

# **SCIENTIFIC FEEDING OF THE DOMESTIC ANIMALS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649091423

Scientific feeding of the domestic animals by Martin Klimmer & Paul Fischer

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**MARTIN KLIMMER & PAUL FISCHER**

**SCIENTIFIC FEEDING  
OF THE DOMESTIC  
ANIMALS**



# SCIENTIFIC FEEDING

OF THE

## DOMESTIC ANIMALS

by

**Dr. Martin Klimmer, Ph.D., D.M.V.**

Professor of Hygiene and Feeding, and Director of the Hygienic  
Institute of the Veterinary College of Dresden

---

Third Revised and Enlarged Edition

94 Illustrations

---

Authorized Translation by

**Paul Fischer, B.S.A., D.V.M.**

Formerly Professor of Pathological Anatomy in the Ohio State University,  
College of Veterinary Medicine, State Veterinarian of Ohio, etc.



Chicago, U. S. A.  
ALEXANDER EGER, PUBLISHER  
1923

Copyright,  
1923,  
by  
Alexander Eger

## TRANSLATOR'S PREFACE

The translation of Klimmer's admirable work on Veterinary Hygiene and Scientific Feeding of Animals was undertaken at the suggestion of the publisher, Mr. Alexander Eger, with the hope and belief that in doing so the translator was rendering a real service.

While some of the ideas and practices outlined in this work do not entirely fit into the economy of our own country and many changes and adaptations might have been made and served a useful purpose, the translator believed that a practically literal translation of the work as offered by the author would be not only more interesting to the American student but really more instructive.

A comparison of the careful and painstaking methods of the German people and their continual efforts to economize, with our own characteristically wasteful practices, even though conditions prevailing with us are entirely different, cannot fail to have a wholesome influence.

The translator has therefore confined himself to adding only here and there a few words of explanation which he believed necessary for clearness, either in the form of footnotes or remarks in parentheses in the text.

The translator wishes to express his sincere thanks to his friend, Dr. J. R. Mohler, Chief of the United States Bureau of Animal Industry, for reading the manuscript before its submission to the printer, making valuable suggestions in the arrangement of the text and adding instructive footnotes. Dr. Mohler's suggestion that the extensive references to technical literature which are appended to most chapters in the original German edition, be omitted, was also followed. It was mutually agreed that since this would be of value only to students familiar with the German language the original work of Dr. Klimmer would be available to them for such references.

The translator wishes further to express his appreciation to the publisher, Mr. Eger, for his patience in overlooking the many annoying but unavoidable delays in preparing the manuscript and reading the final proof of this translation.

Paul Fischer,

Bartow, Florida.  
February 10, 1923.





## ABSTRACT FROM THE PREFACE TO THE FIRST EDITION

In accordance with the great practical importance of a knowledge of feeding and of injurious feed admixtures I have devoted liberal space to this department of veterinary hygiene. The principles of feeding as elaborated in this work have been based upon the epoch making labors of Kellner who has directed the study of this science into new channels. The kindness and obligingness of Prof. Dr. Kellner and of the Publishing House of Paul Parey has made it possible to include the tables on the composition, digestibility and starch value of feeding stuffs to which I have added for the sake of handy reference the digestible albumen and starch value ratios as well as the table of condensed feeding standards. I consider it a pleasant duty to express my sincere thanks for the kind permission granted to publish these tables.

Dresden, in the fall of 1917.

---

## ABSTRACT FROM THE PREFACE TO THE SECOND EDITION

In revising this work it has been my endeavor to correct any existing shortcomings of the first edition which have been kindly pointed out by my critics, and further, to make such changes and additions as recent investigations and discoveries demanded.

Dresden, November, 1913.

---

## PREFACE TO THE THIRD EDITION

The recent decision in favor of the separate consideration of the study of feeding and veterinary hygiene in the college courses of veterinary medicine and in state examinations has been the motive for the publication in two separate volumes, "Veterinary Hygiene" and "Scientific Feeding of Animals," of my former work which was published under the common title of "Veterinary Hygiene."\* Whether this division and separate consideration of the subjects was practical and necessary is a matter concerning which differences of opinion may well exist. I regret it.

The fact remains that animal nutrition is one of the most important branches of the study of veterinary hygiene. A sharp distinction between these two divisions is not always possible.

---

\*Note. First Volume. Hygiene of the Domesticated Animals. Third revised and enlarged edition. With 270 illustrations. About 440 pages. Berlin, 1921.

Important sections as for instance those on injurious feed admixtures and pasturage, which to this day are considered as coming properly under the subject of veterinary hygiene, constitute an intimate connecting link between hygiene and feeding. Furthermore, I do not consider it wise that a comparatively restricted field of study which is practically complete in itself (Veterinary Hygiene) should be artificially subdivided into two dependent halves (hygiene and feeding). Not even the temporary interests of the student would justify such unwarranted proceedings. On the contrary, pedagogic interests would be served by dealing with related subjects under as few heads as possible instead of an indefinite splitting up of subjects into every possible kind of specialty.

Notwithstanding my objections to this division of veterinary hygiene into separate sciences I have submitted to the trend of the times and published my "Veterinary Hygiene" in two parts, "The Science of Feeding" and "Hygiene of Domesticated Animals." As long as the entire work was published in one volume, objections were not so serious because the whole subject was always at hand for reference. But this no longer holds since the increased bulk of the work made its publication in two volumes almost necessary.

In the revision of the work numerous additions were called for in every part, thus the enlargement of the chapter on the conservation and preparation of feeding stuffs, the preparation of a key for the determination of the most important meadow grasses and descriptions of the same, the sections of feed for goats, dogs, poultry, ducks, geese, rabbits and fish. Discussions of several new feeding stuffs and substitute feeding stuffs have also been added and the chapters on examination of feeding stuffs and contaminations have been enlarged. Individual and group feeding have also received additional discussion. To conform with modern efforts to feed for economic production. The addition of 58 new cuts is believed to be a decided help in the study of this work.

In the revision of this work the extraordinary practical importance of the subject of "feeding" to the veterinary and agricultural interests has been kept constantly in mind.

My sincerest thanks are extended to Dr. Haupt and to Dr. Schadowsky for the laborious work of correcting the proof, and to the publishing house of Paul Parey for its ready compliance with all my requests.

May the revised third edition in its new form meet with the same kindly reception by its readers and critics as was the fate of its predecessors.

M. Klimmer.

Dresden, Fall of 1920.

# CONTENTS

## INTRODUCTION

	Page
Politico-economical Considerations on Animal Husbandry and Feeding	1

## SECTION I

### Feeding Stuffs

<b>A. General Matter.</b>	2
a. Chemical Composition of Feeding Stuffs	2
Nutrients and Condimental Substances	2
I. Water and dry matter	3
II. Salts	4
III. Albumens	5
Appendix: Ferments (enzymes) and Vitamins	7
Nitrogenous compounds, not belonging to the albumens (amido-compounds, nitrogen-containing glycosids, alkaloids, salts of ammonia and nitric acid)	8
IV. Fats	10
V. Carbohydrates	11
1. Crude fiber (cellulose, pentosanes)	11
2. Nitrogen-free extractives (easily digestible carbo-hydrates), (starch, cellulose, dextrine, sugars, pectin substances, pentosanes and pentoses), organic acids (lactic, formic, acetic, butyric, malic, tartaric, citric and tannic acids), nitrogen free glycosids and bitter principles	12
b. The Conservation and Preparation of Feeding Stuffs	16
I. Conservation	16
1. Storage	16
2. Drying	19
a. Hay Making	19
b. Artificial drying	21
3. The Conservation of Feeding Stuffs by means of Fermentation	23
a. Baked hay	23
b. Brown hay	23
c. Sweet Silage	24
d. Sour Silage	27
II. The Preparation of Feeding Stuffs	28
1. The reduction of coarse material into fine particles	28
2. Moistening and Soaking	28
3. Cooking, scalding and steaming	28
4. Roasting	28
5. Leaching	28
6. Fermenting	28
7. The Conversion of Indigestible into Digestible Matter	28
8. Predigestion	28
9. Baking	28
<b>B. The Most Important Feeding Stuffs</b>	34
I. Green Forage	35
Botanical Matters relating to pastures and Pasture Grasses	35
Sweet Grasses. Key for their Determination	36
Sour grasses. Scouring Rushes	43
Herbaceous Meadow plants	44
Chemical Study of Pasture Grasses	44