Employing a porcelain pestle, 15.0 cm. in length and 4.5 cm. in diameter at the base, and a No. 1 wedgwood mortar, 60 cc. portions of 12½% oil emulsions were prepared. The acacia and 4 parts of oil were first triturated well, and then the 2 parts of water were added all at once; the resulting mixture was triturated for 5 minutes, and the remainder of the water was added gradually to volume. The results are given in Table II.

The results show that the English method has very little advantage over the Continental method when using less than 1 part acacia. The two methods give practically the same results.

Fifty Per Cent Emulsions.—Experiments were carried out with 50% oil emulsions to see whether or not the results obtained with the 12½% oil emulsions would be applicable to emulsions containing a higher percentage of oil.

It was found that the 50% oil emulsions showed less creaming than the 12½% oil emulsions when standing over a period of three hours. In other respects, the results of experiments with 50% oil emulsion were in agreement with the results obtained with 12½% oil emulsions.

DISCUSSION OF RESULTS

Results of the English method of emulsification show that this method has no advantage over the Continental method with respect to appearance and stability of the finished product as well as the range of emulsification and the average size of the oil globules; both methods of emulsification appear to give the same finished product. However, it takes about twice as much time to make 60 cc. of an emulsion by the English method as it does by the Continental method. Fifty per cent oil emulsions were found to show less creaming than 12½% oil emulsions.

A search of the pharmaceutical literature reveals that little or no work has been done on the English method of emulsification from the scientific standpoint. Textbooks on pharmacy are not in accord concerning the various factors and techniques of this method.

The present study brought out several interesting conclusions. With reference to the rate of addition of the oil to the mucilage of acacia, results showed that it is better to add the oil gradually rather than all in one portion. Time of trituration of the emulsified oil mixture, that is, that mixture which resulted when the 4 parts of oil was added to the mucilage of acacia, seemed to be the most important factor in the production of a more stable emulsion. Addition of the oil gradually in one cc. portion to the mucilage produced just as good emulsions as when the oil was added dropwise.

With respect to variation in proportion of acacia, when using one part and less than one part of acacia for 4 parts of oil, data showed that a decrease in the amount of acacia caused an increase in the average size of the oil globules. The use of less than 0.8 part of acacia resulted in creaming or oil separation in all emulsions within a period of 3 hours of standing; when using the Continental method similar results were obtained.

The commonly accepted belief that a small amount of acacia will emulsify a large quantity of oil, when using the English method, does not appear true, since this method showed scarcely any advantage over the Continental method with respect to range of emulsification.

SUMMARY

A detailed study was made of the English method of emulsification. Results showed that this method has no advantage over the Continental method with respect to appearance and stability of the finished product as well as the range of emulsification and the average size of the oil globules; both methods of emulsification appear to give the same finished product. However, it takes about twice as much time to make an emulsion by the English method as it does by the Continental method.

The commonly accepted belief that a smaller proportion of acacia may be used in the English method than in the Continental method is shown to be incorrect for all practical purposes.

REFERENCE

(1) Husa, William J., and Becker, Charles H., JOUR. A. PH. A., 30 (1941), 83.

(To be continued)

Le Clergé et la Pharmacie

Essai sur le rôle du Clergé et plus particulirement des Congrégations religieuses dans la préparation et la distribution des remèdes avant la Révolution; a review of the book by J. Tournier, I

*By K. L. Kaufman**

A brief notice of this book (1) appeared in the *Journal de pharmacie et de chimie* (2) over a year ago. After some difficulty, a copy was obtained. The material covered a phase of Historical Pharmacy which was sadly neglected in the writings of our own country. Once procured, the book seemed to be of enough interest to review for this group.

* Assistant Professor Medical College of Virginia, Richmond, Va.

The subject matter is well referenced, though little of the original material would be available in our United States. Where comments appear in this review, they are to be attributed to the original author and not the reviewer.

PREFACE

In addition to the usual acknowledgments for assistance rendered, it is made clear that much material has been obtained from the Bibliotheque Mallet and the Hôtel-Dieu, of Pontoise, and the Bibliotheque Nationale.

It seems that religious workers were never content with their status as distributors of ordinary remedies to the poor. Rather, they preferred "to profit in the prestige they exert on the public to become makers and vendors of remedies. . . .One understands, then, that the clergy had been for the apothecaries' corps a dangerous and disloyal competitor . . . ."

INTRODUCTION

Tournier has described briefly the role of the pagan priesthood in relation to pharmacy and medicine. Their collection of plants at the great sun fete of the summer solstice was continued into Christian times, though with slightly changed significance. Among the plants mentioned as used in ancient times were the orpins for burns and fever, houseleek for corns, St. John's wort for its essential oil, lavender, etc. In addition to plants of real efficiency, many were used for purely magical powers. Examples of this sort are the oak, mistletoe, boxwood, vervaine, betony, sage, wormwood, burdock, sorb, etc.

The presence of the pagan priest at the herb collection was regarded as essential to the acquisition of medical properties. A definite ritual and ceremony accompanied the gathering of the plants. A "Prayer to the Earth," taken from one of these ceremonies, follows. (The translation is somewhat free.)

The monk who has compiled this document has given it the title: "Priere à la Terre, que prononçaient les anciens paiens, quand ils voulaient récolter des herbes."

> "Oh Earth, sacred divinity, mother of nature, which produces and reproduces all, tutelary planet to the humans, of which the domain is encircled by the sea and the sky, where nature is calmed, and where light comes again when night is fled, oh you who recover again the dead with your riches and the immensity of your bosom, you who contain the winds, the rains, and the tempests and unleash them at your will, you who raise the seas, who banish the sun and cause the storms; oh you who when you wish well dispense us serene days and with a constant fidelity furnish us all that is necessary to our existence; oh you in whom we take refuge when we quit this life, since all you create returns to you, you have well merited the name of Mother of the nations and of the gods, without whom nothing can be born, or die. You are great, you are the Queen of the Gods, oh diety, I adore you and your name comes naturally to my lips. Grant it that I ask of you, oh diety, and I shall render to you the actions of grace inasmuch as you deserve my gratitude. Excuse me and assist my designs. It that I ask of you, oh diety, grant me. Beget you all the herbs and distribute them to all the nations to give them health. Put in them all the beneficial virtues of which you are the dispenser, to the end that all I shall do with them be wholesome and that whoever shall receive them of my hand shall be healed. I pray to you, oh diety, grant it that I ask and beg."

The idea of the priest as healer and intermediary between the sick and the sickness is not confined to pagan antiquity. "The Christian tradition at its best, the Gospels, sees in Jesus Christ the Savior of souls and the 'Healer' of the body." The author then lists some of the works of art, and Murner's "Voyage aux Bains Mystiques" in which Christ is represented as practicing pharmacy and medicine not humanly, but "divinely."

To Cassiodorus (b. 468), Tournier attributes the beginning of the pharmaceutical movement among religious workers. This reached full bloom in the late Middle Ages. Cassiodorus recommended to the monks that they learn to ". . .distinguish each kind of plant," that they "mix with care the diverse species of drugs," and that they study the works of Dioscorides, Hippocrates, Galen and Coelius Aurelianus.

The monastic orders received the ideas of Cassiodorus quite favorably in many cases. As evidence, one notes the Benedictine Medical School at Salerno, and similar projects by the Franciscans. In tenth century France, many convents had an "Apotecarius" who filled the roles of doctor and pharmacist. One of these became quite famous for a medicinal wine compounded for use in "Cardiac crises."

In 1309, the Dominican convent at Montpellier sheltered more than sixty monks who taught pharmacy to priests of all nations. Some apothecary monks ". . .enjoyed lordly prerogatives" among the communicants, so important were they considered.

The secular clergy also prepared and distributed remedies, many of which seem rather odd. Among the examples given are: dust from the tomb of a saint, wax of candles which burn in the tomb and plants preserved near the tomb.

The remedies compounded by the monks seem to be taken from a very few source books. Nicolas de Gorram, a thirteenth century monk, has left a manuscript with a number of formulas for frictions, ointments and plasters. A few others of the fourteenth and fifteenth centuries are cited.

Monastery gardens were the source of a great many of the plants used in the medicines. For example, those at St-Germain-des-Prés furnished licorice, olive, myrtle, pomegranate, orange, rose, thyme, lily, etc. The monks charged with the collection of the herbs kept a catalog of the plants. The Benedictine Walafrid Strabus thus compiled his "Hortulus" of simples which grew in his monastery gardens. Included were sage, rue, mint, agrimony, poppy, etc.

"One may say that by their taste for classification, for order, and for methodic work, the monks had all the necessary qualities to be good apothecaries. We shall see that they were also excellent merchants."

CHAPTER I

Numerous edicts and orders on the subject of secret remedies were made by the civil authorities. More rarely, there were direct attacks of public powers on the clergy, usually cases in which the former offered their opinions to settle discussions between the apothecaries and the clergy. Among the examples of such, one may cite: the action of the Toulouse Parliament (1691) prohibiting the sale and distribution by all clergy of any drugs or medicines except to their own religious communities; the 1695 decree of the Faculty of Medicine against all religious workers who made medicines and went into homes to treat people; the 1708 ordinance of Nancy which limited the religious workers to the preparation of remedies for their own needs; the prohibition by the Council of State (1698) from the ". . .exercise of pharmaceutical roles on pain of 50 livres fine, confiscation of their remedies, and imprisonment for one year at 20 leagues from the place at which they gave the remedies. . . ." The Faculty of Medicine had the power to make the arrests. This latter prohibition was reënforced by Royal Edict in 1707, which increased the fine to 500 livres. Other similar regulations took effect in Cambrai (1799), Nancy (1665) and Bordeaux (1678).

In 1756, one finds the civil authority at Rodez prohibiting surgeons, religious workers and others from the practice of pharmacy there ". . .if they have not been accepted as masters of this art."

Finally, the royal declaration of April 1777 confirmed the Edict of 1707 (*q. v.*). A few exceptions had been made to these prohibitions. The most outstanding of these special dispensations were those to Brother Célestin to make his "Specific Remedies," and to the Carmelites to distribute their "Eau Mélisse." The first took the form of an ordinance preventing apothecaries, surgeons and physicians from interfering with Brother Célestin under penalty of 1000 livres fine, plus costs. The second was issued by the King in 1780 as a patent. The application for the letters patent specified that they would pay annually a sum of 1000 livres to the apothecaries for this privilege.

The apothecaries did not lack in defending themselves against their competitors. Vigorous protests were frequently made. In this connection, the following quotation from Lemery's "Chimie" (1756 Edition) is of interest: ". . .It is necessary to know that this pretended Eau de Mélisse is the famous water of the Carmelites of which the obstinate public without foundation wishes to attribute the secret to these ecclesiastics, although it is only on their part a usurpation from the Profession of the Apothecaries who are all able to prepare it as well and as good as these. . . ."

The decisions were rather generally approved by both public and physicians, for they prevented to some extent the exploitation of so many secret remedies. Letters are reproduced which show the violent feelings against secret nostrums and their religious inventors.

While occasional writers after Cassiodorus had urged the practice of pharmacy on the clergy, the official viewpoint of the Church often disagreed. The Councils of Clermont (1130), Reims (1131), Latran (1135), Montpellier (1162), Tours (1163), Montpellier (1195) and Paris (1212) all forbid the clergy to practice pharmacy and medicine. Some popes made exceptions, however, while some orders (*e. g.*, St. Francis) forbid themselves to practice pharmacy.

CHAPTER II

Role of the Female Religious Workers in Hospital Pharmacies

The Hôtel-Dieu at Paris installed an apothecary in 1495 and placed in charge two religious workers and a domestic.

Strangely enough, the sisters were sometimes forbidden any medicine when they were ill, as it was collected for the poor. Eventually, some hospitals gave most of the work to an "apothecary," often a mere boy, the nuns retaining supervisory powers. However, it appears to be a common complaint among the physicians that the sisters did not follow directions either as to quality or quantity of drugs in the precriptions, and often advised the patients against the use of certain medicines.

Finally, the posts of Inspector and of Apothecary-in-Chief were created with a view to remedying the situation. That this was not completely successful is shown by the continued troubles at such places as Alençon, where the apothecaries charged that several deaths were caused by the improper activities of the sisters. The pharmacists even complained directly to Mme. de Pompadour, but the city officials and others usually took the part of the nuns. A similar battle was waged at Auxonne until 1712, when the Archbishop of Besançon finally gave the sisters at that (Auxonne) hospital the right to sell to anyone in the city provided the profits be used for the benefit of the poor.

The "Suc de Réglisse," made by the nuns at Blois, became a very famous preparation. It was widely imitated.

The St. Laurent Hospital at Chalon-sur-Saone contains an interesting copper plaque in memory of a Sister Ponoard (d. 1682), who left 6200 livres, the income from which was to be used to buy drugs and sugar for making free medicines for the poor. The lady in question was the first "apothecary-sister" of this hospital.

An unusual plan was tried at Dijon, where the civil authorities had created a service for medical assistance to the poor in 1445. In 1528, this was expanded into the "Chamber of the Poor," management of which was entrusted to a physician and a surgeon. In 1551, an apothecary was added.

The Chamber decided, in 1643, to create a "Shop of Pharmacy" at the hospital and install sisters as apothecaries. It was originally intended that two master-apothecaries would appear thrice weekly to instruct the nuns. The former were also to prepare a book, in French, of all the preparations it would be necessary to make in the shop. On their part, the nuns were to manage the shop, and collect and prepare in season the herbs and the products made from them. The system worked quite well until 1652, when Sister Pierrette Courtois, in charge of the apothecary, refused to obey the administrators. Trouble continued until 1682, when the régimé of the nuns was abolished for about a year. The following year, the sisters were reinstalled. But things still went badly, for the apothecaries failed to visit the hospital regularly, and the nuns did not always do their work conscientiously. Finally, the sisters were given full control and the apothecaries only appeared occasionally to give instruction. Because the Chamber became convinced that the nuns were incompetent as buyers of good primary materials, it appointed in 1695 an apothecary to see to their instruction. Four years later, a city apothecary was elected to supply materials and inspect the pharmaceutical service of the hospital. In 1738, three books by Lemery were purchased for the hospital. They were his "Chimie," "Traité Universel des Drogues," and "Pharmacopee." Gradually, and partly due to their own bickerings, the apothecaries lost control over the hospital pharmacy.

Similar troubles prevailed at Lyons from 1656 to 1785.

The history of the Hôtel-Dieu de Pontoise is dealt with in great detail, particularly from 1629. The hospital was administered by the Augustine de Saint Nicolas sisters. A great deal of the material deals with the correspondence between the nuns and the widow Tranchepain. The business connection had begun in 1683, when the latter's husband, a Paris druggist, had established an account at the hospital. After his death, the widow carried on the business. Metinier, who became procuror about 1727, furnished a memorandum listing in detail the products supplied. A few of those mentioned are presented here:

". . . 2 ounces catheteric and specific onitment	03 L.	10s.
2 ounces white anodyne ointment	02 L.	00s.
11 ounces Balm of Fioraventy	22 L.	00s.

* * *

Application at various times of catheteric spirit	02 L.	00s."

When mineral waters were needed, the sisters bought directly, as the waters of Abbey-du-Val and Passy.

Numerous other apothecaries who supplied the hospital pharmacy are listed. Most important of all was probably one Brechot, Pontoise apothecary, who furnished drugs from 1732 to 1745. Some of his memoranda are reproduced for the light they shed on the medicines of the time. A few excerpts from these are listed below:

". . . 5½ ounces syrup of violet
An opiate weighing 15 ounces composed of quinine, contrajerva, salt of Mars, of Riviera, of absinthe, of tamarind, prepared iron, and syrup of absinthe.

* * *

For Madame, 2 ounces catechu prepared with violet
3 purgative enemas

* * *

30 drops spirit of vitriol (2 times)
6 ounces syrup of violet
1 ounce laxative violet syrup

* * *

4 half-packages rhubarb in powder
2 ounces syrup of marshmallow
½ package confection of hyacinth

* * *

2 ounces sweet oil of almonds
Spirit of wine
6 boluses spermaceti, powdered gamboge, rhubarb, and sugar candy

* * *

Emulsified medicine
2 ounces honey of Narbonne
1½ packages crushed amber

* * *

Plaster for the teeth
For Madame, her opiate

* * *

1 package and 48 grains of native cinnabar
2 handsful veronica
10 ounces distilled water of black cherries

* * *

For Madame, 7 ounces syrup of maidenhair fern

* * *

For Madame Sainte-Scholastique, a citron
8 boluses of Kermes' crayfish eyes, and syrup of diacodion

* * *

$8^1/_2$ ounces orange flower water

* * *

1 ounce of white poppy seeds

* * *

An opiate for Madame, divided in 12 doses, and composed of extracts of cerula campana, cress, chicory, absinthe, diaphoretic, gum ammoniac, galbanum, opoponax, sagapenum, and syrup of absinthe.

* * *

$1^1/_2$ package salt of duobos (K_2SO_4?)
2 packages spirit of dulcified salt. . . . . ."

Incidentally, the author notes that the cost of these and other articles listed totaled over 115 livres. A balance of 40 livres was owed in December, 1743, which was not paid until January, 1745, ". . . the delay in payment being normal to that time."

CHAPTER III

Role of the Nuns in Convent Pharmacies

"It is necessary to believe that the sale of medicaments constituted an important source of revenue for the convents, inasmuch as the greater part was an entirely commercial traffic in remedies, which in principle should be distributed gratuitously to the poor."

The notable exceptions were the "Miramiones," or Daughters of Saint Geneviève. Their convent was a veritable clinic, and Mme. de Miramion, who supported the dispensary, paid out more than 1500 livres per year for the remedies used.

Various other orders and their activities are noted:

The Benedictine nuns at Moret were known for their sugars and syrups for whooping cough and affections of the breast. Those at Traisnel sold a famous lavender water, so popular that it brought an income of 7000 livres in 1737.

The Bernardines were the targets for the apothecaries' complaints at Bourges, in 1789. The latter claimed that all medicines were sold publicly, and refused to the poor for whom they were intended.

The Carmelites perhaps interest us the most because they had a pharmacopœia composed especially for their use. The author was Pierre Dufresnois. It appears from the preface that the book was prepared at the request of Mme. Seguier, Prioress at Pontoise at various times from 1624 to 1672. Two sentences selected from the preface indicate the pride of the writer: ". . . Indeed, Madame, I venture to say that there is nothing in all the extent of pharmacy which is not comprised in this little volume I send you. . . . it is, Madame, the passion I have had for you to learn all my secrets, and to confide to you all that experience, travels, and the capable people of my profession have come to learn regarding that which you wish to know, and that with which I have perfectly acquainted you. . . ." The work is divided into two parts, preceded by a section on weights and measures. The first section deals with the choice and preparation of the simple medicaments entering into various compounds. The second is a dispensatory of the most-used compositions, including numerous "particular secrets," both of medicine and cosmetics.

Apparently, other Carmelite houses trafficked in medicines. In some cases, the sister in charge had spent a short time at the Hôtel-Dieu in Paris, or elsewhere, to learn bleeding and pharmacy. From the records available, it appears that most of the remedies used were purgatives and calmatives.

The nuns of the abbey of Chaillot, of the Convent of Sainte-Perrine, were given the privilege of vending a balsamic syrup in 1728. The reported profits the first year were 3000 livres, and a prospectus was prepared which described the supposed properties and uses. (This is reproduced in its entirety.) It is interesting to note that none of the various distributors listed were apothecaries.

At La Maison de L'Enfant-Jésus, there was a remarkable apothecary: "Not alone by the medicaments found there, but also by the curiosities of natural history that one can admire there, by the laboratory furnished with apparatus and by the room for drying the balsamic herbs collected in the large garden of seven hectares which extends behind the buildings." The Hospitalieres de la Rue Mouffetard also had a well-equipped apothecary.

Various other groups are mentioned, many of whom made and distributed some remedy.

The religious community of Port-Royal de Paris had a medical personnel of sufficient importance to get considerable allotments of money. Among the drugs employed there, one finds cassia, scammony, senna, licorice, clove, pepper, ass milk, triticum, nutmeg, sweet almond oil, viper, cinchona and various mineral waters.

THE ROLE OF THE MONKS IN CONVENT PHARMACIES

The Augustines.—A letter of Guy Patin, written in 1660, testifies to the medical practice of one Brother Valérien, Augustine monk, who promised to cure the lawyer Pucelle. It was said that the Brother had two particular secrets either unknown to or ignored by the physicians. Valérien had gained some notoriety previously by the preparation of a water. The product was said to heal all sorts of maladies.

The Benedictines.—This order gained its greatest pharmaceutical fame through the "Onguent du Bec," first prepared by Dom Leclerc, and named after the abbey in which he worked. An elaborate prospectus is reproduced. This latter is divided into two parts, first describing the "virtues," and

then the mode of application in the various disorders. A few of the claims follow:

". . . generally proper for the healing of all wounds."
". . . works by transpiration. . . . "
"It extracts all the wounds of foreign bodies. . . ordinarily in less than twenty-four hours, and without pain."
". . . to heal all the ills which frequently come to the breasts of women. . . ."
"It cures all sorts of fevers. . . ."
"It brings happy accouchements to women in child labor."
"It returns the menses. . . ."
"It extracts the humour of the gout."
". . . the lives of many persons have been saved by this ointment."

In 1766, the *Ecclesiastic Journal* announced the distributors of the product for the benefit of the people of the provinces. The price was raised in 1768, due to the great demand.

The ointment was supposedly made of burgundy pitch, lard, yellow wax, naval pitch, rosin and powdered frankincense.

The Capuchins.—Numerous Capuchin groups prepared remedies.

Father Hilarion had a prescription "to dissipate the stone," made with white wine and celandine. He was also known for his diuretic infusion. Brother Joachim, of Paris, had a laxative syrup containing oil of tartar, spirit of vitriol, and polychresticum.

At Alençon, the Capuchins rendered great service in the epidemic of 1638. They had an "apothecary-Brother," who was a great botanist, and who painted some six hundred plants or flowers in natural colors. His studies were facilitated by a large monastery garden.

At Faubourg St. Jacques lived the famous Brother Ange, who distributed among other things "an opiate" and a "syrup mésenterique et épatique." His opiate cordial was made with preserved apricots, poppy flowers, sal ammoniac, sugar, etc. The product was used to purify the blood, for queasy stomach, etc. The ingredients were sometimes varied. Ange also distributed a cream for redness of the face (made with farina and distilled vinegar), a laxative "vegetable water" and an antimony preparation.

His reputation was great, and his income proportionate. Even the Dauphin brought him to court, but found no relief in his remedies.

Perhaps the most famous of the Capuchins were those at the Louvre. They will be discussed separately.

REFERENCES

(1) Tournier, J., "Le Clergé et la Pharmacie," Paris, Librairie Caffin (1938).
(2) ————, *J. pharm. chim.*, **28** (1938), 191.

Book Reviews

The Pharmacological Basis of Therapeutics, by LOUIS GOODMAN, M.D., Assistant Professor of Pharmacology and Toxicology, Yale University School of Medicine, and ALFRED GILMAN, Ph.D., Assistant Professor of Pharmacology and Toxicology, Yale University School of Medicine. 1383 pages, illustrated. The Macmillan Company, New York, 1941. Price $12.50.

This book, which is intended to serve both the medical student and the practitioner, presents a new approach to the study of pharmacology, one which aims at a correlation of basic physiological principles with pharmacodynamics and of pathological physiology of disease with the actions and uses of drugs. The scope of the text is sufficiently wide to serve the student throughout the medical course and subject matter is of such a nature that it should be of value to the practicing physician in refreshing his fundamental knowledge of pharmacology and in keeping abreast of the latest advances.

The subject matter is grouped into twenty-six sections covering all drugs of recognized value, including those recently introduced, as well as the latest information concerning the actions and uses of older drugs of established prescription writing. There are twenty-six illustrations, sixty-seven tables and rather extensive bibliographies at the end of each chapter. The volume is thoroughly indexed with entries for both drugs and diseases. Because of its scope and the arrangement of material, the book should be of value not only to the student and practitioner of medicine but also to the pharmacist, particularly as a reference work.—A. G. D.

University of California, Hospital Formulary, prepared by a Committee of the University of California, Medical Center Staff. v + 270 pages. University of California Press, Berkeley, California. Price $2.00.

This little volume is a handbook of helpful information, particularly with reference to drugs and chemicals and is intended primarily for the use of the staff and student body of the University of California Medical Center. Among the more important subjects with which it deals are prescription writing, vehicles and coloring agents, buffered and isotonic solutions, some of the commonly used trade-marked preparations, drugs for diagnostic purposes, endocrine preparations, vaccines, serums and antitoxins, the vitamins, parenteral fluids, therapeutic index and procedures for pediatrics, dental formulary drug list, x-ray examinations, laboratory and clinical procedures, treatment of burns and treatment of acute poisoning. The book is printed on thin paper, is of a size convenient to carry in the pocket and contains such a wide variety of information of use to the physician and clinical laboratory worker that it should be widely used.—A. G. D.