same space had already been drawn, in the order in which they emerged, as the excavation progressed downward. Since a little distance below the surface, above the ruin of the gate, there were found remains of house foundations, which were a part of a network of similar structures that were riding on demolition-rubbish and running out over the broken-off city wall, we counted this as the first level. But everything found below these house foundations, mingled with the rock-and-earth rubbish resulting from the razing of the upper parts of the gate and the city wall, was properly counted as the second level.

V. ORGANIZATION AND MANAGEMENT OF THE EXCAVATION GANGS

THE WORKMEN are divided into gangs, and each gang consists of pickmen, basket-fillers, and carriers. The pickmen loosen and break up the surface layer of soil—to the depth of about a foot, on virgin soil where no architectural remains are encountered near the surface. Behind them come the basket-fillers, who in Palestine use for the filling a short-handled, triangular hoe, called a *turiyye*. The filled baskets are carried away to the dump by the carriers, who consist mostly of women, girls, and boys. Women carry on their heads, men and boys on their hips. The latter mode involves much spilling and a severe strain on the rush baskets. As may readily be imagined, the mortality of baskets is greatly increased when men and boys have to be used as carriers. Only a few times, when some of the women carriers were needed for harvesting, did we have to employ also men and boys.

Each gang, made up as described, is under the watchful direction of a skilled Egyptian foreman (*reis*) who works like the rest, usually wielding a *turiyye* (fig. 3). He makes the first examination of any emerging architectural remains, regulates the pace at which the work proceeds, sees to it that no earthen floors or pavement levels are broken through, and is responsible for the method and quality of his gang's performance. Therefore a foreman's name regularly appears with other information on the tags that are attached to baskets of pottery and other artifacts recovered on his section of the strip. If occasion arises to make further inquiries about anything that was found by his gang, he is expected to furnish the desired information.

The number of workmen in a gang varies according to circumstances and the distance of the dumping place. In general one needs twice as many fillers as pickmen, for the former, while filling the baskets, have to break up the clods, examine the earth, and pick out carefully all potsherds and other artifacts and place them in baskets set apart for that purpose. On virgin ground from four to six pickmen can make work for a gang ranging in numbers from twenty to thirty persons. After several years of training, many of the local workmen become so expert that they do not require close supervision; and a foreman can manage a larger gang efficiently when he has no novices. Experienced local workmen can sometimes be put in charge of minor gangs in less important areas. Usually we had four full-sized gangs, each under the direction of its own Egyptian foreman. But at the height of the work in 1932 we had as many as seven foremen.

For several seasons it was found convenient to coordinate the work of all these gangs under the superintendency of a head *reis*, or general foreman. Much depends on the energy and ability of the latter, for he has to see to it that all the various field activities gear into each other properly, that there is no lack of tools, implements, and baskets, and that the workmen do not loiter. He receives general instructions from the director for each day's work, picks men for special tasks when the occasion arises, sees to it that regulations are carried out, and administers discipline for infraction of rules. He usually stands on some high point from which he can oversee the excavations, and as a symbol of authority carries a stick or a switch. Of course, it would be very unwise for a director to leave him or any overseers of gangs to their own devices for long, since their understanding of methods is mechanical.

The Egyptian foremen were given a set of general rules for whose strict observance and enforcement they were held responsible. Among those which have to do with excavation work were the following:

1. No stone must be moved out of its find-location until it is certain that it does not form part of a wall, or in some other respect has architectural significance.
2. All objects found in a room, or tomb, must be cleared and photographed *in situ* before removal.
3. Every cover of an opening, whether of tomb, silo, or cistern, must be left untouched until photographed and inspected by the director, and no one may enter through such opening except at his request.
4. No basket of artifacts may be moved from its place, or brought down from the mound, until it has been provided with a provenience tag by the field recorder.

Among regulations for the control of workers on the mound, both men and women, were the following:

1. Every worker must obey absolutely the directions of the *reis* to whose gang he or she belongs. Insubordination is punished with fines or dismissal. To guard against injustice, any case may be brought for review before the director.
2. Unless formally excused, employees must be in attendance promptly every day. Irregularity of attendance entails dismissal. But the offender may have a second chance by going on the waiting-list for reemployment.
3. There must be no obscene songs or conversation. Offenders are subject to summary dismissal.
4. Brawling, fighting, and the carrying of weapons by workmen are strictly prohibited in the excavations.
5. Any person who finds an object of possible value or importance must at once show it to his foreman and in-

dicating the exact find-spot. The finder's name is then listed for appropriate reward on the weekly pay-day.

6. Loafing villagers are not permitted to come as spectators into the excavations. Even the land owners may come only on business.

7. Marked improvement in skill and industry on the part of any workman is accounted worth recognizing on pay-day. Lazy workmen are demoted to lower rank and pay, or are assigned to unimportant piece-work.

During the campaign of 1932 we had five experienced Egyptian foremen in charge of our local workmen, most of whom had been in our employ for several seasons and were well trained in our methods. When the drying out of the soil had reached a depth sufficient to enable us to resume excavations also in the necropolis, we added two more, so that for a part of the season we had seven. This is a greater number of skilled foremen, in proportion to the number of workmen employed, than is customary in Palestine. But our purpose was to intensify the application of our field technique to the problems in hand, and the results justified the plan. The director, spending most of his time on the mound, was able to draw more and more tightly the lines which insured the application of strict scientific methods where it usually counts most—where the *antikas* were being uncovered.

A determined effort was made to recover every potsherd or other artifact from the earth of the strata as they were removed. In making the rounds the writer kept an eye on the work of the basket-fillers, and if he observed anyone overlooking bits of *shikaf*, he stopped him and, with the whole group in mind, addressed to them in Arabic some such warning as this: *Idha kuntu ma bitshufu esh-shikaf lamma tibhashu ana beddi nas yikdiru yeshufu hash-*



Fig. 3. Five of the Egyptian foremen, or *reis*, employed by our expedition in 1932. P.I. Photo 824.

shikaf ("If you do not see potsherds while digging I shall have to secure people who can see the sherds"). The tacit implication that defective eyesight was to blame for their shortcoming brought them up more sharply than censure for carelessness. Since employment was scarce and no one wanted to lose his job, such admonitions steadily increased the effectiveness of the fillers.

Nevertheless, some sherds escaped the attention of the fillers, and in order to salvage this leakage a number of women were always kept on the slopes of the dumps to recover and place in specially labeled baskets any fragments of pottery, or other objects, that had escaped the scrutiny of the fillers. Since the sherds and other artifacts picked up on the slopes of the dumps were known at any given time to come from particular 10-meter squares, usually two and rarely more than three, the provenience tags attached to the baskets of dump-*shikaf* specified these squares instead of one particular square. Thus the recordable objects recovered from these baskets could also be incorporated as a separate group into our record system with a minimum of doubt concerning the precise area and level from which they came. But all the "dump" record cards form a section by themselves in our files. The offer of "baksheesh" for objects later found important by the washers, greatly stimulated the watchfulness of the gleaners on the dump.

When the contents of a basket of earth are flung down a steep slope by a carrier, the material spreads out so thinly that even small objects like beads become visible in the brilliant Palestinian sunshine. Some remarkable recoveries were made in this manner—occasional seals, stamped jar-handles, missing fragments of Greek vases partly recovered in a previous season, fragments of deco-

rated ware. On the other hand, when the amount of *shikaf* recovered from the dump rose to thirty or more half-bushel baskets a day, it became an irrefutable proof of increasing carelessness on the part of the fillers, and they were called to account again, either directly or through the gang foremen. Such difficulties with the fillers, of course, arise only when surface areas, consisting of large masses of mixed *débris*, have to be moved. Obviously no such problem arises where knife-and-brush work is followed by double sifting, and even treble sifting, as in work at tombs.

VI. THE DUTIES OF THE FIELD RECORDER

LET US NOW RETURN to the tagging of baskets of *shikaf* before their removal from the mound to excavation headquarters. Obviously this is a function of major importance and must be performed by someone who is not likely to make a mistake when he enters the provenience symbols on the label. We found it best to assign to this task a member of the main staff, whom we call the field recorder. It is a part of his duty to place a serial number on rooms, silos, cisterns, and tombs the moment their enclosing walls or their openings come to light. He keeps and carries a record book in which he enters the numbers of all structures with their location and date of discovery. Every evening he reports to the chief recorder the numbers of the structures whose excavation has been completed in the course of the day. Since the numbers of the structures have to appear later on the topographic map, he coöperates with the surveying and mapping squad, and is himself practically trained in that work. He carries with him at all times a package of tough paper tags, specially printed for us in Munich. They are provided with wire loops which make for instant, easy, and secure attachment. Rain must not be able to spoil them, nor the wind to tear them off. The blank spaces on the printed tag (fig. 4) call for definite information concerning date, strip, 10-meter area, level, gang leader, or foreman, and the number of the room, cistern, or tomb, all of which he records according to requirement before he attaches the tag. He also makes a check mark opposite the types of objects which chiefly make up the contents of the basket. Important small objects like coins, beads, or seals, are provided

with special smaller labels and placed in cardboard boxes adapted to their size. These special packages can then be taken to headquarters separately, or be sent down with the labeled baskets from the same area.



Fig. 4. Two specimens of basket tags, illustrating the manner in which they are filled out by the field recorder before they are attached to a basket by means of the wire loop. The one on the left was made out for the seventy-fifth basketful of pottery from cistern 285. The letters "D," "R," and "P" stand respectively for "Drawn," "Recorded," and "Photographed," and the check mark under each letter indicates that the successive operations were completed. P.I. Photo 783a.

If there is prospect of a series of baskets from the same structure, as when a large cistern or silo is excavated, the

field recorder also writes on the tags the basket numbers in the order of emergence. Such basket-number series become important later as an aid in restoration work, for those pottery fragments which were found most closely associated are likely to contain the sherds needed to complete some important or unusual vessel. The field recorder is on the mound continuously during working hours and through the director exercises some supervision over the foremen of the gangs with special reference to technical handling of the objects found.

Now let us suppose that several series of baskets, accurately tagged in respect of provenience, are standing at the edges of the excavations, ready for transfer to headquarters. Usually a group of women, selected for the purpose by the foremen, transports the *shikaf* to headquarters at noon and at close of day. Since they carry the baskets on their heads, the artifacts are not subjected to any jolts and strains. The material now passes into the hands of the "laundry gang." Only sun-baked and Early Bronze Age pottery are excepted from the washing process, the former because it may soften and disintegrate in water, the latter because it should first be dry-cleaned and examined for decorations. The baskets on arrival at headquarters are received by the "*shikaf* chief" (chief washer) and arranged in orderly sequence series so as to facilitate rapid and systematic handling.

VII. WASHING, SORTING, AND EXAMINATION OF POTTERY

THE WASHERS form an important link in the chain of staff activities. Soil clings to the potsherds and hides or obscures seal impressions, decorations, and incised inscriptions. The best way to clean them is by washing with water. We engaged and trained for this work three Arab boys who either were graduates of, or had attended, the American Friends Boys' School at Ramallah, for it was important that they should be able to read, write, and speak English. They were taught how to clean pottery without risking the destruction of evidence in the form of writing in ink, or of ornamentation in color. Each had a large round pan half-filled with water and a variety of brushes with differing degrees of flexibility. Into the pan was deposited the entire basketful of sherds, and as each piece was cleaned it was put back again into the same basket to which the provenience tag remained attached, so that the contents of different baskets would not get mixed.

These washers also received instructions concerning the things they must look out for, and rewards for the detection of seal impressions and other marks of unusual interest. Anything of special importance they must leave on top of the basket of washed fragments when it is set in the sun to dry. From time to time the director and the chief recorder went along the basket rows to see what had been "turned up" and to decide whether rewards were in order. The washers also were instructed to begin the separation of the body fragments of pottery from rims, handles, and bases. The body fragments were placed in the bottom of the basket, and the more important parts

on top. This initiated and facilitated a more searching separation when the contents of the baskets were spread upon the tables. It should be added that the washers were under the immediate direction of the chief recorder, Mr. J. Carson Wampler.

It belongs to the credit of Mr. Wampler that he worked out, in connection with our system, an improved method of handling our ceramics. His procedure was as follows: On his arrival at headquarters in the morning, the head washer handed him a list of baskets of artifacts brought down from each excavation area the previous day. Consulting his file of earlier cards, he marked on the new card the order in which the output from the various areas was to be washed. This order was followed by the head washer and his assistants. As soon as the material from one area was finished, its basket series was segregated and the next in order was handled. The order of washing was in part determined by reports which the field director, as mentioned above, regularly handed in at the office. If he reported that certain areas or architectural features had been completely excavated, and that no more *shikaf* would come from these sources, it was an indication for the chief recorder that all the archaeological evidence from the completed structures and areas could now be cleaned, spread out, examined, and recorded as a whole (fig. 5).

This method of procedure had obvious advantages: first, for the restorers (pot menders) who were much more likely to be able to complete fragmentary objects if they had under their eyes at one time all the ceramic materials likely to contain the missing pieces; second, for the director, who after examination of the total evidence recovered could add to his field journal such additional inter-

pretative notes as the examination suggested; and third, it enabled the draughtsmen and the recorder to treat the material groupwise for the millimeter-card records and in the registry book, thus preserving in a manner the underground associations of the objects. In order to accomplish this end, pottery was often kept on hand in serially

Tell en-Nasbeh		Potsherd Handling Record		8 May 1932	
		(Remains recovered 7 May 1932)			
Order of Washing	Number Baskets	Area	Washed	Spread	Examined and Discarded
(4)	4	S 23 X Level I	✓	✓	✓
(5)	8	S 24 X Level I	✓	✓	✓
(9)	3	Room 271, S23 Level I	✓	✓	✓
(8)	5	Room 277, R24 Level I	✓	✓	✓
(6)	10	Room 278, R23 Level I	✓	✓	✓
(7)	9	Cistern 215, T23 Level I	✓	✓	✓
(10)	2	Bin 212, T24 Level I	✓	✓	✓
(11)	6	Silo 205, T22 Level I	✓	✓	✓
(12)	12	Tomb 44, West Cemetery	✓	✓	✓
		Shekef recovered on dump from squares-			
(1)	5	S23x, S24x Level I	✓	✓	✓
(2)	3	R23x, R24x Level I	✓	✓	✓
(3)	6	T21x, T23x, T24x Level I	✓	✓	✓
	73				

Fig. 5. A typical card of instructions for the washers. The first column on the left indicates the order in which the various basket series are to be washed. The next states the number of baskets in each series. Under the heading, "Area," is given the find-spot and the level in which each group of artifacts was recovered. In the three final columns the head washer checks the completion of each of the three operations indicated. P.I. Photo 1181b.

numbered baskets for a week or more in order that the materials might be sorted, examined, and recorded as a whole. Tomb 32, for example, which it took a small group of knife-and-brush men nearly a month to clear, was nevertheless all handled at one time, and as a whole, at the excavation office.

I have referred several times to the spreading and sorting of pottery, and have said that this was done in group



Fig. 6. A typical group of the tables for "spreading" potsherds for examination and possible restoration. The pile from each basket has its identifying basket-tag attached to the nail in front of it. P.I. Photo A821.



Fig. 7. A pot mender who has just completed the restoration of a wine jar. On a primus stove in the foreground is a kettle in which carpenter's glue is boiling. P.I. Photo A920.

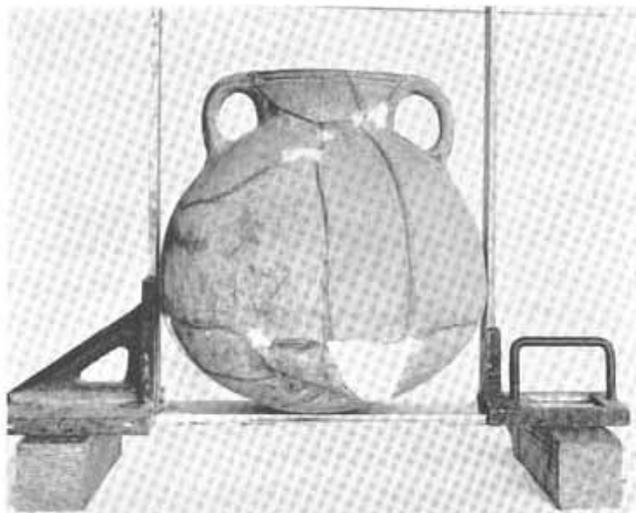


Fig. 8. Measuring device for obtaining simultaneously the height and maximum diameter of pottery vessels. The sliding vertical is on the right. P.I. Photo A1317.

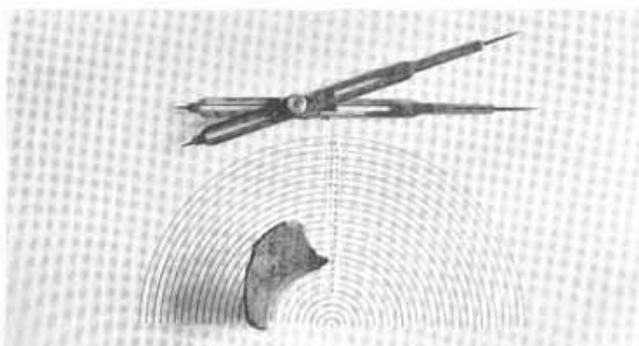


Fig. 9. Proportional dividers and a chart of graduated concentric half-arc lines used to aid the draughtsman in finding the original mouth-diameter of a vessel represented by a fragment only. P.I. Photo A1318b.

units which included all the materials from given sources. A large number of tables had been constructed for the purpose, some of which are shown in figure 6. As a basketful of washed *shikaf* was poured out upon a table the identifying tag was removed from the basket for the first time and attached with the wire loop to a nail fixed in the table opposite the pile. The task of spreading and sorting usually was performed by a member of the staff or by the experienced Egyptian restorer, who thus obtained his first comprehensive view of the possibilities of reconstructing broken vessels from the remains. Since the management of this part of our technique was in the care of Mr. Wampler, I quote from his own description of the procedure.

The purpose [writes Mr. Wampler] was to secure a more searching and intelligent segregation than that of the pottery washers. The unusual fragments and the portions of rims, handles, and bases were placed in one heap beside the body fragments from the same basket. Then the Egyptian restorer went to work and tried to assemble from these piles all fragments belonging to one and the same pottery vessel. In order to increase the chances of success in this procedure, pottery from contiguous areas was spread on neighboring tables. This increased the probability of success, since all fragments of a vessel do not necessarily fall within an arbitrary quadrangle established by an excavator.

When the restorer had exhausted the possibilities afforded by the fragments available for reassembly, the next step was to select type fragments for recording. This selection made the third examination to which the potsherds were subjected. Since I was in charge of the recording, this selection was made by myself and consisted of representative examples of shape, finish, and ware, all unusual fragments, all complete or nearly complete objects, and usually all artifacts in materials other than pottery. However, in making this selection the quantitative aspect of the evidence was considered as well as the qualitative. In other words, if a particular area yielded mostly

one type of pottery the selection was so made as to give this quantitative feature the proper weight in comparison with less frequent evidence. After the groups of selections had been removed to the draughting room, each accompanied by its identifying basket tag, the remainder of the sherds was thrown on the *shikaf* dump. This completes a typical series of manipulations as indicated on the card [reproduced in fig. 5, p. 30].²²

At this point a brief description of the work of the professional restorer is in order. Dr. C. S. Fisher, during his directorship of various expeditions, developed several Egyptian restorers who became fairly expert. Two of them, especially Mahmoud Kurayem, have repeatedly been in service with us since 1926. On many occasions, notably when the contents of rich cisterns were coming to headquarters, members of the staff, also, gave time to restoration work. But it was the steady task of the professional pot-mender to examine the potsherds from any and all sources, and to reassemble the sherds of any vessel of which enough could be recovered to reconstruct its form.

There recently came to my attention, long after we had developed our own system, a method of "sorting" described by Sir Flinders Petrie,²³ whose purpose was to facilitate the reconstruction of vases from masses of broken fragments. In his method he also sorted rims, body fragments, and bottoms into separate series before attempting to fit the fragments together. Our system of "spreading," described above, followed the same general principle, but on a much larger scale. It will readily be seen how greatly it facilitated the work of the professional restorer to have parts of rims, body fragments, handles, and bottoms

²² MS. Department of Anthropology, University of California (1933, not published).

²³ *Methods and Aims in Archaeology*, p. 102.

sorted and spread out for his inspection on adjoining tables as a matter of daily routine.

Decorated, burnished, or otherwise unusual vessels had first claim upon his attention. If an important jar, or a nest of them, was uncovered on the mound with all the breakage in position, it was his task to go up and gather them in, marking the pieces with reference to one another so as to facilitate reconstruction. It should be noted, however, that no permanent restoration work is attempted; only a provisional reintegration with the aid of ordinary carpenter's glue (fig. 7) which will readily dissolve in water when the object finally reaches the hands of a museum preparator.

The problems presented by the popular modern jigsaw puzzles are as a rule very simple compared with the task of first finding and then reassembling the fragments of a jar broken into scores, and sometimes into hundreds, of pieces millenniums ago. Most of the earlier expeditions in Palestine regarded such salvage as beyond the bounds of practicability. But this restoration work is extremely important, for if done systematically and perseveringly it will become a valuable aid to the scientific work of the expedition. Under the stimulus of our system not only the professional restorer, but several members of our staff as well have developed a high degree of skill in this work. One result has been the recovery of a number of rare and interesting vessels which have the character of date-marks on our site, and of which I have never seen whole specimens either in Palestinian excavations or among the published finds. Another consequence has been a considerable enlargement of the corpus of pottery found at Mizpah. The range of forms, especially during the Iron Age, is surprisingly large.

VIII. MILLIMETER-CARD DRAWINGS AND DESCRIPTIONS

IF THE READER will refer once more to the typical washers' record card shown in figure 5, he will observe that seventy-three baskets of pottery were handled in that assortment. Out of such a mass of ceramic material a very large number of selected objects and fragments of pottery were normally sent with their basket tags (see fig. 4) into the draughting room, where permanent records of them were made on 5 × 8-inch (approximately 12½ × 20 cm.) cards quadrille-ruled in millimeters. To guard against misunderstanding let me emphasize at this point that by far the greater number of the drawings made did not record objects of museum value, nor even of sufficient importance for preservation. Many a basket of *shikaf*, from a given 10-meter area and stratum, might contain not a single artifact worth registering, but it almost invariably furnished fragments of ceramic type-forms which were selected, drawn, and included in the millimeter-card file of that area for the sake of having a complete record of the evidence found there. The principle on which the particular artifacts to be drawn were selected will appear a little later. The same exhaustive portrayal of all significant evidence was followed in the excavation of tombs, silos, and rooms, and when such concentrations of pottery evidence were definitely dateable, they naturally transferred their date-range to all identical pottery forms which were already in the millimeter-card record.

To the task of making our millimeter-card record were assigned two of our staff members who were skilled

draughtsmen, able to work rapidly as well as accurately. They were kept busy daily and continuously from morning till evening. When the number of our workmen rose to one hundred and fifty or more we could easily have used a third draughtsman on full time. These members of the staff were occupied solely with drawing shapes to scale and their work was facilitated by the use of a number of instruments and devices. One of these, shown in figure 8, was made by a Stuttgart firm in accordance with the writer's directions. It follows the plan of a similar one still in use, made for us in hardwood some years ago, after a design by Dr. C. S. Fisher. The bottom and the verticals of the one shown in the illustration are graduated to millimeters. The right-hand vertical is movable and gives instant readings of maximum diameter in a dial frame under the overarching handle. A horizontal ruler brought down on top of the vessel gives simultaneous readings of height on the graduated verticals; or, the vessel can be placed on its side and then the height will be read in the dial frame just like the diameter.

Other measurements for drawing to scale are secured by means of finely adjusted "universal proportional dividers" (Keuffel and Esser, No. 440). They are an X-shaped pair of compasses with two pairs of points, which spread to extents proportionate to their distances from the common pivot. The latter is adjustable by means of a vernier, which may be set so as to secure automatically a reduction to any desired proportional scale (see fig. 9). Ordinarily all objects in our records are drawn on a scale of 2:5, unless the object is so small that the card will hold it if drawn to actual size. When reproduced for publication by the engraver the drawings usually are reduced by one-half, making the resulting proportion 1:5. This is

why on our published plates¹⁷ the scale is given as 1:5. Very large objects are at once plotted on a scale of 1:5, or even 1:10. Occasionally millimeter cards of more than ordinary size have to be used. Consequently a supply of such cards is kept in reserve.

Those rare occasions excepted in which the mouth of a vessel is too small to permit the thickness of its walls to be measured, pottery vessels are regularly drawn in such a way as to show the thickness of the walls and, when these marks are present, the nature of the ribbing produced by the fingers of the potter in the rotating clay on the wheel. The irregular fluctuations of thickness in hand-made vessels, as well as the slow or rapid wheel-marks, are features of ancient ceramic technique which may prove of scientific importance, and they should be visually portrayed in the record. To accomplish this the vessel is drawn as if the right-hand vertical quarter-section nearest the observer were cut away, disclosing the thickness of the walls from the mouth to the base. The inside surface of the exposed remaining right quarter-section then affords an opportunity to indicate the wheel-ribbing¹⁸ or other peculiarities of technique. The actual diameters of the walls of vessels are obtained by means of a special kind of calipers employed in different sizes according to the requirements of each shape. All drawings are first made in pencil and then inked for permanent preservation.

Every draughtsman has in front of him a prepared chart (fig. 9) of graduated concentric half-arcs, with indicated diameters, by means of which the mouth diameter of a broken vessel can instantly be ascertained when a rim fragment is fitted to the arc with the corresponding curve.

¹⁷ Cf. plates in TN, No. 2. ¹⁸ Cf. TN, No. 2, Pl. XIII, p. 43, et al.

Having found the diameter, the draughtsman can use the slant of the rim, form of the handle, or other surviving feature, to outline in broken lines the corresponding lost complementary part of the vessel. This makes a much more engaging as well as informing drawing. But anyone

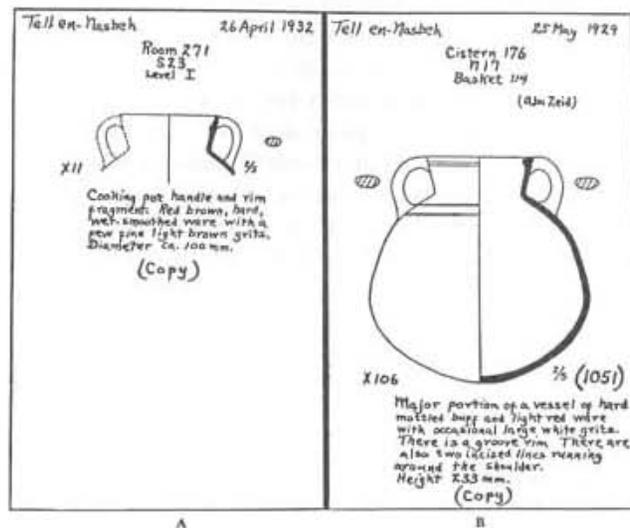


Fig. 10. A: Fragment of a cooking-pot rim drawn to scale for filing. B: A similar record made of a complete object. Its registry number relates this object to its description in the "museum book" of the expedition. P.I. Photo 1180b.

who wants to see only the strict actuality on which the design is based needs merely to cover up the broken-line restoration on the left side (see fig. 10A).

After all the new or variant shapes from a given area-level, room, silo, tomb, or cistern are drawn, the objects, together with the drawings, are passed on to that member of the staff who does the describing. The identifying bas-

ket tags also pass along with the materials to this next stage of their progress. The describer, whom we may without invidious implications call "the scribe," must be familiar with the conventional or technical terms currently employed by potters, excavators, and archaeologists. If he is in doubt he consults with other members of the staff who may be more familiar with the object in hand. The description must give the essential facts tersely, and is ordinarily written just under the drawing on the millimeter card. Figure 108 gives an illustration of a typical millimeter-card record of an object whose registry number (1051) has already been assigned. The entry x106 on the left side under the drawing shows that this vessel is the one hundred sixth object from cistern 176 of which a millimeter-card record has been made up to that point in the series. The notations above the drawing show that the cistern is situated in the 10-meter quadrangle whose northeast corner intersection-lines on the topographic map of the mound are N17, and that it was recovered in the one hundred fourteenth basketful of artifacts yielded by the cistern. The foreman of the excavating gang was Abu Zeid.

IX. THE WORK OF THE CHIEF RECORDER

THE DESCRIPTIONS OF THE CARDS having been completed, the objects and records, which still include the basket tags, move on to the final stage in our field technique. They now go into the hands of the chief recorder. As I have previously indicated, only a fraction of the objects drawn and described rise to the importance of museum objects. Generally speaking, anything of special historical importance and all complete objects are placed in that class. To such objects the recorder gives a serial number which is written with india ink on the object, or on a tag securely attached thereto. The number is also entered in the first column of the "museum" or registry book (fig. 11) opposite a tracing of the object taken from the millimeter-card record. Every page of the registry book is in duplicate, and the alternate secondary pages, being perforated so as to facilitate removal, receive the identical record of the primary pages by means of carbon tracing. The alternate pages are ultimately detached and given to the Department of Antiquities as a duplicate record of all important finds made on the site. The department also uses it, together with photographs of the objects, in making the division, prescribed by regulations of the Antiquities law, between the Palestine Museum in Jerusalem and the institution represented by the excavator. The schedule of itemized information called for by the pages of the registry book is based on one used by Dr. C. S. Fisher at Megiddo in 1926. Some modifications and improvements were introduced when we printed our own, and the next edition will be still more fully adapted to the newer requirements of our present technique.

tic, that played a part among the inhabitants of ancient Palestine in different periods.

The great number of type specimens of pottery which, after completion of the millimeter-card record, also passed along to the recording-room, were marked with their provenience symbols (square and level) and kept on hand during the season under rough general classifications based on form and characteristics, not on provenience. At the end of the season a selection of them was taken along to Berkeley, others were given to the Department of Antiquities, and the rest were discarded. The only value which they possessed at the close of the seasonal campaign was to serve as sample illustrations of the millimeter-card record. Since the accumulation of these marked fragments for one season amounted to eight thousand or more, the question of preservation naturally presented difficulties arising out of sheer bulk. But selections of such ceramic materials, running through four seasons and covering the entire site and extra-mural sections, make ideal material for the instruction of students desirous of qualifying for a place on our or some other Palestinian expedition's staff. Among other tests, each candidate has to pass an examination in which a large variety of numbered fragments of pottery are submitted to him for identification with respect to shape and age.

X. IMPROVEMENT OF METHODS: A COÖPERATIVE TASK

THE WRITER in his capacity as director of the expedition has aimed to make the improvement of the excavation technique as coöperative an undertaking as possible. In other words, the members of the staff were invited to share the responsibility for bettering the methods of the expedition by suggesting improvements which occurred to them as practicable in their particular part of the work. Such an improvement, among others, was suggested and put in practice by our recorder, Mr. J. C. Wampler, in connection with the technique of recording. As previously explained, our system of filing records is based on the map symbols of 10-meter areas and numbered structures within them, such as rooms, cisterns, and tombs, and by occupation levels. This arrangement serves by far the most useful purpose. But sometimes it becomes necessary to invoke the aid of the records in determining the frequency of occurrence of some particular type of pottery like the Philistine, or polished black ware; or to make sure about the level in which certain objects are prevailingly found.

To search for such facts in an areally organized file containing from six to eight thousand drawings and about twelve thousand descriptions would prove too time consuming. In order to meet this difficulty Mr. Wampler made an index of all the millimeter-card records as they were accumulating during the progress of the excavation.

This index [writes Mr. Wampler] included the subdivision of pottery under shape, type, finish, ware, and classification of other objects under material, use, and other significant cate-

gories. Particular attention was given to the listing of qualities having chronological significance; for one purpose of the index, which was roughly kept up-to-date, was to provide the possibility of checking the architectural clearing and segregating with the total body of artifacts and remains. Its workability was shown on one occasion when Père H. Vincent visited the excavation to inspect the architecture of the East Gate. After looking at the structure and returning to headquarters he expressed curiosity to know whether certain pottery and other objects of chronological significance had been found in a level above the street in the vicinity of the gate. By turning a few pages of the index the information was immediately available.

Moreover, the index will prove of great value in the preparation of reports and for special reference at any time to particular results of the season's work. It also affords the important opportunity to collate the data statistically. . . . In short, this system of recording, as the reader will have observed, extends its thoroughness to considerable detail. In fact, if a more thorough method of handling pottery has ever been used I do not know of it.²⁰

This method of indexing does away with the cumbersome alternative of making duplicate cards of drawings, by means of carbon paper, for a file whose arrangement is based on the nature and form of the antiquities instead of their provenience. Even if such a duplicate file were limited to complete, or reasonably complete, antiquities it would in point of utility be superseded by our method of indexing which makes available all such objects, as well as a much more comprehensive conspectus of supplementary and interpretative evidence.

To this system we have been able to add another item of evidence which to the best of my knowledge is new. Every excavator in the Near East knows how difficult

²⁰ *Op. cit.*

it sometimes is to correlate definitely contemporaneous levels on different parts of the mound, or to integrate them with deposits of pottery in cisterns and tombs, since those ancients who built new cities upon old ones often disturbed the underlying stratification. A way to solve the problem suggested itself to me in 1927 and we have since then followed it up with interesting results. It is, in short, the finger-print method.

It was found that in a fair proportion of instances potters had left their thumb-and-finger prints on handles at the points where they had been joined to the vessels. When these occurred on fragments of handles the best specimens were preserved and given their marks of provenience. It is no reflection on the characters of ancient potters of Mizpah to say that we are recording their finger prints with the aid of the noted criminologist August Vollmer, now Professor of Police Administration in the University of California. I mention this feature of our method only because of its promise and its obvious utility in determining the contemporaneity of occupation layers and tombs in which the same potters have left their ceramically preserved finger prints. The most perfect prints have so far been found inside of moulded lamps. Such evidences become part of the scientific data in our files.

XI. HOW COMPLETE SHOULD THE SALVAGE OF ARTIFACTS BE MADE?

EVERY EXPEDITION has to face and solve for itself the problem of how clean a sweep it is going to make of the innumerable artifacts, mostly potsherds, that pepper the deposits of a Palestinian mound. Fortunate are the excavators, among whom I am able to count myself, who are not under pressure from home to secure valuable collections of specimens at any cost, even that of neglecting the most complete study of the conditions under which they are found. "A great deal of pressure," writes Dr. David Randall-MacIver, "is often brought to bear on the explorer to make him not only excavate the most lucrative sites, which may be quite legitimate, but to neglect the less attractive and remunerative parts of his concession. This is so notorious that I need not quote instances."²¹ A more general and probably much more serious impairment of the scientific results of archaeology is produced by such pressure if it relaxes an excavator's effort to find as nearly as possible every artifact in the strata excavated and make it yield its testimony. He is, in any case, under the pressure exerted by limitations of time and means. The digging season is brief and he wishes to move as much earth as possible. Means are limited and may not continue unless the expenditure seems justified in museum specimens and historical results. All these influences operate against a system that combs the strata with a fine-tooth method, although historical results often

²¹ "The Place of Archaeology as a Science," in *The Advancement of Science* (1932), p. 153; an address delivered before The British Association for the Advancement of Science.

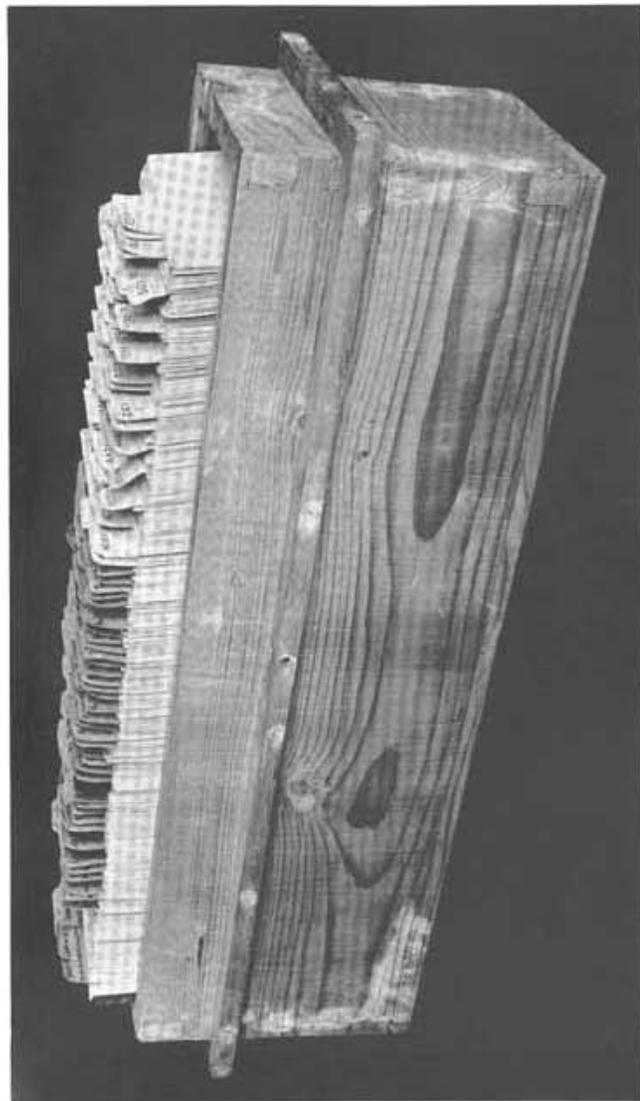


Fig. 12. The millimeter-card file of 1932 in its box ready for shipment. Varicolored index-tabs serve as guides to the contents. The ramp around the box prevents the lid from pressing down on the tabs. P.I. Photo A1319.

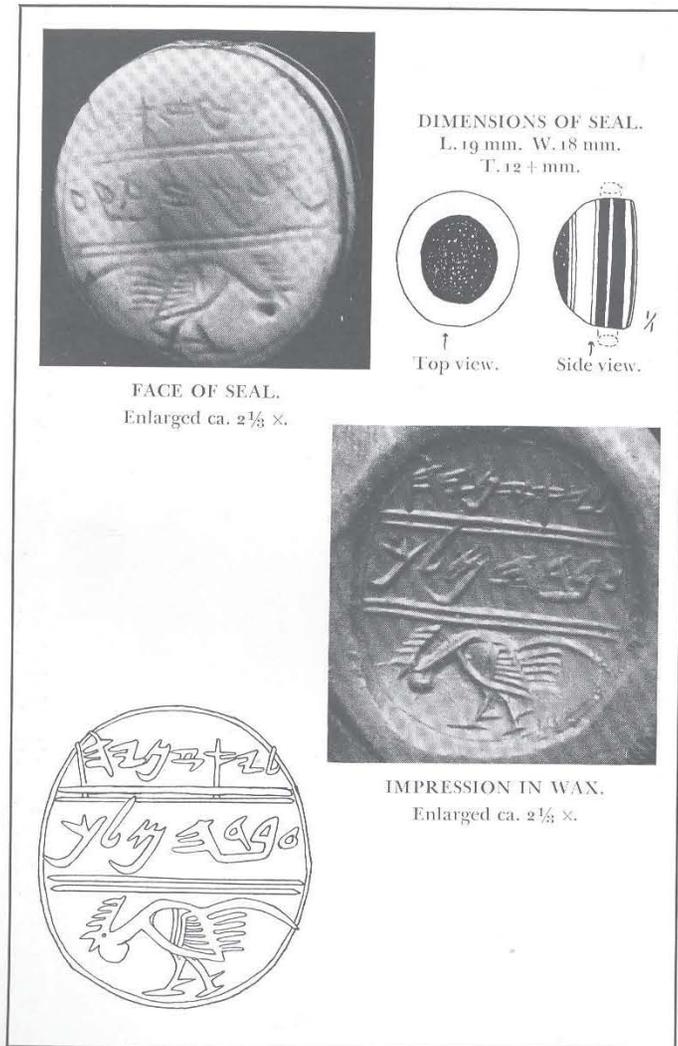


Fig. 13. The seal of Jaazaniah.

are most signally advanced by its use. We have every reason to ascribe to this system of minute scrutiny three of the most striking individual discoveries made in our last campaign—the seal of Jaazaniah,²² the Shebna seal impression,²³ and another which is probably Syro-Hittite. The last, impressed on the under side of the rolled rim-fragment of a storage jar, was detected only under the third and last scrutiny to which a basketful of spread *shikaf* was subjected by the chief recorder.

I have seen no expedition in Palestine so far, except a Danish one, which seriously attempted to recover every potsherd in the deposits. But the digging was done with garden trowels and consequently proceeded at so slow a pace, and with such unimportant results, owing to the smallness of the area that could be excavated in one season by this method, that most institutions would judge the money and effort expended to be in disproportion to the material and historical results obtained. In other words, the knife-and-brush method, which every careful excavator applies when he deals with richly stored rooms, cisterns, tombs, and other significant concentrations of important antiquities in limited areas, is not profitably applicable to the masses of comparatively barren débris that form the greater part of Palestinian mounds. But it was a fine object-lesson, and a real gain for the technique of excavation, to have had so careful an archaeologist and scholar as the late lamented Dr. Hans Kjaer of Copenhagen make an experiment of this method at Shiloh.

The opposite extreme was represented by an expedition which I observed operating in Syria some years ago. There was no attempt at a systematic collection, exami-

²² Badè, "The Seal of Jaazaniah," ZAW (1933), p. 150.

²³ To be published soon.

nation, and recording of artifacts. They were lying about thickly everywhere and could be picked up by anyone. Débris peppered with artifacts was being moved in large masses and in a badly supervised manner, so that the stealing of objects by workmen was easy. The aim, evidently, was to find and recover something showy, something of great intrinsic value rather than of historical significance. The procedure was but a small improvement over those older methods which, as Sir Flinders Petrie remarks, have made museums "ghastly charnel-houses of murdered evidence." One accustomed to a more painstaking method could not help wondering how much historically valuable evidence was daily going into the dump heaps unrecorded—lost beyond all hope of recovery by destruction of the stratified context. As Commander Wheeler justly observes, "the true importance of an object found bears no relation to its size, cash-value, or beauty: the most uninteresting looking scrap may have more to tell than the rest of the season's digging."²⁴ I assume that a painstaking method is being applied in the excavations at Ras Shamra, a site of outstanding historical importance, although the pictures in the *National Geographic Magazine*,²⁵ showing scenes of actual digging, are not altogether reassuring on this point. Doubtless the excavators will later give some account of their staff and the methods by which they controlled the collection, examination, and recording of artifacts.

²⁴ *Antiquity*, June, 1930, p. 175.

²⁵ July, 1933.

XII. A PROBLEM: HOW TO COMBINE SPEED WITH THOROUGHNESS

ONE OF THE PROBLEMS which we set ourselves to solve at Tell en-Nasbeh was whether we could apply a fine-comb method to the artifacts and yet excavate seasonally an area large enough to make the complete excavation of the mound a reasonable aim. That now is practically accomplished, for the first time in the history of Palestinian excavation. But further comment is necessary to provide against misunderstanding when Dr. Albright calls it "a feat possible only because of the shallowness of the debris of occupation."²⁶ It is true that along a narrow midridge of the mound there are outcrops of bedrock, but even these were honeycombed with large cisterns and silos which were excavated with much labor and care, and which will demand a special report on account of the significance of their contents and special features connected with them. But there were large areas on the mound where the deposits ran to depths ranging from six to ten meters, and this involved the moving of enormous masses of debris. Such depths, often containing remains of five city levels, can scarcely be described as shallow without conveying a wrong impression.

The rapidity of the excavation was in part due to a planned strip-method of excavation by which the dumps were almost always on previously excavated territory, close to the edge of the new diggings, involving short carries, followed afterwards by the employment of super-gangs for the refills. During the time when the house *niveau* had to be left open for the taking of levels and the

²⁶ APS (1932), p. 49.

completion of details on the architectural drawings, the workmen's gangs were moved to another part of the mound where a separate series of strips had been laid out. By this alternating method we managed to dig during the last two campaigns without intermissions for more than four months, with gangs numbering as high as one hundred and fifty or more. I should add that the refilling of excavated strips can be timed in such a way that the staff can use these occasions to clear away accumulations of artifacts at headquarters.

It may be remarked here that the purchase of an entire mound, like Megiddo, and its excavation by occupation levels over the entire area, is undoubtedly the ideal method. But it also has disadvantages, especially when the mound is large. The inevitable necessity of moving great masses of débris long distances, even when it is done by means of railway and dump cars, slows up the pace of the excavations. Areas on the slopes of the mound must first be cleared to make room for the dumps. While this preliminary work often is rewarding in tombs and antiquities, it postpones the time when the summit of the mound itself can be attacked.

Under the strip system of excavation, on the contrary, the disposal of the dump presents no problem. The basket carries are short, and the masses of rock and earth go back again into the excavation, usually with great speed, for the gangs make a frolic of the refill, working to the rhythm of Arabic roundelays and in gang rivalry. The method also provides an opportunity for an accurate source-control, described above, of objects recovered from dumps while the excavation of the strip is in progress. This intensification of method becomes impracticable when the rubbish from many parts of the mound is gath-

ered in cars and shot down on a general dump. The chief advantage of the strip method, however, is in the gain in speed.

Yet in the last analysis the pace at which the work of any thorough method moves is determined by the size and the competence of the staff,²⁷ especially when the technique is an exacting one. Our principal staff in 1932 consisted of nine persons including the director, and the consulting architect made a tenth. Listing them with an indication of their principal functions, they were the following:

THE DIRECTOR, who was accompanied on his daily rounds on the mound by a young Arab assistant; the latter carried a small camera and tripod and a bag with special archaeological tools and measures likely to be needed in emergencies. During off hours the assistant helped as a pot mender. The director acted also as epigrapher of the expedition.

THE DIRECTRESS, who managed the staff headquarters in Ramallah, and acted as curator of beads and jewelry.

THE CHIEF RECORDER, who had under his direction a chief washer and two assistants; he also determined the order in which the groups of baskets were to be washed, and consequently the order in which the objects selected for record passed to the draughting room.

TWO DRAUGHTSMEN, who made all the millimeter-card drawings of objects for the excavation records.

THE SCRIBE, who wrote the descriptions on the millimeter cards.

THE PHOTOGRAPHER, who ordinarily had one carrier assistant while on the mound.

THE SURVEYOR, who had two assistants while mapping and leveling.

THE FIELD RECORDER, who numbered the structures, tagged the baskets of artifacts on the mound, kept the tally of the workmen, and made cross-sections of structures whenever these were called for.

THE CONSULTING ARCHITECT.

²⁷ The following members of the Tell en-Nasbeh Expedition received broad special training for the various staff activities in which they were engaged from 1927, all but the last three being at the time graduate students from the Pacific School of Religion, or pursuing special preparatory studies under the writer's direction: Frances B. Darwin, Sterling Gorrill, Wesley C. Havermale, George P. Hedley, Helen M. Perkins, Clifford O. Simpson, Labib Effendi Sorial, J. Carson Wampler, James M. Menzies, William Effendi Gad, Boulos Effendi Araj.

The reader will have noticed that in addition to the principal staff there was a secondary staff of assistants numbering twelve in all. This included the four skilled Egyptian foremen and an experienced Egyptian restorer; making, altogether, twenty-two persons who in 1932 were concerned with the scientific work of the expedition.

During the first three seasons Dr. Clarence S. Fisher generously served as consulting architect. On account of his absence in Syria in 1932 we arranged for visits by architects from Jerusalem, in particular Mr. E. Glunckler, architect of the magnificent new Y.M.C.A. building in Jerusalem. To him we are particularly indebted for his professional observations on certain features of the East Gate, and to Herr Bernhard Gauer for a painting and special drawing of this gate.

It is customary for the expedition to pay the round-trip traveling expenses of the Egyptian members of the staff, and of the Egyptian overseers—unless any of them join another Palestinian or Syrian expedition in the same season, in which event the second expedition assumes the expenses of the return trip. Only twice, and then under exceptional circumstances, have traveling expenses been allowed for graduate student members of the staff. As indicated in another connection, it has been a rule from the beginning that the director and his wife and all American members of our expedition (graduate students) should pay their own traveling expenses from America to Palestine and back again. In consequence, the total cost of each season's work, in spite of a large staff, has been held down to a figure so modest that it has surprised all who have had anything to do with excavations. Strictly speaking, the traveling expenses are a kind of contribution toward the enterprise, so that the student members of the staff are

in a real sense shareholders in it. They agree among themselves at the outset to observe a code of simple rules by which their common life together is regulated and subordinated to a common purpose.

As director I wish to pay a deserved tribute to the speed and precision with which our hard-working staff handled in one season, by the fine-comb method described above, the steady flow of nearly four thousand baskets of pottery, made in the neighborhood of eight thousand drawings to scale, and about five thousand special descriptions of objects not drawn. As I have indicated at an earlier stage of this discussion, only assistants previously trained to do each his part, in a coherent and thoroughly understood system, could meet the demands which this type of procedure imposes. This was the reason why we felt obliged to decline the offers of a number of otherwise able persons, both from America and from Palestine, who in 1932 desired to join our staff at their own expense. To induct them into the technical routine would have required some important staff-member's time and might have proved impeding rather than promotive. Loosely attached student observers, who work by impulse and come and go irregularly, are no help to an expedition organized like ours, where all parts of the system have to move forward in even step.

The case is different when a visiting student of another nationality, specializing in Palestinian archaeology, desires to acquaint himself for professional reasons with our system of excavating and recording. Of such a one it might be assumed that he already had some training in at least one of several archaeological field activities, like drawing or mapping. It would be advisable for such a student to spend with us a full season as a guest, or visiting

member of the staff, working his way practically through all the main stages of the technique.

In making the exception noted above, the writer has in mind a suggestion made by the far-sighted editor of the ZAW, Professor J. Hempel, of Göttingen, who in a recent discussion entitled "Balata"²⁸ has stressed anew the extreme importance of developing and applying in Palestinian excavations a thoroughgoing scientific system. It must be remembered that the time is not distant when the future progress of Palestinian archaeology must become the responsibility of younger men now entering this field. In order that these may become imbued with the most advanced standards of the profession it might prove highly advantageous to develop a kind of attaché system by which selected students of promise would be enabled to interchange visits between different expeditions in order to study the refinements of their technique. In the freemasonry of science we must aim to arrive ultimately at standards of excellence which will be acknowledged irrespective of race or nationality, and without adherence to which no one will be allowed to lay clumsy hands on the secrets of a mound.

²⁸ ZAW (1933); see especially p. 165.

XIII. THE FINDING AND CLEARING OF TOMBS

THERE IS ONE PROBLEM in connection with the excavation of Palestinian town sites whose solution by an excavator often means for him the difference between a highly successful and a comparatively meager season. All the ancient settlements had in their immediate vicinity places where the inhabitants entombed their dead. But to find them under the obliterating effects of two or three thousand years of human occupation, not to mention the changes wrought by natural agencies, is often a baffling task. Yet, as the reader will perceive, the interpretation of the stratigraphy of the mound and of its artifacts gains enormously if there is a concurrent excavation of tombs whose deposits integrate ceramically, and consequently chronologically, with corresponding levels on the *tell*. The more complete and painstaking the collection and study of artifacts from the city levels has been, the more informing is likely to be their comparison and integration with the contents of the tombs. Most revealing of all becomes the conflation of the two categories of evidence when one or the other, or both, include identifiable potters' finger-prints and objects that are definite "date-marks."

During the first two years the writer tried all the usual methods for detecting the presence of tombs, with only moderate success. In some localities weathered-out tombs reveal the presence of a necropolis. Where the soil cover on rock surfaces is shallow, the shafts and forecourts of buried tombs often are indicated by small patches of green vegetation surviving into the dry season. This is caused by the presence of water which seeps into tombs

during the winter rains. Where partly covered ledges of rock project slightly above the surface, telltale remains of the entrance façade²⁹ of a tomb may lead to the detection of a burial site. Very significant, also, are marked concentrations of potsherds when they occur in patches in the fields around an ancient town site. There is always a good possibility that the sherd marking of such areas has resulted from the partial clearing of old tombs for reuse by later inhabitants. *Fellahin*, while tilling their fields, generally have observed such places and readily respond to inquiry about them without suspecting one's purpose. As stated above, the writer had only moderate success, until 1929, in his search for tombs by some of the methods indicated.

But in 1932 he tried a new method of his own with the result that the count of tombs rose from five in the previous season to forty-eight in the last. The discovery of some of these was incidental to the finding of a second necropolis. But many were found by the new method, which is especially applicable where tombs have been hewn out in rock. It would not be in the interest of archaeology to publish the method at this time. The tomb-robber still plies his trade in Palestine; several fine tombs were opened, looted, and covered up again at Tell en-Nasbeh during our absence in 1931. It seems to be a recent development in the practice of tomb robbery that those who engage in it carefully efface all evidence of their work so that government agents may not become aware of their activity.

²⁹ Badè, TN, No. 2, p. 7, Fig. II. On p. 6 of the same report will be found a discussion of the reasons why it was customary in ancient times for the inhabitants of cities to group their family tombs in particular localities, thus forming cities of the dead.

In one of the pillaged tombs above mentioned the side of a weathered-out Roman tomb had been used in Byzantine times as a façade for the entrance of a new tomb. The latter must have belonged to a family of distinction, for it had been chiseled out with elaborate care. Each loculus had been closed with a separate stone door. The tomb doubtless contained many glass vases and ornamental lamps. After removing its contents the plunderers had covered the site and obliterated all traces of their work. It was found when we systematically stripped the soil from the rocks of the north necropolis. Only the architectural features of the tomb remained to be recorded.

The chronological range of the tombs found at Tell en-Nasbeh extends from about 3000 B.C. to late Byzantine times and thus has given opportunity for the study of a great variety of tomb architecture. We have succeeded in laying the foundation for a developmental study of tomb interiors, although the problem has been much complicated by the practice of reusing ancient tombs and adapting the interiors to suit the taste of later times. One very large tomb (No. 32) whose caved-in roof had protected its contents, was found to have been used in successive periods through more than two thousand years. Since it was possible to excavate this tomb in sectional divisions by the "onion-peel" method under the open sky, a great many interesting side-lights on ancient life and crafts were obtained. One of the surprises in this tomb was the discovery that just before the roof had collapsed a narrow shaft-grave of recent type had been dug through the deposits to the rock floor of the tomb, causing a considerable mixture of artifacts at that point. In one corner of the tomb, in the lowest stratum, was found a deposit of incinerated human remains which showed beyond all ques-

tion that cremation of the dead was practiced at one time by the early inhabitants of Tell en-Nasbeh. Associated with these remains were found Early Bronze Age forms of pottery, among them two that were entirely new to us and to Père H. Vincent. They resembled two pairs of terra cotta funnels united at their pointed ends, but with a fairly large opening from one funnel into the other. The explanation which suggests itself most readily is that they were intended to serve as stands for vessels with slender pointed bottoms, such as were found by the late Père A. Mallon in the second and fourth levels at Teleilat Ghas-sul.⁵⁰ Whether there is a cultural relationship remains to be determined. The most important parts of this tomb were cleared by the director himself and members of the regular staff. The importance of settling with the aid of all discoverable evidence certain problems which arose out of the contents of this tomb has made it seem desirable to develop a still more meticulous technique for the clearance of tombs of this kind. This means that the knife-and-brush work of the *reises* will in such cases have to be confided entirely to experienced members of the staff.

I ought to add here that in the application of our fine-comb method we have sought to accomplish, among other things, a particular purpose—that of determining more precisely the chronological range of certain types of pottery vessels. Some archaeologists are committed to the view that certain types of pottery vessels prevailed all over Palestine during the same periods. The absence of the so-called *bilbils* would on this view indicate the absence of a Late Bronze Age occupation. I believe this to be still an

⁵⁰ RS (1932), fasc. 4, Pl. LXIX, Nos. 1 and 2.

unproved assumption and apt to mislead when an argument is based on their absence. On this point we already have pretty decisive evidence. In general it is true that the presence of particular pottery styles is a safe date-mark for certain chronological and cultural periods. But in respect of pottery, also, the argument from silence must be used with great caution. It is clear to me that there were appreciable differences between localities in the same region during the same periods. We have found at Tell en-Nasbeh types which have not been reported from any other site, nor have I seen even fragments of them at any neighboring site when deposits of the same general period were being moved. As the results of more and more accurately recorded observations become available, we shall probably find that, in some parts of Palestine, introduced styles lagged in making their first appearance, and lingered beyond the period of their normal continuance. Only the application of more careful scientific methods can bring about a final solution to problems on which there still is too much hasty generalizing.

XIV. PROBLEMS OF STRATIGRAPHY, AND SOME SPECIAL FUNCTIONS OF THE DIRECTOR

IT SEEMS DESIRABLE, at this point, to recur once more to the field work of the director. We have stated elsewhere that he should be freed from the routine duties at headquarters so that he can spend most of his time among the workmen on the mound. No system of excavation and recording can be devised that will automatically take care of certain complexities of stratification, or the occurrence of thin occupation-layers of limited extent within a general occupation-stratum of greater depth. Foremen generally are helpless in the presence of something unexpected, to which the rules they have learned in Egypt do not apply. They may either ignore it, or follow a rule of procedure that dictates perhaps the opposite of what should be done.

There is a widespread popular delusion, fostered by writers who have had little or no experience in the field, that the débris which an excavator undertakes to remove from the sites of Near East cities overlies them in even horizontal strata which can be peeled off like the layers of an onion. Since the sites are rarely level, but are composed of hillocks and hollows to which the deposits have accommodated themselves, the excavator has to take account of complexities which arise out of this fact. There is stratification, but it is not of the simple kind imagined. One may always expect it to consist chiefly of two types: occupational, and catastrophic.

The former type of deposit accumulated slowly under foot while the inhabitants of a city were pursuing their customary peaceful activities. The breakage of pottery in

such strata generally consists of small sherds, the discard of broken water-jars and other common ceramic utensils of daily life, trodden into the soil. The accumulation of occupational rubbish may still be observed in modern cities; even London, in spite of garbage collection, is said to bury itself at rates ranging from six to nine inches in a hundred years.

The catastrophic type of deposit is different, for it has resulted from sudden, not gradual, accumulation. Sooner or later the life of an ancient city ended in tragedy, which oftenest took the form of capture by an invading army. When a town was razed by fire the wooden supports burned away under the roofage, which was mostly of clay, allowing the superstructures of the buildings to collapse into the rooms, while the side walls fell outward or inward, completing the ruin. The house rubbish which results from this type of destruction is clearly recognizable. At Tell en-Nasbeh the remains of charred timbers were occasionally found under masses of roof clay, usually made of soft limestone, pounded into fine particles and mixed with water. The ceramic furniture of the houses, though usually broken, was found buried in place in the rooms. If at the time of the rebuilding of the city the surface was simply leveled for new structures, the demolition stratum will vary from two to four feet, according to the original height and massiveness of the collapsed buildings.

Another catastrophic type of deposit was caused by earthquakes. It necessarily exhibits the same general features as the one described above, and therefore is distinguishable only with difficulty, even when not accompanied by fire. Th. Wiegand,³¹ after an exhaustive investigation,

³¹ "Untergang und Wiedererstehen antiker Kulturdenkmäler," SPAW, 1928.

reached the conclusion that earthquakes were the cause of more widespread destruction of cities, temples, and monuments of antiquity than any other single factor. It is estimated by geologists that since the beginning of the Christian era no less than ten thousand earthquakes have occurred in Asia Minor, many of them with catastrophic consequences. Syria and Palestine were especially subject to them and numerous Scripture passages bear testimony to the terror which they inspired. Professor Garstang believes that in his recent excavations at Jericho he has discovered clear evidence that the Late Bronze Age fortifications of the city were overthrown by an earthquake.

In 1927 our expedition was concluding its second campaign at Tell en-Nasbeh when an earthquake of marked severity occurred on July 11. Nablus and Jericho at that time afforded instructive examples of the devastating effect of earthquakes on native Palestinian houses. In Nablus not only did houses collapse, but house walls fell into the narrow streets, burying them and hapless pedestrians to a depth of six feet or more. Unfortunately we cannot drop the plummet of psychological analysis into the emotions aroused by earthquakes among populations that lived in Palestine three millenniums ago. But the paralyzing panic fear which they inspired is mentioned by the prophet Amos and abundantly attested by later records.²²

²² In 1927 we had the opportunity to observe the psychological reactions produced by such an event among the Arab peasants, from whom our workmen were drawn. To them it was a highly mysterious, not to say demonic, phenomenon before which their mental powers fell prostrate. This may be illustrated by two incidents which occurred at the time. Suspecting that the quake was caused by a slip along the fault crack followed by the Jordan, I remarked to a comparatively well educated Arab that I should not be surprised if the scanty summer-flow of that stream had disappeared for a time into crevices along the fault line. My remark was passed on immediately by my interlocutor, and it ran like

The total abandonment of some earthquake-razed cities seems to have taken place several times within the historical period, if ancient records may be trusted. Reoccupation after the lapse of a century or two will hardly have obliterated the observable effects of such a phenomenon.

It happened sometimes that after a destruction a town was not rebuilt over the entire area. Some parts were left unoccupied while in others hastily constructed dwellings were erected on débris resulting from the destruction. The last-mentioned phenomenon was encountered several times at Tell en-Nasbeh. As the excavation proceeds downward, these patchy remains of house foundations, seen at section points, appear to be floating on débris. This frequently was true of Maccabean remains on Tell en-Nasbeh. But there also were scattered islands of surviving Hellenistic and Roman remains. Once, on removing a very ancient boundary wall of stone, we found preserved, underneath, a long strip of a Byzantine occupation level which stood eighteen inches above adjacent areas that had been denuded of this level by a combination of tillage and weathering.

wildfire through the neighborhood; of course, without the qualifying reasons for the supposition. When a few hours later a courier appeared at Ramallah from Jericho with his tale of destruction, and the announcement that the waters of the Jordan had gone underground in some places, his hearers turned up their noses and told him he was too slow-footed with his news. "Why, the *mudir* [Arabic title given to me as director of the excavations] told us that hours ago!" they said, with evident pride over the fact that they were connected with someone who had such long-range knowledge of the strange performances of earthquakes.

A day later the second incident occurred. An Arab boy came running through the villages of El-Bireh and Ramallah, shouting at the top of his voice that according to a telegram just received from Cairo another earthquake was due at three in the afternoon. The extravagant absurdity of the assumption that anyone in Egypt could foretell to the minute the arrival of an earthquake in Palestine did not halt for a moment the immediate exodus of the villagers into the open.

Unless the director is on the ground with his camera and excavation journal, such phenomena may go unobserved and unrecorded. The artifacts recovered from such special areas may in the meantime have gone down to headquarters as proceeds from the main level, when in reality they belong to a patchily preserved superimposed level. It would, in fact, be difficult for the field recorder to do otherwise than tag the baskets of *shikaf* as a part of the main level, so long as the deposits and floating structures cut irregularly across the 10-meter squares, and often cannot be certainly recognized as such until after excavation has freed them. But the director's field notes and photographs, and the mapper's color shadings and notes on the map, combined with the record of ceramics from the areas being worked, constitute a sufficient and decisive registry of evidence for the interpretation of the phenomena. This is only one out of a variety of situations in which the director's personal observations during the removal of the deposits are indispensable to a right interpretation of the facts of stratigraphy, on the one hand, and of the ceramic record, on the other.

During one season we tried the experiment of keeping two diaries, one by the chief recorder and the other by the director. But they were not found to supplement each other sufficiently to call for their continuance. If the director keeps a full day-book or journal, embodying all the more important observations made during his supervisory work on the mound, it will provide all the extra information needed to supplement the very detailed general records of the card file.

Dealings with Arab landowners, when one has to secure a lease on areas to be excavated, are apt to be tedious as well as amusing. It is the duty of the director of an ex-

pedition to create in the Arab community a friendly feeling for the enterprise. This means that he must never lose his patience or his temper, practice all the arts of politeness in which an Arab himself excels, and maintain a steady, dignified pressure in the direction of a just agreement. The first season, the writer, being a newcomer in Palestine, sought help in reaching an agreement with the landowners from some who had been there longer. But the sequel showed that they had not yet developed a technique for the task, and the result was not as satisfactory as it might have been. Later, the writer carried on his own negotiations with the *fellahin*. The director's most important preliminary is to request his surveyor to make for him a chart on which the metes and bounds of each owner's land are shown with exact measurements, permitting the reduction of the areas to *dunums* and fractions of *dunums*. He must ascertain also the crop values per *dunum*, which will readily be furnished by a peasant who has leased his land for shares of the crop. Armed with these facts, the director can ask the landowners to confer with him at the office of the district magistrate. In 1932 it required only two hours of one forenoon to reach satisfactory agreements with more than a dozen owners. They speedily discovered that we always rigidly fulfilled our agreements to leave the excavated areas in good agricultural condition, and that the productivity of the land often was doubled by our operations. This observed fact was the reason why on two occasions *fellahin* came to me to report that their land covered many *antikas* and that they were willing to let me excavate them without indemnity. Since their land was quite outside the limits of the mound, I had to decline the shrewd offer.

It once happened that two landowners questioned the

accuracy of our surveyor's chart, declaring that their holdings were much larger than indicated. We requested the magistrate to appoint two neutral observers who were to act as witnesses of a resurvey of the parcels in question. In the interest of fairness the magistrate was asked to request the protesting owners to pay for the resurvey if it should be found accurate, and to accept a reduced rental if our original survey should be found too liberal. Since we made it a practice to add to each *fellah's* plot a fraction of a *dunum* in our computations, for good measure, there was no possibility of our being found in the wrong. Faced with the practical certainty that they would get the short end of the bargain, the two owners withdrew their objections. On another occasion, after obtaining a lease on a peasant's holdings, we discovered that he had pledged the expected seasonal crop to a neighbor for a loan. Soon both appeared at our headquarters, each loudly asserting a claim to the entire rental. I calmly explained that we could pay neither of them until they had settled their differences before the local magistrate and had brought from him sealed instructions advising us how to proceed. We found it a wise precaution, whenever an indemnity or a rental was paid, to ink the recipient's right thumb and let him affix his thumb print to the bottom of the receipt, in lieu of his signature.

One day, in our first season on the mound, a substantial Arab citizen of El Bireh came to watch our workmen pick potsherds out of the earth as it was being removed. The puzzled expression on his face showed that he was far from understanding the purpose of this organized and expensive hunt for what in his eyes was worthless *shikaf*. An inquiry directed to one of the workmen brought no intelligent explanation. "Allah may know what the *mudir*

wants to do with this stuff. They say the Jews made it!" After a while he came to me with a sly expression on his face. "Khawaja," he said, "I see that you are spending much money to dig out this ancient *shikaf*. It is poor and old. In our village we are breaking pottery vessels all the time. Our *shikaf* is much fresher than this. I will collect it and sell it to you for half of what it costs you to dig out this."²⁸ Confronted by a poser like that, it is difficult to preserve a dignified demeanor. But such proposals must be treated with evasive seriousness, and not with derision, or hilarity, if good feeling is to be preserved.

²⁸ When F. J. Bliss was excavating Tell en-Hesi the Bedouin of the neighborhood furnished their own explanation of his search for potsherds. The Crusaders, they said, had hidden gold in the mound; Bliss knew how to convert it into sherds in order to remove it without attracting attention; when he had the sherds at home he turned them into gold again.

XV. THE PART WHICH THE CAMERA PLAYS

THE PHOTOGRAPHER of an expedition should avail himself of the best improvements which the advance of photographic science can place at his service. The deciding factors in his choice of equipment must be adaptation to needs and simplicity of operation. Although our site was only seven miles from Jerusalem, we found after a brief trial that we could not depend on commercial photographers in that city to develop our highly light-sensitive panchromatic plates without fogging them. Our staff photographers had been trained to develop them by touch in absolute darkness; so we established our own dark-room, where Dr. George P. Hedley during the second and third campaigns, and the Rev. Wesley C. Havermale during the fourth, did all our developing. This procedure took care of those numerous occasions when it became necessary to develop an exposure without delay, in order to make sure that a good photograph had been obtained, sometimes of objects *in situ*, sometimes of transient stages in the excavation of a structure. The photographic materials used were obtained directly from the Agfa factories in Berlin, being delivered at stated intervals to a European shipping-port by air mail. By this arrangement, which merely involved a little planning, our films and plates were always in fresh condition.

Since the camera work of an expedition must always, in these days, form an important part of its scientific records, the photographic equipment was chosen with the fulfillment of this purpose in view. It consisted of an Eastman View Camera, 2D, for exposures 5×7 ins. The camera was fitted with a Voigtlaender Kollinear lens, f3.5, a Com-

pur shutter, and a firm, light tripod equipped with a tilting device that permitted photographs to be taken at all angles. A second camera, suited to special purposes, was a Zeiss Ica with a Zeiss Tessar lens, f4.5 and supplementary Distar (telescopic) and Proxar (wide-angle) lenses. In the second campaign we began to use also a Universal standard motion-picture camera with 32 mm. film. The director had in daily use a special 3¼×4¼-in. film Kodak with a Zeiss lens, to illustrate the records in his journal and to obtain negatives suitable for lantern slides.

For the view camera it was found advisable to employ flexible plates of cut film rather than glass plates; the film plates are more portable and they survive accidents of handling that would break glass. A series of preliminary experiments showed that Agfa Panchromatic matt-back film would best serve the needs of our expedition. The Zeiss camera was equipped with film pack and holders for cut film. The choice of panchromatic film, used also in the motion-picture camera, was determined chiefly by the various shades of red which prevailed on our site, both in the excavations and in the pottery discovered. Its greater speed proved an added advantage.

The following notes, furnished by Dr. George P. Hedley, our resourceful photographer during two campaigns, present a few leaves from his experience:

Summer light in Palestine [he observes] is of unusual strength, and the clear atmosphere made possible distance "shots" which exhibit remarkable sharpness of detail. The average exposure for outdoor views, with ordinary proportions of light and shade, was established at 1/25 sec. at f22. In almost every case, K2 or K3 filters were employed, lengthening the exposure by the usual factors. The F filter, requiring twenty-five times the normal exposure, was used to bring out the detail of black or brown decorations on red pottery,

and also for negatives of the red poppies and anemones which brighten the Palestinian landscape in springtime.

Photographic subjects ranged from the interiors of cave-tombs, requiring exposures up to twenty minutes' duration, to general views of the excavated areas and to triple-exposure shots showing three different views of the same vase or jar. Each strip or individual area excavated was photographed as each successive level was laid bare, thus providing a complete record of the building remains found upon the site. Objects discovered were photographed at least twice, once in "type" groups—lamps, bowls, statuettes, etc.—and once in "provenience" groups, bringing together the objects from a given room, cistern or cave. Those of special interest or importance also were photographed separately; the use of a black cloth background made double and triple exposures on the same plate a relatively simple matter. Included in each exposure were the museum numbers of the objects, and also a scale to indicate their dimensions.

In the dark room improvised at our staff headquarters in Ramallah, all negatives were developed on the day of their exposure. The high temperature and the lack of running water created serious problems. The former, after unsuccessful experiments with "hardeners," was met by the use of ice purchased in Jerusalem. The latter meant repeated and laborious washings. Finding that his oil lamp, provided with a green Wratten safelight, was not light-tight at all its corners, the operator settled down, after the first week, to development of the panchromatic film in absolute darkness.

Not the least interesting experience was the use, as a temporary dark room, of a tomb hewn out of the rock during the Hellenistic period. The motion-picture camera, in which was exposed film of some importance, suddenly jammed. The operator, loath to undertake the hot and dusty tramp over the hill to headquarters, thought of the darkness inside the tomb. He dragged the camera inside, had the Arab laborers roll up the stone and fill the chinks with soil, and there . . . made the necessary adjustments to a recent product of modern Hollywood.

It was one of the photographer's duties to keep in a special record-book complete data about each photograph, including aperture and length of exposure; also, when necessary, identification notes about objects in the photograph. All negatives were arranged in two numerical files. One consists of the 5 × 7-in. negatives, the other, distinguished by a prefixed A, includes all the smaller negatives. Albums specially made for the purpose are used to mount prints of all negatives in the chronological order of their appearance. Since each photograph bears the same number as the corresponding negative, these albums serve as an index to the files of negatives. Each filed negative carries in its numbered pocket one additional print. A third print is made of all museum objects listed in the registry book, and these extra photographs, together with the duplicate pages of the registry book, are given to the Department of Antiquities.

Other points at which the photographer's work gears into the general system will be observed in figures 4 and 11. On the basket tags appear three columns marked respectively D (drawn), R (recorded), and P (photographed). A check mark is made opposite the indicated objects when each process has been completed. In the registry book the photographer finally enters, in the column provided for him, the number of the photograph on which the given object appears. When a level has been cleared, general views are taken of the architectural remains from a portable-tower platform constructed for the purpose. These photographs can later be used in connection with the scale drawings of the architectural remains made by the mapping squad.

XVI. SURVEYING, MAPPING, AND LEVELING

THE BASIC IMPORTANCE of a topographic survey as the starting point for our system of recording has already been set forth in Section IV. As the beginning of scientific exploration, the entire mound must be surveyed and laid out on a control map divided into 50-meter squares. This map in turn serves as a basis for subdivision maps in which the strips of surface chosen for excavation are laid out and staked on a grid of 10-meter squares. These unit areas, severally designated by the letter-and-number symbols of their intersection lines, provide the means of recording the find-spots of all artifacts and to map all structural remains in their *horizontal* positions. Their *vertical* positions, or the depths at which they are found to lie in the mound, have to be recorded by levels, or strata, best indicated by Roman numerals from the original surface downward. Transit, plane table, and alidade are instruments indispensable for accurate work and must form an essential part of an expedition's equipment.

As soon as the removal of deposits has brought the remains of buildings clearly above the surface, they are oriented and plotted, with plane table and alidade, on a topographic sheet containing nine 10-meter squares. Near one corner of each sheet is a key which relates it to contiguous sheets. When a given occupation-level has been cleared over the entire strip, the details of the masonry are traced in. The cartographer has two assistants who measure the individual stones and announce the size in centimeters, and the mapper draws their outline in the wall with the 1:100 reduction in scale. It has been our

[72]

practice to draw all surface stones in walls to scale, so that the charted masonry reveals its type at a glance.

A slightly different method has been followed in the mapping of very thick city walls. Obviously, there would be no point in drawing to exact scale the surface pattern of the innumerable small filling-stones that compose the core of very thick fortification walls. At Tell en-Nasbeh the thickness of the city walls ranges from five to eight meters, or fifteen to twenty-six feet. In mapping these structures the filling-stones exposed on the upper surface of the wall have been drawn conventionally in order to indicate their relative size and the fact that there was no earth core; but all the inner and outer courses of stones, and the structure lines of towers that are traceable into or through the walls, have been drawn to precise scale. Mapped thus, the city wall presents to the eye many peculiarities of construction which will scarcely admit of any other explanation than that it was built in sections by a *corvée*, as recorded in I Kings 15:22. Where a variety of materials has been used in the structures to be mapped, the cartographer can indicate the fact by a variety of hatchings, for the interpretation of which a key should be provided. At Tell en-Nasbeh the abundant local limestone was the only kind of stone used for building throughout the entire history of the mound.

Finally, levels of all important points are taken with reference to the adopted base-line and entered in red figures on the topographic sheets. These points must include the floor levels of rooms and the tops of remaining walls, so that cross-sections of the structures can be made whenever required. Two-way sections of caves, cisterns, and similar structures are usually made at once on the wide margins of the plane-table sheets. The numbers of all

structures that constitute a locus are entered clearly in fadeless black ink, so that all recovered objects bearing provenience marks can easily be traced to their source on the map which ultimately represents the mound in miniature. We have found it a wise precaution to use for our topographic maps only shrink-proof paper and water-proof ink. Ordinarily one surveyor and several assistants have been able to keep pace with the excavations. But in 1929 we had two professionals as well as an assistant who made models of tombs.

NOTE

THE WRITER has purposely omitted a description of the manner in which our expedition has been housed and provisioned. Nearly every site presents its own problems, which have to be solved according to circumstances. Our local workmen came from nearby villages, especially El Bire. The American contingent of the staff was housed in Ramallah within sight of the mound. The Egyptian members of the staff were quartered at the foot of the Tell in the basement rooms of a large Arab house whose upper rooms served also as working headquarters for the entire staff when digging was in progress. Extreme precautions have to be taken throughout the Near East to guard against infectious diseases conveyed by polluted water and food. For the uniform good health enjoyed by members of the expedition throughout all seasons of work we are chiefly indebted to the care and good management of Mrs. William F. Badè.

XVII. THE SEAL OF JAAZANIAH

AS ONE RESULT of the painstaking methods described in the foregoing pages we had, in 1932, the rare good fortune to make a discovery of thrilling biblical significance. It was nothing less than the onyx seal of one of the four army-captains who are mentioned by name in II Kings 25:23, as having come to Mizpah after the departure of the Babylonian army in 586 B.C. The passage reads as follows:

Now when all the captains of the forces, they and their men, heard that the king of Babylon had made Gedaliah governor, they came to Gedaliah to Mizpah, even Ishmael the son of Nethaniah, and Johanan the son of Kareah, and Seraiah the son of Tanhumeth the Netophathite, and Jaazaniah the son of the Maacathite, they and their men.

The last of the four, whose name transliterated from the Hebrew is vocalized *Ya'azanyahu*, is the one whose seal was found in tomb 19 of the western necropolis of Mizpah. The upper register of the seal contains the name of Jaazaniah written and vocalized exactly as given in the second book of Kings. In the middle register he is described as "servant [i.e., officer] of the king," which corresponds to the biblical statement that he was one of the "captains of forces." In a detailed discussion* of this seal, now in the Palestine Museum in Jerusalem, I have shown that its owner can have been none other than the Jaazaniah mentioned in the passage cited. A further reference to him is contained in Jer. 40:8. Thus the discovery dramatically confirms the identification of Tell en-Nasbeh with the site of Benjaminite Mizpah, which became the

* "The Seal of Jaazaniah," ZAW (1933), Vol. V.

capital of Judah after the destruction of Jerusalem by the Babylonians in 586 B.C.

The reader will observe (fig. 13, upper right-hand corner) that the alternate black and white layers of the onyx have been skilfully ground away to form the rounded oval top of the seal, so that it presents the appearance of an eye with a black pupil.

In a collection of photographs of Assyrian tablets, preserved in Berlin, are a number which enumerate the magic potencies that inhere in particular gem-stones. Some are capable of winning for the owner the favor of specified deities, while others bring good dreams, or ward off demons of disease. These beliefs undoubtedly were widespread in antiquity and must have had their parallels in Palestine. There, as in Assyria, it was not an aesthetic preference only that led to the choice of particular stones for the making of seals. The selected stone was to serve also as a protective charm. Such a purpose is clearly indicated by the onyx seal of Jaazaniah, especially in view of the fact that the upper side is finished in imitation of a human eye. There still is some doubt about the identity of the *šoham* stone in Gen. 2:12, but when the revisers of the English Bible rendered it "onyx stone," they gave this species of agate the distinction of having been one of the glories of paradise.

The third and lowest register of the seal presents a real surprise in the form of a cock in a fighting attitude. His comb, wattles, and spurs leave no doubt that a rooster is intended. The fact that no domestic chickens are ever mentioned in the Old Testament had long ago led to the belief that chickens were unknown in Palestine before Hellenistic times. But this seal, dating from 600 B.C., presents decisive proof that descendants of the East Indian

jungle-fowl had spread to Palestine at least as early as the seventh century B.C. It is recorded that Themistocles (514-449 B.C.), while proceeding with his army against the Persians, observed two cocks fighting desperately. Stopping his army, he bade the soldiers observe the valor and obstinacy of the feathered warriors. The annual cock-fights, instituted at Athens as a result of the victory won against the Persians on this occasion, are said to have instigated and spread cocking as a sport all over Greece and Asia Minor. The use of the cock symbol, and the attitude of the bird on the seal under discussion, may indicate that this form of sport was known in Palestine centuries earlier. In any event, the fighting cock was an appropriate symbol on the seal of a soldier.

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