2013

Kamlet Laboratories and Clinitest: Idea to Product

Dean F. Martin

University of South Florida, dfmartin@usf.edu

Brodie A. Reiger

University of South Florida

Follow this and additional works at: https://digitalcommons.usf.edu/chm_facpub

Part of the [Chemistry Commons](#)

Scholar Commons Citation

Martin, Dean F. and Reiger, Brodie A., "Kamlet Laboratories and Clinitest: Idea to Product" (2013).
Chemistry Faculty Publications. 2.
https://digitalcommons.usf.edu/chm_facpub/2

This Article is brought to you for free and open access by the Chemistry at Digital Commons @ University of South Florida. It has been accepted for inclusion in Chemistry Faculty Publications by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact digitalcommons@usf.edu.

KAMLET LABORATORIES AND CLINITEST: IDEA TO PRODUCT

Dean F. Martin and Brodie A. Reiger

Institute for Environmental Studies, Department of Chemistry,
University of South Florida, Tampa, FL, USA

This article examines the process of development of Clinitest pills that could be used in clinics or physicians' offices for rapid, convenient analysis of glucose and other components of clinical interest. It was invented by Dr. Jonas Kamlet. We were able to follow the process because his papers are accessible (as The Kamlet Laboratories Collection) at the University of South Florida Library. The accessibility of these papers gives an opportunity to see steps in the development of a successful product from conception to patent and commercialization. Kamlet, a consulting chemist, took the invention to Miles Laboratories of Elkhart, Indiana, in the early 1940s. Ultimately, it was replaced by a Miles invention, Clinistix, which had the same purpose. While Dr. Kamlet earned money for his two-person laboratory, contemporary accounts give credit to the Director of Miles Laboratories, Walter Ames Compton, M.D., for the invention of Clinitest. Correspondence between Kamlet Laboratories and Miles Laboratories (1940–1945) was reviewed, with no written evidence of hurt feelings or acrimony discovered.

Key words: Clinitest; Clinistix; Miles Laboratories; Recognition; Invention

INTRODUCTION

How does an inventor receive credit for his or her invention? Sometimes a name is attached to a process invented, such as the Hall Process or the Héroult process for the electrochemical production of aluminum (16). There is a plethora of organic reactions named for their inventors. But too many times, credit is not forthcoming, especially for a hired consultant. The authors had the opportunity to examine a particular situation of the development of an idea from patent to product by examining the Kamlet papers available at the USF Library. The files of Kamlet Laboratories (*vide infra*) were donated to USF in 2006 (15,18). A website was set up so that chemists and other interested persons may view the general contents of the Kamlet papers (13). The first manuscript in the series described the origin of the collection (14). A second manuscript (15) considered details of the early years of

operation using information found in the Kamlet Laboratories Collection at USF (18). This article is concerned with the development of an idea by Dr. Jonas Kamlet: pills that would allow rapid, accurate tests of important clinical constituents to be made in physicians' offices.

Our study revealed a noticeable absence of credit given to Dr. Kamlet, inventor of a product called Clinitest, marketed for a number of years by Miles Laboratories, then of Elkhart, Indiana. Sold as pills, Clinitest was designed to test biological fluids for glucose and other components of interest in the treatment of diabetes. In 2010, an estimated 25.8 million children and adults (8.3%) of the US population had diabetes. Some 18.8 million of that number were diagnosed (2). Today, the preferred analysis for glucose testing is the blood glucose meter, but in the past, urine glucose concentrations were tested

by chemical means, then by pills, then by strip tests (vide infra) (2,3).

Few persons are aware of the background of the test strips Clinistix or appreciate that perhaps some of the credit should go to the person who was responsible for obtaining the first patent for what became Clinitest, the forerunner of these strips at Miles Laboratories (3,4). We believe that some credit should go to the founder of Kamlet Laboratories (New York, NY), Dr. Jonas Kamlet, a man who developed a unique system of chemical entrepreneurship. He was assisted in the activities of the Kamlet Laboratories by his wife, the late Edna Yadven Kamlet Rogers, a resident of Sarasota, Florida (14).

BACKGROUND OF MILES LABORATORIES

This section considers some salient features of Miles Laboratories'—widely famous for Alka-Seltzer—interesting and varied history (4,5,17). Starting as Dr. Miles' Medical Company (established by Dr. Franklin Miles of Elkhart, Indiana) in 1885, the founder was soon joined by two colleagues—George Compton and Albert Beardsley—and the trio became responsible for Miles Laboratories. Descendants of the trio, including Dr. Arthur Compton, would later be executives within the firm (4).

The company was profitable within 5 years, in major part because of the sales of a sedative, "Dr. Miles' Restorative Nervine" (4). Subsequently, Alka-Seltzer would be a major seller, a product that was suggested by Andrew "Hub" Beardsley, nephew of a trio member and later first Chairman of the Board (4,5,17). Having noted that reporters of a local newspaper seemed to resist colds by taking a mixture of aspirin and sodium bicarbonate, he encouraged a different emphasis on products. After years of experimentation, Alka-Seltzer became available in 1931 (4,17).

The timing was excellent for this product, coming just before the repeal of prohibition (4,17). Alka-Seltzer was designed to alleviate headaches and upset stomachs, "as the incidence of hangovers increased, so did the consumption of Alka-Seltzer" (17). At last report, it was available in more than 100 nations with annual sales of \$90 million (17).

The firm decided to diversify into a wider range of products under the leadership of Dr. Walter Ames Compton, company president from 1964 to 1973 and later Chairman of the Board. Diversification included

the development of products for comprehensive health care. Though many of the developments occurred in the late 1960s and early 1970s, One-a-Day vitamins had been developed much earlier and were first marketed in 1943 (4,17). Jonas Kamlet also deserves partial credit for this product (12).

However, the company may have become too attractive and, in October 1977, was subjected to a takeover bid by Bayer AG (West Germany). The firm was converted to the North American division of Bayer AG and later became defunct in 1995 as Bayer removed the Miles name from all products and facilities. The US headquarters was moved from Elkhart to Pittsburgh (17).

BACKGROUND OF KAMLET LABORATORIES

The background of Kamlet Laboratories has been described elsewhere (14,15). Briefly, Kamlet Laboratories was founded in 1940. Laboratory personnel consisted of Jonas Kamlet and his wife, Edna Yadven Kamlet (14,15). They specialized in consulting or in developing inventions and selling the patent rights to interested companies. Though the laboratory had some facilities for doing laboratory experiments, the Kamlets also arranged subcontracted work to be done by others. Outside work, however, was carefully divided by Edna Kamlet, so that only the Kamlets knew how the components would fit into a final product (14).

HOW IT STARTED

Jonas Kamlet was associated with Miles Laboratories in a number of ways according to the correspondence (10–12). How this association developed requires a bit of background. Ultimately, 10 patents that Dr. Kamlet developed were assigned to Miles Laboratories. He developed ideas for diagnostic compositions and methods of analyses of blood and urine for specific components of interest in clinical chemistry that led to patents assigned to Miles Laboratories (Table 1). The purpose was to provide a rapid, simple, and convenient method for performing tests with a high degree of accuracy and specificity, one that can readily be used by the average physician without laboratory equipment or specialized analytical training (7,8).

Table 1. Summary of Patents Awarded to Jonas Kamlet and Assigned to Miles Laboratories*

Date	Patent Number	Title
4/28/1942	2,280,918	Preparation of ortho-hydroxycinnamic acid (substance is "valuable as an intermediate in manufacture of coumarin, which is extensively used as a flavoring material")
5/19/1942	2,283,262	Diagnostic composition and method (detection/quantitative estimation of acetone and acetoacetic acid in body fluids)
7/21/1942	2,290,436	Diagnostic composition and method (qualitative detection/semi-quantitative estimation of blood in body fluids)
2/09/1943	CA 410,533**	Reagent mixture for determination of reducing sugar (e.g., glucose)
3/23/1943	2,314,831	Preparation of D-tartaric acid by fermentation (economical method using cheap, readily available raw materials)
5/25/1943	2,320,282	Diagnostic compositions for amino-arylsulfonamides (simple test for estimate of "sulfa" compounds)
4/11/1944	2,346,261	Titration reaction vessel (used in a diagnostic method)
6/19/1945	2,378,559	Synthetic elastomers (new rubber line synthetic polymers)
9/03/1946	2,406,774	Synthesis of riboflavin and intermediates Therefore (new synthesis of Vitamin B ₂)
3/25/1947	2,418,033	Diagnostic compositions (detection/quantitative, estimation of glucose, etc. in body fluids)

*US patent search: <http://www.pat2pdf.org/>

**Canadian patent, Canadian Intellectual Property Office: cipo.ic.gc.ca

Dr. Kamlet would use a method (e.g., Benedict's reagent for glucose); develop it for clinical use; and convert the necessary reagents into, for example, five-grain tablets, and the tablets would then be agitated to produce carbon dioxide when dissolved in water (7,8). One patent was concerned with the analysis of acetone and acetoacetic acid (Table 1) (7). Another was concerned with the analysis of "occult blood" in body fluids and feces (8). A third was concerned with the analysis of sulfa drugs in body fluids, using 2.5-grain tablets. The analyses provide a good estimate of concentrations of antibiotics at a time when proper doses had not been established (cf. Table 1, Patent 2,320,282). A fourth was concerned with the estimation of reducing carbohydrates such as glucose, levulose, and arabinose in body fluids (urine, cerebrospinal fluid, milk). The patent titled "Diagnostic Compositions" was a continuation in part of copending applications.

Clearly, Jonas Kamlet had developed an idea for a tablet that could be used in tests for diabetes, and these were covered in patents assigned to Miles Laboratories (7-9). He needed a convenient method for agitating the solution, and his wife suggested contacting Miles Laboratories because they manufactured Alka-Seltzer and would know how to agitate something in solution using a pill (14). Further development of the story from the Kamlet point of view has been described elsewhere (14,15).

Dr. Kamlet had a sound appreciation of how the mixture worked (10). In a December 1943 letter (12), he noted why "the sodium hydroxide and the citric acid go so well together in our Clinitest tablets *until* (sic) the tablet is wetted. Then they interact like all get out" (10). He cited an old Aristotelian dictum that he wrote still held good: *Corpore non agunt nisi solute* or "bodies do not interact unless they are dissolved" (12).

KAMLET AND PUBLIC RELATIONS

Jonas Kamlet realized that there was a need for publicity for the Clinitest products, and his ideas are outlined in a letter written to Dr. R. L. Conklin (11), a popular Elkhart physician who helped run the Miles medical facility on a part time basis during World War II:

One of the next steps that I believe we ought to take in the introduction of our Clinitest series to the physicians and clinical pathologists of this country, is to publish a paper in one of the journals (e.g., the Journal of Laboratory and Clinical Medicine is my choice) (10).

It is hard to disagree with the wisdom of this idea, but it is interesting to read further in the letter. He noted on May 5, 1942, that he "forwarded to Dr. Compton a

16-page letter containing an extensive bibliography to serve as the basis around which we could construct the first Clinitest paper.” He also suggested that, at their next meeting, they “should discuss the advisability of publishing this paper in the near future as well as lay down a policy for future publications ” (10).

Jonas Kamlet had another idea, which he added at the end of the first paragraph: “The author of the introductory paper must be what appears to be a disinterested outsider. I suggest that Dr. Casper of the Herman Keefer Hospital in Detroit be requested to ‘author’ the first Clinitest paper which we can ghost-write for him” (10). Thus far, we have been unable to find the ghost-written paper, either in manuscript or published form.

Dr. Kamlet was an enthusiastic proponent of the Clinitest kits. In 1943, he wrote to Dr. Raymond L. Conklin at Miles about a visit to the International Paper Company at Glens Falls, New York. He specifically noted that there were two problems that he suggested could be solved using the Clinitest kit. He wrote, “During a second trip, I brought along one of these [kits] and demonstrated its use. Dr. Taylor and his staff were very interested and wanted to know where they could buy this kit” (11). Kamlet was unable to find a pharmacy in Glens Falls that stocked the Clinitest kit, so he suggested sending a half dozen complimentary kits to Dr. Taylor (11).

THE IMPROVEMENTS

Bohning (3) wrote an article based on the Chemical Heritage Foundation’s Oral History Program. He noted that just before Dr. Alfred Free (codeveloper of Clinistix) arrived, “Miles [Laboratories] had developed Clinitest, a tablet for monitoring the glucose in urine for diabetic patients. The tablet, based on the relatively simple chemistry of Benedict’s reagent (CuSO_4 , NaOH , and tartaric acid) contained cupric sulfate, citric acid, sodium hydroxide, and because it came from Miles—a little bit of carbonate to make it fizz.” Dr. Alfred Free’s research group improved the Clinitest process and increased the sensitivity so that amounts of glucose up to 5% could be detected, rather than stopping at 2%.

One of the problems with Clinitest tablets, according to Helen Free in an oral presentation (6), was that the bottle had a skull and crossbones on it (4). Subsequently, Dr. Alfred Free “realized that paper

could be impregnated with the reagent and a drop of urine added. Finally, even the dropper was eliminated by cutting the paper into test strips so that the strips could simply be dipped into the urine. The concept of the Clinistix was born” (4).

The system had a number of assets—convenience, safety, sensitivity, and an impressive range of analytes, including density (6). Clinistix had a curious response by some users. Bohning noted that the College of American Pathologists had approved Clinitest as the acceptable method for measuring urine reducing sugars (3). Clinistix was also accepted but with a caveat that the test would need to be confirmed with Clinitest, presumably a less sensitive test.

Credit to Dr. Walter Compton

Helen Free, codeveloper with her husband Dr. Al Free, of Clinistix was interviewed in 2011 (1). The resulting article said, “In the 1940s the company [Miles Laboratories] had already introduced a test called Clinitest, which was developed by Walter Ames Compton, who would later become president and chairman of the board at Miles” (1). The comparison of composition (Kamlet vs. Compton) is summarized in Table 2.

Jonas Kamlet did, in fact, receive some written credit for his contribution. Cray (4) wrote that when Compton “became head of research and development at Miles, he became concerned as to whether something couldn’t be done about making laboratory tests more convenient. He enlisted the skills of a consulting chemist, Jonas Kamlet, and Maurice Treneer, the in-house expert on effervescence” (4). Clinistix tablets still sold well more than 40 years after their introduction in 1941. In addition, the Kamlet papers indicate involvement with other effervescence products (4). In crediting Compton (1), was the Free research group’s contribution neglected? No, but neither does the name Jonas Kamlet appear in either article.

CONCLUDING REMARKS

Dr. Jonas Kamlet was a bright capable inventor and chemist, who was also a shrewd businessman, as evidenced by an analysis of the earnings of the Kamlet Laboratories during the first 15 years (15). It seems that the good living and the success of the

Table 2. Letters to Dr. Raymond L. Conklin of Miles Laboratories in 1943

Subject	Dates
Dicoumarin anticoagulant	April 8
Exploitation of Patent 2,314,831 (manufacture of tartaric acid)	April 19
by U.S. Industrial Alcohol Corp (possibly on a license basis)	April 22
	April 25
	May 4
Cation-absorbing resin to remove iron from molasses in citric acid fermentations	April 24
Malazone tablets (60 grain effervescent) for mouthwash, antiseptic, general germicide	May 4
<i>p</i> -Thiocyananiline, agent for possible sulfanilamide-like activity;	May 8
Alternate synthesis of citric acid in face of wartime restrictions	June 10
Palatable effervescent colloidal aluminum hydroxide tablet, Alumi-Vess	June 21
Samples of proposed product, Alumi-Vess Hemibasic calcium phosphate as a citric acid substitute	July 7, 15
Nose-drop composition (samples)	July 30
Possible licensing arrangement with a Brazilian firm "for our tartaric acid process"	August 7
pH Clinitest tablets	August 10
Halazone tablets	August 18
Nasal vasoconstrictor preparation	September 13
(new sample prepared and sent)	September 15
Nasal vasoconstrictor – available trade names	September 15
Citric acid source (3 kg of waste tobacco stems); source of 3.8% mixture of citric and malic acids	September 20
Intention to file a patent on "our nasal vasoconstrictor preparation containing 2-aminoheptane-D-gluconate"	September 22
Comments of patent application for nasal vasoconstrictor (in response to patent examiner)	December 27
Multivitamin tablets	December 29
Vitamins A&D and the B complex. Technique for preparation; composition	December 29

firm were based on his success as an entrepreneur and consultant, rather than an author of manuscripts in refereed journals. In one sense, he could be regarded as what some attorneys call a "hired gun." He was financially compensated for what he produced, rather than for what he wrote for refereed journals as would be true for a faculty member in a major college or university today. As noted earlier, some inventors are memorialized by having their names attached to their invention. Paul L. T. Héroult and Charles Martin Hall had their names attached to the same invention but in different parts of the world: Hall in the US and Héroult in the rest of the world (16). The Colt pistol is another example, as is the (Rudolph) Diesel engine, the (John) Deere plow, the (Karl) Benz motor vehicle, and the (Cyrus) McCormick harvester, among others.

Dr. Kamlet was not overlooked at the time (4). The available correspondence with Miles Laboratories available at USF (13) covers the period November 21, 1940 through April 19, 1945 (13). He seemed to be on great terms with his correspondents (chiefly Dr. Raymond Conklin) and typically closed his

letters saying, "With kindest regards" (10–12). His correspondence with representatives of Miles Laboratories reveals a helpful person, full of ideas (10–12). This is amply indicated in Table 2.

We have seen no written concern over a lack of personal publicity for his efforts. His wife (the late Mrs. Edna Yadveh Kamlet Rogers) may have focused on a topic more important than fame—money. She said of a certain patent assigned to Miles Laboratories that they (the Kamlets) earned \$5 million in 5 years; they had expected to earn \$17 million (14).

ACKNOWLEDGMENTS: We are grateful to the late Mrs. Edna Yadveh Kamlet Rogers for her generous donation that enabled the transfer and cataloging of the Kamlet papers. We are also grateful for the encouragement of Dr. Mark Greenberg, USF Tampa Library. We appreciate the helpful assistance of Mr. Andy Huse, Special Collections, USF Library. We thank Mrs. Barbara B. Martin and Mr. Stephen Crist, USF Division of Patents and Licensing for technical assistance. The authors declare no conflict of interest.

REFERENCES

1. Ainsworth, S. J. Helen Free looks back. *Chem. Eng. News* 89(34):50–52; 2011.

2. American Diabetes Association. Data from the 2011 National Diabetes Fact Sheet. Retrieved November 2011 from <http://www.diabetes.org/diabetes-basics/diabetes-statistics/>
3. Bohning, J. J. Diagnosing disease: A story from the CHF Oral History Program. *Chem. Herit. Found.* 21(3):2-13, 42-44; 2003.
4. Cray, W. C. *Miles 1884-1984: A centennial history.* Englewood Cliffs, NJ: Prentice-Hall; 1984.
5. Compton, W. A. *Serving needs in health and nutrition: The story of Miles Laboratories, Inc.* New York: Newcomen Society in North America; 1973.
6. Free, H. M.; Savol, R. M. History of the in vitro diagnostic industry. 232nd ACS National Meeting. San Francisco, CA: American Chemical Society Division of the History of Chemistry.
7. Kamlet, J. Diagnostic composition and method, U.S. Patent 2,283,262. May 19, 1942.
8. Kamlet, J. Diagnostic composition and method, U.S. Patent 2,290,436. July 21, 1942.
9. Kamlet, J. Diagnostic compositions, U.S. Patent 2,418,033. March 25, 1947.
10. Kamlet, J. "Publication of original papers," letter to R. L. Conklin, Miles Laboratory, April 23, 1943. Retrieved November 2012 from http://www.lib.usf.edu/aeon/eads/index.html?eadrequest=true&ead_id=U29-00049-K27
11. Kamlet, J. "File XXII-Joint Project With International Paper Company," letter to Dr. R. L. Conklin, Miles Laboratories, August 10, 1943. Retrieved November 2012 from http://www.lib.usf.edu/aeon/eads/index.html?eadrequest=true&ead_id=U29-00049-K27
12. Kamlet, J. "Re: Multi-vitamin tablets," letter to Dr. R. L. Conklin, Miles Laboratory, December 29, 1943. Retrieved November 2012 from http://www.lib.usf.edu/aeon/eads/index.html?eadrequest=true&ead_id=U29-00049-K27
13. Kamlet Laboratories/Miles Laboratories correspondence, November 21, 1940-April 19, 1945. Retrieved November 2012 from http://www.lib.usf.edu/aeon/eads/index.html?eadrequest=true&ead_id=U29-00049-K27
14. Martin, D. F.; Martin, B. B. Jonas Kamlet (1914-1960) chemist/entrepreneur. *Florida Sci.* 70(1):40-44; 2007.
15. Martin, D. F.; Bidani, K. Deficit and surplus data for the Kamlet Laboratories, 1941-1955. *Bull. Hist. Chem.* accepted.
16. Martin, D. F. The race for cheap aluminum. *Hall versus Héroult. Technol. Innov.* 12(3):233-238; 2012.
17. Miles Laboratories History. Company history. Retrieved August 2012 from <http://www.fundinguniverse.com/company-histories/MILES-LABORATORIES>
18. USF libraries obtain medical history maker's collection. *Southeastern Librarian* 54(4):13; 2006/2007.