MATHEMATICAL, METROLOGICAL AND CHRONOLOGICAL TABLETS

Temple Library of Nippur

By

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To the Memory of His Highness The Duke Friedrich of Anhalt

whose numerous acts of grace encouraged the author in his explorations and cuneiform researches

in Reverence, Love and Gratitude
PREFACE.

The cuneiform texts here published form a very small part of a large collection of tablets and fragments once constituting the Temple Library of Nippur. In order not to allow of any doubt as to the real meaning of my words, I emphatically state once more, I do not mean the Temple Archive (on which cf. Vols. XIX, XX, and other volumes to follow), or the Temple School (on which cf. Vol. XIX, Part 1, in press, and subsequent parts), or anything else but the Temple Library of Nippur. Enough of the crude and unsolicited advice received during the last two years in signed and unsigned American newspaper articles, journals, etc., as to what should constitute an Old-Babylonian temple library, and what I should call the epoch-making discoveries of the University of Pennsylvania's expeditions to Nippur. I must resent it the more, as I happen to be the only Assyriologist who (however hastily in many cases) has examined all the (more than 50,000) cuneiform inscriptions thus far excavated there, and who from its inception to the present day has been connected with this great scientific undertaking.

What a Babylonian temple library looks like according to the facts furnished by the spade, and not according to more or less confused theories, I have attempted to set forth in Chapter 4 of Vol. XIX, Part 1 (in press): "Model Texts and Exercises from the Temple School of Nippur." This chapter was written to form part of the present book: but finding that the new mathematical and chronological tablets here edited required a fuller discussion than originally planned, I was obliged to reserve it for the next volume, in which the Temple School and Temple Archive are treated in their relation to the Temple Library.

It is a very natural desire on the part of scholars to see published as early as possible what is left of the scientific and literary activity at the oldest and most renowned Babylonian sanctuary and seat of learning. At the same time, it is not my nor any one's faith that the various results of our excavations could not have been submitted more rapidly to Assyriologists. All the members of the Babylonian Section of the University of Pennsylvania are taxed to the utmost with constant work on the material to appear in our expedition series. At the best a cuneiform volume is no novel which may be written from day to day. Before the rather pleasant task of "book-making" can begin, the
numerous fragments preserved in two museums, separated by more than 5000 miles, must be cleaned, minutely examined, catalogued, divided into groups and subdivisions, and as far as possible joined to other pieces of the same tablet (often excavated at different times by different expeditions),\(^1\) that the scholar entrusted with the editing of a volume may receive his material properly prepared. This exceedingly difficult and fatiguing preliminary work has occupied the writer's best time during the past years, when both in Philadelphia and Constantinople he deciphered and catalogued cuneiform material found in the most lamentable condition,\(^2\) in order, first of all, to bring order into a perfect chaos of larger, smaller and smallest fragments of unbaked and mostly half-effaced, crumbling, nitre-covered and otherwise damaged tablets generally written in Old-Babylonian characters.

On the whole, the tablets from the smaller temple library of the Cassite period are much better preserved—being sometimes even baked, cf. No. 20—than those from the time of the first dynasty of Isin (third millennium B.C.). The fragments published as Nos. 21-24, 27, 29, 34-35, 39, are fair representatives of the average condition in which the remains of the older library have come down to us, while Nos. 32, 33, 36, 37, 41-43, are far above the average condition.

Peculiar circumstances arose which made my task even more exasperating. Toward the end of May, 1900, the antiquities excavated by the fourth expedition and packed at Hilla under Haynes' personal supervision, were sealed and delivered to the representatives of the Ottoman Government at that place for shipment to Constantinople. The way around Arabia is long; numerous delays were unavoidable, and frequent transfers of the precious material necessary. The boxes were often exposed to the inclemencies of the weather and roughly handled by inexperienced workmen. Their Excellencies Hamdy and Halil Bey (to whom again I express my warmest appreciation of their continued interest and loyal support of our work) did everything in their power to secure the early arrival of the antiquities at the Imperial Museum; but more than a year elapsed before they were landed at their place of destination.

In 1901 I went twice to Constantinople, personally unpacking, examining and repacking more than 20,000 inscribed tablets and fragments within four months. A large portion of the Temple Library was presented by His Majesty the Sultan to the writer for his past services in connection with the organization of the Imperial Ottoman Museum. It happened that large masses of antiquities from other excavations arrived in Constantinople that very year, while the magnificent third building of the Sultan's

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\(^1\) Cf. e.g., Pls. 17-19 and Pls. XI and XIII, partly restored from C. B. M. 19,990 (excavated by the second expedition) and C. B. M. 19,815 + 19,757 (excavated by the fourth expedition).

Museum was still in course of construction. It was impossible to provide proper storage for all the boxes in the spacious cellar and crypt at the north end of the authority. Wooden shelves had to be erected in the courtyard of the museum, to give temporary shelter to whatsoever could not find a place behind stone walls. The full and winter rains of 1901 to 1902 were extremely severe, and these shelves proved very insufficient protection for our own antiquities. Thoroughly wet and partly rotting, the boxes given to the writer arrived in Philadelphia in the summer of 1902, when he was absent in Germany.  

Upon my return to Philadelphia, end of September, 1902, the antiquities received were presented to the Board of Trustees of the University of Pennsylvania and a series of public lectures delivered, in which for the first time a summary of the history and scientific results achieved by all the Babylonian expeditions of the University were submitted to the numerous friends and supporters of this great undertaking. At my earliest opportunity I also opened some of the boxes from Constantinople. They were still so wet that their contents of unbaked inscribed clay threatened to be lost to science forever. Energetic measures were necessary to save the broken remains of the Temple Library destroyed by the Elamites and 1600 years later brought to light again by so much personal sacrifice on the part of the Committee and the members of the expedition. Accordingly strict orders were given not to move or touch any of the tablet boxes stored in a moderately heated large room of the museum, until the writer was satisfied that their contents had become hard enough to be handled with safety.

About two and a half months after my arrival I had to leave Philadelphia again (December 16, 1902) for Constantinople, where I spent over five months in 1903, (February and March; September to December) in cataloguing cuneiform texts and assisting in the arranging of antiquities for the opening of the new museum building. On December 24, 1903, I was back in Philadelphia, examining at once into the condition of the tablets left wet and soft in the previous year. Having convinced myself that the antiquities had been saved by the precaution taken, I commenced to catalogue the large number of tablets remaining from the previous expeditions; for until the present new archaeological museum of the University had been opened (end of 1899, when the writer was en route for Babylonia), there was no suitable place for cataloguing and storing the thousands of antiquities already obtained, after the limited space temporarily assigned to the Babylonian section in the Library building had been used. Many of the boxes then in our possession could not be opened at all; others, after a hasty examination of their contents, were repacked and stored with the rest in the cellar of the Library building.

1 It may suffice to refer my readers to B. E., Ser. 1, Vol. 1, p. 388, note 1, and to the preface (pp. VII.) of my "Explorations in Bible Lands."
About 6000–7000 tablets and fragments have been catalogued by the writer in Philadelphia since January, 1901; several other thousands of cuneiform texts in Constantinople during the same time. My impatient critics must not forget that, with all the well-known energy and enthusiasm displayed by the authorities of the British Museum, Sir Henry Rawlinson and his intelligent and hard-working assistants, nearly fifty years elapsed before Assyriologists could obtain a tolerably accurate idea of the contents of the beautifully inscribed baked fragments of the infinitely better preserved Library of Ashurbanipal. I plead for only ten years for my associates and myself to demonstrate the rich contents of the badly preserved fragments of the Temple Library of Nippur. Apart from the mathematical, metrological and chronological specimens submitted in the following pages and the first part on the Temple School, already in press, four more volumes on hymns and other religious Sumerian texts, syllabaries and lexicographical tablets, and the official correspondence between the Temple officers and the Babylonian kings are already in the course of preparation; to say nothing of four other volumes on dated documents, including the series on the Temple Archive recently successfully opened by Prof. Clay.

The writer is only human and cannot do more than devote his entire life and the strength left to him (after eighteen years of continuous hard work and frequent deprivations of the ordinary comforts of life in behalf of a scientific undertaking) to the resurrection of ancient Nippur. The power of every man has its limits set by nature, even when he is ably supported, as the editor finally is, by half a dozen of enthusiastic pupils and associates in the great work of deciphering and publishing the results of the University of Pennsylvania's Babylonian expeditions.

Many questions, which came up in connection with the study of the texts here submitted, could only be touched upon, if the introduction was to be confined to its proper limits. The writer, therefore, has excluded a discussion of the real meaning of a class of tablets represented by Nos. 20, 24, 37 of his autograph plates and by Plates IV, V, XIII and XIV of the phototype illustrations, for which he refers to the Introduction of Vol. XIX. For the present it may suffice to state that they are text-books prepared by the teachers in the classroom and afterwards deposited in the Temple Library. They afford us a welcome glimpse of one of the ways in which scientific and literary works of Babylonian temple libraries were supplemented and increased. Specimens of this kind are known to me from Nuffar, Jökhâ and Abû Habba. On the Obverse of Nos. 20, 24, 37 (cf. Pls. IV and XIII) the priest in charge of the class wrote the left column with his own hand as a model for the pupil, who copied the text in the right.

Cf. Scheil, Sippur, pp. 33f., especially the first 8 lines of p. 34.
When the exercise was perfectly, the teacher removed the pupils' writing by scraping the upper layer of clay off the right column. Frequently, however, before destroying the pupil's exercise, the teacher turned the tablet over and inscribed the Reverse with a similar or an entirely different text, sometimes writing his model twice or three times, after the manner of our own Salmon Arithra. Occasionally, specimens when, the right column has been inscribed and scraped off so frequently that it is considerably thinner than the left column. There are even specimens where the right column has been cut off entirely. In other cases the pupil's exercise has been removed so superficially that, like a Greek palimpsest, the traces left aid in deciphering the contents of the preserved but frequently damaged left column. Through a fortunate accident the pupil's awkward attempts are almost entirely preserved on the fragmentary Obverse of No. 29 (cf. also Pl. IV of the phototypic productions).

If the teacher was young and inexperienced or careless, his writings were as little free from mistakes as the books of modern "professors," or as many legal documents of ancient Babylonia, where, if anywhere, we should expect a careful wording and writing. I lay stress upon this fact, as it has become rather fashionable in certain quarters to regard everything as a school exercise, due to an unmistakable tendency to measure Babylonian cuneiform works with another standard than the "literary" and "scientific" productions of to-day. As illustrated also by Vol. XIX, there are, of course, a limited number of school exercises, which have come down to us, more by accident than with the purpose of their preservation. At the same time it should be kept in mind that, as a rule, in ancient Babylonia such exercises were destroyed immediately after they had been written. This is amply testified by the very numerous scraps of inscribed clay tablets intentionally pressed out of shape, which we gathered from the floor of the Temple School at Nippur.

In his first publication on the Temple Library of Nippur, it was the intention of the writer to give Assyriologists an insight as possible into the real condition of the material at his disposal and the manner in which the texts here submitted are inscribed and arranged on the originals. He, therefore, has copied even inscriptions, like the Obverse of Nos. 23 of Pls. VIII and VII, 24, 37, the Reverse of No. 38, the texts given as Nos. 11, 15, 16 and Pl. XIII, which with the same right could be classified as syllabaries and lexicographical tablets. For a proper discussion of this kind of cuneiform texts the reader is referred to Vol. XXI, which is in the course of preparation, and to Chapter V of the present volume "Description of Tablets and Ruins," pp. 64 ff. A few observations may be added to elucidate some of these inscriptions.

For the classification of tablets from Nippur, cf. Jb. 1900, p. 10, 101, 104, where even inscriptions were even buried in the Kim before they were incorporated in the Temple Library.
No. 24. Obverse, contains Sumerian and Assyrian synonyms for “food.” The left column gives the sign PAD with its Sumerian values to the left of it, the right column offers the corresponding Semitic words: *ku-ra-ru-um-tum* (well known), *ka-ru-pa-tu*, *pu-uz-tu-zu*, “something crushed” or “ground,” i.e., “flour,” “meal” or “pap,” *ra-aq-qu*, “something baked,” “broiled,” “fried” or “roasted,” the last three words being known only from this little Nippur text.

The Obverse of No. 37 is a Sumerian syllabary, containing some values of the signs *KUL* (= *ku-ul* and *nu-mu-utum*), *LA* (= *lu-ut* and *shi-ku*), *SI* (= *si-i* and *sh-i*), *SL-ganu* (= *si* [cf. *S* 24]–*ni*), *UM* (= *u-am*), *TUB* (= *tu-ub*).

Pl. VI (cf. No. 23, Obverse, and Pl. VIII) contains Sumerian and Assyrian synonyms for “bad doer,” “enemy,” etc. The left column gives the ideographic writings preceded by the determinative *anclu*, the right column the corresponding Assyrian words—a fragment of the greatest importance for the Assyrian dictionaries. As an autograph copy of this text will be found in another volume, I confine myself to the right column. Li. 1: *si-ir-rum* (= *si-rum* = *sarrum* = *sarrum*, “oppressor,” on which cf. the dictionaries). Li. 2: *shu li-ib-ha-shu si-ru* [= *sirru*, form *jlu*] *ut-pa-ash-shu* (“he who in his heart contrives enmity”). Li. 3: *nu-an-si-* *rum* (= *nasirum* = *nasarrum*, “the lurker” [change of “a” into “ɛ,” resp. “i” before “ɛ,” form *ʃu*] from *nasaru* II). Li. 4: *ra-ua-qa* *la* *ra* “looter,” “frivolous,” “good-for-nothing fellow” (corresponding to *NE-RU* = *crim* in the left column, i.e., the ideogram generally

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1 A form like *niṇaḥbā* (on which cf. Jensen in Schrader’s *K. B.*, Vol. VI, p. 380). Cf. also “Cuneiform Texts,” Vol. XII, Pl. 32, the sixth fragment, lines 4–5 (the mutilated last sign of li. 5 to be restored to “pu” = *kudúpu*), and Behrens on *kudúpu* in Aszýrisch-Babylonische Briefe Kultischen Inhalts aus der Sargönidzeit, p. 81.

2 From *pāzizu*, “to crush,” “to reduce to small pieces.” Cf. Zimmern in Göttinger Gelehrten Anzeigen, 1898, p. 823.


4 For this value cf. already Delitzsch, Assyrische Lexestücke, 4th edition, p. 8, No. 47, c.


6 The value “ši-i” thus far known only from this Nippur text.

7 Cf. *Utpashku* = *utuppashku*, cf. *utnun* = *utunnen*, and Hilprecht, Assyriaca, pp. 44ff. *Epēšku*, “to meditate,” “to plan” (*utupakku* corresponding to Sumerian *AB-HU-SI-A*, cf. Meissner, Selbene Asyr. Ideogramme, p. 61), root *šīn*, “to dig,” “to fathom,” “to explore,” “to search,” “to plan,” etc., from which *epēshu* and *epēšku*, “wiss.” Cf. Tell-el-Amarna, Berlin 104, 121; Zimmern *Sumiria* *iš-gi-u-shu* (from *šig* [cf. 103, 7], “sie versendigen sich an ihn,” or *ši* = *šli* [cf. 177], “sie haben ihn gefangen genommen”?) *arduli* *iš-shu* [apposition in singular, “seeking” or “planning”] *naa daki* [“to kill him”]

8 *Namuṣar* and *nasara*, “sword!” (cf. Zimmern, Beiträge zur Kenntnis der Babylonischen Religion, p. 59, li. 189), are *našal* forms from the same verb *nasaru* II, probably identical with *nasaru* I, “to guard,” i.e., either “to protect” (namušar, “the instrument of protection,” “sword”) or “to lurk,” “to lie in wait for” (nasirum, “the lurker,” cf. Job 7, 20: *šāniš* *šīl*).

While preparing this volume, I was repeatedly absent from my library in consequence of unavoidable visits to Constantinople. This compelled me to rely frequently upon the friendly assistance of European colleagues. With warm gratitude I acknowledge the help received from Messrs. Heuzey, Hommel, King, Kugler, Martin, Scheil, Thureau-Dangin and Zimmer, who not only provided me with duplicate copies of important contributions made by them to Assyriology, but at all times most generously placed their time at my disposal for the purpose of examining cuneiform passages temporarily not accessible to me or comparing references required in connection with my researches. To Dr. Badge and Dr. King, of London, I am under special obligation for their liberality in making certain unpublished material of the British Museum accessible to me, and for doing all in their power to render my brief stay in England as pleasant and profitable as possible.


Through the help of the historical development of Assyrian grammar, RAC., R.I., Series D, Vol. III. p. 167, note 20, and other of Delitzsch, 1. Proc. German. at second edition, §§ 200 ff., I have recently endeavored to convince the new group is (less value word) does not occur in Assyrian. 441. It must be noted that "*šēl/* is a "syllabic" by Delitzsch, 441. 442. 443. 444. etc., are perfectly correct Assyrian forms. Historically an aus through syncope of the syllable /i/ or /e/. Delitzsch, 1. c., § 504, 1, visualizing of "*šēl/* from the other form: *šēl/*, "prayer," "prayer," which Delitzsch, "The Hebrew," vol. V. Vol. 1. 444. 445. It does without saying that the earlier and the later forms may occur disrelatedly side by side together with a third form arisen by dropping the first consonant and vowel, and *šēl/* and even a change of place, "cumulus," "cumulative," "anybody," alongside of the shortened form, etc.


The sign in position seems to be identical with an accidentally sign frequently occurring in an early Babylonian personal name. *RAC./*, R.I., Series D, Vol. III. p. 155, note 29, and Series A, Vol. VI. Part I. "List of signs," No. 299, which probably had two occurring *šēl/* or *šēl/*, "child." (Delitzsch, *Assyrisches Handwörterbuch,* p. 168), and the symbolic value *še, *š, or *š or *š or *š or *š or *š, *š.

14 Cf. V.R. 25: 16, *šēl/* wrongly *šēl/*, etc.


The character of the tablets here treated and the difficulty of the Greek text in which the famous number of Plato appears (cf. Chapter II, pp. 29-34, below) made it necessary for me to appeal to my friends and colleagues in the University of Pennsylvania. For the chemical and microscopical analysis of the clay of certain tablets Vice-Provost Dr. Edgar F. Smith and Prof. Dr. Amos P. Brown deserve my heartiest thanks; while Prof. Dr. E. S. Crawley was always ready to lend a hand in solving mathematical problems, and Prof. Dr. W. A. Lamberton spent an entire evening, not easily forgotten, with the writer expounding the meaning of technical terms in Plato's writings and enabling him to profit otherwise from his profound knowledge of Greek language and literature.

With a view of relieving the Publication Committee of additional expense, a Philadelphia lady, who in other ways has manifested a deep interest in the Babylonian Section of the University of Pennsylvania, has enabled the writer to procure the handsome phototype illustrations found at the end of this volume, which he feels sure will be appreciated by the specialist, and for which he himself is truly grateful. The Editor desires also to express his warm appreciation to Mr. H. C. Mercer, of Doylestown, Pa., for his many successful efforts in baking cuneiform tablets of our Babylonian collections in his kiln and thus helping to preserve them, and to Dr. Talcott Williams, member of the Board of Managers of the University Museum, who for twenty years has taken a cordial interest in our Babylonian researches.

With lasting gratitude I remember the loyal support received for so many years from Mr. Eckley Brinton Coxe, Jr., Vice-President of the Department of Archaeology, unwavering as a man and as a friend, who not only continued generously to provide the means for the publication of the expedition work, but together with Provost Dr. C. C. Harrison, Mr. Samuel F. Houston, President of the University Museum, and Mr. J. Levering Jones—all members of the Publication Committee—and many other members of the University, believed in the writer's science, protecting his honor, and comforting and encouraging him in the darkest hours of his life.

H. V. Hilprecht.

Philadelphia, December, 1905.
LIST OF ABBREVIATIONS.

I. D. E. W. VI.

II.

III.

IV.

V.

VI.

VII.

VIII.

IX.

X.

XI.

XII.

XIII.

XIV.

XV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.

XVI.

XVII.

XVIII.

XIX.

XX.

XXI.

XXII.

XXIII.

XXIV.

XXV.
THE TEMPLE LIBRARY OF NIPPUR.


K. .................................. Kouyunjik Collection (containing the library of Ashurbanapal).

Meissner, B. A. P. .............. Beiträge zum Althethnischen Privatrecht, by Bruno Meissner.

Mitteilungen ................................ Mitteilungen der Deutschen Orient-Gesellschaft.

M. I. O. N. .................. Catalogue of the Babylonian Collections from Nippur deposited in the Musée Impérial Ottoman, Constantinople—prepared by the Editor.


P. 100 (101, etc.) ............. (=Peiser 100, 101, etc.) refers to the cuneiform texts published in Urkunden aus der Zeit der dritten babylonischen Dynastie, by F. E. Peiser.


I R., II R., etc. .............. "The Cuneiform Inscriptions of Western Asia," edited by Sir H. C. Rawlinson.

Vols. I and II by Sir H. C. Rawlinson, assisted by Edwin Norris.

Vols. III and IV by Sir H. C. Rawlinson, assisted by George Smith (Vol. IV, second edition, assisted by Theophilus G. Pinches).

Vol. V by Sir H. C. Rawlinson, assisted by Theophilus G. Pinches.

Recueil................................ Recueil de travaux relatifs à la Philologie et à l'Archéologie égyptiennes et assyriennes, edited by G. Maspero.

Rm .................................. Rassam Collection (referring to that part of the library of Ashurbanapal excavated by Hormuzd Rassam).

Scheil, Sippar ................. Une Saison de fouilles à Sippar, by M. Vincent Scheil (=Vol. I of Mémoires publiés par les membres de l'Institut Français d'Archéologie Orientale du Caire, sous la direction de M. E. Chassinat.


Winckler, H. F. ............... Altorientalische Forschungen, by Hugo Winckler.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>ON the Age of Babylonian Literature</td>
<td>1-40</td>
</tr>
<tr>
<td>II</td>
<td>Multiplication and Division Tables</td>
<td>41-54</td>
</tr>
<tr>
<td>III</td>
<td>Ashur, Sibin, Nidu, Agarinnu, Silli</td>
<td>55-68</td>
</tr>
<tr>
<td>IV</td>
<td>A New Chronological List</td>
<td>69-76</td>
</tr>
<tr>
<td>V</td>
<td>Description of Tablets and Reins</td>
<td>77-79</td>
</tr>
<tr>
<td></td>
<td>A. Autograph Reproductions</td>
<td>77-79</td>
</tr>
<tr>
<td></td>
<td>B. Phototype Reproductions</td>
<td>80-84</td>
</tr>
<tr>
<td>VI</td>
<td>Cuneiform Texts Autographed</td>
<td>Plates 1-30</td>
</tr>
<tr>
<td>VII</td>
<td>Phototype Illustrations</td>
<td>Plates 1-XV</td>
</tr>
<tr>
<td></td>
<td>Corrections</td>
<td>Page 70</td>
</tr>
</tbody>
</table>
ON THE AGE OF BABYLONIAN LITERATURE.

According to Berosus, a Babylonian priest who lived some time between 350 and 250 B.C., the origin of all human knowledge goes back to divine revelation in primeval times: “In the first year there made its appearance from a part of the Erythraean sea which bordered upon Babylonia a living being endowed with reason, who was called Oannes.” According to this tradition, confirmed by Apollodorus, the whole body of this creature was like that of a fish, and it had under a fish’s head another (or “a human’) head, and feet similar to those of a man but subjoined to the fish’s tail, and it also had a human voice; and a representation of him is preserved even to this day. This being, it is said, in the daytime used to converse with men, without however taking any food; he instructed men in the knowledge of writing, of sciences and every kind of art; he taught them how to settle towns, to construct temples, to introduce laws and to apply the principles of geometrical knowledge; he showed them how to sow and how to gather fruits; in short, he instructed men in everything pertaining to the culture of life. From that time (so universal were his instructions) nothing else has been added by way of improvement. But when the sun set, this being Oannes used to plunge again into the sea and abide all night in the deep; for he was amphibious.”
Berosus' statements with regard to the mythology and history of his own people have been so amply confirmed by cuneiform documents,\(^1\) that at the outset we may assume with safety, there was a general Babylonian tradition, according to which the beginnings of agriculture and architecture, religion and legislation, writing and reading, mathematics and astronomy and other sciences, and of the various handicrafts and arts practiced by the inhabitants of lower Mesopotamia were lost in the remotest antiquity. The general correctness of this view of the extraordinary age of Babylonian civilization has for some time been inferred from the remarkable discoveries made in the deepest strata of Nuffar, Tellô, Fàra, Bismâya, and Abû Habba, which at a moderate estimate lead us back into the third and fourth pre-Christian millennia. In studying those early remains of Babylonian art and literature, certain natural conclusions and comparisons with well-established facts force themselves inevitably upon us. We know for certain that the comparatively high state of civilization revealed by such monuments as, e.g., the pre-Sargonic arches, wells and drains;\(^2\) the stele of victory commonly known as "the stele of vultures," erected by Eannatum,\(^3\) the still older bas-relief representing the solemn meeting of two great chiefs and their retinues of warriors,\(^4\) the remarkable heads of bulls and goats in copper with inlaid eyes from the time of Ur-Ninâ;\(^5\) the silver vase of Entemes\(^6\) and the numerous inscriptions of that early period—even preceeded by those archaic tablets on which writing in part is still pictorial\(^7\)—cannot have sprung into

\(^1\) Cf. on this whole question Zimmern's recent observations in Schrader's K. A. T., pp. 490, 530ff., 543ff.


\(^3\) Cf. De Sarzec-Heuzey, Découvertes, PIs. 3, 3bis, 4, 4bis, 4ter, and for the literature concerning this monument cf. Heuzey, Catalogue, p. 117.

\(^4\) Cf. De Sarzec-Heuzey, Découvertes, Pl. 1bis, No. 2; 1ter, Nos. 1a and 1b, and also Heuzey, Catalogue, pp. 86-9. To the same period belongs the limestone fragment from Nippur published by Hilprecht, B. E., Series D, Vol. I, p. 487.


\(^6\) Cf. De Sarzec-Heuzey, Découvertes, PIs. 43 and 43bis, and as to the literature referring to it cf. Heuzey, Catalogue, p. 380.

MATHMATICALLY, METEOROLOGICAL AND CHRONOLOGICAL TABLES.

have been the result of a gradual development of many years.

On the basis of this and other arguments drawn also from a certain Semitic influence and the evident decay of the Sumerian language, noticeable even in the earliest inscriptions at our disposal, and with due regard to the enormous accumulation of debris below the ancient arch of Nippur, I had, some time ago, reached the general conclusion that the first settlements of this city cannot have been later than c. 7000 or 6000 B.C. My discussion of the new chronological fragment published on Pl. 30 (cf. Chapter IV) will furnish material to show that the Babylonians had facilities to follow their political history far beyond the time of Sargon I and Naram-Sin (c. 2700 B.C., cf. Chapter IV, below), by means of ancient lists containing the names and reigns of at least as many pre-Ur-Etager rulers as we know to have lived between Ur-Etager (certain time between 2500 and 2000 B.C. to the fall of Babylon 539 B.C.). In other words, at a moderate estimate, the Babylonian scholars of the later period were able to trace the history of their country chronologically as far back as the fourth millennium before our era.

This does not need to surprise us, considering the startling but well-founded results obtained by Hommel and Winckler through their examination of the names of certain Babylonian months. As early as 1891, Hommel had drawn the conclusion from the designation of Tammuz and Elul, as the month of sowing and the month when the grain is in the ear, that these two months must have fallen much earlier than in historical times, when they correspond to our June-July and August-September respectively. He wrote as follows: "Ja, einige der bisherige [zeit. der Mondnahmen] müssen sogar als Vorbeispiel einer noch früheren Zeit [et. his Aufsätze und Abhandlungen, pp. 355 and 459] bezeichnet werden. Denn wenn der sumerische Name des vierten, bzw. vor 2500 v. Chr. dritten, Mondes den Namen "Aussam," der sechste (bzw. fünfte) aber "Abur der Göttin Istar," an auf die Ernte und den Dreschen erinnert, so passt hier den Landesverhältnissen nach weder der Juli (bzw. Juni) fürs erste, noch der September bzw. August..."


3 It will be wise to keep these facts in mind when assigning any to the value of certain ancient dates furnished by Nabenduow and Winckler, to regard entirely without value. Cf. my R. F. "Zweite Reihe XVII," p. 369, and Schrader, K. 4. 77, pp. 17. For my present attitude towards the chronological opinion of Chapter IV, below.

furs zweite. Die Sonne muss mindestens noch zu Frühlingsanfang im Zeichen des Krebses oder gar des Löwen gestanden haben, wenn die alten Namen für den Tammuz und Elul irgendwelchen Sinn haben sollen; damit sind wir aber in 7. oder gar 8. vorchristlichen Jahrtausend; denn nach Littrow nahm die Mitte des Krebses im Jahre 6770 v. Chr. den Frühlingspunct ein.\textsuperscript{11}

Winckler arrived at similar results in his discussion of the significance of IV R.\textsuperscript{2} 33 (a list of the Babylonian months, with the corresponding gods placed alongside). Some of his more important sentences may be reproduced here literally: \textit{"Die Monatsliste zeigt deutlich, dass die Vertheilung der Monate an die einzelnen Götter eine Zeit voraussetzt, wo das Jahr im Sivan begann, d. h. wo die Sonne in den Zwillingen aufging, also zwischen 5700 und 2500." \ldots \textit{"Die Monate Nisan und Airu sind also erst später vom Ende des Jahres an die Spitze gesetzt worden, als man den Ausgleich mit dem Wellenrücken der Sonne in Stier und Widder vornahm." \ldots \textit{"Wann die Aussaat in den Februar (=Tammuz) und die Ernte in Mai--Juni (=Elul) fällt, so führt das auf einen Frühlingsanfang im Zeichen des Krebses oder sogar des Löwen, also vor 7000, denn um 6770 v. Chr. stand die Sonne in der Mitte des Krebses." \ldots \textit{"Der Monat Sins, der Sivan, wird also hier [Sargon Cyl. 57--90] als der Monat des Jahresanfangs, des Frühjahrsaquinoxiums, behandelt, wie es im 7. Jahrtausend der Fall war. Die Mythologie und Weissagung rechnet demnach noch mit den damaligen Bedeutungen der Monate und nicht mit denen ihrer Zeit."}

\textit{"Das Gleiche gilt von der sich sogleich an die obige anschliessenden Bezeichnung des Monats Ab, als arab warad Gibil, der Monat des Herbststeines des Gibil (Feuergott), denn dieser steigt bekanntlich 50 Tage nach dem Frühjahrssolstice, nach dem Wiedereinsetzen der Frühjahrsonne (Marduk-Tammuz) herab. Also auch hier entspricht die mythologische Bedeutung des Ab den Verhältnissen des 7. Jahrtausends."}

Winckler, in adding new proof that Babylonian mythology rests largely upon astronomy, shows at the same time that the period reflected by many of the calendar myths is the time between the sixth and the fourth pre-Christian millenniums, and that, moreover, this period in which the Semitic Babylonian civilization grew and developed, gradually superseding the Sumerian and everywhere influenced by the latter, was the fundamental period for the entire following civilization generally designated as Babylonian. In later times the ancient learning was regarded as the true one.\textsuperscript{3} The art of soothsaying and divination, according to a cuneiform inscription, originated with En-me-Duraniki,
the seventh mythical king of Babylon, Enuma Elish,1 whose name is general given back to antediluvian times, when "the ancient sages" (Caldecott, "Menes of the Earliest"), lived and committed their sayings to writing.

Our knowledge of Babylonian science and literature, however, has hitherto been derived chiefly from the Library of Ashurbanipal (668-626 B.C.), which, according to the codlomons often found on the tablets, consisted largely of copies of Babylonian originals preserved in the cities of Akkad, Babylon, Cuthah, and Nippur. But it was generally maintained by Assyriologists that many of the scientific and literary texts from the Kuyunjik collections were not the first time fixed in writing in the seventh century before Christ, but existed in some form or other in a considerably earlier period. This view rests principally on internal evidence and was the result of a critical examination of the writing, language, and content of the tablets. It will be sufficient for my purpose to quote a few examples from a constantly growing number. Compare, e.g., the fragmentary lists of archaic signs and picture characters (to many of which the Assyrian scribe added the later cuneiform equivalents) published by Houghton in "Transactions of the Society of Biblical Archaeology," Vol. VI, pp. 145 ff., and King in "Cuneiform Texts," Vol. V (cf. also Belz, "Catalogue").

On the hymn of thanksgiving by Nebuchadrezzar toward the end of the twelfth century B.C., known from K 2600, K 3141, D.T. 71, and the same king's song of lamentation preserved through K 3426. On the two fragments of royal letters, K 3015 and K 2641, which from their mention of earlier Babylonian and Assyrian kings and the use of the characteristic Old-Babylonian letter-formulae were shown to be copies of originals written some time in the second pre-Christian millennium. Or the inscription of the Cassite king Agum-Kakrime (c. 1600 B.C.) known only from a copy of the royal library in Nineveh. Or...
the collections of laws written on K' 4223, Rm. 277, and other tablets,\(^1\) and the numerous fragments of the grammatico-legal series called ana itti\(\text{-}\)sha, which on account of certain peculiar spellings and the occurrence of words, phrases, measures, etc., characteristic of the Old-Babylonian contracts, points to the third millennium before Christ as the probable time of its compilation.\(^2\) Or, the legend of Sargons of Agade (K' 3401 + Sm. 2118, K' 4470),\(^3\) who is said to have lived about 3000 years before Ashur\(\text{-}\)nina\(\text{-}\)pal, or the tablet of omens referring to the same Sargon and his son Nar\(\text{-}\)am-Sin and evidently containing historical facts based upon ancient lists of dates.\(^4\) Or the legends of Hammurabi, Libit-Ishtar of Isin, Dungi of Ur, Nar\(\text{-}\)am-Sin and other early kings published by King in "Cuneiform Texts," Vol. XIII, Pls. 44-47, 49-50.\(^5\) Compare also K' 8805 + 10,238 + 10,888 and K' 11,596 with Johns in "American Journal of Semitic Languages," Vol. XVIII, No. 3 ("A new pat\(\text{-}\)esi of Ashur"), and Bezold's remarks in Z.A., Vol. XVI, p. 417f.

In quite a number of cases the internal evidence could be supported by subsequent discoveries and excavations. Thus, e.g., the legend of Adapa, known from K' 8241 and a few other fragments,\(^6\) was shown to have found its way even into Egypt as early as c. 1400 B.C., through Berlin, V.A., Th. 348, edited by Winckler and Abel, Thantafelfand von El-Amarna, p. 166, a and b. The legend of Etana (cf. especially K' 2506 and K' 8563) was committed to writing (in part even literally identical with the later version) at least at the time of Hammurabi (cf. the fragment published by Scheil in Recueil, Vol. XXIII, No. LV of his Notes d'épigraphie et d'archéologie assyriennes).\(^7\) Portions of the Gilgamesh epics, for the greater part edited by Haupt in Das Babyloniische Nimrod\(\text{-}\)epos,\(^8\) were proved by Meissner in Mitteilungen der Vorderasiatischen Gesellschaft, 1902, pp. 1ff. (cf. Pinches in P. S. B. A., 1903, Pls. 8 and 9), to have existed in a different version at the time of the first dynasty of Babylon (Berlin, V.A., Th. 4105). The legend attached to the name of an ancient king of Cuthah (K' 5418, K' 5640, K' 8582) can now be studied from a much earlier fragment (c. 2000 B.C.) published by Scheil in Recueil,


\(^{5}\) Cf. also King, "Babylonian Religion and Mythology," pp. 198ff.

\(^{6}\) One of them published by Scheil in Recueil, Vol. XX, on the plate accompanying his Note XXXVIII. Cf. also Jensen in Schrader's K. B., Vol. VI, pp. XVIII, 92ff., and Zimmern in Schrader's K. A. T., pp. 520ff.


Vol. XX, pp. 65f., Note XXXV.1 The story of the Deluge, familiar to us from numerous fragments of the royal library in Nineveh, can be traced back to the time of King Ammi-zaduga by the aid of a fragment of the second tablet of a composition called *ēnuma ellenādis*, also published by Scheil in *Revue*, Vol. XX, Note XXXV; while the story of a creation of men by the goddess Mani, referred to on K 3295 and K 3351 (with which et. K 3522, the seventh tablet of the creation, containing the hymn to Marduk), has been recognized by Zimmern on the badly preserved fragment Ba 91–539, 269, belonging to the period of Hammurabi. In this connection we may also refer to the numerous tablets of forecasts known from Ashurbanipal’s collections, remembering that similar texts existed towards the end of the third millennium before Christ. Cf. e.g., King, “Cuneiform Texts,” Vol. V, Nos. 22, 116 and 22, 147, compared with Zimmern, *Religion*, p. 85, and Hunger, *Recherchenzusammen bei den Babylonern*, pp. 61ff.

We are therefore justified in ascribing the origin of entire branches, not to say the bulk, of Assyrian literature dealing with ancient writing, mythology and history, hymns and incantations,1 laws, astronomy and astrology, etc. (and for the greater part first known from the library of Ashurbanipal), to at least the period of the first dynasty of Babylon. Cf. on this question, e.g., Zimmern, *Babylonische Hymnen und Gebete in Auswahl*, p. 4 (also p. 281): “Bei der uns bis jetzt vorliegenden babylonisch-assyrischen Hymnen- und Gebete-Literatur kann von einer allmählichen geschichtlichen Entwicklung, die wir bei ihr verfolgen, kaum die Rede sein. Die Hymnen und Gebete an die Götter werden vom dritten Jahrtausend v. Chr. bis zu den letzten Zeiten, da noch babylonische Literatur aufgezeichnet wurde, d. h. bis kurz vor Beginn unserer christlichen Ära, fast unverändert weitertradiert. So stellen sich, R. Hymnen und Litaneien an den Mondgott Sin, an den Gott Tammuz, die wir aus dem zweiten Jahrhundert v. Chr. besitzen, als direkte Duplikate der nicht etwa nur zu Texten aus der Bibliothek Assurbanipals (vielleicht Jahrhundert v. Chr.), sondern sogar auch zu solchen aus der Zeit Hammurabi (K. 3295, 269) gehören. Nun ist aber doch nicht anzunehmen, dass sich die babylonische Religion im wohl die zwei Jahrtausende nicht stark verändert und weiter entwickelt hatte; vielmehr haben wir eine zweite direkte Zeugnisse, die beweisen, dass solche Weiteverwirklichung, wie ja auch selbstverständlich, in der Tat statt gefunden hat. Die uns vorliegenden Hymnen und Gebete gewähren darum im allgemeinen nicht

Winckler, as already indicated above (p. 4), after reviewing the essential features of the entire civilization of the ancient Babylonians as revealed by their religion, astronomy and astrology, their calendar, their system-of numbering and measuring and by their other attainments, comes to the result that "bereits am Anfange der ältesten geschichtlichen Kenntniss alle diese Dinge in jenes wissenschaftliche System gebracht waren, und von diesen aus auf uns gekommen sind." Many facts could be gathered, and many inevitable conclusions might be drawn from the earliest inscriptions known to us in support of Winckler’s theory, with which the present writer agrees entirely. But in order to overcome old prejudices, it may seem preferable not to rely upon internal evidence exclusively, but to support it by more ancient literary and scientific documents. For we must confess frankly, many gaps are to be filled out, before the evidence is complete.

The discovery of the famous "Code of Hammurabi," rightly styled "one of the most important documents of the entire human history," proved beyond any doubt that the fragments of legal literature from Ashurbanipal’s library above referred to (pp. 5f.) and the laws in use at the time of the Neo-Babylonian empire existed already at the end of the third millennium. And furthermore, a comparison of their contents with the legal and commercial documents of the period of the dynasty of Isin and the second dynasty of Ur preceding it proves conclusively that Hammurabi did not invent these laws, but codified only what, for the greater part, had existed a long time before him.

A similar statement can be made with regard to Babylonian chronology and metrology. For early chronological lists compare Chapter IV of this Introduction. The metrological facts gathered by Reisner, Thureau-Dangin and others from dated docu-

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1 Cf. Winckler, Die babylonische Kultur in ihren Beziehungen zur unsrigen, p. 23.
2 Cf. the result of the writer’s examination of the lowest strata of Nippur, referred to above, pp. 2f.
3 Cf. Winckler, Die Gesetze Hammurabes, pp. 6f.
4 My statement concerning the legal expressions in use at the time of the dynasty of Isin rests upon unpublished material from Nippur dated in the reigns of the kings Ur-Ninib, Bēr-Sin, Istar-KA-sha, Anshu-ili-bain, Bēl-bain and Dōnig-ilishu. Cf. Chapter IV, below.
8 In Recherches sur l’Origine de l’Écriture Cunéiforme, pp. 81-90.
ments of the second dynasty of Ur, and even of a considerably older period, reveal the same system of measuring we find in use at the time of Hammurabi. The Old-Babylonian scale of weights known from Berlin F. 1. Th. 1155, and the list of measures of capacity preserved on the Berlin cylinder F. 1. Th. 2506, would therefore seem to stand in practically the same relation to the earlier commercial, etc., tablets as the Code of Hammurabi to the preceding legal documents. It will, however, be shown in the following pages that such metrological tables or classified lists of early Babylonian measures, and also chronological lists, existed already at the time of the kings of the dynasty of Isin and even before.

Thus far we have examined only single scientific and literary products of the second and third millenniums, from which—in addition to other texts not quoted above—Assyriologists felt justified to draw important conclusions as to the existence of certain branches of literature at this early period. Our knowledge of the literary activity and scientific method towards the end of the third millennium before Christ was considerably advanced by King's The Letters and Inscriptions of Hammurabi, 3 volumes, London, 1898-1900, and Scheil's Une Saison de Famille à Sipper, Cairo, 1902, in which for the first time entire collections of ancient tablets other than the ordinary temple records and votive inscriptions were made known to the public. The first mentioned Letters claim our interest both as literary compositions and as official documents containing important historical facts, and at the same time illustrating the king's relation to his vassals and provinces and the administration of justice by the monarch and his officers. On the other hand, the numerous literary and scientific texts published by Scheil—such as fragments of epical literature (cf. pp. 61, above), hymns, incantations, exorcisms, proverbs, astronomical and astrological, mathematical and metrological tablets, plans of fields, and other drawings, sign lists and syllabaries, rationally arranged collections of grammatical and lexicographical material, lists of proper names and name elements, analyses of legal documents, letters, etc., demonstrated that practically all the branches of Babylonian literature known from Ashurbanipal's library were cultivated at the time of Hammurabi.

My former investigations in connection with the earliest inscribed tablets and artistic remains from Tell'oi and Nufil were summed up thus: "Ancient Sumerian art and science have gradually degenerated under the Semitic invaders. It is true in certain epochs of national importance a laudable renaissance took place, and much that is worthy of recog-

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3. By the fragments published on Pla 67/68 of the Journal de Tablettes Chaldéennes, Théodore Pinney has shown that plans of houses, fields, cemeteries, etc., were already drawn on clay tablets at the time of Sargon I of Agade.
nition was accomplished in many departments in the days of the kings of Ur, of a Hammurabi, of the PA-SHE [=Isin] dynasty, of an Ashurbanapal and a Nebuchadrezzar; but compared with that highly developed civilization on the threshold of the fifth and fourth millenniums, the new shoots are only miserable aftergrowths of a great period of independent creation long past. 1 In order to understand and appreciate this ancient fundamental period more fully than is possible at present, we need an increased number of literary and scientific tablets older than the seventh century, which will enable us to trace the various branches of Assyro-Babylonian literature and the contents of certain representative texts step by step through the centuries even further back than we can do with the material already published, and which may even help us to determine the place, time and circumstances of their original composition and the changes they naturally must have undergone in the course of millenniums under different political and religious conditions and many other influences. The final result will doubtless prove the correctness of the view of the extraordinary age of the entire Babylonian civilization maintained by Berosus, and in very essential features already corroborated by modern Assyriological research. The texts from the Temple Library of Nippur published in this and other volumes of Series A will, it is hoped, contribute their share towards the solution of the problem by enabling us to trace the different branches of Babylonian literature known from the library of Ashurbanapal (c. 650 B.C.) to the middle of the second and to the middle of the third millennium, and in some cases even beyond it.

In the first chapter devoted to this subject—Chapter II of the present volume—the writer will endeavor to show, how a certain class of tablets correctly designated by Berosus as mathematical in his Literatur and “Catalogue,” but represented only by a few specimens in the royal library of Nineve, can be studied for the first time methodically with the aid of the important new material made available through the discovery of the Temple Library of Nippur. As far as unearthed and studied, this library consists of two large collections of tablets and fragments, like the library of Ashurbanapal (cf. p. 5, note 3), discovered in two different buildings at two different parts of the mound. The one, excavated in the long ridge to the west of the Shat’t en-Nil, 2 was written at the time of the Cassite rulers (c. 1350 B.C.), the other, found in the large triangular mound opposite it, 3 dates from the period of the first dynasty of Isin (c. 2200 B.C.). For further details as to the age and contents of the Temple Library cf. Vol. XIX, Chapter I (in press). Specimens from both collections are submitted to Assyriologists in the following pages.

2 Hilprecht, “In the Temple of Bel at Nippur,” p. 69 (= Vortroig, p. 71).
II.

MULTIPLICATION AND DIVISION TABLES.

The mathematical and metrological texts thus far published are not very numerous. Bezold, in his *Literatur* (1886), pp. 225f., enumerated only six inscriptions, three of which are rather lexicographical in character. Since then a few more tablets have been added by Pinches and King from the collections of the British Museum, by Meissner and others from those of the Berlin Museums, and by Scheil from the results of his excavations at Abu Habba. The new texts which we owe to the last mentioned French Assyriologist are ten metrological texts (including variants and duplicates, cf. *Sippar*, pp. 49-51) and three mathematical texts, No. 289 (a multiplication table: $25 \times 1$), No. 428, and No. 659 (a table of square roots, known already from *IV B*, p. 374). Besides there have been published a number of topographical plans, which may be grouped under the general

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1 The inscription quoted by Bezold under No. 6 of his list (p. 226) written on a fragmentary very small piece of clay. According to Remane's *Orientalische Forschungen*, pp. 107-108, No. 89, p. 224, it contains "... a table of the values of the cubical contents of a group of gas, the number of which was unknown" (i.e., the number of the gas). For a new text, see Dörpfeld, *Jahresbericht* (1889), pp. 450-451.

*II. Mathematical and Metrological Texts. Part IV. N. *Baber and S. J.*

R. J. P. Pl. 56, 57. No. 29, above.


25 Commercial and topographical plans. See also *Babylonische Tafeln*, p. 13.

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*II. rattled under the general title of "Topographical Plans."*
class of mathematical tablets, and certain lexicographical fragments, which are important for our knowledge of the Babylonian numbers. In the fifth volume of his Catalogue, Bezold quotes only four tablets from the royal library of Nineveh as "mathematical calculations," three of which are known to us in part or completely, while the fourth (K'0010) consisting of ten lines (Bezold, *l.c.*, p. 978: "Line 1 of reverse contains a sum total") is still unpublished. It may be that some of the c. 30 unpublished tablets of the Kuyunjuk collections, referred to by Bezold in his Index under "Geometrical Figures," "Amulets" and "Astrolabes," belong to the class of mathematical tablets; but being described in the catalogue proper as "omens," "forecasts," "incantations," "a letter from the king" (K'13,154), "part of a religious text" (K'S111), "portions of a spheroid," etc., they are better excluded from our present discussion. An opinion as to the possible meaning of the "geometrical(?) figures" found on a number of these tablets was recently expressed by Bezold himself in *Z. f. A*, Vol. XVII, pp. 95f.

With regard to their contents, the real mathematical tablets above referred to do not offer a great variety. Omitting *Br. Mus.*, Nos. 85,194 and 85,210, which present certain difficulties, and *Sippar*, No. 428, which is too fragmentary to be deciphered with any degree of certainty (cf. however p. 25, note, below), we thus far possess only a table of


2 K'3168 (= IV K'37); K'8527 (described by Bezold, *l.c.*, p. 935, as "Babylonian; not from Konyunjik(?). Mathematical calculations, similar to those of K'3168. . . Cf. also 81-2-1, 72",), and K'0909 (four lines of which were published by Bezold, *l.c.*, p. 400. For my interpretation of this text cf. pp. 25ff., below). K'8527 was determined by King some six years ago as a multiplication table (15 x 1). Cf. "A Guide to the Babylonian and Assyrian Antiquities," British Museum, 1900, p. 292, No. 15 (Case I), where the text is referred to under its exhibition number, 92,703 (I owe this information to a personal communication from King, as from the description given by Bezold in his "Catalogue") I naturally could not have recognized K'8527 in No. 92,703. (Cf. also p. 13, note 3, below.

3 At my request King kindly examined K'0909 and K'0910 for me. K'0909 will be discussed on pp. 25ff. K'0910, according to King's copy, is too fragmentary to determine its contents absolutely. I am, however, inclined to regard it as a mere tabular statement concerning certain objects registered and counted; in other words, I do not believe that it is a mathematical tablet, but a business or administrative record somewhat similar to those recently published in large numbers by Clay in *B. E.*, Series A, Vols. XIV and XV.
The mathematical texts here published may be classified as multiplication tables, division tables (previously not recognized and generally found in connection with the former on the same tablet), tables of squares, tables of square roots, a geometrical progression (Pl. 15, No. 25; cf. Pl. IX), and the fragment of a class of texts (Pl. 15, No. 25a) which will receive proper attention in Part 2 of this volume. For another class of mathematical texts see, for the present, *Förerlg*, p. 60, Jb. 46 (= "Lecture," p. 31, No. 11). The tables of squares and square roots on Pls. 16 and X, though previously known from other sources, have been published as an illustration of the variety of the mathematical texts excavated at Nippur, and at the same time to enable Assyriologists to control my statements with regard to the contents and age of the tablets in question. Moreover,

1 At least two (also 81-23-1, 7.27) in the British Museum, K 3186, Oliver = IV E 2 100 and B. Max. No. 12,136, Reconstructed IV E 2 135; one in the Royal Museum of Berlin, 11 1/2; in *Leipzig Museum*, 651, and one in the Imperial Ottoman Museum at Constantinople, Suppl. 639 = p. 24 note 3.


3 Abdi Halil, where, after my excavation, later discovered a considerable number of multiplication tablets of the same general character." I wondered whether I had overlooked any publication from which Peters could have gathered his information. Though familiar with the results of Schultze's excavation in the Imperial Ottoman Museum at Constantinople, I thought it best to address a letter to the French scholar, enquiring whether he had recovered any other mathematical tablets at Abdi Halil than the three reported by Ludwig in Suppl. only one of which is a multiplication tablet.

4 The immediate answer was, "Kaveitham, them seben che niam? I know of nothing else."

5 Cf. Bezold, *Catalogue*, p. 93, under K 8527. "Babylonian, not from Uruk-jagur." After an examination of the four lines, the first three and the last of the consonant text copied for me by King entirely agree with Bezold's view, also shared by King in correspondence by letter, that the tablet is Babylonian, not Assyrian. It is, however, considerably older than examined by Gude, *Bib. Max.*, p. 331 (also p. 12, note 2 above).

the tables of squares given on Pls. 16 and X differ somewhat from IV R.2 37, in so far as A-DU(R.H.1) is not used in the two Nippur texts, and the writing of the number 19 is peculiar on Pl. 16, No. 26. As indicated above, p. 10, and stated in detail in the "Description of Tablets and Ruins" (Chapter V), the mathematical and metrological tablets here published belong to the second (c. 1350 B.C.) and third (c. 2200 B.C.) pre-Christian millennia; they were taken from two collections of tablets written at the time of the Cassite rulers and the kings of the first1 dynasty of Isin respectively. The geometrical progression Pl. 15, No. 25, characterized by the peculiar form of its tablet; and the fragment2 published on Pl. 15, No. 25a belong, however, to an earlier period, not later than the second dynasty of Ur.

All the multiplication tables submitted were excavated by our expeditions at Nippur, except "9 × 1" (cf. Pl. 2, No. 3, and "Table of Contents"), which was purchased (with another mathematical tablet) by Noorian, a member of our first and second campaigns, from Arabs, who informed him that both came from Abū Habba.3 Arab veracity is too well known among Semitists to require any illustration on my part. We may take it for all that it is worth, but we must surely be permitted to disregard an Arab statement altogether if contrary to all sound reasoning and internal evidence. After a careful examination of the whole question, I had reached the conclusion some time ago that the multiplication table obtained by Noorian for the University Museum did not come from Abū Habba, but from Nippur, where evidently it had been stolen from our trenches or secretly been excavated by some Arab(s). For this reason a photograph of this tablet was already used in my German Vortrag, p. 60, Abb. 45, as an illustration of the contents of the temple library, from which at the time the lecture was delivered and printed I was thousands of miles away. The other mathematical tablet just referred to will appear in Part 2 of the present volume. My reasons for assigning the purchased multiplication table, 9 × 1, to the ruins of Nufiar, as its place of origin, are briefly summed up as follows:

1. Stealing and secret digging was carried on by the Arabs at Nufiar long before our arrival there in 1889, and has been continued ever since. This is proved by the upper part of a large boundary stone in the Royal Museums of Berlin, described as coming "from Nippur" in Verzeichnis der Vorderasiatischen Altertümer und Gipsabgusse.

1 I designate the dynasty represented by lāhā-Girra and his successors (cf. Chapter IV, below) as the first, and the members of the P.A-SHE (= Isin, cf. p. 10, note 1, above) dynasty as the second dynasty of Isin.
2 The rounded corners and the convex surface of the Obverse (without a knowledge of its inscription scarcely to be distinguished from the Reverse of the tablet) is a peculiar feature of the earliest clay tablets (cf. Thureau-Dangin, Recueil de Tablettes Chaldéennes), which, however, occurs occasionally as late as the second dynasty of Ur.
3 In color and writing this fragment shows the peculiarities of the Nippur and Jekka tablets dated in the reigns of the kings of the second dynasty of Ur.
1889, p. 66, No. 243; by a doorsocket of Engur, for many years in the possession of Hajji Turrâ, which according to its inscription belonged to the temple of Bûl, but afterwards had been carried away by the Arabs from Bart el-Amir (cf. Peters, *Nippur*, Vol. II, p. 269); by the ancient beds and other ornaments worn by the Akkadian women around Nuffar, which they declare to have taken out of the collars and burial urns of this mound excavated by them in a very primitive manner; and lastly by our own repeated experience at Nuffar, and by numerous dated and undated Cassite tablets frequently offered for sale in the bazaars of Constantinople. 


2. As this and the following parts of Vol. XX will show, the multiplication tables are a characteristic feature of the Temple Library of Nippur—e. g. 15 tablets being published here (cf. p. 29, below)—while the excavations at Abû Habba thus far have yielded but one multiplication table, which, moreover, has very peculiar features of its own.

3. The multiplication table $9 \times 1$ has certain features in common with other Nippur multiplication tables of the Cassite period: its color of clay, palaeography and general appearance, its not using $\text{A} \times \text{AM} \text{E} \text{E}$, "times" (cf. Nos. 2, 8, 12, 15, 17, 19, also 26), its not being ruled (cf. Nos. 2 and 12), its not being dated (a feature in common with all the multiplication tables of Nippur thus far excavated), its use of the cuneiform sign $\frac{\text{M}}{\text{M}}$ (for "1"). There cannot be any doubt that the tablet in question belongs to the Cassite period, which is represented by more than 18,000 tablets and fragments from Nippur, while thus far, according to my knowledge, not one clay tablet of the same period has been excavated at Abû Habba. But more than this, the only multiplication table ($25 \times 1$) discovered at Sippur differs essentially from similar Nippur tables in its use of the ligature $\frac{\text{M}}{\text{M}}$ for $\text{A} \times \text{AM} \text{E} \text{E}$, never occurring on any Nippur tablet but known also from other Sippur tablets (cf. Part 2 of this volume); in its use of the cuneiform sign $\frac{\text{M}}{\text{M}}$ for "4," found sometimes on the earlier mathematical, metrological, chronological, etc. tablets from Nippur (cf. Nos. 7, 29, 47); and in being dated in the year of a king of the first dynasty of Babylonia. For though the cuneiform signs following $\text{SHE} \times \text{KULI} \times \text{AM} \times \text{E} = \text{AB} \text{L} \text{AM} \text{E} \text{E} \text{E}$ are not quite certain, the mode of dating according to a "year following that in which" such and such a thing happened, and the ideographic writing of the fourth month with $\text{A}$ as the last sign, instead of the
regular A RA (exclusively in use at the time of the Cassite period), are sufficient to show that the Sippar tablet was not written during the time of the Cassite rulers, but must belong to an earlier period, probably the time of the Hammurabi dynasty.

4. Upon my request Prof. Amos P. Brown, of the University of Pennsylvania, kindly subjected the clay of a number of tablets from Nippur, Babylon and Sippar, including the multiplication table 9 × 1 and the Nippur tablet 6 × 1 (excavated by Peters in the course of his second campaign), to a microscopical examination and a chemical analysis. Without having any knowledge as to their places of origin, he at once separated these two multiplication tables, as forming a distinct group by themselves, from the rest of the tablets, declaring their clay to be practically identical and apparently taken from the same bed.

All the multiplication tables, including K 8527 and Sippar, No. 289, are arranged in the following manner: The figures 1 to 20, 30, 40 and 50 are given in their consecutive order, together with the amounts obtained by multiplying each figure by a certain number. According to the use or omission of the ideogram A-DU(RA) representing our sign of multiplication (× = "times"), we distinguish three different ways in which these tables are written:

<table>
<thead>
<tr>
<th>I.</th>
<th>II.</th>
<th>III.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 A RA</td>
<td>1 2</td>
<td>540</td>
</tr>
<tr>
<td>A RA</td>
<td>2 3</td>
<td>1080</td>
</tr>
<tr>
<td>A RA</td>
<td>4 6</td>
<td>1620</td>
</tr>
<tr>
<td>A RA</td>
<td>5 8</td>
<td>2160</td>
</tr>
<tr>
<td>A RA</td>
<td>6 10</td>
<td>2700</td>
</tr>
<tr>
<td>A RA</td>
<td>7 12</td>
<td>3240</td>
</tr>
<tr>
<td>A RA</td>
<td>8 14</td>
<td>3780</td>
</tr>
<tr>
<td>A RA</td>
<td>9 16</td>
<td>4320</td>
</tr>
<tr>
<td>A RA</td>
<td>10 20</td>
<td>4860</td>
</tr>
<tr>
<td>A RA</td>
<td>11 22</td>
<td>5400</td>
</tr>
<tr>
<td>A RA</td>
<td>12 24</td>
<td>6480</td>
</tr>
</tbody>
</table>

1 Cf. the constant writing SHU-KUL-X1 on the tablets published by Clay in B. E., Series A, Vols. XIV and XV, also No. 162 of his "List of Signs" (Vol. XIV). Though I catalogued thousands of other tablets of the same period, I never found SHU-KUL-X1. The writing SHU-KUL on P(Weier) 100 is an abbreviation or a scribal error.

2 For the writing of the names of the months in use at this early period cf. King, "The Letters and Inscriptions of Hammurabi," Vol. III, pp. XXXVf., note 3, and the present volume, No. 46 (dynasty of Isin) and Chapter IV.

3 Cf. B. E., Series D, Vol. 1, p. 532. I have not come across this multiplication table again since I copied it in Constantinople, November, 1901. It is thus far the only one arranged in this manner besides the table of squares published on Pl. 16, No. 26. For a still other way cf. the table of squares IV R. 37 (1 A RA 1 = 1; 2 A RA 2 = 4; 3 A RA 3 = 9, etc.).
MATHEMATICAL, 

Il: \[ VNI ) \]

In the beginning of this line, the transposition of the transposition of the transposition, etc., is intended to be read as "...[page continues]..."
scribe He'i-Kargal."¹ No. 7, 24 offers "Viduba, which possibly was preceded originally by another sign, with which it formed the proper name of the scribe. At the end of other tablets we find a number, the meaning of which is not always clear (cf. No. 3, 24; No. 8, 24: No. 12, 26).² In some cases we have a colophon indicating the next lowest multiplication table of the whole series, sometimes preceded by the square of the number multiplied on the tablet (cf. e.g., No. 12, 24f., which reads: "432 × 432 = 186,624," also No. 16, 24, and No. 19, R., Col. II, 11, which originally read: "144 × 144 = 20,736"). Sometimes these colophons are of importance for the correct understanding of the multiplication table itself. Thus, e.g., No. 15 can be read either "9 × 1 = 11," or "9 sosx × 1 = 540," etc. The colophon, however, reading "500 × 1 = 500," the first mentioned interpretation is

¹ I read dKur-gal. For the reading dE-GAL, which in view of "Cum. Texts," Vol. II, 37 (=Bu, 91–5–9, 381), ii, 4, and B.E., Series A, Vol. X, p. 40 (Arslan-dE-GAL, MAJ), suggests itself, is excluded because of the oblique wedges in the sign after inu (cf. Clay, B. E., Series A, Vol. XIV, "List of Signs," No. 229, compared with No. 116). The reading dKur-gal (not Gog-gal) seems assured by a variant dKur-gal (most naturally read dUX-GAL by Clay, B. E., Series A, Vol. XV, p. 50), if we may regard the first sign (UX, cf. Clay, I.e., Vol. XIV, "List of Signs," No. 113) at the same time as a variant of PISII, KUR, KUR (ib., No. 171). But however this may be, in Vol. XV, No. 31, 2, we evidently have to read hit dGu-la-u (instead of the Ki of Clay’s copy) dKur-gal Nippurî, "the house of Gula and Kargal in Nippur"). This deity Kargal, which was worshiped in Nippur at the time of the Cassite dynasty, cannot be compared with the well-known ideogram dKUR-GAL, i.e., dHit, dImmuru (cf. Clay, B. E., Series A, Vol. X, pp. 7f.; Peiser, Urkunden aus der Zeit der dritten babylonischen Dynastie, p. VIII). In all probability it was a Cassite deity, also contained in the name dKur-ta-gal-za (V R. 41, 23ab), generally written dKur-ri (or dKur-i) gal-za (cf. Clay, B. E., Series A, Vol. XIV, p. 45). For the interchange of a and u before r in Cassite words cf. p. 17, note 4, above. In this case we would have to analyze Kur-yanalu (= r'i bitšakki), V R. 44, 23 ab, cf. Deitsch, Die Sprache der Assyrier, p. 23) as kurgal = r'i and zu = bitši. For the present, however, it may seem equally possible to regard Kur-yanalu as a Babylonian, not as a Cassite name. The element gala, which erroneously was thought to be an Elamite or Cassite god (Scheil, Délivrance en Perse, Vol. II, p. 8; Jastrow, Die Religion der Babylonier und Assyrier, 162); Clay, B. E., Series A, Vol. X, pp. 3 (note 3) and 54), is contained in quite a number of Babylonian names. Cf. e.g., A-ta-mar-GAL-za (= Atum-ras-bašu (= ras-bašu)) and A-ta-ma-ra-la-za (= ras-tašu), quoted by Clay, I.e., from the time of the Cassite rulers, or dDa-na-GAL-za and dDa-a-GAL-za from the time of Hammurabi, or dShamash-GAL-za and Skur-za-GAL-za (kindly communicated to me by Hommel) from the period of Sargon of Agade. Unless we regard GALL-ZU in these names as an ideogram, with an unknown meaning (cf. however Lugal-gal-su, Reissner, Tempelurkunden aus Tellah, 99, VIII, 1), the most natural interpretation is to read GAL-za (zu) = ras-bašu = ras-bus, and in view of such names as Ra-ba-at, Ra-ba-at-dShamash, Ra-ba-at-sTu (Banke, R., Series D, Vol. III, p. 137), to regard GAL-za (in Manishtusu, A, Col. IV, 2, read "Rabash, the judge," not Galzu-daijatu), dDamu-ras-bašu, etc., as abbrev. Semitic names, in which zu = su = šub, "his," refers to a deity. For a possible deity KUR (in Kurigalzu, if interpreted as Babylonian) cf. Dniehes, Alf. babyl. Rechtsurkunden, p. 19, and the names Kur-galum, Kur-kudum and Kuri-ilu (Ranke, I.e., p. 216).

² No. 8, 24, is perhaps to be changed into "1 721" ("1 × 72 = 72") and to be regarded as a colophon indicating that the next lowest number of the series, to which this multiplication table ("1 × 90 = 90") belonged, was not "1 × 81," as we should expect, but "1 × 72." (I, also p. 27, note 1.

In view of No. 16, 25, we also should expect the last line of No. 12 to indicate the next lowest multiplication table of the whole series, which would be "1 405" ("1 × 405 = 405"). If the highest number of the series was given, the closing line should read "1 450" ("1 × 450 = 450"). As however the last sign of this line is not clear, and the next highest number of a series is never given as a colophon, the real significance of this number remains obscure to me.

³ The whole question as to the meaning of the multiplication tables will be discussed below.
out of question. No. 16 closes with "750 \times 750 = 562,500," followed by the column "729 \times 1 = 729" (the next lowest number of the series).

Besides such single multiplication tables as published on Pls. I-7, the Babylonians had tablets on which different multiplication tables were given together. Cf. Nos. 17, 18, 19, 22 Rev., 23 Rev., and Pl. VII, Rev. It is to be observed that this class of multiplication tables begins always with the highest number to be multiplied, and ends with the lowest. Thus No. 17, which can be easily restored except the fifth number, which must remain doubtful, contained the following nine tables: 1080 \times 1, 1000 \times 1, 960 \times 1, 900 \times 1, 720 \times 1, 1,000 \times 1, 540 \times 1, 500 \times 1. Though very fragmentary, No. 18 has preserved remains of 2160 \times 1, 1500 \times 1 (Colv.) and 1000 \times 1 (Rev., Col. II); No. 19, portions of 300 \times 1, 240 \times 1 (Colv.), 180 \times 1, 150 \times 1, 144 \times 1, and 120 \times 1 (Rev.); No. 22, Rev., portions of 1350 \times 1, 1080 \times 1, 960 \times 1; No. 23, Rev., portions of 1350 \times 1 (Col. II), 1080 \times 1 (Col. I), 1000 \times 1 (Col. II), 900 \times 1 (Col. III), 720 \times 1, 600 \times 1 (Col. IV), 500 \times 1, 480 \times 1 (Col. V), 322 \times 1 (Col. VI). An autograph copy of Pl. VIII, Rev., which contains the multiplication tables of very high numbers (among them 180,000 \times 1, 162,000 \times 1 and 160,000 \times 1) will be published in Part 2 of this volume. For our present purpose it is sufficient to state that it is arranged like all the other tablets containing more than one multiplication table.

Including the Sippar tablet (25 \times 1) and K 5527 \times 1 (Col. I) — both being also represented in the Nishtar collections — and the colophons on Nos. 8, 13, and 16, the following 41-46 multiplication tables are thus far known to me from the Temple School and Temple Library of Nippur (cf. R. E., Series D, Vol. I, pp. 531 ff.):

1. The table, as stated above, p. 18, closed with 114 \times 114 = 20536. Hence, therefore, 114 + 114 =

2. Contrary to the custom as well as to what the Kerenyi tablet arranges in perpendicular columns, to be read from right to left, the bases than the Kerenyi after No. 11 the table must be read from left to right. The tables on the back, therefore, as 1800 \times 1, 1700 \times 1, 1600 \times 1, and 1500 \times 1 have been given earlier than the general principle of the highest number given last and lower numbers, if read from right to left, would appear to have been written in any order. A manuscript, X 24 B, and No. 29 Rev., shows that the columns of the former also cannot be read in the same way. The interpretation of No. 31 and 32, however, would be confirmed accordingly. What is called text Col. IV should be changed into X 24 B and No. 29 Rev., and text Col. V, into X 24 B and No. 25 Rev. The table on the back, in other words, is written in the manner of the Kerenyi tablet, but has been arranged as 0980 \times 1, 0820 \times 1, and 0660 \times 1, and not 0980 \times 1, 0820 \times 1, and 0660 \times 1.

3. The "25 \times 1" of p. 16 (and 16B) is X 25 Rev., and No. 24 Rev. Col. V, to be changed into Col. II, as stated in the preceding paragraph.

4. No. 8 is "72 \times 1" of p. 18 and 20B. Nos. 13 and 15 are also from No. 47, Rev. C II.

THE TEMPLE LIBRARY OF NIPPU.

\begin{align*}
2 \times 1 &\quad 50 \times 1 \text{ (No. 20, Rev., No. 21)} &\quad 540 \times 1 \\
3 \times 1 &\quad 60 \times 1 &\quad 600 \times 1 \\
4 \times 1 &\quad 72 \times 1 &\quad 720 \times 1 \\
5 \times 1 &\quad 90 \times 1 &\quad 750 \times 1 \\
6 \times 1 &\quad 100 \times 1 &\quad [810 \times 1?] \text{ (No. 17 Co. IV broken off)} \\
8 \times 1 &\quad 120 \times 1 &\quad 900 \times 1 \\
9 \times 1 &\quad 144 \times 1 &\quad 960 \times 1 \\
12 \times 1 &\quad 150 \times 1 &\quad 1000 \times 1 \\
18 \times 1 &\quad 180 \times 1 &\quad 1080 \times 1 \\
24 \times 1 &\quad 240 \times 1 &\quad 1350 \times 1 \\
25 \times 1 &\quad 300 \times 1 &\quad 1500 \times 1 \\
30 \times 1 &\quad 452 \times 1 &\quad 2160 \times 1 \\
36 \times 1 &\quad 450 \times 1 &\quad 3000 \times 1 \text{ (No. 22, Obv., Col. IV)} \\
40 \times 1 \text{ (No. 24, Rev., Col. IV)} &\quad 480 \times 1 &\quad 160,000 \times 1 \\
45 \times 1 &\quad 500 \times 1 &\quad 162,000 \times 1 \\
\end{align*}

In examining this series, we naturally ask the question, whether such multiplication tables are confined to certain numbers, or whether we may expect to find any number between 1 and 180,000 (or even higher) thus multiplied. In *B. E.,* Series D, Vol. I, p. 531, I inclined to the latter view, since abandoned. An attempt will now be made to show that a certain principle underlies these multiplication tables, the recognition of which will help us to determine their real purpose. Our attention is directed at once to three remarkable features: 1. Whenever several multiplication tables are written together, the highest number begins the series. 2. The numbers multiplied are not consecutive, but are often separated from each other by comparatively large intervals. 3. Besides 3 and 5, no undividable number or its multiple is multiplied (note the absence of 7, 11, 13, 14, 17, 19, 21, 22, 23, 26, 28, 29, 31, 33, 34, 35, etc.).

Since the quotient of a number divisible by more than one number becomes smaller the larger the divisor grows, the supposition forces itself upon us that the series of numbers multiplied on the same tablet may represent a descending series of quotients of an unknown high number divided by an increasing series of numbers contained in it. As, however, the divisors of a number are the same as the quotients in inverted order, it would be doubtful whether the single multiplication tables (cf. Nos. 1–16, No. 20,

1 To be changed into Col. III (cf. p. 19, note 2, above).
2 Unless to be read "50 \times 1."
3 For 180,000, 162,000 and 160,000 must also be contained in this number.
4 Which itself, however, must not be divisible by 7, 11 nor any other higher undividable number or its multiple.
MATHEMATICAL, METEOROLOGICAL, AND CHRONOLOGICAL TABLETS

Olv. and Rev., No. 21, Olv. and Rev., No. 22, O lv., are to be regarded as multiplied divisors or quotients. In view of the circumstance that the forty odd multiplication tables given above most probably do not represent all the numbers that used to be multiplied, and furthermore that we do not know whether the latter are divisors (or quotients) of one or more unknown high numbers, the solution of the problem seems to be most difficult. Fortunately, however, there are a number of mathematical tablets known from Nippur (four of which are published here, cf. No. 20, Rev., No. 21, Rev., No. 22, O lv., and No. 24, Rev.) which throw considerable light on the whole question.

These tablets are all fragmentary and otherwise mutilated, but a study and comparison of the cuneiform signs preserved on them enable us to restore a part of their original text completely. It is alike on all of them and reads transliterated as follows:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,640,000</td>
<td>6,480,000</td>
<td>1,320,000</td>
<td>324,000</td>
<td>259,200</td>
<td>2,160,000</td>
<td>1,620,000</td>
<td>1,440,000</td>
<td>1,200,000</td>
<td>864,000</td>
<td>810,000</td>
<td>1,080,000</td>
<td>648,000</td>
<td>720,000</td>
<td>648,000</td>
<td>720,000</td>
<td>540,000</td>
<td>1,800,000</td>
<td>1,400,000</td>
<td>810,000</td>
<td>518,000</td>
</tr>
</tbody>
</table>

According to No. 20, Rev., which is better preserved than any of the other three fragments, this text (being written three times alternately with 70 × 1) closed with "72 1,800,000." Observing at once that the first eighteen multiplication tables of the list published above (p. 20) are among the numbers standing at the beginning of the lines of this restored text, and that the last number of this text (1,800,000) is also one of the highest multiplication tables thus far known (Pl. VII), I continued the calculation to 81, thereby ascertaining that the other two high multiplication tables quoted from Pl. VII on p. 20, above 1,620,000 × 1 and 1,400,000 × 1, are identical with the closing numbers of the next two lines of our restored text.

This interesting text may be described as a division table, containing the divisors of
12,960,000 (= 60⁴ or 3600²) to 72 in an increasing series (the left numbers), together with their corresponding quotients in a descending series (the right numbers). If we continued the calculation still further, we would obtain all the numbers found in our list of multiplication tables and many additional numbers, which doubtless also formed part of the complete series of multiplication tables. For it is a fact that all the numbers multiplied on p. 20 are divisors or quotients of 12,960,000.

No. 22, Obv., Col. I, is especially important, because the divisors and quotients are not simply placed side by side, as on the three other fragments, but are separated by the cuneiform signs GAL-BI. A glance at No. 25 and Reisner's observations in Z. A., Vol. XI, p. 423, enables us to restore the beginning of this tablet as follows:

Line 1. IGI—1—GAL-BI (i.e., its two-thirds) = 8,640,000 A-AN
  " 2. IGI—2—GAL-BI (its half) = 6,480,000
  " 3. IGI—3—GAL-BI (its third part) = 4,320,000
  " 4. IGI—4—GAL-BI (its fourth part) = 3,240,000
  " 5. IGI—5—GAL-BI (its fifth part) = 2,592,000
  etc.          etc.        etc.
  " 13. IGI—18—GAL-BI (its eighteenth part) = 720,000

I may add that on some of the division tables examined by me a third (evidently abbreviated) expression is found, e.g., "IGI 3 4,320,000," "IGI 4 3,240,000," etc.

The number meant by BI, "its," is 12,960,000. The divisor (IGI-GAL, "having an eye," evidently thus designated as "the decider" (ershu) or "determinator" (i.e., the denominator) of a fraction, and perhaps to be read igigal or ershu (syn. of modâ) is expressed in each case by the number standing between IGI and GAL, while the quotient is characterized by A-AN (i.e., Sumerian am, or Assyrian ma, V R. 22, Obv. 30 a-d) attached to the last number,1 which thereby becomes distributive.2 Like the ideogram IGI-GAL, expressing our sign of division (:) or our fraction line (/), the sign of

1 A-AN is generally written only once (after the first quotient), on some tablets examined by me (cf. No. 21, Rev.) twice (also after the second quotient). It is doubtless to be supplemented after every quotient.

2 We therefore should translate more exactly: "12,960,000 divided by 2 is 6,480,000 each" (= je 6,480,000), "12,960,000 divided by 3 is 4,320,000 each" (= je 4,320,000), etc. That A-AN (or -en-A-AN) placed after a number was originally not regarded as a mere determinative, but actually pronounced by the Babylonians, who thereby rendered a number distributive, was already supposed by Jensen in Schrader's K. B., Vol. VI, p. 316. An especially instructive example is furnished by Strassmaier, Cambyses 121, which is to be translated: "3 oxen, 6 qa each (= A-AN) [per day], i.e., 3 gar (here correctly without A-AN) barley, feed for the month of [Kisli]; 6 oxen, 3 qa each (= 'a) [per day], i.e., 3 gar barley, feed for the month of [Kisli]." Total: 6 gar barley, [feed] for 9 oxen, from the eighth day [of the month of Tashrit]," followed by the date. No less instructive is the frequent phrase known from the late Babyl. 'numan contract literature, /ihämda-umabûna a-abûrî il(še)ker, which cannot be translated "ein Schriftstück nahmen sie" (Meiners, Supplement zu den Assyrischen Worterbüchern, p. 20), but "sie nahmen je ein Schriftstück" ("they have each taken a document," cf. Kohler and Peiser, Aus dem Babyloniischen Rechtsleben, III, p. 14). This ishtuma-
multiplication (8, 1), as we saw above (p. 16), can either be omitted, or it is rendered by the ideogram $\Box$ resp. $\Box$ at Nos. 9 and 11. I regard the latter only as a variant or an abbreviated form of $\Box$. This explanation suggests itself in view of the ligature (cf. p. 15, above) used for $\Box$ on certain Sippar tablets, in view of the fact that $\Box$ and $\Box$ occur in the same text (cf. No. 9, 1): $\Box$, while all the other lines offer $\Box$, and also in view of other variants occurring in the mathematical tablets from Nippur, notably the numerous variants of "1 9," some of which may be merely scribal errors:

They evidently all go back to the form $\Box$ or $\Box$ (20 = 1 = 19). The intermediate sign between $\Box$ and the so-called $\Box$ is probably preserved in the form $\Box$ (No. 13, 21) or $\Box$ (No. 7, 23), from which the form $\Box$ can easily be derived.

The ideogram $\Box$ (\textit{times}) (doubtless to be read \textit{a-â} in Sumerian) is not an artificial ideogram derived from Semitic \textit{â}, "time," as I was inclined to regard it in \textit{B. E.}, Series D, Vol. I, p. 532, but is of Sumerian origin, like all the other mathematical terms known to us, including the $\Box$ rendering a number distributive and $\Box$ (= "denominator") used to express a fraction in the division table; $\Box$, "minus" (cf. Jensen, \textit{Die Kassasologie der Babylonier} p. 106, note 2; King in \textit{Z. I.}, Vol. X, p. 396; Reim in \textit{Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin}, 1896, p. 125), $\Box$, "plus" (Reim, \textit{Z. I.}, \textit{Math.-Phil.}., Vol. XIV, 11, "square," and \textit{B. E.-D.}, "cube" (the latter two expressions...
being regarded erroneously by Hommel as Semitic verbal forms \( \equiv " \text{ibdi}, \text{bad}i," \) "(das u. das) kommen heran," (cf. Grundriss, p. 287, note 1).\(^1\)

on p. 13, note 1, above. For the sake of convenience I have distinguished throughout the above discussion between Babylonian "tables of squares" and "tables of square roots," retaining the title assigned to the latter class by Sir Henry Rawlinson (cf. IV R\(^2\) 40), who first recognized the true character of these "tables" (in "Journal of the Royal Asiatic Society," Vol. XV, p. 218). Strictly taken, however, both classes are "tables of squares" differently expressed and differently arranged. (Cf. IV R\(^2\) 37 (= Be, Mus. No. 12,139), which offers the following three columns:

\[
\begin{align*}
1 & \quad a^2 - 1 & 1 & \quad -e 1 \text{ b-d-di} & 1 & \quad -e 1 \text{ b-d-di-e} \\
2 & \quad a^2 - 2 & 4 & \quad -e 2 \text{ b-d-di}, \text{ etc.} & 8 & \quad -e 2 \text{ b-d-di-e}, \text{ etc.}
\end{align*}
\]

Tables arranged according to the manner of Vol. I \((1 \times 1 = 2; 2 \times 2 = 4, \text{ etc.})\), cf. Pl. 16, No. 26, and Pl. X, Nos. 11f. of the present volume, i.e., tables in which the idea of "square" is expressed by repeating the number to be squared, with or without \(a\)-\(d\), "times," placed between them, are only a special kind of multiplication tables. Tables arranged according to the manner of Vol. II \((1 = 1'; 1 = 2', \text{ cf. Pl. 16, Nos. 27 and } 28, \text{ Pl. X, Nos. 13 and } 14\), i.e., tables in which the idea of "square" is expressed by a technical term \(\text{IB-DL}, " \text{square}," \) e.g., Oppert in Z. 1., Vol. XVII, pp. 60f.) placed after the number to be squared (or the root of the square) correspond more to our modern tables. The meaning of "\(E\)" standing between the square and its root in the latter class of texts is not yet quite clear. Lenormant's explanation offered in his Essai sur un Document Mathématique Chaldéen, p. 7, and closely connected with his erroneous view of the Babylonian system of numbering, is untenable. But I am also unable to accept Hommel's interpretation (to be inferred from his Grundriss, p. 287, note 1, and confirmed by him in a letter to the writer), according to which "\(E\)" is a technical term used to express both "square" and "cubes," i.e., "power" (Oppert, L'étalon des mesures assyriennes, p. 23), e.g., "\( \text{Bals Quadrat von } 3 \text{ kommt heran}," \) or "\( \text{27 als Cubus von } 3 \text{ kommt heran}," \) while \( \text{badi} \) and \( \text{badi} \) are Semitic verbal forms. For apart from the fact that all other terms used in our mathematical texts are to be explained as Sumerian and, therefore, \(\text{IB-DL} \) and \(\text{BA-DL-E} \) most naturally also, it would be hard to understand, why the pre-sub-

\[\text{bb-di} \] (= \( \text{bad}, \) evidently regarded by Hommel as a penultimate, which however can read only \( \text{bb-di} \)) is confined to the table of cubic. Besides this "\(E\)" does not seem to have been essential for a correct understanding of the tables of squares and cubes; for it is omitted altogether in Scheil, Sippur, p. 18 ("Autre tablette"). Moreover from Pl. 16, No. 28 (cf. Pl. X, No. 14), where the inscription is arranged in two columns, we learn that "\(E\)" is not to be connected with the following, but the preceding number. The most natural explanation of this "\(E\)" therefore, seems to be, to regard it merely as the so-called "\( \text{Verlängerungswort} \)" of the first number (like the "\(E\)" often found after \( \text{in} \) in the dates of early Babylonian documents), which, according to Haupt, A. S. K. T., p. 135, can be used or omitted without any apparent modification of the meaning of the preceding word. Evidently this "\(E\)" was more frequently employed than omitted in this class of texts, because it separated two numbers (square and root) very effectively, thereby considerably facilitating the reading in closely written lines. The Sippur text just quoted is remarkable in still another way, the ideogram \(\text{A-IY} (= \text{Sum. am. Assyr. ma})\), rendering a number distributive, being placed after the number to be squared. Cf. e.g., II, 3: "1156 = 34 \(\text{IB-DL} \)," i.e., literally: "1156 = 34 each square" (or 34 \(\times\) 34)—a writing easily to be explained in view of what has been stated above (p. 22, note 2), for \(\frac{1156}{34} \times 34 = 34.1\).\(^4\)

As against Thk. 253 (Verzeichnis der Vorderen, Altertumer, Konigl. Museen zu Berlin, p. 65), which containing the second half of a table of squares from 1\(^2\) to 60\(^2\), appropriately begins with "990 = 31\(^2\)," the Nippur tablet published on Pl. 16, No. 28, begins with "990 = 30\(^2\)," i.e., with the line forming the closing line of the first tablet of the Berlin table of squares. The reason for this seemingly strange beginning is readily understood. Thirty (\(\frac{1}{2} \text{ soss}\)) and 30\(^2\) (\(\frac{1}{2} \text{ soss} = 990 = 15 \text{ soss}\)) being round numbers easily kept in mind, they evidently were used as a means of finding rapidly the squares of the following numbers from 31 to 59 by applying the binomial theorem \(a + b \\text{ roots} = a^2 + 2ab + b^2\), which for this very reason must have been known to the Babylonians in some form or other. Cf. e.g., 32\(^2\) (= \(\frac{1}{2} \text{ soss} + 7\))\(^2\) = \(\frac{1}{2} \text{soss} \times 7\) = \(\frac{1}{2} \text{ soss}^2\) (or \(15 \text{ soss} \) + 2 \(\times\) \(\frac{1}{2} \text{ soss}\) or 7 \(\text{ soss}\) = \(\frac{1}{2} \text{ soss}\) = \(\frac{1}{2} \times 7\) = \(19\) = \(22 \text{ soss} + 49\),

\(^{1}\)The ideogram \(\text{IB-DL}, " \text{square}," \) occurs also in the interesting text Pl. 15, No. 250, Col. 1, i.e., and last line, Col. 11, 13 f.e., which will be discussed in part 2 of the present volume. Cf. likewise the fifth and sixth lines of Scheil, Sippur,
A word must be said with regard to the first line of the division tables here published. They all read: "1 8,640,000 4 1.\(\text{VI}\)." The quotient 8,640,000 being \(\frac{129,600,000}{2}\) of \(129,600,000\), we should rather expect "1 8\(\text{VI}\)" instead of "1 4\(\text{VI}\)" as its divisor, for \(129,600,000\) divided by \(\frac{1}{2}\) is \(= 129,600,000 \times \frac{1}{2}\). I am unable to explain this strange phenomenon. Possibly we have to regard it as an abbreviated expression well understood by the Babylonians.

Besides the division tables from the temple library of Nippur, which are all based upon \(129,600,000\) (\(\approx 60\) = \(3600\)) as their dividend, I know of only one other division table, which once belonged to the library of Ashurbanipal in Nineveh. Four lines of this fragment, marked \(\text{K}^\text{2}003\), were published by Bezold, who describes it as "probably containing mathematical calculations" ("Catalogue," Vol. I, p. 100). This tablet indicates the fraction by \(1\text{GL}\) alone (the abbreviated term referred to above, p. 22).

So 428 (p. 48), h 5, "... 609 shinnam 1\(\text{I}-\text{DI}\)"; h 6, "... 53 1\(\text{I}-\text{DI}\)". Since "... 53" contains "709" (h 6) as its last two numbers, it is evident that the number preceding 1\(\text{I}-\text{DI}\) in h 6 was the square root of the number which stood in h 5. Incorporating the result of my examination of the original, I translate these two lines accordingly: "Total: ... 6 (x 216,000) 8 (x 3600) 6 (x 60) to the ... 109, with regard to what [Accurate translation]. Oppert, therefore, correctly "... do of what?" is it the square? It is the square of 53." Oppert in ZA, Vol. XVII, p. 61, restored the two numbers contained in lines 5 and 6 as follows: h 5, "126,000" and h 6, "53." But the two numbers must have been much higher. Oppert's treatment of the entire inscription is most arbitrary. In order to prove his theory, he was obliged to make very radical changes in the uniform text offered by Schöch. Examining Oppert's transliteration, I found it difficult to believe that an ancient Babylonian scribe or a modern Assyriologist could have made all the mistakes imputed to the one or the other by Oppert. Pretending from my annual visit to the Imperial Ottoman Museum, I copied Nippur, No. 428, September 21, 1906. The results of my recent examination may be summed up briefly as follows:

The fragmentary text published by Schöch consists of seven lines written on the obverse of a lopsided clay tablet. The upper part of the Reverse also bears traces of an inscription on three lines (apparently numbered), for the greater part badly effaced and otherwise damaged. The first line given by Schöch is the first line of the tablet. **LI.1:** The second wedge of the first number ("5") is somewhat effaced. The fifth number of this line is similarly effaced (Schöch) but "5"; for though only the two lower wedges and the lower end of the right upper wedge are preserved, the "5" is certain because everywhere our text the "1" is written with the upper right, i.e., the lower wedge, never with the sign "6" (i.e., with two lower wedges). **LI.2 and 3:** The numbers given by Schöch are wrongly correct. **LI.4:** In the first sign I recognized two more wedges below the three given by Schöch. To judge from their position I would regard this first number to be a "5," like the second number of the same line. Immediately after the latter there is a small break in the tablet, by which possibly a small number was destroyed. **LI.5 and 6:** The consecutively given by Schöch are correct, except the first character given in h 6, which I regard as a "6" rather than a "5." Because the two right lower wedges stand exactly under the corresponding upper wedges, the first lower wedge is further away. As Schöch did not endeavor to give a phonetic transcription of this, I do not place the two numbers of the second and following lines exactly where they stand on the original with regard to the characters of the first line. We consequently gain the impression from his copy that only one sign is broken away at the beginning of h 5 and 6, whereas, as a matter of fact, 2-4 signs are fragmentary at the beginning of h 5 (the first sign given by Schöch is actually almost entirely below the "4" of h 4) and 3-4 signs at the beginning of h 6, and almost as many at the beginning of the last line. **LI.7:** Before the "33," given by Schöch as the first sign after the break, two small perpendicular wedges (these written above the others) are visible, representing the last wedge of another "5." Oppert, the sign omitted by Schöch before "ab" is clearly the sign "100," as clearly regarded by Schöch, to judge from his translation "sidus."(7).
On the basis of the few lines given by Bezold, the dividend seemed to be 15,120,000 (\(= 12,960,000 \cdot \sqrt[6]{6} + 2,160,000 \cdot 6\)). But remembering my experience with the Nippur tablets, the dividend of which had to be increased as often as a new fragment was added, until the complete text had been restored, I asked King for a copy of the entire fragment, which he kindly placed at my disposal. It confirms Bezold’s statement that the line designated by him as Obv., li. 13, is the last line of the Obverse. The beginning of this line, as sufficiently indicated by the remaining horizontal stroke (used by the scribe exclusively to fill out the empty space of a line with only one large number at the beginning), and supported by my calculation, must have read “IGI 4.” Apart from the restoration of these two characters, the end of the Obverse and the beginning of the Reverse are entirely preserved, so that the twenty-eight lines or portions of lines inscribed on the fragment form a continuous inscription. This is of importance for our deciphering. For owing to the absence of a zero in Babylonian, every \(\sqrt[6]{6}\) or \(6\), as illustrated by the following scale (which may be continued indefinitely),

\[
\begin{array}{cccccccc}
\sqrt[6]{6} & 6 & \sqrt[6]{6} & 6 & \sqrt[6]{6} & 6 & \sqrt[6]{6} & 6 & \sqrt[6]{6} \\
12,960,000 & 2,160,000 & 216,000 & 36,000 & 3,600 & 600 & 60 & 10 & 1
\end{array}
\]

can be read in many different ways, unless determined by the context and a sufficient number of smaller figures following. Each line of the left column of K 2069 beginning with either a “2,” “3” or “4,” and of the right with a “10,” it is easy to ascertain the actual values of these first numbers by determining their position in the longest number preserved in each column. The longest number in the left column having six figures and ending in “20” (Obv., li. 11), the value of the first figure (a “2,” “3” or “4”) in each line of this column is obtained by multiplying this figure with 216,000. The longest number in the right column consisting of nine figures and ending in “40” (Rev., li. 24), the first figure (a “10”) in each line of this column has the value 129,600,000.

The third line given by Bezold, i.e., is therefore to be transliterated as follows: \(IGI 3 \times 216,000 (= 648,000) \mid 23 \times 12,960,000 (= 298,080,000) + 2 \times 2,160,000 (= 4,320,000)\); in other words \(\sqrt[6]{6} \cdot \sqrt[6]{6} \cdot \sqrt[6]{6} = 302,400,000\), or \(x = 302,400,000 \times \sqrt[6]{6} = 195,955,200,000,000, \ i.e., \ 12,960,000^2 (= 167,961,600,000,000, \ expressed \ by \ \sqrt[6]{6}) \ + \ (2,160,000^2 \times 6), \ i.e., \ the \ next \ lowest \ unit \ (\sqrt[6]{6}) \ in \ the \ scale \ of \ numbers (\(= 27,\)

\[\text{These four lines would read accordingly, li. 2: } IGI 9600 \mid 1575; \text{ li. 3: } IGI 10,000 \mid 1512; \text{ li. 4: } IGI 10,800 \mid 1400; \text{ li. 5: } IGI 11,250 \mid 1314.\]
$996,600,000,000,000$. \( K \cdot 2009 \), therefore, is a division table, containing a number of divisors of $195,955,200,000,000 \mid \exists \mathcal{K} \) in an increasing series (in the left column), with their corresponding quotients in a descending series (in the right column). In all probability the text, to which this tablet belongs, began: \[
\begin{array}{c|c|c}
K & \mathcal{K} & \mathcal{K} \\
\end{array}
\]

"the 216,000th part of 195,955,200,000,000 = 907,200,000;"

If we would take the time and trouble to find all the other divisors contained in 195,955,200,000,000, we could easily restore the entire text. For our present purpose it will be sufficient to fill out the lacuna in the thirteen lines preserved on the Obverse and in the first ten lines of the Reverse. These twenty-three lines restored read as follows:

\[
\begin{array}{ccc}
K & \text{Obv.} & 1: \\
& 2: & 1; \\
& 3: & 1; \\
& 4: & 1; \\
& 5: & 1; \\
& 6: & 1; \\
& 7: & 1; \\
& 8: & 1; \\
& 9: & 1; \\
& 10: & 1; \\
& 11: & 1; \\
& 12: & 1; \\
& 13: & 1; \\
\text{Rev.} & 14: & \text{1;} \\
& 15: & \text{1;} \\
& 16: & \text{1;} \\
& 17: & \text{1;} \\
\end{array}
\]

1. Even the list of divisors given by the scribe in the preserved 21 lines is not complete. For, to quote only one example, 750,000 is not attested by the series deduced by the corresponding quotient, 261,273,000. The same incompleteness is frequently found on the Nippur division tables, cf. p. 18, note 4 and 14, 16, 17, 28, 29, 26.

2. There are traces clearly preserved in the line to prove the correctness of my restoration: two perpendicular wedges (each - 216,000) and three parallel (each - 10,000) mark the beginning of the column. The horizontal stroke following 8 (\( \times \) 12,000,000) in the right column shows that the mutilated end of the line contained no other number.

3. For lines 2–15 see the text published by Braid. In the lacuna of p. 26 (at the extreme right) must have stood a "15" (each unit = 216,000).

4. The traces of the last number seem to extend to "15," suggesting the translation of an "11" (\( \parallel \) 216,000).

5. For the restoration of the first number in the left column, \( 1 = \text{216,000} \); cf. p. 26 above.
THE TEMPLE LIBRARY OF NIPPU.

<table>
<thead>
<tr>
<th>Rev.</th>
<th>18:</th>
<th>IG1</th>
<th>933,120 = 210,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19:</td>
<td>IG1</td>
<td>937,500 = 209,018,000</td>
</tr>
<tr>
<td></td>
<td>20:</td>
<td>IG1</td>
<td>960,000 = 204,120,000</td>
</tr>
<tr>
<td></td>
<td>21:</td>
<td>IG1</td>
<td>972,000 = 201,000,000</td>
</tr>
<tr>
<td></td>
<td>22:</td>
<td>IG1</td>
<td>1,036,800 [1] = 189,000,000</td>
</tr>
<tr>
<td></td>
<td>23:</td>
<td>IG1</td>
<td>1,080,000 [2] = 181,440,000</td>
</tr>
</tbody>
</table>

In connection with the multiplication and division tables just treated a word should be said about the interesting text, No. 25, which I transliterate as follows:

| Li. 1: | 125 | 720 | Li. 9: | 2000 | 18 |
| Li. 2: | IG1-GAL-BI | 103,680 | Li. 10: | IG1-GAL-BI | 6480 |
| Li. 3: | 250 | 360 | Li. 11: | 4000 | 9 |
| Li. 4: | IG1-GAL-BI | 51,840 | Li. 12: | IG1-GAL-BI | 3240 |
| Li. 5: | 500 | 180 | Li. 13: | 8000 | 18 |
| Li. 6: | IG1-GAL-BI | 25,920 | Li. 14: | IG1-GAL-BI | 1620 |
| Li. 7: | 1000 | 90 | Li. 15: | 16,000 | 9 |
| Li. 8: | IG1-GAL-BI | 12,960 | Li. 16: | IG1-GAL-BI | 810 |

We observe (a) that the first numbers of all the odd lines (1, 3, 5, 7, 9, 11, 13, 15) form an increasing, and all the numbers of the even lines (preceded by IG1-GAL-BI = “its denominator”) a descending geometrical progression; (b) that the first number of every odd line can be expressed by a fraction which has 12,960,000 as its numerator and the closing number of the corresponding even line as its denominator, in other words 125 = \( \frac{12,960,000}{103,680} \); 250 = \( \frac{12,960,000}{51,840} \); 500 = \( \frac{12,960,000}{25,920} \); 1000 = \( \frac{12,960,000}{12,960} \); 2000 = \( \frac{12,960,000}{6,480} \); 4000 = \( \frac{12,960,000}{3,240} \); 8000 = \( \frac{12,960,000}{1,620} \); 16,000 = \( \frac{12,960,000}{810} \). But the closing numbers of all the odd lines (720, 360, 180, 90, 18, 9, 18, 9) are still obscure to me. Notwithstanding all my efforts to find a law in them or to solve the problem by the aid of competent American and European mathematicians, I have failed to get at their meaning. Suffice it to state that there seems to exist a certain relation between the first and the second number in each odd line. For if we write 125 (li. 1) = 2 soÁs + 5, 250 = 4 soÁs + 10, 500 = 8 soÁs + 20, 1000 = 1 mÁr + 6 soÁs + 40, 2000 = 3 mÁr + 200, 4000 = 1 shÁr + 400, 8000 = 2 shÁr + 1 mÁr + 200, 16,000 = 4 shÁr + 2 mÁr + 400, and divide 3600 by the last figure

1 The left column is to be restored thus: 4 (× 216,000) + 4 (× 36,000) + 8 (× 3600).
2 The entire left column is broken off. The number which stood there was “5 (× 216,000),” followed by a horizontal stroke.
thus obtained (5, 10, 20, 40, 100, 200, 400, 1000), we obtain the last number of every odd line: 5 = 720, 10 = 3600, 20 = 180, 40 = 90, 200 = 18, 1000 = 9). The question arises, what is the meaning of all this? What in particular is the meaning of the number 12,960,000 (±360 or 3600), which underlies all the mathematical texts here treated, including the Sippur tablet and K 2063 and K 8527? The answer, as it seems to me, is partly given by Plato in his "Republic," Book VIII, 546 B-D, which contains the famous "Number of Plato," notoriously the most difficult passage in his writings. According to James Adam, to whom we owe the latest thorough discussion of the entire passage, accomplished by the necessary references to the immense literature written on the subject, "the difficulty lies in the Greek, and not in the calculations." The number occurs in the following context: There are four leading varieties of States and individuals (1. Timarchy or the Cretan and Laconian State; 2. Oligarchy; 3. Democracy; 4. Tyranny) in addition to the perfect polity and perfect man. Inasmuch as the specific character of States is determined by that of individuals, there will be five leading types of individual character, embodied respectively in 1. the aristocratic, 2. the timarchical, 3. the oligarchical, 4. the democratical, 5. the tyrannical man. The commonwealths will be examined first and afterwards the individuals. How does Timarchy arise out of Aristocracy? It may be laid down as a universal rule that constitutional change is originated by dissension within the governing class. The Muses are invoked to tell "how first sedition entered." Everything that has a beginning has also an end. Even the ideal city, therefore, will in time perish and come to dissolution. But the cause of decay, not being contained in the ideal city itself, must come from without. What is this cause? How does this degeneration start? By wrong or inopportune marriages and births (γενετήρια γυναικών, γεννηματα). Having indicated this cause and described the manner in which degeneration begins to take place, Plato proceeds to construct a "geometrical number" (γεωμετρικον μεγαλων) out of the elements of the number which expresses the shortest period of gestation in the human kind (216 days). This "geometrical number" (12,960,000), which he calls "the..."
lord of better and worse births," is the arithmetical expression of a great law controlling the Universe. According to Adam this law is "the Law of Change, that law of inevitable degeneration to which the Universe and all its parts are subject," —an interpretation from which I am obliged to differ. On the contrary, it is the Law of Uniformity or Harmony, i.e., that fundamental law which governs the Universe and all its parts, and which cannot be ignored or violated without causing an anomaly, i.e., without resulting in a degeneration of the race.

The Greek text of the famous passage reads: ἦστι δὲ θεία μὲν γεννητὸς περίοδος, ἐν ἀριθμὸς περάκλιμαί τίλειας, ἀνθρωπείῳ δὲ ἐν ὁ πρῶτος αἰξήσεις διανύσαν τε καὶ δυσαπτό-όμεναι, τρεῖς ἀποστάσεις, τέτταρες δὲ θρόνους λαβόντασιν ὄφωντο τε καὶ ἀυτομοῦσιν καὶ αἰξώμας καὶ φθινῶν, πάντα προσέγγισαι καὶ ρητὰ πρὸς ἄλληλα ἀπέφηγον ὃν ἐπίτρετος πυθόμεν πημάνας συνεγείρει δέν ἄρμοις παρέχεται τρις αἰξήσεις, τὴν μὲν ἑσπερινὰς ἑκατόν, τοσιάς τοσιάς, τὴν δὲ ἱσομέγερη μὲν τῇ, προμέρις δὲ, ἑκατόν μὲν ἀριθμοὶ ἀπὸ διαμέτρων ἑκατον, πημάνας δειμνῶν ἑκατόν, ἔριζον δὲ δρόμοι, ἑκατόν δὲ κόλποι πράδος. Ξύπνος δὲ οὐτός ἀριθμὸς γεωμετρικός, τοσιάς τοσιάς, ἱσομέγερης μὲν τῇ, χειρός γενέσεως, ὡς ὅταν ἀνθρωπείες ἑκατόν ὀν φύλακες συνεκίζονισιν νύφαις νυφίσις παρὰ παρὰ, ὧν εὑρεῖς οὗτοι εἰς τυχεῖς παιδίς ἔσταται. "The divine creature (i.e., the World brought of chaos into order) has a period comprehended by a final number (i.e., the period which its creation occupies), whereas the human (creature has a period (of gestation) comprehended by a number) which is the first number (after the unit) in which root-and-square increases (i.e., processes of multiplication) comprehending three distances (i.e., the three dimensions, length, breadth and thickness) and four limits (i.e., the points by which these dimensions are determined)¹ of (some) numbers (i.e., the numbers to be cubed) that make both like (i.e., square numbers) and unlike (i.e., oblong numbers) and wax and wane (a description of the sides of the Pythagorean triangle), render all things conversable and rational with one another (i.e., $3 \times 3^2 (= 3^3 = 27) + 4 \times 4^2 (= 4^3 = 64) + 5 \times 5^2 (= 5^3 = 125) = 216$); two of which (numbers to be cubed, namely) 4, 3 (forming two of the three sides of the Pythagorean triangle), coupled with 5 (by multiplication, i.e., $4 \times 3 \times 5 = 60$) furnish two harmonies when thrice increased (i.e., three times multiplied by itself, therefore $60 \times 60 \times 60 \times 60 = 12,960,000$)—the one equal an equal number of times (i.e., a square number), so many (i.e., 36) times 100 (i.e., $3600^2$), the other of equal length one way, but oblong: on the one side, of one hundred squares of rational diameters of five (i.e., the nearest rational number to the real diameter of a square whose side is five, i.e., to $\sqrt[3]{50} = 7$; for $\sqrt[3]{49} = 7$), diminished by one each (i.e., $(49[= 7^3] \times 100)

¹ According to Adam, the whole expression αἰξήσεις—λαμβάνει "means cubings and nothing more." "The period of the human creature" is accordingly the first number in which cubings make everything conversable and rational with itself. The numbers to be cubed are 3, 4 and 5.
Now 12,960,000, i.e., half diminished by two each (i.e., \(18\times 60\times 60\times 60\)) or it from irrational diameter 100, diminished by two each (i.e., \((\sqrt[3]{50})^3\times 100\times 12\times 100\times 3000\times 200\times 1800\) on the other hand, of 100 cubes of 3 (i.e., \(100^3\times 3 = 2700\); the second harmony is therefore \(4800 \times 2700\). This total number, a geometrical number (Adam: "a number measuring the earth"), is lord of better and worse births: and whenever our guardians in ignorance of these underlying principles promote marriages inopportune, the offspring (of such unions) cannot be well endowed nor even favored of fortune."

According to Adam the two harmonics of Plato furnished by \(60\times 60\times 60\times 60\) (i.e., 3600 and 1800 \(\times\) 2700, both \(= 12,960,000\)) represent two recurrent seasons in the life of the Universe, in which the World waxes and wanes alternately, the harmony 3600 measuring the cycle of Uniformity, and the harmony 1800 \(\times\) 2700 the cycle of Dissimilarity described by Plato in the "Politics." Be this as it may (cf. also p. 31, note 1, below), it goes without saying that the number 3600 rests upon the Babylonian sexagesimal system. From the fact that Plato constructs his number (12,960,000) out of the elements of the number expressing the shortest period of human gestation (216), it may be inferred that, according to Plato, both stand in a certain mathematical relation to one another. The smaller number (216) referring to days, it is safe to interpret 12,960,000 also as days. Now 12,960,000 days, expressed in years (360 days counted in the year), are equal to 360,000 years. And we know from Berosus, whose accuracy in all matters connected with the mythology and history of his people has been sufficiently tested (cf. Chapter I, above), that a period of 360,000 years—called "the great Platonic year," "magnum Platonicae annos," in early astronomical treatises—was actually the duration of a Babylonian cycle. We also have shown above that all the multiplication and division tables from the temple libraries of Nippur and Sippar and from the library of Ashurbanipal are based upon 12,960,000. This coincidence can scarcely be accidental. We must necessarily come to the conclusion that Plato, or rather Pythagoras, whom he closely followed, borrowed his famous number and the whole idea of a decisive influence exercised by it upon the life of man directly from Babylon. The very expression "lord of better and worse births," as a designation for something inanimate, points to Babylonian origin. Cf. the similar use of hebê, "lord," in hebê qaruâti. V R. 6. 17, literally "the lords of war," a designation for "war weapons," evidently thus styled because weapons are the supreme rulers in war, determining its final issue. Like divine beings or human allies endowed with reason, they, therefore, are "called upon" by the warriors to decide the battle (mâšâlâ kakkéšannah, Creation Story, IV, 92; Sukh. II, 77, etc.).

1 While frequently differing from Adam in the interpretation of the Greek text, Hultsch also makes the two numbers referred to by Plato, 216 and 12,960,000. Cf. Zumtobel, "Die frieß, 1908, 4 Phys., Aa XXVII, Berichter Asch., pp. 41-59. Observe that 216 also occurs in the of number K 2098 (p. 20, above).
The Platonic number, 12,960,000, measuring a period in the lifetime of the Earth, and therefore (as Adam points out) called \( \varphi \omega \alpha \tau \varphi \rho \alpha \omega \zeta \); in the ordinary sense of the term as well as in the symbolic, is "the lord of better and worse births." In what sense this number, \( i.e., \) the square of the highest Babylonian number designated by a special name (\( sh\varphi r \)), determines good and bad births has been explained in various ways. Adam believes the explanation of Plato's words to be simply this: that in the early stages of our cycle of 36,000 years, before disintegration and dissimilarity had gone far, Nature produced better children than later, because the Universe is growing worse. But this interpretation is scarcely sufficient. Evidently the Greek philosopher wants to bring out the double idea (\( a \)) that through the ignoring of a fundamental law of the Universe at some early time "strife was kindled," \( i.e., \) disagreement arose, followed by a subsequent degeneration of the whole human race; (\( b \)) that the same fundamental law still governs the Universe, and that its violation at any time is accompanied by the same result. Though, then, it is true that all the births occurring at a later stage of our cycle of 36,000 years are comparatively worse than those at an earlier period, the former are by no means of equal value. On the contrary, Plato's words: "Whenever our guardians in ignorance (of these underlying principles) promote marriages inopportunely, the offspring cannot be well endowed nor even favored of fortune," necessarily imply that whenever the guardians do observe these principles, the children born will be well-formed and prosperous in life. Hence it follows that good births are not confined to an earlier stage of the life of the Universe and bad ones to a later one, but that good and bad births may occur at all times in our cycle. Whether a birth is good or bad is determined by the number 12,960,000, which for this very reason is called "the lord of better and worse births." The meaning of Plato's words, therefore, can be but this: In order to be a good birth, the birth of a child—\( i.e., \) the consummation of its period of gestation, marked by its entrance into life—must stand in a certain relation to 12,960,000, as the arithmetical expression of a fundamental law of the Universe, which Adam called the "Law of Change," and the writer the "Law of Harmony."

But what is this law? How can this number influence or determine the birth and future of a child? The correct solution of the problem is closely connected with the Babylonian conception of the world,\(^1\) which stands in the centre of the Babylonian religion. The Universe and everything within, whether great or small, are created and sustained by the same fundamental laws. The same powers and principles, there-

\(^1\) Cf. Winckler's numerous writings devoted to the explanation of the entire system. Even non-Assyriologists will read with great profit a summary of his researches in his Himmels- und Weltenbild der Babylonier als Grundlage der Weltschauung und Mythologie aller Völker, Leipzig, 1901; Die babylonische Kultur in ihren Beziehungen zur unserigen, Leipzig, 1902; and Religionsgeschichtler und geschichtlicher Orient, Leipzig, 1906.
fore, which rule in the world at large, the macrocosm, are valid in the life of man, the microcosm. It is the task of astronomy, which forms the foundation of the entire system, to prove this uniformity and harmony, and to determine those invariable laws which permeate the Universe in all its parts and subdivisions. For the starry firmament through which the gods principally reveal themselves is the great book, the *shifer gloamm* ("the writing of heaven"), in which they have written the whole story of heaven and earth, its past, present and future. The astronomer studies and deciphers this divine writing, the astrologer interprets its meaning with regard to the life and affairs of man.

According to this conception, all institutions on earth, including the State, and family and even the different temples and cities scattered throughout the Babylonian plain, are fashioned after heavenly patterns; and all human knowledge and science, including mathematics and astronomy, are divided into the division of the circle into 360 degrees, the calendar, the system of measures and weights, are of divine origin (cf. Chapter I, p. 1). Everything existing in heaven is found in a lesser degree on earth, and whatsoever affects the life of the Universe affects the smaller circle of the life of man. The number 12,960,000 governs the Universe, for 12,960,000 days, as stated above, are equal to 36,000 years, which form a Babylonian cycle or constitute an aeon in the life of the Universe. As man is controlled by the same mathematical laws as the Universe, of which he forms a part or fraction, the same number 12,960,000 or one of its fractions (expressed by its divisors) must control the life of man. Now we know from another passage of the "Republic" (Book X, 515 B) that Plato reckoned the duration of human life as 100 years, or 100 × 360 = 36,000 days. Hence it follows that a day in the life of man corresponds to a year in the life of the Universe; in other words, the duration of a human lifetime forms the 360th part of an aeon of the Universe or the 360th degree of a corresponding circle. Everything else in man's life from his birth to his death is governed by the same number or by one of its divisors, especially the period of gestation—i.e., the time the child is in the womb of its mother—which must stand in a certain relation to 12,960,000 that the birth may be good and the subsequent life normal. The number assigned to the period of gestation by Plato in the passage translated above is 216, which "was known to the Pythagoreans as the *dorgoroz* xaijo, because it expresses the period of the seven months' child counted in days." 1, 270 is the Pythagorean number 5 with its multiple and divisors, is also the governing number throughout Plato's "Laws." 2

1 As seen on p. 39, 216 is the first number to which the ratios of 9, 1, 5 are given. Adam calls attention to the fact that, "it is the only number that can be divided into 216, 54, 36, 18, 9, 6, 4, 3, 2, 1. Plato, speaking of the harmony of the universe, says: 'there is the same number of days in an earth year as there are in a human lifetime, and the number 216 represents the number of the whole of the universe.'" In other respects also the number 216 maintains the character of a harmonic and geometric form, for the square of the area of the zoogonic triangle and the product of the sides of the first rank and female numbers (15 × 36 = 180) equal 216.

2 As seen on p. 39, 270 is the first number to which the ratios of 9, 1, 5 are given. Adam calls attention to the fact that, "it is the only number that can be divided into 270, 90, 60, 45, 30, 15, 10, 9, 6, 3, 2, 1. Plato, speaking of the harmony of the universe, says: 'there is the same number of days in an earth year as there are in a human lifetime, and the number 270 represents the number of the whole of the universe.'" In other respects also the number 270 maintains the character of a harmonic and geometric form, for the area of the square of the number 15 and the product of the sides of the first rank and female numbers (15 × 36 = 180) equal 270.
gorean period of gestation for a nine months' child. Each of these two periods must have inaugurated a lucky birth, for both numbers are divisors of 12,960,000. Likewise every other period will be regarded as lucky for the child's birth, if the number of days represented by it is a divisor of 12,960,000. In this sense the Platonic number is "the lord of better and worse births." 7, 11 and 13 are no divisors of 12,960,000, therefore they have continued even to the present to be regarded as unlucky numbers in the life and history of man. In this light examine the Babylonian sabbath question.

Future researches in the great mass of unpublished mathematical texts, omens and astrological forecasts, forming one of the most important branches of Babylonian literature, will doubtless throw more light upon the full significance of the Platonic number. For the present it must suffice by means of the Nippur tablets to have traced its origin to Babylonia and to have connected it with the fundamental Babylonian doctrine, according to which the same divine power manifests itself harmoniously in all parts of the Universe. In view of the importance attributed to this number by the Greek philosopher the tablets here published will receive an additional significance. They are not mere multiplication and division tables in our sense of the word, but have an astrological bearing. They evidently served as works of reference and as text-books to introduce students into mathematics as a means of astronomical and astrological calculations. For, as Bezdorf correctly stated (Literatur, p. 225), "die Mathematik stand bei den Babylonier-Assyren, so viel wie bis jetzt wissen, vornehmlich im Dienste der Astronomie und letztere wiederum in dem einer Pseudo-wissenschaft, der Astrologie, die wahrscheinlich in Mesopotamien entstand, sich von dort aus verbreitete und bis hinein in die gnostischen Schriften und aufs Mittelalter rererbierte, ohne dass wir aber bis jetzt im Stande sind, die Kette dieser ganzen Uberlieferung, deren Glieder vielfach zerstuckt sind, wiederzustellen."

We close this chapter about the first mathematical texts from the temple library of Nippur, crystallized in the Platonic number 12,960,000, with the words of Adam (p. 208):

"I know not what others will think, but to me it seems that the extraordinary range and elevation of its central ideas make the Platonic number worthy even of a writer who is full of 'thoughts that wander through eternity.' The connection between the Human Child and the Divine, the Microcosm and the Macrocosm, has played no small part in the history of human thought, and the story of a Great Year, with the hope which it affords of the θεοκατάπτωσις of all things (Acts iii, 21), has been and is, in its religious setting, the solace and support of many a 'human child.' "

Adam : "And 180, which = 210(7 x 30) + 270(9 x 30), is the sum of the usually recognized periods of gestation for children born after seven and after nine months. The Great Year of the Universe may therefore be denoted by a rectangle whose sides are respectively the longer period [270] and the sum of the longer and shorter periods of gestation [180] in the race of man, after it has been multiplied by the square of the Pythagorean perfect number 10 [representing the lifetime of man]."
The metrological texts here submitted will be discussed in Part 2 of the present volume, where I expect to complete the series of this class of tablets excavated at Nuffar. At the same time an effort will be made to restore the different tables of measures and weights with their corresponding equivalents from all the fragments at my disposal, according to the method adopted in Series A, Vol. 1, Part 2, Pls. 38-42. For the present it may suffice to call attention to the fact that the existence of an *ammalu* of different standards, previously inferred by Lehmann and others, is fully corroborated by the new tablets published on Pls. 20 and 27. They make us acquainted with two different kinds of *ammalu*, the one = 30 *ubāinu* (Nos. 41 and 42; No. 30,Cols. 1 and 11), the other = 24 *ubāinu* (No. 30, Cols. III and IV). We also see that *ubāinu* was not the lowest unit known, but that an *abīnu* could be subdivided again. For the one standard cf. 1 *abīnu* = 2 x (No. 41, and No. 30, Col. II), from which it follows that 1 *abīnu* was designated by a special name; and 1 *abīnu* = 10 x (No. 42, and No. 30, Col. I). For the other standard cf. 1 *abīnu* = 150 x (No. 30, Cols. III, upper half), or 1 *abīnu* = 90 x (No. 30, Cols. III and IV), or 1 *abīnu* = 2 x (No. 30, Col. IV, lower half).

From No. 30 we learn besides that a *gubbin* was equal to 5 G 4 R, and that an *asli* was equal to two *gubbin*. For the text of Col. 1, lines 16ff., should be restored as follows (keeping in mind that the scribe erroneously took 1 G 4 R as unit in lines 8ff.):

Li. 16-17: 5 (X 3600 = 18,000) = 10 G 4 R *gubbin* (or rather \( \frac{10}{2} = 5 \) G 4 R, which are called a *gubbin*)

18: \( \frac{10}{2} (X 3600 = 36,000) = \text{asli} \times 4 \) G 4 R (\( \frac{20}{2} = 10 \) G 4 R = 2 *gubbin*)

19-20: \( X 3600 = 54,000 \) = asli *gubbin* (i.e., 1 *asli* and 1 *gubbin* = 15 G 4 R).


1 As to *asli* and *gubbin* of Meissner-Butler, R.A. Vol. III, p. 558, n. 11. A Summary list follows.
Li. 21: \[20 \times 3600 = 72,000 x\] = \(\text{shi}-\text{ni-}tu\) ash-\(lu\) (i.e., 2 ashlu = 20 GAR)

22-23: \[25 \times 3600 = 90,000 x\] = \(\text{shi}-\text{ni-}t\{u\}\) ash-\(lu\) ś\(u\)-ub-ban (i.e., 2 ashlu and 1 šubbān = 25 GAR)

24: \[30 \times 3600 = 108,000 x\] = \(\text{sha-la-}\text{ash-}t\{u\}\) (i.e., 3 ashlu = 30 GAR)

25-26: \[35 \times 3600 = 126,000 x\] = \(\text{sha-la-}\text{ash-}l\{u\}\) šu-ub-ban (i.e., 3 ashlu and 1 šubbān = 35 GAR)

27: \[40 \times 3600 = 144,000 x\] = ar-ba ash-\(lu\) (i.e., 4 ashlu = 40 GAR)

evidently continued to

Col. II, li. 6: \[60 \times 3600 = 216,000 x = 6\) ash-\(lu\) \(= 60\) GAR = 1 USH).

At the rate of 30 ubānu to an ammatu we accordingly obtain the following scale for the Cassite period from No. 30, Cols. I and II (upper half), and Nos. 41 and 42:

\[
\begin{align*}
1 \text{KAS-GLD} & = 30 \text{ USH} \quad (= 1800 \text{ GAR}) \\
1 \text{USH} & = 6 \text{ ashlu} \quad (= 60 \text{ GAR}) \\
1 \text{ashlu} & = 2 \text{ šubbān} \quad (= 10 \text{ GAR}) \\
1 \text{šubbān} & = 5 \text{ GAR} \\
1 \text{GAR} & = 2 \text{ qanū} = 12 \text{ ammatu} \\
1 \text{ammatu} & = 30 \text{ ubānu} \\
1 \text{ubānu} & = 2 \text{ (resp. 10) x}
\end{align*}
\]

No less interesting are the three descriptive paragraphs occurring in No. 30, Cols. II, III and IV. The first may be transliterated and translated in this connection:

Col. II, li. 10: \(\text{an-ni-}t\{i\} \text{ ubānu sha 30 ubānu}\

11: 1 ammatu am-mat \(\text{niszēru} 10 \text{ GI-MESH}\
12: \text{sha 1 adapu}\
13: \text{am-mat ni-um ū agarinnu}\
14: ū 1 ammatu \(\text{nišu}\

\(\text{i.e., "this is the ubānu at the rate of 30 ubānu to 1 cubit (ammatu), namely the cubit of a piece of land under cultivation, 10 qanū long and 1 qanū broad (cf. Johns, \textit{i.e., p. 221}, which (requires seed equal to)\textsuperscript{2} a vessel called adapu, 1 cubit wide at its narrowest (\(= \text{nišu}\)) and widest (\(= \text{agarinnu}\) parts and 1 cubit high (\(= \text{šili}\)).}

If my interpretation of the three technical terms mentioned be correct, it necessarily follows that in the middle of the second pre-Christian millennium the Babylonians

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\textsuperscript{1} The excavating Arabs who(? joined the preserved portions of this tablet (evidently found together) with a kind of date paste, placed the small fragment forming the left lower corner of the tablet a little too high. The printed number 25 (indicating the corresponding line of Col. I) should therefore be moved up one line.

\textsuperscript{2} For this interpretation cf. also Thureau-Dangin in Revue d'Assyriologie, Vol. IV, pp. 18f.
were able to determine the contents or volume of a certain vessel, called aspa, from its three dimensions.

The more exact determination of nimmu and agarimmu depends upon our understanding of the shape of this vessel. The earliest Babylonian copper vessels (1-D.1-F.1 is generally determined by cūi, "copper") excavated by me have the form of a frustum of a right circular cone. Cf. Illust. A, and Helm and Hilprecht in Verhandlungen der Berliner anthropologischen Gesellschaft, Feb. 16, 1901, p. 161 (No. 3). When applied to this class of vessels, nimmu (cf. Delitzsch, Assy. Handwörterbuch, pp. 138 and 409, doubtless originally meaning "narrowness," like nilu, cf. nibb or nibish hamú, "my ungeschlossen") must designate its narrowest part at the top, i.e., the diameter of its circular opening (a), while agarimmu (as indicated by its ideogram, whose first compound means enaišku, "to be wide," and its derivatives) must refer to the widest part of such a vessel at the bottom, i.e., the diameter of its circular base (b). Silla, "shadow," has here the meaning "altitude" (c), evidently because the height of an object was frequently determined by ancient peoples from the length of the shadow it threw at a certain time of the day. As the two diameters of the vessel described are to be equal, the vessel in question must be a right circular cylinder.

If, however, it could be proved that the vessel in question was not circular but rectangular (cf. Illust. B), nimmu would designate "the smaller" (a) and agarimmu "the larger side" (b) of its base, while silla naturally would refer to its lateral edge or "altitude" (c).

As these three dimensions are to be equal, the vessel in question would be a rectangular parallelepiped whose faces are all squares, in other words a cube. Which of the two vessels is meant in the inscription cannot yet be settled. The fact that early Babylonian vessels, whether made of stone, copper or terra-cotta, generally are circular, speaks in favor of a cylindrical vessel; but the circumstance that it is easier to

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1 In another connection already inferred by Lehmann in Zeitschrift für Altertumskunde, Vol. IV, pp. 306ff.
2 Cf. also silla in neppum, K 437, Col. VI, 34.
find the volume of a cube than of a cylindrical vessel is in favor of the quadrangular vessel. The formula for calculating the volume of a cube is \( V = a^3 \). Its practical application in the second millennium before Christ would presuppose on the part of the Babylonians the knowledge of how to find the area of a square and of a rectangle in general. This, however, can be proved from ancient plans of fields accompanied by certain measures of length and surface, especially from a tablet of the period of the second dynasty of Ur, now in the Imperial Ottoman Museum of Constantinople, which was thoroughly discussed by several scholars. As the Babylonian scribe of this important document calculated, as accurately as we do, the area of a right triangle from the length of its two legs, of a rectangle from its base and altitude, of a trapezoid from its two bases and altitude, it follows with certainty that at this early period the Babylonians must have been familiar with the following theorems: 1. The area of a rectangle is equal to the product of its base and altitude. 2. The area of a square is equal to the square of its side. 3. The area of a right triangle is equal to one-half the product of its base and altitude. 4. The area of a trapezoid is equal to one-half the sum of its bases multiplied by its altitude. And, furthermore, if the vessel described above was a cube, that \((5)\) the volume of a rectangular parallelepiped is equal to the product of its base and altitude; \((6)\) the volume of a cube is equal to the cube of its edge.

If, however, the vessel referred to was a circular cylinder, whose volume is expressed by \( \pi r^2 h \) or \( \frac{3}{4} d^2 h \), or, as its altitude is to be equal to its diameter, by \( \frac{3}{4} d^3 \), we necessarily would have to assume that the Babylonians of the second pre-Christian millennium, by practical experience or by mathematical calculation, had found out \( (1) \) that the circumference of a circle bears a constant ratio to its diameter, and \( (2) \) that they were familiar with the approximate value of this ratio \( (\pi) \), which, according to the calculation of Archimedes (De Dimensione Circuli), we generally express by \( \pi \approx \frac{22}{7} = 3.14159 \), but which, strictly speaking, is incommensurable. In view of the close connection between the Babylonian measures of length and time—s—s—s the former being practically a sub-divided circle unrolled—and in view of the importance which the circle plays in Babylonian astronomy, it is almost impossible to believe that the Babylonians should not have discovered this constant ratio and been familiar with its value, though they may have expressed it less accurately than Archimedes, simply by \( \pi = 3 \).

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A NEW CHRONOLOGICAL LIST.

The new chronological list which I have published as the last text of this volume (cf. Pls. XV and 301) is in more than one way of interest and importance. Since the discovery at Nippur of date lists of kings of the second dynasty of Ur (cf. B. E., Series A, Vol. I, Nos. 125 and 127), it was almost certain that sooner or later we would find chronological lists arranged after the manner of the lists of kings known as A and B, or Chronicle S, and at the same time giving us better information concerning the earliest history of Babylonia than the few fragmentary lines preserved on the Obverse of the last-mentioned chronicle (cf. Winckler, Untersuchungen zur Altorientalischen Geschichte, p. 153, upper fragment). For, though for some time familiar with quite a number of rulers earlier than the Hammurabi dynasty, and in some cases even able to catch a glimpse of their lives and deeds, we have thus far not succeeded in assigning to most of them their exact place in history.

Through the unearthing of documents dated in the reigns of some of the earliest rulers hitherto known—including such names as Entemena, Lugalsagd, Urkagina, Sargor of Akkad, Naram-Sin, Ur-Bau, Nammuabu, Gudea, Ur-Ningirsu, and others—we obtained positive proof that the system of dating was practically the same in the fourth millennium as it was at the time of Hammurabi, and furthermore that the tablet of omens concerning Sargon and his son, as had been asserted before, contained historical facts based upon ancient lists of dates. Considering this in connection with the fragmentary lines of Chronicle S,Cols. I and II referred to above), and with the numerous copies of earlier inscriptions known from the library of Ashurbanipal and from squeezes and copies of Neo-Babylonian scribes, it became evident that a period not long...
ago regarded as mythical, from which hundreds of dated documents are already known to us, must have been far from obscure to King Nabonidos, who refers to it, stating even the number of years lying between his own time and that of certain ancient rulers.

The new chronological fragment, written towards the end of the third millennium, furnishes us another link in the chain of arguments, showing that chronological lists with the names of dynasties, the number of rulers belonging to each, and their respective years of government actually existed nearly 2000 years before King Nabonidos, whose statements have been subjected to a very severe criticism. Unfortunately what is left of this precious tablet is in such a deplorable condition, that for the present its Reverse alone could be published in an autograph copy. The Obverse, largely covered with crystals and other deposits, will have to be treated chemically before it can be deciphered. As it was impossible to clean it sufficiently without endangering the Reverse, which begins to scale off, it seemed wiser to leave the Obverse untouched, until all the questions which may come up in connection with my following discussion of the Reverse have been settled (as far as this is possible) by a repeated examination of every trace of a cuneiform sign preserved.

The phototype reproduction on Pl. XV, which may serve as an illustration of the real condition of the fragment, shows that both sides of the tablet were ruled and arranged in the same way. Effaced or indistinct as most of the characters on the Obverse are at present, we can state positively that it also contained the names of rulers arranged chronologically and followed by *mu*, "year," and a number. From the remains of a perpendicular dividing line, clearly visible near the upper right edge of the Reverse, and from the fact that the fragment reaches its greatest thickness at the right lower corner of Reverse, it follows that the tablet, when complete, was about double as wide and long as the preserved portion. Its inscription consisted of four columns of writing—two on the Obverse, and two on the Reverse—each numbering about forty-five to fifty lines, altogether containing the names of about 180 early Babylonian rulers. As the inscription discussed in the following pages forms the upper half of Col. IV, beginning with King Ur-Engur of Ur, whom I place about 2500–2200 B.C., there must have been known to the Babylonians of the time of Hammurabi about 135 pre-Enguric rulers—in other words about as many as we know at present to have lived between Ur-Engur and the fall of Babylon under Nabonidos (539 B.C.). If,

1 The age of the inscription can be obtained approximately from palaeographical reasons and the consideration that Col. IV cannot have had more than 48 to 50 lines, 25 of which are partly preserved. Since the fragment closes with the first dynasty of Isin (ii. 24), the 23 to 25 lines following, if indeed the entire column was inscribed, cannot have contained much more than the dynasty of Larsa and the first dynasty of Babylon. In this connection we call attention to the fact that the last column of the larger fragment of Chronicle S. (Winckler, *Untersuchungen zur Altorientalischen Geschichte*, pp. 144 and 153) was, in part at least, uninscribed.
therefore, such chronological lists as the one here published were preserved in the temple archives and libraries of the Neo-Babylonian empire, which appears to one certain, the priests and scholars of Nabonidos were able not only to trace the history of their country to Sargon I., but to a considerably earlier period. The question arises, what is thought represented by this early period?

The chronological references gathered from Nabonidos’ inscriptions with regard to the age of Sargon I. and of other early Babylonian rulers, will always remain of great value, as a means of checking our own results, unless it can be proved that the king or his scholars, as often has been asserted, “manufactured” this high date, in order to attribute a greater importance to their own archæological researches. This proof, however, has never been furnished, notwithstanding the partly successful efforts of prominent scholars to show the impossibility of Nabonidos’ assertions. We acknowledge, there are very serious difficulties connected with our accepting the king’s statements. Lehmann, therefore, endeavored to reduce the 3200 years given by Nabonidos as the interval between Naram-Sin, son of Sargon I., and his own government, by assuming a scribal error in the figures of the cuneiform texts (2200 years instead of 3200). Winckler, by taking it for granted that the Neo-Babylonian scholars had “keine Königserzählungen mehr, welche bis auf Sargons Zeit historisch hätten,” for various reasons neither theory, however, the more strongly defended, met with much favor among Assyriologists and historians.

It seems to me that the problem may be approached and solved in still another manner. After a very careful re-examination of the entire material from which we usually construct the framework of Babylonian history, and with due consideration of the two sides of the chronological fragment under discussion, which at first glance would appear rather to support Nabonidos’ claims, I have felt it necessary to revise and modify my former conclusions. As sufficiently indicated in Chapter I. and pp. 106, above, I more than ever believe in the greatness of Babylonian literature, and I have positive reasons for asserting that the Neo-Babylonian scholars had chronological lists, by means of which they could study the history of their country far beyond the time of Sargon I. At the same time, I find it no longer possible to reconcile Nabonidos’ statements with certain well-known facts established by Assyriological research, not the least by Winckler’s and Lehmann’s own writings.

The results at which I have arrived may be summed up briefly as follows:

1. The c. 3200 years claimed by Nabonidos is the approximate age of Naram-Sin rep-
resent a round sum.\textsuperscript{1} This sum was found by the royal scholars through actual honest calculations, based upon authentic chronological material at their disposal.

2. These calculations, however, are erroneous, like certain other chronological statements with regard to the age of early Babylonian rulers found in Nabonidos’ texts and in other inscriptions;\textsuperscript{2} because based upon an erroneous conception of the meaning of ancient Babylonian chronological lists. But the mistake made by the king and his scholars is no worse than the mistakes constantly made by us in our own search for truth. Nabonidos’ erroneous view is the more pardonable, because at one time or other it was shared by practically every Assyriologist and, I dare say, is maintained even to-day by quite a number of scholars.

3. In all probability Nabonidos obtained his dates by adding the years of the different dynasties found in his lists, believing, with his scholars and other (Babylonian and modern) chronologists, that these chronological lists contained, in successive order, the names of all the rulers occupying the throne of Babylonia from the earliest times accessible down to his own government.

4. In examining these chronological lists we must, however, distinguish between kings of a certain city or district and kings or emperors (to use this more significant title) of Babylonia. For not all the members of the various dynasties recorded could lay claim to the more significant of these two titles. The chronological lists, then, instruct us only concerning certain cities and districts having a temporary hegemony over other Babylonian cities and states, by giving us the names of these cities or districts, together with the names and reigns of their local rulers constituting certain dynasties; but they do not give us any information as to how many of these local rulers were emperors of Babylonia at the same time.

5. The chronological lists, therefore, are of only relative value for the reconstruction of early Babylonian chronology. The names of those local kings who also were emperors of Babylonia, the duration of their reigns as emperors and their succession, must be established from other sources, notably by means of their titles assumed in their own inscriptions, through certain events referred to in documents dated in their reigns, and by other direct or indirect evidence drawn from their own and contemporaneous inscriptions or from certain historical references made by subsequent rulers.

\textsuperscript{1} As formerly maintained by me, cf. Assyria, p. 93, note 2.
\textsuperscript{2} Coup., e.g., the statement concerning the 696 years (in B. E., Series A, Vol. I, Part I, Pl. 20, li. 6–8) said to have elapsed between Gulkishar (i.e., from his death) and Nebuchadnezzar I (i.e., to the beginning of his government as emperor of Babylonia). These 696 years were obtained by the scribe simply by adding the 576\textsuperscript{1} years ascribed to the Cassite dynasty on the larger chronological list (A) + the last 120 years (\(= 9 + 7 + 26 + 28 + 50\)) of the last five kings of the dynasty of \textit{SHAIURU}-\textit{IZAGU}\textsuperscript{2} years, the scribe omitting only the fraction of a year, to round off his sum. Cf. Hilprecht, Assyria, pp. 20ff.
6. As already assumed by Hammel, Winckler, Niederl, Landl, etc., the dynastic
known from the chronological lists sometimes overlap each other. In referring
my readers to the well-known literature on this subject, I state it as my own conviction, based upon
acknowledged facts and new arguments, that about the last 400 years of the first
dynasty of Isin (for which compare my list below) are contemporaneous with the first
100 years of the Hammurabi dynasty (cf. p. 20, note 5, below); and that the dynasties of
Akkad (represented by Sin-gashid, etc.) and Larsa (known from Nin-lammer, etc.)
must be placed in the same general period; (d) that the dynasty of \( SIBSH \) (cf. I)
\( IZ.H.L.H \), which, according to all evidence, arose in the "Sea-Land," and which, for
a great part, is contemporaneous with the Hammurabi dynasty (cf. pp. 553f., below);
(e) that at least the first 800 years of the Cassite dynasty run parallel with the corre-
sponding historical years of the preceding dynasties; (f) that the first c. 35-40 years of the

\[ \text{Source: } \text{Mathematischer, Meteorologischer und Chronologischer} \]

\[ \text{Babylonien.} \]
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P.A-SHE (i.e., the second Isin) dynasty are contemporaneous with the last 35-40 years of the Cassite dynasty, and that Nebuchadrezzar I, the third or fourth king of this second dynasty of Isin, was the founder of the supremacy maintained by its members as emperors of Babylonia.1

7. According to my interpretation of Nabonidos’ method, the dates assigned by him to certain periods of Babylonian history would have been about as follows: We begin our calculation with the first year of Nebuchadrezzar I as emperor of Babylonia (which not necessarily was the first year of his reign as king of Isin; on the contrary, strong reasons speak against it), i.e., the first year after his overthrow and expulsion of the Cassite dynasty (the last year of Bel-shum-iddina, last king of the Cassite dynasty, being the šat râš šarrâiti of Nebuchadrezzar; for we know from the dated Cassite tablets that at this early period the year of accession to the throne was already distinguished from the following years of a king’s reign, according to the well-known method prevailing in Neo-Babylonian times). At the same time we allow a reasonable time for the unknown periods of the dynasties of Erech and Larsam, which, if separately enumerated in Nabonidos’ chronological list, must have covered at least c. 150 years. If only the dynasty of Larsam was given, an allowance of c. 100 years will be moderate. The first year of Nebuchadrezzar I as emperor of Babylonia may be given approximately as 1140 B.C.,2 to which we must add about 10 to 15 years, when he was only king of Isin (= 1150-55 B.C.), + the 23 years of his predecessors known from the chronological list (= c. 1173-78 B.C.) + 576½ years of the Cassite dynasty (= c. 1750-1755 B.C., the 9 months counted as a full year) + 308 years of the second dynasty (= c. 2118-23

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1 Cf. B. E., Series A, Vol. I, Part 1, pp. 41ff. Through a recent examination of a portion of the original tablet on which the chronological List A is inscribed, I have been convinced that the objections raised by Winckler and others against my placing Nebuchadrezzar I at the head of the second dynasty of Isin (= P.A-SHE) are justified. But while it is true that this king occupied only the third or fourth place among the members of his dynasty, it is likewise true that, as I always claimed, he was the real founder of his dynasty as to the throne of Babylonia. His predecessors were merely kings of Isin, at a time when the last Cassite kings were still in possession of Nippur, retaining a nominal supremacy over Babylonia, until their dynasty was overthrown by Nebuchadrezzar. In my previous writings I inferred this from the king’s proud titles (cf. especially šatilu Kashiškī) and remarkable victories. This theory can now be proved beyond any doubt by the new boundary stone referred to on p. 43, note 2, above, where Nebuchadrezzar has the significant titles (Col. II, 23.), šar kishkēti, mukin ishid mati, illustrated by the words that Bel (who had looked favorably upon him because of his care for the god’s sanctuaries) broke the weapon of his enemy and placed the scepter of his enemy in his own hand, that he might pasture (ana ru’al) Sumer and Akkad, renew the sanctuaries of the city of dwellings (or mankind? menaq đaqara [ iqtesšum; from adānu?]) and regulate the titles of Ekur and Nippur (ana sadar satuk Ekur u Nippur), Col. I, 22-III, 5. This important document is dated in the sixteenth year of Nebuchadrezzar (Col. V, 26). The text will be published in B. E., Series A, Vol. I, Part 3, while its transliteration and translation with commentary by my pupil Dr. W. J. Hinck will appear in B. E., Series B, Vol. IV.

the first dynasty of Isin yet, the new chronological fragment below = c. 2748-2738/2704 B.C. = 147 years of the dynasty of Ur let, the old chronological fragment below = c. 2765-2750/21 B.C. Therefore, in other words, at a moderate estimate, we would obtain c. 2800 or 2915 B.C. as the beginning of the reign of Ur-Engur, 2655 or 2705 B.C. as that of the MV/IR, c. 2522 or 2571 as that of Hammurabi, c. 2126 B.C. for the first king of the 2nd dynasty, c. 1756 B.C. as the first year of the Cassite dynasty. Practically the chronology hitherto more or less adopted by Assyriologists, who generally reduced it by about 100 years, because it was unknown that the first dynasty of Isin ruled as long as 225 years, represented as it is by 16 kings, only half of whom were previously known to us. Considering the fact that, according to all evidence (cf. p. 40, above) when complete, the new chronological list published on Pl. 30 must have contained about 135 pre-Enguric rulers and, furthermore, that the "Babylonische Kleinstedte" was a much more pronounced feature in the period preceding Ur-Engur than afterwards, I do not hesitate to assume that the c. 835-885 years required to fill out the gap between c. 3750 B.C. (Naram-Sin's age according to Nabonidos) and c. 2805-2915 B.C. (Ur-Engur), could easily have been obtained in the part of Nabonidos by simply adding the reigns of the different rulers of the largely contemporaneous dynasties in successive order recorded between Naram-Sin and Ur-Engur in his evidently better preserved chronological lists.

8. According to my own view of Babylonian chronology, these traditional high dates from Ur-Engur to Nebuchadrezzar I are impossible and must be reduced by about 2–400 and in some cases even 500 years. Accordingly, I assign c. 1140 B.C. to Nebuchadrezzar I as emperor of Babylonia and successor to Rim-Shum-Idlina, last member of the Cassite dynasty ceasing to reign c. 1141 B.C.; c. 1717 to Gandash, as ruler of the Cassite herders, c. 1925 to Agiaia (Kakrine), as probably the first Cassite emperor of Babylonia. Accordingly, our conception of the extent of the contemporaneous reigns of members of the so-called second and the Cassite dynasty with the first dynasty of Babylon, the dates to be assigned to Hammurabi must vary considerably. At the lowest estimate he ruled c. 1830 B.C., at the highest he cannot be placed beyond 2000 B.C.

Ur-MV/IR, accordingly, would have ruled some time between 2500 and 2000 B.C., Ur-Engur some time between 2500 and 2200 B.C., Sargan I between 3000 and 2700 B.C.

I lay stress only upon the principle set forth above. The dates themselves must be understood as mere possibilities. They cannot be fixed more accurately without a much better knowledge of Babylonian history than I frankly confess, we have at present,
After this brief digression from our principal subject, we return to an examination of the new chronological fragment.

The Reverse of this important fragment reads as follows:

1. Urشمba "Ur-Engur-ra lugal-ām
   "Ur-Engur became king, ruled 18 years.

2. Dungi, "Ur-Engur-ge mu 58 in-ag
   son of Ur-Engur, ruled 58 years.

3. Bār-Sin, "Dun-gi-ge mu 9 in-ag
   son of Dun-gi, ruled 9 years.

4. Gimil-Sin, "Bār-Sin-ge mu 7 in-ag
   son of Bār-Sin, ruled 7 years.

5. Iši-Sin, "Gimil-Sin-ge mu 25 in-ag
   son of Gimil-Sin, ruled 25 years.

6. "5 lugal-er-ne
   5 kings,

7. Uršumšum-ba "ba-bal nam-lugal-šum šú-bal-ši
   Ur, its reign was overthrown, Isin took its kingdom.

8. Isin: Ishbi-Ura became king,
   ruled 32 years.
The Sumerian does not offer any difficulty. Most of the lines close with "in-ma-sha, "he ruled," two lines (6 and 24) with "in-ug-ash, "they ruled," phrases well known from Chronicle S (Winckler, Untersuchungen, p. 153). For "ug = haru, "to rule," cf. V 81, 59. All the names preceded by "duru, "son of," have the genitive sign qa, except "En-dingir (li. 15) and "Sin-magir (li. 25). Observe the "Verhangerungsstil, "ca" after "Ur-dingir (li. 1, but, strangely enough, omitted in li. 2 before qa), which proves that the royal name ended in a. For the reading "ca ca" et Thureau-Dangin, in Revue d'Assyriologie, Vol. V, p. 79, note 2, and Les Inscriptions de Sumer et d'Alkad, p. 263, note 9. No less usual is the "Verhangerungsstil, "na" after "Sia in lines 3-5. This use of the "Verhangerungsstil, "ca" and "na" especially the latter, assures the Semitic reading of "EX-ZE = Sia), in connection with the omission of the "Verhangerungsstil, "ma" after "rum" and "na" after "Lis" (li. 7)—generally omitted in the Semitic inscriptions of the kings of Ur and Isin and of their period, while the Sumerian texts have them—proves that the Sumerian was written by a Semitic scribe, which for other reasons we anyhow would have assumed.

Lugal-I-Ass (lines 1 and 8) = "Lugal-assu" (cf. Z. K., Vol. 4, p. 300), "he was," or "he became king" (cf. dingir-assu, "he was a god," Prince, "Materials for a Sumerian Lexicon," p. 11), while "Lugal-" often occurring in the dates of the 1. dynasty of Babylon and elsewhere, means simply "the King" (not "he became king") (Lindall and King) nor "king of E.," i.e., Babylon, as I formerly translated it, cf. Delitzsch in B. A.,
Vol. IV, p. 104, Duiches, A.R., p. 71, Ranke, R.E., Series A, VI, 1, p. 11, note 1. In li. 6 by mistake the scribe omitted mu, distinct traces of which are preserved in li. 24. But the omission of the sign ZU after 4 UV (cf. Pl. XV) in the name of Gimil-\textsuperscript{2}Sin (li. 5) is due to an error on the part of the editor. Uran\textsuperscript{5}-ma (li. 1) and Isin\textsuperscript{5}-ma (li. 8), marking the beginning of a new dynasty, are placed emphatically at the beginning of the line, without any grammatical connection with the words following. The end of li. 7 is very probably to be read shu-sha-ti, "it took, seized," a phrase well known from the business records (= "he received" = imbur or mahir) of the third millennium. The writing I-bi-\textsuperscript{2}Sin (li. 5) definitely settles the reading of the name of the last king of the dynasty of Ur, generally written J-\textsuperscript{5}Ye-\textsuperscript{2}Sin, in favor of Delitzsch's proposition = I-bi-\textsuperscript{2}Sin (in B. I., Vol. II, p. 626), accepted by Ranke, Dissertation, p. 28, B. E., Series D, Vol. III, p. 229, note 5, Thureau-Dangin, Recueil de Tablettes Chaldéennes, p. 1, note 2, and Les Inscriptions de Samer et d'Akkad, p. 289, note 6, and others—a transliteration which Delitzsch himself, however, lately abandoned again in his Babylonische und assyrische Herrscherlisten.

For the identity of the names Bür (written ideographically, cf. Brünnow, "A Classified List," No. 9068)-\textsuperscript{2}Sin and Bar (written syllabically, cf. Brünnow, i.e., No. 6971)-\textsuperscript{2}Sin, cf. Delitzsch, in B. I., Vol. II, pp. 622ff. The name of King Li-bi-il-Ish(=U)-tär (= DAR, cf. Thureau-Dangin, Les Inscriptions de Samer et d'Akkad, p. 290), known already from his two cone inscriptions (King, "Cuneiform Texts," Vol. XXI, Pls. 18 and 19), is written Li-bi-\textsuperscript{2}Ish-tar in K 2973 (King, "Cuneiform Texts," Vol. XIII, Pl. 45, Obv., li. 4). I am inclined to regard the name Dun-qi as an abbreviated Semitic name written syllabically = Dumqi. The verb damăqa is commonly used in the earlier Semitic proper names, cf. li. 23 of our chronological list and the names Dāmīq-Mordak, Damqi-Bīl, Damqija, Damqi-iliska, Damqj-Sin, Ilu-dāmīq, Ima-in-bil-ilb-dāmīq, Eš-mudāmīq, and especially the two instructive feminine names, Du-na-\textsuperscript{5}ug-de-ul-tim and Ilu-dums(\textsuperscript{TUM})-qi\textsuperscript{2} (which, however, can also be read Ilu-ib-qi; for Ibiq and ib-ku likewise are common elements in earlier proper names).

The preserved portion of the Reverse is divided into two sections (a) lines 1-6: the kings of the dynasty of Ur, beginning with: "Ur: Ur-Engur became king, he ruled 18 years" (li. 1), and closing with: "5 kings ruled 117 years" (li. 6). (b) lines 7-24: the kings of the dynasty of Isin, beginning with: "Ur, its reign ceased" (literally "broke," "tore," "perished," "was destroyed," or the like), "Isin seized its kinghood" (li. 7). "Isin: Isbi-Ura became king, he ruled 32 years" (li. 8), and closing with: "16 kings ruled 225 years."

Mutilated as some of the names at the lower end of the fragment are, the number 1 For all these names of Ranke, B. E., Series D, Vol. III.
of rulers composing the two dynasties and their respective reigns are absolutely certain. Besides, two of the royal names (lines 15 and 18) can be restored with great probability from several unpublished Nippur tablets containing the names of two otherwise unknown kings, who for various reasons must have been members of the dynasty of Išin. These two royal names are 1-ta'ir-KA-shá, and 1-Bēl-bat-su. The last mentioned king, already referred to by Scheil (in Recueil, Vol. XIX, Note XXXVII, Reprint, p. 23), who found him on M. 1. O., Ni. 558, is known to me from three other dated Nippur tablets, among them C. B. M. 11.5631 and M. 1. O., Xi. 1898. King 1-ta'ir-KA-shá son K.A-shá, cf. Ranke, R. E., Series D, Vol. III, pp. 255f., note 9) appears on three dated tablets. The one—the interior of a case-tablet, covered repeatedly with the seal impression of a certain Luqit-Nin-IB, son of K.4 (= Luqiti- or Biṣa-)dIN-NIN-IB, prominently mentioned in the transaction—is dated 1-ta'ir-KA-shá [lugal]." The second is a fragment closing with 1-ta'ir-KA-shá [lugal] followed by three not very distinct lines (continuing the date and mentioning Bēl and Nippur). The third is among the unclassified tablets which I examined only once very hastily. There occurs another king by the name of 1-MUR(?)-ILU-SHUB (or 1.I.T) on the unpublished tablet C. B. M. 11.913, who, however, cannot belong to this dynasty (cf. p. 55, note 1). In L. 16 of the new chronological list we find the sign SHERISH after the traces of ama(?), which I do not regard as part of the name, but as an apposition to X, designating the latter as the brother of the preceding King 1-ta'ir-KA-shá, and, therefore, as a second son of Būr-Sin of Išin. Cf. the same sign SHERISH placed after Shushi of the dynasty of SHERISH (??-?)AŠag on the larger list of kings, known as A, who thereby is designated as the brother of Iškibul.

With the exception of one contract tablet excavated by Scheil at Abu Hadba and dated "in the year after that in which King [Dū]miq-ilishu built the wall of Išin," documents dated according to kings of the dynasty of Išin, to the best of my knowledge, have thus far been discovered only at Nippur. Besides the tablets just treated, I have seen one dated "in the year when 1-ta'ir-NIN-IB . . . . " (rest mutilated, M. 1. O., Xi. 1912), three in the reign of 1-DU-mi-qišišu-lagard (cf. C. B. M. 11.562), and one or two in the reign .

1 The name of two months 1-EN-NIN-ASIR, Virous turning part of its date. The ideograms of the different months found on the tablets dated in the reign of kings of Išim correspond with those known from the tablets of the period of Bammara (cf. 1-EN 30. X, 16. From documents dated in the reign of kings of the dynasty of Išin I have gathered the following chronogram way-30-si-di AB-ˇ šá-uš, 1-ta'ir-NIN-IB (or). 1-AŠag, 1-ta'ir-KA-shá, 1-ta'ir-NIN-IB (or). 1-MUR(?)-ILU-SHUB, 1-Bēl-bat-su, 1-DU-mi-qišišu-lagard, 1-DU-mi-qišišu-lagard, 1-DU-mi-qišišu-lagard, 1-DU-mi-qišišu-lagard, 1-DU-mi-qišišu-lagard.

2 Thus correctly interpreted by Lehmann, Delitzsch, and others.
5 Dated M. 1. O., Xi. 558, or Nippur, p. 14f., and one or two in the reign (1-ta'ir-KA-shá).
of "Bûr-ÆSin. ¹ Altogether, therefore, five kings of this dynasty are represented by dated tablets. I have no doubt a good number of the insufficiently dated Nippur documents (i.e., dated after an important event but omitting the name of the ruler) will turn out to belong to the same period. Dûmûq-ilishu is also known from two fragmentary terracotta cones with identical inscriptions, excavated at Nippur in 1893 and 1895 respectively,² and probably also from Chronicle S. (large fragm., li. 3) and K. 3942, li. 10 (cf. Winckler, J. E., pp. 515ff.). Sin-mûgîr is represented by two fragments of a terracotta cone (of the same general type as those of Dûmûq-ilishu from Nippur) excavated by the German expedition in the temple E-Pû1-TU-TI-LA of Babylon and published by Weissbach in his Babylo...
Dugän, Bär-Sin left numerous bricks inscribed with their names and titles at Nippur. 1 For the inscriptions of Libût-Ištar cf. p. 48, above.

The result of our examination is that ten of the sixteen kings forming the dynasty of Isin are already familiar to us from their own inscriptions or from documents dated in their reigns. An eleventh name is obtained from ii, 9 of the new chronological list (Gimil-Ištar). It is very probable that the remaining five members, whose identification is facilitated by the traces of cuneiform characters left in ii, 16-17, 19-24, will be found on some of the unclassified tablets from Nippur. Hommel recently called my attention to a king Nibû-Dugän, mentioned in "Cuneiform Texts," as possibly one of these missing kings. 2 Simû-er-bani (Scheil in Recueil, Vol. XXIV, No. 1, 1905, Col. 350) may have been another, unless the one or both belonged to the Larsa dynasty. As to the so-called "Er-sargobor" of the first dynasty cf. pp. 36ff.

We observe that apart from Bêl-Išini and Sin-mâgir, whose names begin with a deity and, therefore, with the sign for "god," the names of all the known kings of this dynasty are determined by ûtu in their own inscriptions and in those written during their government, while they naturally appear without any determinative in the chronological list. We have known for some time that the rise of the dynasty of Isin was closely connected with the possession of the great sanctuary at Nippur; for its members placed the title sib nipp-mans-il Nîhar1, or sib dâng Nîhar1 dâng-dâng, or sib BûR-mans-Nîhar1, or sib ûtu ... (Kûbî, or ûtu Nîhar1), by which they designate themselves as the sublime or pious shepherds who have the interest of the temple of Bêl at heart, before all their other titles. And we also know that the significant title: înu-gal ulûr-sa lâtu-ulûr-sa = šar kilat arûsim, "king of the four quarters of the world," was bestowed by the high-priest of Bêl at Nippur [cf. my remarks in R. E., Series A, Vol. 1, Part 2, pp. 53ff., and Series D, Vol. 1, pp. 48ff., where the wall of Nippur is called by King Simû-sîlûma: markû-sîlûma, "the link of the lands," i.e., "the wall which unites all the lands," in other words, "the centre of the world"). These kings then evidently enjoyed divine honors, like Sargon I, Narâm-Sin, Dungi, Bîr-Sin I, Gimmâl-Sin, Ibi-Sin before them, because by reason of this title they were the human representatives of Bêl on earth. The custom of deification seems to have sprung up with Sargon I, been revived by Dungi1 and his


successors (including Nīr-Immer and Rim-Sin), and after a lapse of many centuries adopted again by Kurigalzu, Nazi-Marruttash, Kadashman-Turgu, Kadashman-Bēl,\footnote{As previously stated by me (Z. A., Vol. VII, pp. 306ff.), Cassite kings never have any determinative before their names and comparatively rarely any title after their names in the numerous votive inscriptions preserved to us. The determinative īlu, on the other hand, while never occurring in any dated document of Burna-Buriash and Bitiliashu, is often placed before the names of the six Cassite kings mentioned above on the numerous tablets dated in their reigns. For the published material cf. Hilprecht in Z. A., Vol. VII, pp. 308ff., and VIII, pp. 306f.; Vdovc, Urkunden aus der Zeit der arischen babylonischen Dynastie, and Clay, B. E., Series A, Vol. XIV (by an oversight Clay forgot to indicate the determinative īlu before the name of Kadashman-Turgu in his useful "Concordance of Proper Names." \(a\) It appears, however, in Nos. 99: 6, 105a: 7, 105b: 5, 166b: 8, 107: 7, 108: 5, and on a number of unpublished tablets). After Clay, on the basis of certain proper names, made it very probable (\(i.e.,\) pp. 3ff.) that the name of Kadashman-Turgu’s successor, whom I read Kadashman-Buriash, was Kadashman-Bēl (formerly regarded by me as identical with Kadashman-Turgu), the names of the seven Cassite rulers preceding Bitiliashu in the larger List A (which on October 13, 1906, King and I examined anew in the British Museum, in the light of the fresh material furnished by the Nippur tablets, presenting the results of our combined collation in this note) can be restored as follows (with due consideration of the fact that the Cassite votive objects and dated documents form one group, which cannot be dismembered to fit theories): Burna-Buriash (latest Nippur tablet dated in his 25th year), Kurigalzu (his son, but possibly not his immediate successor; doublet 25 years according to the traces preserved in List A, beginning of Col. II, latest Nippur document dated in his 23rd year), Nazi-Marruttash (his son, 26 years according to List A, latest Nippur document dated in his 24th year), Kadashman-Turgu (his son, 17 years; according to List A, latest Nippur document dated in his 16th year), Kadashman-Bēl (beginning of his name (Kad-assu-\(\ldots\)) and traces of the number of years of his reign preserved in List A (in all probability 11 or 12; but if we do not allow the "ten," only 1 or 2), latest Nippur document dated in his 6th year), Kudur-Bēl (possibly his son, formerly read Is-an-\(\ldots\) in List A, where the partly effaced number of his years seems to have been a 6—a discrepancy between List A and the Nippur documents—latest Nippur document dated in his 9th year), Shagarakti-Shurriš (second? son of Kadashman-Bēl (cf. B. E., Series A, Vol. I, No. 68, Col. i, lines 5 and 14-15), 13 years according to List A, latest Nippur document dated in his 12th year (cf. B. E., Series A, Vol. IV, No. 138, li 2; the number 22 given by Clay, \(i.e.,\) pp. 3 and 72, is a mistake, for No. 130 clearly offers shatru 24[b]), Bitiliashu (his son, 8 years according to List A, latest Nippur document dated in his 6th year). Cf. my first tentative list in B. E., Series A, Vol. I, Part I, pp. 37f.)}

Kudur-Bēl and Shagarakti-Shurriš, who made Nippur their stronghold\footnote{Cf. B. E., Series A, Vol. I, pp. 306f. More than 18,000 tablets and fragments dated in the reigns of Cassite kings have been excavated at Nippur.} and evidently gained the support of its priesthood by endeavoring to restore the former glory of Ekur and by stepping forward as the champions of the sacred rights of “the father of the gods,” who in return for their loyalty and devotion raised them to the rank of gods while still living.\footnote{The deification of living rulers, indicated by the determinative īlu placed before their names, as stated above, seems confined to the person cited. The more natural deification of dead persons is known from several other examples, cf. e.g., Gudea, Sa(u)mu-abu, Hammurabi (cf. also King, “Letters,” Vol. III, note), Samsu-ilunu, Zabium, etc. Cf. Radau, “Early Babylonian History,” pp. 307ff., Ranke, B. E., Series D, Vol. 11, p. 212, and others.} The neglect of the Nippur cult, \(i.e.,\) the diminution of the temple income, seems to have commenced with Bitiliashu. On the new boundary stone of Nebuchadrezzar I. from Nippur (cf. p. 44, note 1, above) this is given as the cause of the anger of Bēl, resulting in the downfall of the Cassite dynasty.

On the basis of the two Nippur lists containing dates of Dungi, Būr-Sin and Gimil-
Sin in chronological order, and certain additional material gathered by several Assyriologists from dated tablets, seal impressions and other cuneiform texts, Thureau-Dangin had previously established the order of succession of the five kings of Ur, at the same time stating that Ur-Engur ruled at least four, Dungi at least forty-six, and Ibi-Sin at least three years, while Bar-Sin and Gimmil-Sin must have ruled nine years each. With the exception of the last-mentioned king, the French Assyriologist was correct. But the nine years ascribed by him to Gimmil-Sin are evidently due to a mistake somewhere (perhaps two of the years of this king's reign were known by two different dates, as e.g., several years of Dungi), for the list of dates edited by me in B. E., Series A, Vol. 1, No. 127, in accordance with Thureau-Dangin's own calculations, *Les inscriptions de Sumer et d'Uruk*, pp. 336 ff., assigns only seven years to Gimmil-Sin, in entire accord with the new chronological list discussed above. The unclassified dates given by Scheil, *Recueil*, Vol. XIX, pp. 54 ff., and Thureau-Dangin, *loc.*. pp. 336 ff., as we may now safely assume, belong to Ur-Engur, Dungi, Ibi-Sin of Ur, and perhaps also to kings of Isin and Larsa.

The information conveyed by the new chronological tablet is of extraordinary importance for our better understanding of a very obscure chapter of Babylonian history, and surely we are grateful for what we have received. But at the same time one cannot help wishing that at least one more line was preserved on the fragment to serve as a first guide through the period which separates the reign of the last king of Isin from the time of Hammurabi. Considering all the evidence before us, I must adhere to my previously expressed conviction (*B. E.*, Series D, Vol. 1, p. 382), that the dynasty of Isin was supplanted by the dynasty of Larsa. For not only are the tablets dated in the reign of Rim-Sin found practically in the same stratum at Nippur, but the few remains of cuneiform signs left in li. 25 of the new chronological list seem to favor this view. For assuming that li. 25 was phrased as li. 7—which, however, is nothing but a mere hypothesis—the traces under "*a šešu*" of li. 24 would contain part of the name of the city which succeeded Isin, i.e., UD (part of the head of the perpendicular wedge of the sign preserved) + *UMI* (the two upper horizontal wedges preserved) + *KI* (two horizontal wedges preserved) = Larsa. Disregarding the trace of the first sign (which however cannot be the remains of *š*), we obtain the group *UMI* + *KI* = *Urark*, which of course would fit another theory, according to which the dynasty of Ezech, known to us from the names of Sin-gashid and Sin-gimmil, supplanted the dynasty of Isin. But to

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judge from their titles in their own inscriptions ("king of Uruk, king of Amnanum") and from the utter absence of their inscriptions at Nippur, these kings of Erech (unless = SHESHIR (URU)-KU) did not play an important political rôle in the history of Babylonia.

In B. E., Series D, Vol. I, pp. 378ff. and 512ff., I had reached the conclusion that the breaking and scattering of so many vases, statues, slabs, etc., in the temple court of Nippur (prior to Ur-dNIN-IB's accession to the throne), and of thousands of literary documents in the Temple Library and School to the south of it, "not only indicates a period of great political disturbance in Babylonia but points unmistakably to a foreign invasion," which I called the first Elamite invasion, occurring about 125 years before the second, from which Hammurabi finally freed Babylonia. The question arises whether or not these two invasions are only two known phases of that great political movement and migration of nations taking place in Western Asia at that period and first felt in Babylonia as an invasion by the Elamites, who only gradually were able to conquer the fertile plain, perhaps at one time and in one district victorious, while at another time and in another province repulsed by a Babylonian prince or general, who in consequence of his temporary success acquired a certain influence for himself and his city. At any rate a period of great political unrest is also reflected in the second half of the new chronological list.

After the family of Ishbi-Ura, founder of the dynasty of Isin, had occupied the throne of Babylonia for 94 years or less, Ur-dNIN-IB, "the son of a nobody" (to quote a Neo-Babylonian phrase), usurped the throne. About the same time we find Enamatun, another son of Ishme-Dagín, and therefore the legitimate successor of Libit-Ištar, his brother, as high-priest in the temple of Sin at Ur, which then stood under the control of a certain Gungunn, "king of Ur," who, however, in his own inscription calls himself "king of Larsa, king of Shumer and Akkad." Considered in the light of the devastation of the temple of Bêl referred to above, the historical situation seems to have been this: Towards the end of Libit-Ištar's government a foreign army had invaded Babylonia, succeeding even in conquering Nippur, desecrating and pillaging its famous sanctuary and overthrowing the old line of the dynasty of Isin. Ishme-Dagín's second son, unless invested by his own father with the high office he held at Ur, sought refuge with Gungunn, a Southern prince, who in the general turmoil had established a city kingdom in Larsa and Ur, assuming even the proud title "king of Shumer and Akkad." But

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1 Cf. already Winckler, Untersuchungen zur altbabylonischen Geschichte, pp. 371.; Geschichte Babylonien und Assyriens, p. 48, etc.

2 En-sat-UUXUZ-ZI dNannar, en dNannar, thus called in two inscriptions from Muqayyar (cf. Thureau-Dangin, Les Inscriptions de Sumer et d'Akkad, pp. 294f.), the one inscribed on bricks from the temple of Sin at Ur, which by their very existence testify to the high position Enamatun occupied there.

3 Cf. also the fact that he restored "the large wall of Larsa," calling it "Shamash is the conqueror of the enenmical land." Cf. the similar (abbreviated?) name Ishkibal (4th king of the 2nd dynasty).
Gungnun’s influence in Babylonia did not last very long. Ur-MA-IE of Isin restored order in the country evidently by repulsing the foreigners and winning the “kingdom of the four quarters of the world” for him and his descendants. After about half a century a new disaster befell his dynasty. No less than six usurpers ascended the throne within the 36 or 37 years following the death of Bar-Sin’s unknown second son. It is safe to assert that with the exception of Bel-bani, who ruled 24 years and was in possession of Nippur, they had enough to do at Isin to hold and strengthen their position.

We may take it for granted that some of the old renowned centres, like Ur, Erech, Larsa and Sippur, profited from the political weakness manifested by these nominal Babylonian rulers of the dynasty of Isin. For various reasons it seems to me almost certain that we have to place Sumar-Idu, “king of Ur,” the unknown successors of king Gungnun of Ur and Larsa referred to above (and including Nûr-Himmûr [generally read Nûr-Adad] Sin-iddinam, etc., and possibly Ruin-Amin, unless he belonged to the dynasty of Erech). Sin-gashid and Sin-giûdû, “kings of

[Note: The text is cut off, so the full content cannot be accurately represented.]
ERECH" 1 (the former of the last mentioned two rulers also styling himself "king of Ammanu"), and also the beginning of the city kingdom of Babylon under Sumu-abu(i), founder of the first dynasty of Babylon, in this period of Babylonisches Faustrecht. Once more Isin regained its political influence under Sin-māgir and his son Dāniq-ilīshu, who both have the title "king of Shumer and Akkad" and otherwise left their traces in Babylonian history. 2 Upon the death of the latter the dynasty of Larsa, temporarily represented by Rim-Sin, son of Kudur-Mabuk, the Elamite, who seems to have overthrown Sin-iddinam, son of Nūr-Immer, of the native dynasty of that city, took the leading rôle in the shaping of Babylonian politics; but only for a short period (c. 30 years), for the kings of Babylon made themselves more and more felt in the North, until finally Hammurabi defeated the Elamite army and united the various Babylonian cities and states under his powerful sceptre.

A word remains to be said with regard to *Immerum* and *Ilu-ma-[I]lu, 3 so-called "Usurpatoren," who were contemporaneous 4 with Sumu-la-ilu of the first dynasty of N khuyến (*== iši) + ma + AN (*== ilu), therefore to be transliterated as Bi-li-lu-lang Ilu (*cf. Ranke, Series D, Vol. III, p. 224) ma-ilu. "The lord of gods (an epithet of A, Shamash, Sin, etc.) is god," or better (the sign "bi" frequently having the value "bī" at this period, cf. p. 18, above) as Bi-li-Il-mu Ilu = Bili-lu-ilu, "The lord is god," an abbreviated name, as indicated by the ma after Bili (probably standing for Bili-dē, cf. my remarks in B. E., Series D, Vol. III, p. 186, note 1, and B. E., Series A, Vol. X, pp. Xf.). The question may be asked whether or not this king is identical with the first king of the so-called second dynasty, AN-na-ilu, generally read Ilu-na-ilu; for the sign AN is also hieroglyph for "šēlu" (V R. 21, 17g) and sharru (V R. 30, 8a). The tablet was found at Nippur by the first expedition together with a number of tablets dated in the reign of Samsu-iluna. It, therefore, belongs to that general period. My pupil, Dr. Arno Poechel, who has a volume on the tablets of the Hammurabi dynasty excavated at Nippur in the course of preparation (== Series A, Vol. VI, Part 2), informs me that certain names occurring in the Bi-li-lu-lang tablets are found also on Samsu-iluna tablets. Hence Bi-li-lu-lang must belong to the dynasty of a city which under Samsu-iluna or soon after him (cf. King "Letters," Vol. III, p. LXIX) obtained a signal success, even occupying Nippur (as tablets were dated there according to this king's reign). Unless, as just stated, he was the first king himself, he probably was a prince of the second dynasty. At any rate, as already indicated by the absence of the determinative ilu before his name, he cannot be regarded as a member of the Isin dynasty. As to the king Gir-Ma-Ma or Arad Shā(g)-Shā(g) (made known by Schell in Revue, Vol. XXIV, Note LXII, and V. L. Z., 1905, Col. 351) cf. Thureau-Dangin, Les Inscriptions de Sumer et d'Akkad, pp. 34f. For the king JN-A-AN see the references given pp. 561 f., below.

1 For the literature concerning their inscriptions cf. Thureau-Dangin, *Lc*, pp. 294f., 316f., also pp. 34f.


3 Cf. pp. 49 f. I regard the one as the founder of Bit-Sin-māgir šīlā mitāndi (cf. B. E., Series A., Vol. I, Part 1, Psl. 30-3; and pp. 38f., and Weissbach, *Babyloniische Miscellen*, p. 1), and the other as the ancestor of Shimrash-Shipak son of Erba-Sin, of the fifth dynasty (or the "Sea-Land"), šub pali Dāniq-ilīshu, i.e., "man of the dynasty of Dāniq-ilīshu" (Chronique S, published by Winckler, *Untersuchungen zur altbabylonischen Geschichte*, p. 153).


Babylon. I cannot enter here into a full discussion of a most interesting and difficult problem, but must confine myself to a brief statement of my own view.

Thurmann-Dongin has recently shown that \( \text{I-generated} \) (variant \( \text{I-generated} \) and \( \text{I-generated} \)) is an abbreviated name containing the name of the god \( \text{I-generated} \), whom I regard as identical with the god \( \text{I-generated} \). In the passages given by the French scholar Lantier is abbreviated from \( \text{I-generated} \), but it goes without saying that any other name having the same god as second element could also be shortened to \( \text{I-generated} \).

Then the same author concludes correctly that the name of King \( \text{Nur-Immerum} \) of Larsa (father of Sin-Immerum, generally read \( \text{Nur-Rammun} \) or \( \text{Nur-Irul} \), must be trans-literated as \( \text{Nur-Irul} \). We draw still another conclusion. As indicated above (p. 54) at the time of Libit-Ishtar and \( \text{Ur-MN-IH} \) the city of Larsa began to make itself felt in Babylonian affairs through Gunamun, "king of Uri," and "king of Lasra, king of Shamer and Akkad." It, therefore, is certain that a dynasty of Larsa actually existed about 30-40 years before the time of Sumu-la-ilu, whose reign of 30 years commenced about the 19th or 29th year of Birs-in II of Isin (cf. pp. 196, note 3). From other passages we infer that Larsa's influence gradually extended far into Northern Babylonia, including Sippar, where the same cult of Shamash flourished; and, furthermore, that \( \text{Nur-Immerum} \), king of Larsa, who in his inscription from \( \text{Ur} \) has the determinative \( \text{alba} \) before his name, and, therefore (cf. pp. 551), at some time must also have possessed Nippur, is identical with Immerum, the contemporary of Sumu-la-ilu.

Repeated attempts have been made to identify \( \text{IN-1-1-N} \) generally read \( \text{IN-seer,} \) "secretary," son of Bel-Sama, identified by me with \( \text{IN-1-1-N} \), "the alba of the people of Erech," with \( \text{IN-1-1-N, babali} \), occurring in two dated tablets published by Sayce and Thurmann-Dongin (cf. pp. 556, note 1, above), and \( \text{IN-1-1-N} \) generally read \( \text{IN-seer, resp. IN-seer-ilu} \), the first king of the so-called second dynasty, with
AN-ma-NI-la (read Anu-ma-I-la by Ranke, cf. p. 55, note 4, above), or AN-ma-ilu, contemporary of Sumu-la-ilu of the first dynasty of Babylon, or to regard them all as the same person. The political situation seems to favor these identifications. For it can be shown that both Uruk and the “Sea-Land,” where the second dynasty doubtless arose (cf. p. 43, above), began to influence Babylonian politics at that very time. If we allow this identity, we would obtain as contemporaries Bûr-Sîn II (or his two sons) of the Isin dynasty, Sumu-la-ilu of the Hammurabi dynasty,1 Nur-Immer (or Immerum) of the Larsa dynasty, and AN-ma-ilu(a), founder of the so-called second dynasty. It then would follow with great probability that Damiq-ilishu, last king of the Isin dynasty, and Damki-ilishu, third king of the so-called second dynasty, are identical, since the interval between the unclassified AN-ma-ilu (contemporaneous with Sumu-la-ilu and Bûr-Sîn II, resp. his two sons) and Damiq-ilishu of Isin is practically the same as the interval between the second half of the reign of AN-ma-ilu and Damki-ilishu of the second dynasty. And it would also follow, that Sin-mâqir, father of Damiq-ilishu of Isin, was a prince of the ancestral home of the second dynasty, i.e., the “Sea-Land” (cf. p. 43, above), and, therefore, apparently identical with Sin-mâqir, the founder of Bit-Sîn-mâqir, a province of the “Sea-Land.” In this case Gulkishar, king of the “Sea-Land,” would have been a contemporary of Samsu-ilunu and Abi-čeluh. This seems to be a plausible theory, which may be supported by additional combinations, but which cannot yet be proved definitely with the material available, and with the other candidate Bi-ili-ma-ilu (pp. 55f., note 4, the contemporary of Samsu-ilunu) to be disposed of.2

1 The 19th or 20th year of Bûr-Sîn II, as we saw above, is identical with the first year of Sumu-la-ilu AN-ma-ilu of the second dynasty, who ruled 60 years, therefore, would have been contemporaneous also with Ur-4NIN-IB of Isin and Sumu-abu, founder of the so-called first dynasty.

2 In order to have this book appear as early as possible, Chapter V, pp. 57ff. (being written first), was printed and paged first. Afterwards it was found that the space allowed for the preceding material was underestimated a little. I consequently introduced pp. 56a and 56b.
DESCRIPTION OF TABLETS AND RUINS

ABBREVIATIONS.

c., from C.B.M., Catalogue of the British Museum; Handwritten, prepared by the
Exp. Dept.; Exp., Expedition of T. E. Lawrence; p. W., Printing Press; i.e., in
Handwriting; Trgs., Triglyphs; Inscr., Inscription; L.E., Left Edge; R.E., Right
Edge; M.I.O., Main Imperial Oracle; O. Texts, Origin; Vol., Volume; pp., pages;
R.E., Right Edge; M.E., Main Edge; Vol., Volume.

Measurements are given in centimetres, length (height) width thicknes. Wherever the tablet is
fragments, values in spec. the largest measurement is given.

Texts drawn by hand and at the same time reproduced in photostereotype are indicated by a letter note to the top
column. Tablets quoted without a number are not yet catalogued.

A. AUTOGRAPH REPRODUCTIONS.

<table>
<thead>
<tr>
<th>No.</th>
<th>Place</th>
<th>Age</th>
<th>Content</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1   | 1     | c. 1350 B.C. | 2 x 1 | flanked Braca with inscriptions; another s is broken off, from part of the
|     |       |     |         | slight here. Dyes are present. |
| 2   | 1     | c. 1350 B.C. | 0 x 1 | flanked Braca at lower edge; broken off here. Dyes are present. |
| 3   | 1     | c. 1350 B.C. | 0 x 1 | flanked Braca at lower edge; broken off here. Dyes are present. |

8
<table>
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<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>c. 1350 B.C.</td>
<td>18 x 1</td>
<td>have come from Abu Habba, but according to all evidence (cf. pp. 14ff.) doubleless from Nippur, probably IX. C.B.M. 8535. For half-tone illustration cf. Hilprecht, &quot;Vortrag,&quot; p. 60.</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>c. 2200 B.C.</td>
<td>36 x 1</td>
<td>Fr. (lower part) of a clay tablet. Unbaked. Brown. Small piece of R. chipped off. Ruled. 3.7 (orig. c. 6.2) x 3.3 x 2. Inscr. 7 (orig. 12, O.) + 6 (orig. 11, R.) = 13 (orig. 23) li. Ni. IX. Fourth Exp.</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>c. 1350 B.C.</td>
<td>100 x 1</td>
<td>Unbaked. Brown with numerous black spots. Small pieces chipped off, otherwise well preserved. Ruled, double li. after li. 8. 5.2 x 3.6 x 2. Inscr. 12 (O.) + 12 (R.) = 24 li. Ni. IX. Fourth Exp.</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>c. 1350 B.C.</td>
<td>150 x 1</td>
<td>Fr. (left part) of a clay tablet. Unbaked. Light brown. Somewhat rubbed off. Ruled. 5.8 x 3.5 (orig. c. 3.8) x 1.9. Inscr. 10 (O.) + 13 (R.) = 23 li. Ni. IX. Third Exp. M.I.O., Ni. 1143.</td>
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<tr>
<td></td>
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<td></td>
<td>Unbaked. Brown. The upper corners and the left lower one slightly damaged.</td>
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</table>
|_matematical, metrological and chronological tables,

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<th>Layer</th>
<th>Page</th>
<th>Age</th>
<th>Content</th>
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<tr>
<td>11</td>
<td>6</td>
<td>c. 1350 BC</td>
<td>F30 1</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>c. 1350 BC</td>
<td>H32 1</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>c. 1350 BC</td>
<td>G32 1</td>
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<td>14</td>
<td>7</td>
<td>c. 1350 BC</td>
<td>430 1</td>
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<td>15</td>
<td>7</td>
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<tr>
<td>16</td>
<td>7</td>
<td>c. 1350 BC</td>
<td>730 1</td>
</tr>
<tr>
<td>17</td>
<td>8</td>
<td>c. 1350 BC</td>
<td>800 1</td>
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</tbody>
</table>

Descriptive:
- Sedimentary rock, 1350 BC
- Laid in a horizontal position
- Upper part of a clay tablet
- Mixed light brown with patches of black spots
- Sedimentary rock, 1350 BC
- Laid in a horizontal position
- Upper part of a clay tablet
- Mixed light brown with patches of black spots
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<tbody>
<tr>
<td>18</td>
<td>9</td>
<td>c. 2200 B.C.</td>
<td>Portions of 2160 × 1, 1500 × 1, 1000 × 1.</td>
<td>Each section (by mistake of scribe also R., Col. II, 4 f. c.). 6.6 (orig. c.12) × 9 × 2.5. Inscr. O.: S (orig. 25, Col. I) + 12 (orig. 27, Col. II) + 12 (orig. 28, Col. III) + 11 (orig. 27 or 28, Col. IV) + R.: 14 (orig. 22 or 21, Col. I) + 10 (orig. 30, Col. II) + 10 (orig. 27, Col. III) + 1 (orig. c. 22, Col. IV) = 78 (orig. c. 208) li. Ni. IX. Second Exp. C.B.M. 10219. Cf. Pl. III, No. 6. Fr. (central part) of a clay tablet. Unbaked. Brown with black spots. Ruled. 5.7 (fr.) × 6.5 (fr.) × 3.6. Inscr. O.: 3 (Col. I) + 9 (Col. II) + 11 (Col. III) + 11 (Col. I) + 8 (Col. II) = 39 li. Col. III formed the last col. of O.; the complete tablet therefore had 6 cols. Ni. V. Fourth Exp. M.I.O., Ni. 1588. Fr. (upper right part) of a clay tablet. Unbaked. Brown with numerous black spots. Ruled, double li, indicating end of each section. 6.9 (orig. c. 15) × 5.2 (orig. c. 12.5) × 2.6 (orig. c. 3). Inscr. O.: 20 (Col. III) + 18 (Col. IV) + R.: 18 (Col. I) + 16 (Col. II) = 72 li. Ni. IX. Fourth Exp. (Cf. C.B.M. 19841, a duplicate of the same period Fr. Unbaked. Brown with black spots. 6 (fr.) × 3.4 (fr.) × 2.5 (fr.). Inscr. 2 fr. cols. on O. (Cols. III and IV, the latter beginning with 240 × 1) and one on R. (Col. I, ending with 180 × 50). Ni. IX. Fourth Exp.). Seven frgs. of a clay tablet joined. Unbaked. Light brown with occasional black spots. Ruled. 13 (orig. 17.3) × 11 × 3.3. After these frgs. had been copied, an eighth fr. (C.B.M. 11402, also excavated at Ni. V by the First Exp.) was found to belong to the same tablet (joined on Pl. IV). Its O. being uninscribed, this fr. was disregarded in the autograph copy on Pl. 10. Inscr. on O.: 17 (orig. 23, Col. I) + 7 (orig. 10, Col. II) = 24 (orig. 33) li. Ni. V. First Exp. C.B.M. 11340. Cf. Pl. IV, No. 7, O. The same, but not ruled. Li. indicating end</td>
</tr>
<tr>
<td>19</td>
<td>9</td>
<td>c. 1350 B.C.</td>
<td>Portions of 300 × 1, 240 × 1, 180 × 1, 150 × 1, 141 × 1 (ending with 114f), 120 × 1.</td>
<td></td>
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<tr>
<td>20, O.</td>
<td>10</td>
<td>c. 2200 B.C.</td>
<td>45×1 (Left column written by teacher, right by pupil).</td>
<td></td>
</tr>
<tr>
<td>20, R.</td>
<td>11</td>
<td>The same.</td>
<td>Divisors of 12,960,000,</td>
<td></td>
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</tbody>
</table>
### Table: Mathematical, Meteorological and Chronological Tablets

<table>
<thead>
<tr>
<th>Page</th>
<th>Plate</th>
<th>Age</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 O</td>
<td>10</td>
<td>c. 2200 B.C.</td>
<td>Divisors of 12,960,000 and 50 = 1, written alternately.</td>
</tr>
<tr>
<td>22 O</td>
<td>12</td>
<td>c. 2200 B.C.</td>
<td>Divisors of 12,960,000 (Col. I) and 50 = 1 (Col. II).</td>
</tr>
<tr>
<td>23 O</td>
<td>14</td>
<td>c. 2200 B.C.</td>
<td>Divisors determined by a scale and their sequences.</td>
</tr>
<tr>
<td>23 R</td>
<td>13</td>
<td>c. 2200 B.C.</td>
<td>Portions of 130 = 1, 1,980 = 1.</td>
</tr>
</tbody>
</table>

### Notes:
- Light Brown, often somewhat rubbed off, a small hole running half way through tablet from O towards R. Ruled: 5 (fr.) = 5 (fr. 2nd col. of tablet). Portions of 130 = 1, 1,980 = 1. Divisors determined by the scale and their sequences. Table equivalent.
- Divisions: Inscribed on R 3, (Col. I), 9 (Col. III), 9 (Col. IV), 9 (Col. V), 9 (Col. VI). The divisor is 76. N. V. Second Exp. ORM, 11092. Portion: 1, 980 = 1. Divisor: 15. Portions of 130 = 1, 1,980 = 1.
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</tr>
</thead>
<tbody>
<tr>
<td>21, R.</td>
<td>14</td>
<td>The same.</td>
<td>The first 30 divisors of 12,960,000 and portions of 45 × 1, 40 × 1, 30 × 1.</td>
<td>The same, but not ruled. Inscr. on R. (to be read from left to right, cf. pp. 19, note 2, and 23, note 1): 15 (Col. I, left hand) + 14 (Col. II) + 16 (Col. III) + 16 (Col. IV) + 10 (Col. V) = 71 li.</td>
</tr>
<tr>
<td>25a</td>
<td>15</td>
<td>c. 2350 B.C.</td>
<td>Aritimetical calculations.</td>
<td>Three frgs. of a clay tablet joined. Unbaked. Dark brown. O. considerably chipped off. R. almost entirely broken away, a few cuneiform characters (beginnings of 15 li.) preserved, sufficient to show that the contents of R. was similar to that of O. Ruled. 10.9 (fr.) × 7.15 (fr.) × 2. Inscr. on O.: 20 (Col. I) + 16 (Col. II) = 36 li. Ni. V. Second Exp. C.B.M. 12618.</td>
</tr>
<tr>
<td>26</td>
<td>16</td>
<td>c. 1350 B.C.</td>
<td>Squares of 1 to 50.</td>
<td>Unbaked. Brown with numerous black spots. Right upper corner broken away, small pieces chipped off. Ruled, double li. indicating end. 6.5 × 4.4 × 2.7. Inscr. 13 (O.) + 10 (R.) = 23 li. Ni. IX. Fourth Exp. Cf. Pl. X, No. 12, O., also No. 11, O., and R. (= C.B.M. 19536), a duplicate referred to as Fr. b on Pt. 16), and IV R.3, 37, Fr. 12136 (additions: 81–2–1, 72), R., Col. HI.</td>
</tr>
<tr>
<td>TEXT</td>
<td>TEXT</td>
<td>TEXT</td>
<td>TEXT</td>
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<td></td>
</tr>
<tr>
<td>28</td>
<td>17.1s</td>
<td>150 [rr]</td>
<td>Measure with err and weight</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>17.19</td>
<td>320 [rr]</td>
<td>Weigh against present in street and length</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>50</td>
<td>150 [rr]</td>
<td>Measure with err, including cylinder of 100 tomm and cubic, with their corresponding values</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements:**
- Diameter: 150 tomm
- Length: 320 tomm

**Sources:**
- Various references to experiments and discoveries, including:
  - C.I. 193:1, 214:1, 17:1
  - N.A. 17:1, 19:1
  - IV. 18:1, 216:1
  - K. 150:1, 16:1
  - M. 17:1, 18:1

**Key:**
- L: 1890 p. 45
- Ch. 1905 p. 253
- Ch. 1907 p. 235

**Directions:**
- Three lines of a clay tablet were on Pl. XI.
- Enlarges the known data gained from the present findings.
- The complete tablet had 100 tomm, from 0, to and on R. No. V. Second and Fourth Exp. C.R.M. 18660 (H. Exp. 1625-1105-1105 in Pl. X. No. V. 18677. F. Exp. 65. Pl. XI. No. 1550) also Pl. XIV. No. 19. L. 1907.

**Hanging:**

**Note:**
- W. H. Brown. Writing very distinct. Texts of date reading, conversion and other important statements are restored by long shallow slanting, and the upper part of each line is written in the same manner indicates the end of each unit. 19 (yr) = 9 + 0.
- Liner on D. 28 (Col. I) 206 (Col. II) 25 (Col. III) 77 (Col. IX). Third Exp. C.R.M. 333.
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30, R.</td>
<td>20</td>
<td>The same.</td>
<td>Measures of length continued, weights and measures of capacity, with their corresponding values.</td>
<td>The same. Inscr. on R. 20 (Col. IV) + 19 (Col. V) + 32 (Col. VI) = 77 li.</td>
</tr>
<tr>
<td>31</td>
<td>21</td>
<td>c. 1350 B.C.</td>
<td>Measures of capacity (or weights?) to 1 GIN, with their corresponding values.</td>
<td>Fr. (lower part) of a clay tablet. Unbaked. Light brown with numerous black spots. Cracked. R, considerably chipped off. Ruled. 4 (fr.) $\times$ 5.6 $\times$ 2.4. Inscr. 10 (orig. 25, O.) + 8 (orig. probably 14, R.) = 18 (orig. probably 30) li. Ni. IX. Fourth Exp. (Cf. M.I.O., Ni. 1903, a duplicate of an earlier period (c. 2200 B.C.) Fr. Unbaked. Brown. Inscr. 5 li. on O. (identical with li. 15–20 of our text). Ni. V. Fourth Exp.).</td>
</tr>
<tr>
<td>32</td>
<td>21</td>
<td>c. 2200 B.C.</td>
<td>Measures of capacity (or weights?) from 20 SHE to 1 GIN, and their corresponding values.</td>
<td>Unbaked. Brown with numerous black spots. Cracked. Small piece broken out from the middle of U. E, otherwise well preserved. Ruled, double li. indicating end. 8.5 $\times$ 6.5 $\times$ 2.8. Inscr. 14 (O.) + 5 (R.) = 19 li. On the lower part of R. and on the 4 edges numerous wedges insufficiently erased. Ni. V. Fourth Exp.</td>
</tr>
<tr>
<td>33</td>
<td>22</td>
<td>c. 2200 B.C.</td>
<td>Measures of capacity (or weights?) from 1 to 19 GIN, with their corresponding values.</td>
<td>Unbaked. Dark brown. Small pieces chipped off. Ruled, double li. indicating end. 8.9 $\times$ 5.2 $\times$ 2.8. Inscr. 14 (O.) + 9 (R.) = 23 li. Ni. V. Second Exp. C.B.M. 4505.</td>
</tr>
<tr>
<td>34, R.</td>
<td>22</td>
<td>c. 2200 B.C.</td>
<td>Measures of capacity (or weights?) with their corresponding values. Portions of 1 to 20 GIN preserved.</td>
<td>Two frags. of a clay tablet joined. Unbaked. Light brown with numerous black spots. Ruled. 7.4 (fr.) $\times$ 5.9 (fr.) $\times$ 3 (fr.). The preserved portion of O. uninscribed. Inscr. on R.: 12 (Col. I) + 4 (Col. II) = 16 li. Ni. V. Fourth Exp. C.B.M. 19820.</td>
</tr>
<tr>
<td>Ext.</td>
<td>Plate</td>
<td>Age</td>
<td>Content</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
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<td>-------------</td>
</tr>
<tr>
<td>77</td>
<td>23</td>
<td>2200 B.C.</td>
<td>Measurements varying from 16,500 to 12,000 g.</td>
<td>EGA 12,000 g.</td>
</tr>
<tr>
<td>77, E</td>
<td>24</td>
<td>2200 B.C.</td>
<td>Measurements varying from 16,500 to 12,000 g.</td>
<td>EGA 12,000 g.</td>
</tr>
<tr>
<td>58, E</td>
<td>25</td>
<td>2200 B.C.</td>
<td>Measurements varying from 16,500 to 12,000 g.</td>
<td>EGA 12,000 g.</td>
</tr>
<tr>
<td>58, E</td>
<td>25</td>
<td>2200 B.C.</td>
<td>Measurements varying from 16,500 to 12,000 g.</td>
<td>EGA 12,000 g.</td>
</tr>
</tbody>
</table>

**MATHMATICAL, METEOROLOGICAL AND CHRONOLOGICAL TABLES**
<table>
<thead>
<tr>
<th>Text.</th>
<th>Plate</th>
<th>Age.</th>
<th>Contents.</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>27</td>
<td>c 2200 B.C.</td>
<td>Measures of length, from 1 <em>ubānu</em> (<em>= 2 z</em>) to 2 <em>GAR</em> (<em>= 1440 x</em>). [Hence 1 <em>ammatu = 30 ubānu</em>.]</td>
</tr>
<tr>
<td>12</td>
<td>27</td>
<td>c. 2200 B.C.</td>
<td>Measures of length, from 1 <em>ubānu</em> (<em>= 10 x</em>) to 2 <em>ammatu</em> (<em>= 600 x</em>). [Hence 1 <em>ammatu = 30 ubānu</em>.]</td>
</tr>
<tr>
<td>43</td>
<td>28</td>
<td>c. 2200 B.C.</td>
<td>Measures of length, from 1/3 <em>KAS-GID</em> (<em>= 900 GAR</em>) to 10 <em>KAS-GID</em> (<em>= 18,000 GAR</em>).</td>
</tr>
<tr>
<td>44, O</td>
<td>28</td>
<td>c. 1350 B.C.</td>
<td>Vocabulary (<em>šmu</em> and compounds with <em>šmu</em> in their ideogr. and syllable (Sem.-Babyl.) writing).</td>
</tr>
</tbody>
</table>

**Description.**

17 li. On the lower part of R. numerous wedges insufficiently erased. Ni. V. Fourth Exp. (There is a fr. duplicate of the same period (upper part).

Unbaked. Brown. Ruled. 4 (fr.) × 7 × 2.3 (fr.). Inscr. 6 li. on O. (1 *GAN = 100, 1/2 GAN = 50, 2 GAN = 200, 5 GAN). Ni. V. Fourth Exp.)


<table>
<thead>
<tr>
<th>Text</th>
<th>Page</th>
<th>A.D.</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>28</td>
<td>2500 B.C.</td>
<td>The Babylon idograms of the months.</td>
</tr>
<tr>
<td>3.1</td>
<td>29</td>
<td>2500 B.C.</td>
<td>Chronological list of early Babylonian kings and the Dynasties of Ur and Uruk.</td>
</tr>
</tbody>
</table>

Certain fragments of the first series of these stones (339a) with fragments of the other two remain. But they had been placed on the remains in the room probably erroneously. But the room was cleared as indicated, the paper was thrown away. Certain doubt as to which of the two experiments they belong.
### B. Phototype Reproductions.

<table>
<thead>
<tr>
<th>Illustrations</th>
<th>Plate</th>
<th>Age</th>
<th>Contents</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>c. 2200 B.C.</td>
<td>Northeast section of the earlier temple school and library at Nippur.</td>
<td>Extensive group of ruined rooms and galleries excavated by the Fourth Exp. in the northeast section of Ni. V. Southeast view. The floor of these building remains was reached at an average depth of 6 to 7.30 m, below the surface. The cuneiform tablets here discovered occurred in a stratum from c. 0.30 to 1.20 m thick. An especially large number of tablets was found in the room to the extreme right in the foreground of the picture, and also in the large room to the right of the centre of the picture. In the background the ruins of the temple of Bel, its stage-tower being covered by a modern building of the Exp. erected by Haynes. Photograph taken by Haynes, Feb. 20, 1900. Cf. Geere's survey and drawing of the ground-plan of this section of the ruins in Hilprecht, B. E., Series D, Vol. 1, p. 523.</td>
</tr>
<tr>
<td>3</td>
<td>II</td>
<td>c. 1350 B.C.</td>
<td>18 x 1</td>
<td>Fr. of an unbaked clay tablet, O, and R. Ni. V. Cf. Pl. 3, No. 7.</td>
</tr>
<tr>
<td>4</td>
<td>II</td>
<td>c. 2200 B.C.</td>
<td>36 x 1</td>
<td>Unbaked clay tablet, O, and R. Ni. IX. Cf. Pl. 5, No. 11.</td>
</tr>
<tr>
<td>5</td>
<td>II</td>
<td>c. 1350 B.C.</td>
<td>150 x 1</td>
<td>Fr. of an unbaked clay tablet, O, and R. Ni. IX. Cf. Pl. 8, No. 17.</td>
</tr>
<tr>
<td>6</td>
<td>III</td>
<td>c. 1350 B.C.</td>
<td>1080 x 1, 1000 x 1, 880 x 1, 900 x 1, [810 (7) x 1], 720 x 1, 600 x 1, 540 x 1, 500 x 1.</td>
<td>Fr. unbaked clay tablet, O. Ni. V. Cf. Pl. 10, No. 20. O.</td>
</tr>
<tr>
<td>7, O.</td>
<td>IV</td>
<td>c. 2200 B.C.</td>
<td>43 x 1 (left column written by teacher, right by pupil).</td>
<td>The same, R. Cf. Pl. 11, No. 20, R.</td>
</tr>
<tr>
<td>7, R.</td>
<td>V</td>
<td>c. 2200 B.C.</td>
<td>Divisors of 12,960,000 and 50 x 1, written alternately 3 times.</td>
<td>Six frgs. of a clay tablet joined. Unbaked.</td>
</tr>
<tr>
<td>8, O.</td>
<td>VI</td>
<td>c. 2200 B.C.</td>
<td>Ideograms determined by</td>
<td></td>
</tr>
</tbody>
</table>
MATHMATICAI, METROLOGICAL AND CHRONOLOGICAL TABLES

Page 12

VIII. \( \text{v} 2200 \text{ BC} \)

Table of squares of 1 to 30

VIII. \( \text{p} 2000 \text{ BC} \)

Parties of 12,260,000 and their quotients in geometrical progression.

IX. \( \text{c} 2000 \text{ BC} \)

Diagrams of 12,260,000 and their quotients in geometrical progression.

X. \( \text{c} 1350 \text{ BC} \)

Description:

Part.

Description:

Part.

Description:

Part.

Description:

Part.
THE TEMPLE LIBRARY OF NIPPUR.

<table>
<thead>
<tr>
<th>Illustr.</th>
<th>Plate</th>
<th>Age</th>
<th>Contents</th>
<th>Description</th>
</tr>
</thead>
</table>

ADDITIONS AND CORRECTIONS.

Introduction.


Autograph Plates.

Pl. 2, No. 4, li. 19: Add marginal note: "After A-RA (= Sem. adī) insert a 'ten,' reading '20-1' (instead of '10-1,' which is a mistake of the scribe)."

Pl. 7, No. 14, li. 18: Add marginal note: "Read '20' instead of '20' (last figure of the line), the last '10' (written on the edge) evidently being broken away."

Pl. 14, No. 24, Rev.: Change the numbers indicating the columns; for the Reverse ought to be read from left to right (cf. pp. 19, note 2, and 23, note 1). Read, therefore, Col. I (instead of Col. VI), Col. II (instead of Col. V), Col. III (instead of Col. IV), Col. IV (instead of Col. IIII), Col. V (instead of Col. II).

Pl. 20, No. 30, Obv., Col. I, li. 25: The figure "25" printed to the left of Col. I, to indicate the corresponding line in the cuneiform text of this column, should be moved up one line. Cf. p. 36, note 1.

Pl. 29, No. 45, Rev.: Write "Last Column" below "Reverse."

Pl. 30, No. 47, Rev., li. 5: Insert "ZU" between the second 4EX and na, correctly given on the original. Cf. p. 48.
CUNEIFORM:

tents
Pl. 9

18

Obverse
Col. I. Col. II. Col. III.

Reverse
Col. II. Col. III. Col. I.

* Col. II, 8 "written upon erasure"

19

Obverse
Col. III. Col. IV.

Reverse
Col. II. Col. I.

20

Col. IV, 14: ‘May [the] [name] be...’

Col. I, 12: ‘Erasures...’
Col. IV.  Col. III.  Col. II.  Col. I.

Col. II, 5: Mosaic of orube for ḫ.
Col. II, 12: The star wedge is a mistake of ḫ.

20 Reverse

Pl. 11
29 Obverse.

Continued

Col. IV.       Col. V.       Col. VI.
29 Reverse.

Continued

Col. III  Col. II  Col. I

Col. 1, 15, 17. Perpendicular wedge at base of stone.
This and other small wedges seen on the tablet are remains of the scribe's calculations insufficiently erased or carelessly left by him.
MULTIPLICATION TABLES
MULTIPLICATION TABLE
DIVISION AND MULTIPLICATION TABLE
LINGUISTIC-MATHEMATICAL TABLET
MULTIPLICATION TABLE
LINGUISTIC—MATHEMATICAL TABLET

COVERSE STONE OF ACHRAN CLAYS OF LATE NABOPOLNASHIRU
REVERSE STONE OF ACHRAN CLAYS OF LATE NABOPOLNASHIRU
METROLOGICAL TABLE

METROLOGICAL TABLE

METROLOGICAL TABLE