

- Lucas, V.
Incompatibility of sodium bicarbonate and mercurous chloride
Bol. assoc. brasil. pharm., 14 (1933), 301
- ORGANIC CHEMICALS.
- Bird, F. C. J.
Note of mercuric oxycyanide
Quart. J. Pharm. & Pharmacol., 7 (1934), 251
- Charpentier, Paul
Study of the system, butylethylmalonylurea (Soneryl) and dimethylaminophenol dimethylpyrazolon (pyramidon)
Bull. sci. pharmacol., 41 (1934), 328
- Cox, Gerald, J., *et al.*
Solubility of calcium levulinate in water
JOUR. A. PH. A., 23 (1934), 662
- Fieser, Louis F., and Bannerot, R. A.
Tautomerism of aminonaphthoquinones
J. Am. Chem. Soc., 56 (1934), 1565
- Hann, Raymond M.
Second synthesis of glucosidoferulic acid
J. Am. Chem. Soc., 56 (1934), 1631
- Jurist, A. E., and Christiansen, W. G.
Comparison of neoarsphenamine and sulpharsphenamine when they are dialyzed
JOUR. A. PH. A., 23 (1934), 686
- Katz, I.
Seignette's salt of the Belgian Pharmacopœia IV
J. pharm. Belg., 16 (1934), 573
- Marshall, J.
Note on preparation of pure acriflavine
Quart. J. Pharm. & Pharmacol., 7 (1934), 184
- Woodward, W. A., and Pickles, J.
Stability of mixtures of hydrogen peroxide and ethyl alcohol
Quart. J. Pharm. & Pharmacol., 7 (1934), 88

PHYTOCHEMICAL LITERATURE.*

BY EDWARD KREMERS.

Friedrich Rochleder was born May 15, 1819, in Vienna, the son of the apothecary Anton Rochleder. He died Nov. 5, 1874, as professor in the University of the capital of Austria.

Not satisfied with the routine of the apothecary shop, he began the study of medicine in his native city, receiving the doctor's degree in 1842. While thus engaged he took a special liking to chemistry for which his pharmaceutical apprenticeship had prepared him in part. Hence, after the completion of his medical studies he went first to Prag and then to Giessen. His knowledge of vegetable drugs and of botany coupled with his chemical training under Liebig caused him to specialize in phytochemistry toward which most of his experimental and literary efforts were directed.

Having spent several months in Paris and London, at the age of 26 he was appointed Professor of Technical Chemistry at the Academy at Lemberg. In 1849 he succeeded his friend Redtenbacher at Prag, whom he again succeeded in Vienna in 1870.

A fairly complete list of his publications may be found in Poggendorff's *Biographisch-literarisches Handwoerterbuch*. It is noteworthy that, whereas the more general literary productions appeared between 1847 and 1858, his activities after the latter date were restricted to more specific investigations. Optimistic as he was with regard to the fundamental importance of phytochemistry to plant physiology, he realized that only a mere beginning had been made and that much more detail work was necessary before worth-while generalizations could be indulged in with profit.

His literary contributions in book form are:

* Section on Historical Pharmacy, A. PH. A., Toronto meeting, 1932. Continued from *JOUR. A. PH. A.*, 21, 365.

1847. *Beitrage zur Phytochemie.*
 1852. *Die Genussmittel und Gewerze in chemischer Beziehung.*
 1854. *Phytochemie.*
 1858. *Chemie und Physiologie der Pflanzen.*
 1858. *Anleitung zur Analyse von Pflanzen und Pflanzentheilen.*

The last was translated into English and appeared as *Proximate analysis of plants* in 1861 and 1862.

The biography for the *Allgemeine Deutsche Biographie* was written by Anschuetz. It is evidently based on the more detailed account written by Rochleder's student and friend, H. Hlasiwetz, for the *Almanach der kaiserlichen Akademie der Wissenschaft* for 1875 (pages 195-212), of which society Rochleder had been a member since 1848. This "Nekrolog" was reprinted in the *Berichte der d. chem. Gesellschaft*, for 1875, viz., in Vol. 8, page 1702.

Fr. Rochleder.—Beitraege zur Phytochemie. Wien, 1847. Aus der kaiserl. koenigl. Hof- und Staats-Druckerei. One vol. 8°, pages 51.

This is Rochleder's first attempt to rationalize the numerous observations made in the chemical study of plants and parts of plants. Liebig's theory of radicles, the "true elements" of organic compounds, afford him the means of studying the structure of phytochemical substances and of seeking genetic relationship between them. That, with the limited number of radicles known at the time, there should be so many organic substances produced in the vegetable kingdom, he attributes not only to their capacity to combine with different elements and radicles, e. g., oxygen, sulphur, cyanogen, sulphocyanogen, etc., but above all to their capacity to form "gepaarte Verbindungen" such as salicin, amygdalin, etc. (page 22).

The complaint that so much of phytochemical investigation has been merely qualitative and not quantitative is readily understood when one considers that elementary organic analysis, as simplified and perfected by Liebig, had been in use for about twenty years. It finds expression in the small number of phytochemical substances enumerated with their formulas. The modern chemist, however, will be impressed less with the paucity of formulas than with the daring formulas assigned to pectin and other members of the "carbohydrate group."

Following the trend of v. Uslar and de Saussure, more than half of the small treatise is devoted to what is generally conceived as phytophysiological considerations. In the biochemistry of the plant he recognizes desoxidation as the principal function or chemical process of plant metabolism.

Inasmuch as this treatise has become rare, the table of contents may here be given.

Ueber die Zusammensetzung der organischen Bestandtheile der Pflanzen im Allgemeinen (pages 7-11).

Ueber die Zusammensetzung der Pflanzenstoffe im Besonderen (pages 11-22).

- | | |
|---------------------------|---------------------------------------|
| I. Familie. Kohlehydrate. | VIII. Familie. Bioxyde. |
| II. Familie. Fettsäuren. | IX. Familie. Äther. |
| III. Familie. Gerbstoffe. | X. Familie. Acrodyle. |
| IV. Familie. Lichenyle. | XI. Familie. Albuminoide. |
| V. Familie. Tetryle. | XII. Familie. Alcaloide. |
| VI. Familie. Decatryle. | XIII. Familie. Gepaarte Verbindungen. |
| VII. Familie. Camphene. | |

Ueber die Metamorphosen, welche die Stoffe in den Pflanzen während des Lebens derselben erleiden (pages 23-45).

Einjährige und perennirende Gewächse (page 46).

Ueber die Vertheilung der Pflanzenstoffe in den Pflanzen (pages 47-49).

Schluss (pages 49-51).

Fr. Rochleder.—Phytochemie. Leipzig. Verlag von Wilhelm Engelmann, 1854.

This attempt at a general phytochemistry in which the author was the pioneer, is best revealed by the table of contents. The bulk of the work is devoted to a record of constituents, by no means all chemical units, that had been isolated from plants. The author points out that the gaps are much more numerous than the known constituents and he indicates constantly where more work seems desirable and profitable. This part of the book is, therefore, a sort of precursor to Wehmer.

Part three is in its essence an attempt to bring out genetic relationships with reference to the several families. Even before Kekulé's theories were advanced, he endeavors to bring out what was regarded as structural relationship at that time.

Part four has to deal largely with what we call plant metabolism, of some of the details of which the following table of contents will give further indication.

Einleitung.

Erster Abschnitt. Analysen der Pflanzen, mit besonderer Rücksicht auf ihre organischen Bestandtheile (pages 1-250).

Zweiter Abschnitt. Analysen der Pflanzen, mit alleiniger Berücksichtigung ihrer unorganischen Bestandtheile (pages 251-255).

Dritter Abschnitt. Ueber den Zusammenhang zwischen der Form und Zusammensetzung der Gewächse (pages 257-308).

Vierter Abschnitt. Der Stoffwechsel in den Pflanzen (pages 309-344).

- | | |
|--|---|
| I. Nahrungsmittel der Pflanzen. | VI. Das Verhältniss der organischen zu den unorganischen Bestandtheilen der Vegetabilien. |
| II. Bestandtheile der Pflanzen. | |
| III. Metamorphosen in den Pflanzen. | |
| IV. Bewegung der Stoffe und ihre Folgen. | VII. Perioden im Stoffwechsel. |
| V. Einfachheit der Zusammensetzung der Pflanzen. | VIII. Pflanzengeographie. |

Anhang (pages 345-370).

Alphabetisches Verzeichniss der bis jetzt, ihrer Zusammensetzung nach, bekannten Bestandtheile der Pflanzen.

Index familiarum.

Index generum.

Reviews of this work may be found in the following journals:

Arch. de. Pharm., 133, 335, by H. Bley (8 pages).

Neues Jahrb. f. Pharmacie, 18, 355, by Reinsch.

Fr. Rochleder.—Chemie und Physiologie der Pflanzen. Heidelberg. Karl Winter, 1858.

In this, his last attempt, the author discusses phytochemistry from two points of view, namely, that of chemical botany, and that of the chemical physiology of plants.

In the first part, which constitutes the major portion of his treatise, the chemical constituents of plants, as revealed by so-called plant analysis, are arranged

according to botanical families, genera and species. In this respect he supplements the first part of his *Beiträge zur Phytochemie*. However, what, in the first attempt, is regarded as one of the principal aspects of phytochemistry, namely, the genetic relationship of chemical compounds based on their structure, receives no consideration whatever. His chemical botany is but a catalog of phytochemical substances with references to original literature for details.

The character of the second part becomes sufficiently apparent from the table of contents. It also goes into much greater detail than his *Beiträge* of 1847. The object of the chemical physiology of plants is to investigate "which substances are taken up by plants from without, which products are produced therefrom by the plant, the method by which the plant metamorphoses the substances taken up from without, and the products that are secreted by the plant."

The contents of the volume are herewith revealed:

Einleitung (pages 1-7).

(A) Chemische Botanik (pages 7-98).

Analysen vegetabilischer Körper.

- | | |
|----------------------------------|---|
| I. Vegetabilia dicotyledonea. | III. Vegetabilia vascularia cryptogama. |
| II. Vegetabilia monocotyledonea. | IV. Vegetabilia Cellularia. |

(B) Chemische Physiologie der Pflanzen (pages 99-152).

- | | |
|--|--|
| I. Endprodukte des Stoffwechsels. | V. Eigenwärme der Gewächse und Bedeutung der Wärme und des Lichts fuer die Pflanzen. |
| II. Nahrungsmittel der Pflanzen. | VI. Licht. |
| III. Aufnahme der Nahrungsmittel und Vertheilung der Stoffe in den Pflanzen. | VII. Electricität. |
| IV. Ueber den aufsteigenden und absteigenden Saftstrom. | VIII. Keimen der Samen. |

Anhang. Ueber das Reifen der Früchte (pages 153-154).

AUGUST HEINRICH HUSEMANN.

The younger of the two cousins Husemann was born Sept. 5, 1833 in Stolzenau, Hannover, then an independent kingdom. His early education he received in private institutions and at the gymnasium in Detmold. In 1848 he was apprenticed to the court apothecary in Detmold. Later he acted in the capacity of assistant in Lamspringe, Aurich and Nienburg. In 1857 he became a student at Goettingen where he passed the state board examination in the following year. Devoting himself to the study of chemistry, he worked under Woehler and Limpricht and in 1860 was appointed assistant at the newly equipped physiological chemical laboratory. In the same year, Aug. 8th, he received the doctor's degree and in 1862 he became docent for pharmaceutical-juridical chemistry.

Lung troubles necessitated residence in Italy during the winter of 1863/64. He returned to Goettingen but for a short time, having received a call to the "Kantonschule" in Chur. Whereas in Goettingen his researches were devoted to phytochemistry, in Chur they dealt with the investigation of the mineral waters of Graubuenden. Poor health necessitated his withdrawing from active work. He died in Thusis (Graubuenden, Switzerland) July 17, 1877.

A list of his book and journal publications will be found in Poggendorff, *Biogr. lit. Handwoerterbuch*, Bd. III.

Phytochemically his *Pflanzenstoffe*, which appeared in 1870–1871, is his principal contribution to scientific literature. It was well received. A second edition which appeared after his death, 1882, was edited by A. Hilger and Th. Husemann.

The biographical sketch in the *Allg. Deutsche Biographie*, by A. Ladenburg, is based on the obituary in the *Arch. Pharm.*

ALBERT HILGER.

Born May 2nd in Hamburg, Rhenish Palatinate, he served his pharmaceutical apprenticeship with the apothecary Joh. Hoffmann in Langenkandel, Rhenish Palatinate. Having passed his assistant's examination, he served for three years in this capacity in Mannheim, Karlsruhe and Saarbruecken. He studied in Wuerzburg (1860) where he passed his "Staatsexamen" in 1862; also at Heidelberg, at which university he received his doctor's degree (Ph.D.). He then became Schenk's assistant in Wuerzburg, later the assistant to Scherer, and in 1869 "Privat-docent." In 1872 he was appointed Professor of Pharmacy and Applied Chemistry in Erlangen. Twenty years later he became Buchner's successor in Munich. He died May 18, 1905, in Possenhefen on the Starnberger lake.

For additional biographical data with portrait, also for a long list of his book and journal publications, see B. Reber, *Gallerie*, etc., pages 218 and 363. An appreciation, more particularly of his life-long interest in pharmacy and food chemistry was written by Heger, editor of the *Pharmaceutische Post*, No. 23, 1905.

Poggendorff gives but a brief notice of his life and work (Bd. III). The *Allgem. Deutsche Biogr.* does not mention him.

THEODOR HUSEMANN.

The older of the Husemann cousins was born Jan. 13, 1833, in Detmold, Lippe. From his father, an ex-apothecary whose hobby was botany, he acquired a love for the natural sciences. These he studied, in addition to the required medical subjects at the universities of Goettingen (1850–1852), Wuerzburg (1852–1854) and Berlin (1854). From the last-named institution he received the M.D., Dec. 27, 1854.

After several years as medical practitioner, he returned to Goettingen devoting himself to toxicological and pharmacological studies. During the winter 1863–1864 he accompanied his sick cousin to Italy. Early in 1865 he became "Privat-docent" for Pharmacology and Toxicology at the *Georgia Augusta* and in 1872 he was made professor.

As medical practitioner, Husemann became active in a literary capacity writing on various subjects of medical history. As toxicologist and pharmacologist he wrote extensively on subjects related to these fields. With his cousin he edited the first edition of the *Pflanzenstoffe* (1869–1871). After his cousin's death, a second, enlarged edition was published in coöperation with A. Hilger. A promised third edition did not make its appearance.

He died Feb. 13, 1901.

For more detailed biographical data with portrait, also references to other publications, see B. Reber, *Gallerie*, etc. (1897), 63.

Poggendorff contains but a brief note on his life and literary activities. The *Allgem. Deutsche Biogr.* does not mention him.

A more extensive biographical account will be found in the *Pharmazeutische Zeitung*: see 32 (1887), 443 and 451; also 46 (1901), 147.

Aug. Husemann, und Theod. Husemann.—*Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer und toxikologischer Hinsicht*. Fuer Aerzte, Apotheker, Chemiker und Pharmakologen bearbeitet. One vol., pages vii, 1178. Berlin, 1871. Verlag von Julius Springer.

One of the authors, presumably August H., undertook the editing of the chemical part of the work, the other, presumably Theodor H., that of the pharmacological, etc., parts of the volume. While such mixtures as volatile and fatty oils, resins, etc., receive consideration, extracts and other galenical preparations of plants are excluded. The book apparently filled a long-felt want on the part of chemist and apothecary though it was also written for the medical profession.

The arrangement, of special interest so far as date of publication is concerned, becomes apparent from the table of contents:

Einleitung	1- 18
(A) Reine Verbindungen	
1. Die Pflanzenbasen oder Alkaloide	19- 522
2 u. 3. Die Pflanzensaeuren und indifferente Pflanzenstoffe	523-1073
(B) Gemenge.	
Aetherische Oele—Harze—Fette	1074-1167
Register	1069-1178

As a means of subclassification the plant substances are arranged according to plant families.

Contemporary appreciation and criticism of this work may be learned from the following book reviews:

Arch. Pharm., 194, 282. By E. Hallier.

Am. J. Pharm., 42, 315. By J. M. Maisch.

After the death of Aug. Husemann in 1877, his cousin associated himself with A. Hilger. Of the three authors of *Die Pflanzenstoffe*, two began their scientific careers as pharmacists. The third was the son of an ex-apothecary and had inherited from his father a love for the natural sciences which he cultivated while pursuing his medical studies. The second edition was published in two volumes. The arrangement of the subject matter was altered as becomes apparent from the rearranged table of contents:

I. ALGEMEINER THEIL.

- (A) Chemische Vorgaenge im pflanzlichen Organismus.
Entstehung organischer Substanz (pages 3-11).
(B) Chemische Charakteristik der Pflanzenstoffe (pages 12-72).

Kohlenhydrate.	Die Pflanzenbasen oder Alkaloide.
Glycoside.	Fette (Wachsarten).
Bitterstoffe und Farbstoffe.	Aetherische Oele.
Gerbsaeuren (Gerbstoffe).	Campher.
Pectinstoffe.	Harze (Balsame).
Pflanzensaeuren.	Proteinstoffe.

- (C) Wirkung und Anwendung der Pflanzenstoffe (pages 73-100).

II. SPECIELLER THEIL.

- (A) Allgemein verbreitete Stoffe.

1. Unorganische Bestandtheile der Pflanze (pages 103-105).
 2. Kohlenhydrate (pages 106-188).
 3. Organische Saeuren allgem. Verbreitung (pages 188-261).
 4. Eiweisstoffe (Proteinkoerper) (pages 231-236).
 5. Ungeformte Fermente (pages 237-240).
 6. Pflanzenfarbstoffe (pages 241-261).
 7. Amidverbindungen (pages 263-272).
- (B) Pflanzenstoffe beschraenkter Verbreitung (pages 273-1543).

It is also noteworthy that the bulk of the treatise is devoted to plant substances of limited distribution. Apparently it was Hilger who edited the chemical part after the death of Aug. Husemann.

Book reviews may be consulted in the following journals:

Pharm. Zig., 29, 323. By A. Tschirch.

E. EBERMAYER.

Ernst Wilhelm Ferdinand Ebermayer was born Nov. 2, 1829, in Rehlingen near Pappenheim, Bavaria. His life-work in forestry was carried on primarily as professor at the *Forstlehranstalt* at Aschaffenburg (since 1858) and at the University of Munich (since 1878). He is referred to as the founder of forest meteorology and forest chemistry. For his book and journal publications on these and related subjects, see Poggendorff, *Biogr.—litterarisches Handwoerterbuch* Bd. III, page 396. His *Physiologische Chemie der Pflanzen* appeared in 1882. He died Aug. 12, 1908, in Hintersee near Berchtesgaden.

The *Allgem. Deutsche Biogr.* does not include his biography. Brief accounts will be found in the *Konversations-Lexika* of Brockhaus and Meyer. See also the supplement to the latter.

Physiologische Chemie der Pflanzen. Zugleich Lehrbuch der organischen Chemie und Agrikulturchemie fuer Forst- und Landwirthe, Agrikulturchemiker, Botaniker, etc. Von Dr. *Ernst. Ebermayer*. Erster Band. Die Bestandtheile der Pflanzen. Berlin. Verlag von Julius Springer. 1882.

Inhaltsübersicht.

Die Bestandtheile der Pflanzen.

Erster Abschnitt. Wassergehalt der Pflanzen. (Vorkommen, Vertheilung, etc., quantitative Bestimmung, pages 2-29).

Zweiter Abschnitt. Die organischen oder verbrennlichen Bestandtheile der Pflanzen (pages 30-708).

Allgemeine Betrachtungen.

(A) Die stickstofffreien Erzeugnisse der Pflanzen.

I. Verbindungen aus der Klasse der Fettkörper.

Kohlenwasserstoffe.

Alkohole.

Kohlenhydrate.

Organische Säuren.

II. Verbindungen aus der Klasse der aromatischen Körper.

Kohlenwasserstoffe.

Phenole.

Aromatische Alkohole and Aldehyde.

Aromatische Säuren.

- Die wichtigsten Gerbmaterialien des Handels.
 Aetherische oder flüchtige Oele.
- III. Pflanzenstoffe von unbekannter Constitution.
 Glycoside.
 Bitterstoffe.
 Harze.
 Balsame oder flüssige Harze.
 Eigentliche Harze (Hartharze).
 Gummiharze.
 Pflanzenfarben.
- (B) Die stickstoffhaltigen Erzeugnisse der Pflanzen.
 Pflanzenbasen oder Pflanzenalkaloide.
 Proteinstoffe, Eiweisskörper oder Albuminate.
 Nicht-eiweissartige stickstoffhaltige Pflanzenbestandtheile (Amidverbindungen).
 Fermente.
- Dritter Abschnitt. Die anorganischen oder Mineralbestandtheile der Pflanzen (pages 709-836).
 Vorkommen, Einäschern, Aschen-Analysen, etc.
 Betrachtung der einzelnen anorganischen Pflanzenbestandtheile.
- Anhang.
- I. Bedeutung der Wälder fuer die chemische Industrie
 (Gewinnung von Potasche, Holzkohle, Holzessig, etc.)
- II. Nachträge.
- III. Tabelle.

A METHOD OF PREPARING GLYCERITE OF STARCH.*

BY F. L. GEILER.

INTRODUCTION.

The purposes of this article are: (1) to describe a simplified method of preparing Glycerite of Starch, (2) to show wherein this method differs from the present U. S. P. X method of preparing this glycerite, and (3) to show why the difference or differences mentioned above will be advantageous.

The writer has, for a number of years, assigned Glycerite of Starch as one of the preparations to be made by students in the laboratory. The observations made over this period of years led to the conclusion that undue difficulty was being experienced by the students in making a comparatively simple preparation. The trouble met with has been primarily that of obtaining a smooth, opalescent, translucent product by following the directions given for this preparation in the U. S. P. X. This primary difficulty usually has led to one of a secondary nature due to the effort made to obtain a temperature of around 140° C. with the resultant scorching of the glycerite. Upon questioning the students, almost invariably the scorching has been found to be the result of the use of high heat under the impression that it will eliminate the lumpy condition of the glycerite which has developed because of following the directions as given in the U. S. P. X.

During the time referred to above many students used the method of the U. S. P. X and repeated the experiment as high as three or four times before a satisfactory glycerite was obtained. This always seemed to the writer an uncalled-

* Section on Practical Pharmacy and Dispensing, Washington meeting, 1934.