

AMERICAN HANDY BOOK
OF THE
BREWING, MALTING
AND
AUXILIARY TRADES

124378

A Book of Ready Reference for Persons Connected with the
Brewing, Malting and Auxiliary Trades, Together
with Tables, Formulas, Calculations, Bibliography and Dictionary of
Technical Terms.

COPIOUSLY ILLUSTRATED.

BY
ROBERT WAHL, Ph. D.
AND
MAX HENIUS, Ph. D.

Second Edition.

CHICAGO
WAHL & HENIUS

1902.

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CORRECTIONS

PAGE	LINE	NOW READS	SHOULD READ
6	10 from bottom	48t	48
7	bottom line	113t	113t
18	10 from bottom	3 ² x	3 ² =
52	10 from top	(a x b)	(a + b)
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62	18 from top	50.26	50.24
147	under cut	Meteorologie	Meteorologie
347	17 from bottom	1 1/2 of	twice
347	5, 6, 10 and 14 from bottom	100 feet	132 feet
347	8 from bottom	50 pounds	65 pounds
347	8 from bottom	166 feet	196 feet
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444	9 from top	0.14	0.014
447	lower table	space in left of headings	insert Grains per Gallon.
454	12 from bottom	endosperm	endosperm
455	2 from bottom	mellibiose	mellitriose
456	5 from top	levulose	laevosin
456	6 from top	Tauret	Tanret
459	4 from top	matters and sulphur	wrong line—cross out
478	10 from bottom	-resin	α-resin
478	9 from bottom	-resin	β-resin
478	8 from bottom	-resin	γ-resin
478	14 from bottom	Bryan	Briant
506	2nd cut	pastorianum	pasteurianum
515	2 from bottom	saccharabacillus	saccharobacillus
517	14 from bottom	pastorianum	pasteurianum
535	14 from bottom	mellibiose	mellitriose
687	table	n extract	in extract
680	18 from top	ladle	ladle
718	12 from bottom	1877	1887
768	6 from top	the smaller	the larger
768	9 from top	ordinarily to barrel	need not be more than 50 per bbl.
768	10 from top	add the sentence	With filter use 5-20 chips per bbl. according to size of chip cask.
765	15 from top	one-fourth	one-half
812	14 from bottom	saccharomyces	saccharo-bacillus
917	bottom line, 4th column	34.95	33.95
927	9 from top	127.2 cents	127.9 cents
998	2nd formula	100+	700+
998	"	grits	cereal
998	bottom	formula should be (Total yield—yield of 60 m 40	alt) × 100 = yield of cereal
994	8 from top	it can be mashed directly	it is mashed directly at.. 67° C.
1012	5 from top	one end of which, etc.	1 sq. millimeter so that the volume of liquid between the
1087	15 from bottom	\$250	\$350
1214	16 from top	— water (lls.) 438	442
1215	center, column 1	— oil testing, 15, 1040	315, 1040
1244	20 from top	mellibiose	mellitriose (mellitose)
1261	21 from bott'm 2nd column	— composition of 483,853	484, 853

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PREFACE.

THE AMERICAN HANDY-BOOK OF THE BREWING, MALTING AND AUXILIARY TRADES is designed to be a book of ready reference for the use of persons connected with the trades designated. It does not pretend to be a text-book, which the student of brewing will read through from beginning to end with a view of becoming acquainted with the principles and practice of this great industry. It aims to be, as it were, a pocket encyclopedia, by reference to which the brewer, maltster, refrigerating machine engineer, bottler, etc., as well as a person engaged in the commercial activities of a brewery, may find an immediate answer to questions that may come up in connection with the exercise of his calling, without requiring him to wade through bulky volumes and peruse quantities of information in search of a single item of knowledge.

This purpose, kept steadily in view in the preparation of the present volume, imposes many difficult tasks upon the compilers and editors. While, on the one hand, it necessitates the broadest range of information and the most complete collation of facts possible, covering the entire science and practice of brewing, from elementary arithmetic and algebra, through the physical sciences, the rudiments of machinery, steam engines and refrigeration, the theory and practical details of malting and brewing, the calculation of materials and cost of production, down to the details of tanking, casking, bottling and shipping, and the relations of the brewer to governmental agencies; yet, on the other hand, it is imperative to condense this information, much broader though it be in scope than that embraced in any of the text-books, into the smallest compass, both as to statement in words and as to

mechanical "get-up." To reconcile these conflicting requirements, arising from the nature of the work, has been the chief difficulty in the preparation of the book.

To similar causes must be ascribed the seeming lack of uniformity in the treatment of the various subjects embraced in the work. Certain chapters are treated at greater length than their relative importance and magnitude would appear, at first glance, to warrant, while others, apparently of equal or greater consequence, may be deemed to have been slighted in the amount of space and detail of statement devoted to them. However, these discrepancies, in the judgment of the editors, are only on the surface. Where so much information is given, the wants of many different classes of persons to whom the book will appeal, must be considered.

Making such allowance for these existing differences as seemed necessary, and putting themselves, as far as lay in their power, with respect to each subject, in the position of the man seeking a quick solution of a problem that might arise in his branch of the work, the editors gave to each of the several subjects such treatment as seemed best to answer the requirements of each individual case. The result is that, while the treatment of the several subjects may not seem strictly harmonious from the viewpoint of the writer of a text-book, it is hoped that the work meets the requirements of a book of ready reference far more completely than would a strictly methodical arrangement and mode of treatment from the standpoint of the existing publications on brewing.

There are books on bottom-fermentation brewing as practiced on the continent of Europe, practically all in the German language, and there are books on top-fermentation brewing as practiced in Great Britain and its dependencies, practically all in the English language. The American brewing industry is unlike both of these systems. Lager beer brewing in the United States, while derived from the continental European beer industry, has developed an individuality quite peculiar to itself, and even top-fermentation brewing in this country has found new ways and

methods. The American brewing industry, in a word, is an industry by itself. While it has profited much by the old country systems, it must look within itself for authority for its own operation and progress. No effort has been made, up to the present time, to produce a standard work on American brewing in the language of the country. In that respect, also, the AMERICAN HANDY-BOOK OF THE BREWING, MALTING AND AUXILIARY TRADES is first in the field.

It is manifest, from what has been said, that the plan of the present work was wholly novel—that the editors had no precedents to guide them, but were obliged to seek altogether new paths.

It is the common fate of all pioneer work that it is encumbered with many drawbacks and shortcomings, since it lacks the direction of the greatest of teachers—experience. The editors are conscious of the fact that the present work is no exception to the rule. They rely on the indulgent judgment of the brewing trade and its auxiliaries, and will welcome any well intended criticism, hoping to profit thereby for future editions of the book.

While a book of this character is naturally, to a great extent, a compilation of information from many other sources, the present volume contains much original work elaborated in the course of time by the Scientific Station for Brewing of Chicago. It may also be added that the editors derived much assistance in planning the book and treating the various subjects from their intimate association with brewers in their capacity as directors of that institution, and from studying the needs of students at the American Brewing Academy.

It being a matter of universal experience that the value of many a book replete with useful information is seriously impaired, for ready reference, by the absence of a complete and detailed index, which fact was brought home to the editors with peculiar force in the work of compilation connected with the preparation of the present book, special pains were given to the

elaboration of an exhaustive and complete index, whereby, it is hoped, everything of importance contained in this book can be readily found by the inquirer.

Considerable time and labor were also spent in the compilation of the dictionary of technical terms in English and German, which represents the first effort in that direction.

As to size, typography, binding and other physical properties of the book it need only be repeated that everything was designed in accordance with the plan of a handy and durable reference book.

No innovations were attempted in the style of writing or spelling, preference being shown for that which is customary and understood by all. However, the editors gladly availed themselves of the example of United States government publications in adopting certain convenient forms, f. i., using the cipher before the decimal point, as 0.349, instead of the old style of writing .349, which is too apt to be misread; or, dropping the final "e" in words where it exerts no influence on the pronunciation, as in "dextrin," "glycerin," etc.

The editors indulge the hope that they have been measurably successful in preparing a book of ready reference which the brewing, malting and auxiliary trades will find useful in the prosecution of their work.

It remains to express the gratitude of the editors to those who assisted them in the preparation of this book as associate editors and contributors, and to acknowledge their indebtedness to the authors whose works they consulted.

ROBERT WAHL.

MAX HENIUS.

Chicago, May 20, 1901.

PREFACE TO SECOND EDITION.

The hope indulged by the editors in the preface to the first edition, that they may have been measurably successful in the preparation of this book, has been realized beyond all expectations, if the phenomenal sale of the first edition can be taken as a criterion.

After the *HANDY-BOOK* was issued, it was accorded a most friendly reception and favorable review by the trade press of all countries, which, with the recommendation of its readers, soon exhausted the edition.

A second edition has become necessary in the short space of time of less than one year.

This second edition is substantially a reprint of the first, as only typographical errors have been corrected.

The editors wish again to thank those who have assisted them in the preparation of the book, also its many friends for the interest they have taken in the volume.

ROBERT WAHL,
MAX HENIUS.

Chicago, April 30, 1902.

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