

Adventures of a Chemist

Writing - Adventures of a Chemist Collector

[Material / Illustrations for  
Adventures of a Chemist Collector]

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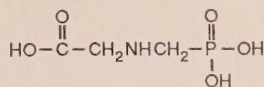
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# How To Find A Great Herbicide

Alfred Bader

In the spring of 1984, we at Aldrich were surprised by the visit of two teams of lawyers and chemical experts who came to question us about the best-selling herbicide ever, Round-up® herbicide which contains *N*-(phosphonomethyl)glycine (**1**) as its active ingredient was patented by Monsanto in 1974 and 1983 (U.S. Patents 3,799,758 and 4,405,531), but the Stauffer Chemical Company had developed a related herbicide having the trademark Touchdown® and questioned the validity of Monsanto's patents.



**1**

We had offered the compound at Aldrich through our *Library of Rare Chemicals*, and had listed it in both the 1967 library catalog and the 1972 Catalog/Handbook — hence, the day-long interrogation by the two teams of lawyers and their experts. How had we obtained the compound, when and why, and what had we done with it?

The compound we had was made in 1950 by Dr. Henri Martin, a very able Swiss chemist at Cilag in Schaffhausen. Dr. Martin had started with Geigy in 1934, worked with Paul Mueller on DDT, and then with Cilag until 1958, when he joined Ciba. There he developed a number of important herbicides, for example, Cotoran (*Merck Index*, 10th ed., 1983, No. 4054). Since his retirement in 1973, he has continued work at the University of Basel. He and Prof. Schwarzenbach in Zurich were collaborating on the development of complexing agents, and Dr. Martin thought that that compound **1** might be a good complexing agent.

Cilag was an independent manufacturer of pharmaceuticals and fine chemicals in Schaffhausen at the Swiss-German border, until 1959 when it was purchased by Johnson & Johnson. Aldrich was Cilag's United States agent, and I had become the good friend of their director of research, Dr. Carl Richter. In Belgium, I had also become a good friend of Dr. Paul Janssen, the head of Janssen Pharmaceutica, which was also purchased by J & J. Paul Janssen is one of the world's ablest medicinal chemists, and he and his team had come up with an incredible number of medicinal products, far more than the rather sleepy team at Cilag. So I was not surprised when J & J decided that Cilag should stop all medicinal research and that it be concentrated at Janssen.

When I learned this, I asked Dr. Richter what Cilag was going to do with the thousands of research samples that had been made during the previous twenty years. It had long been my hobby to purchase such samples for our *Library of Rare Chemicals* — usually from professors, but why not from Cilag? And so I arranged for the purchase of those research samples and their inclusion in our Library.

Dr. Martin had made compound **1** very straightforwardly from chloromethylphosphonic acid, glycine and sodium hydroxide in boiling water (Fig. 1), but unfortunately for Cilag, he never had it tested as a herbicide. Nor did he think of it when he joined Ciba's herbicide research.

It became No. S39,860-8 in our *Library of Rare Chemicals*, and beginning in 1966, several companies bought small quantities, probably for screening purposes, without realizing its potential.

In 1970, Dr. J. E. Franz at Monsanto discovered the great herbicidal activity of this product, Monsanto's CP67573, and obtained patents in most countries of the world. Monsanto could not obtain a patent on the compound itself because of the earlier disclosures in our catalogs, and because of an earlier Stauffer patent, 3,160,632 which, however, had not made any herbicidal claims for it.

Since then compound **1** has become the active ingredient in the world's best-selling herbicide. Monsanto sells over \$500 million worth of Round-up® herbicide annually.

At Aldrich we now have over 40,000 research samples in our Library. How many of these might give valuable leads, agriculturally and medicinally? Clearly, to have the compounds is not enough — you must also have the screens, and these are improving. Would it not make sense for every company interested in wide screening to have its own library — to be used and re-used as new screens are developed and old ones improved?

Over the years I have acquired many, many thousands of research samples from all over the world. But as time goes on, the size of the samples made gets smaller and smaller. Dr. Martin made 7.4 grams of *N*-(phosphonomethyl)glycine in 1950; today, many chemists make just milligram quantities of their new products. When I acquire a collection made over a long period of time, I can tell pretty accurately in which decade the compounds were made.

Time is running out, and that is why we have been working so hard to acquire our Library, and to offer these often unique samples to chemists around the world.

® Round-up is a registered trademark of Monsanto  
® Touchdown is a registered trademark of Stauffer Chemical Co.

Amino-methylphosphonsäure-N-essigsäure.

C <sub>3</sub> H <sub>5</sub> O <sub>5</sub> N P	Molgew. 169,09
Lit.: keine, vergl. Laborjournal Lukaszcyk I S.105	
NaOH	
H <sub>2</sub> O <sub>3</sub> P-CH <sub>2</sub> Cl + H <sub>2</sub> N-CH <sub>2</sub> COOH	→ H <sub>2</sub> O <sub>3</sub> P-CH <sub>2</sub> -NH-CH <sub>2</sub> -COOH
130,5	75
	40
	169,1

Ansatz: 13,0 gr Chloromethylphosphonsäure  
15,0 gr Glykokoll (2 Mol)  
16,0 gr Natriumhydroxyd (4 Mol)  
20 ccm Wasser

Die Mischung der drei festen Substanzen wurde in einem Rundkolben, tropfenweise mit dem Wasser versetzt bis sich das Geringe unter Erwärmen löste. Nach dem Zuhlen mit Wasser wurde bei 140 - 145 ° unter Rückfluss erhitzt. Nach dem Verdünnen mit ca. 100 ccm Wasser wurde die Lösung mit 25 ccm Eisessig versetzt und zur heissen Lösung Diäcetylösung in Uberschuss zugefügt. Das Bleisalz wurde abentrüchtigt, zweimal mit Wasser aufgeschlämmt, wieder abgezogen und nochmals gut mit Wasser gewaschen. In das, in ca. 300 ccm Wasser, aufgeschlammte Bleisalz wurde während 4 Stdn. unter gutem Rühren Schwefelwasserstoff eingeleitet. Nach dem guten Abwaschen des Bleisulfids wurde der Niederschlag nochmals mit Wasser aufgekocht und filtriert. Die vereinigten Wasserlösungen wurden im Vacuum zur Trockne eingedunstet, der sirupartige Rückstand in wenig Wasser in der Schmelze gelöst und die heisse Lösung mit dem gleichen Volumen Äthanol versetzt. Die aus der Lösung ausfallende Substanz war die reine Amino-methyl-phosphonsäure-N-essigsäure.

Ausbeute:	7,4 gr	Smp. 200° Zers.
analyser:	ber.	gef.
N:	8,28 %	8,46 %
P:	16,36 %	16,34 %

Die potentiometrisch Titration lieferte Molgew. von 165 und 172

Benr. Enthält das am Ende anfallende Produkt noch eine in Wasser schwer lösliche Substanz, so war die Umsetzung des Pb-Salzes mit H<sub>2</sub>S nicht vollständig.

Der Smp. wurde unter dem Mikroskop bestimmt.

F I 33  
24.11.1950

Fig. 1

We offer 33,810-9 *N*-(Phosphonomethyl)glycine, isopropylamine salt, 60% solution in water 100ml \$5.00.

To Ch. 9 p. 144 (7)

use part? See later

# TPAP: a mild catalytic oxidant

Professor Steven Ley, Dr. Bill Griffith and their colleagues at Imperial College, London, recently developed a novel reagent for the oxidation of alcohols to carbonyl compounds which promises to be a highly useful addition to the synthetic chemist's repertoire.<sup>1</sup>

The reagent, **tetrapropylammonium perruthenate (TPAP, 1)**, used in catalytic quantities together with *4-methylmorpholine N-oxide* (NMO), oxidizes primary alcohols to aldehydes and secondary alcohols to ketones in a rapid, efficient manner at room temperature. Importantly, **TPAP** is compatible with acid-sensitive functionalities (*e.g.*, epoxide, THP-ether, silyl ether, indole and carbon-carbon double bond) and has been found to oxidize alcohols with adjacent chiral centers without detectable racemization. **TPAP** oxidations proceed rapidly at room temperature in dichloromethane using less than 0.5 mole % of the catalyst. **TPAP** oxidations are also free of the complications (work-up difficulty, generation of obnoxious side products) which sometimes accompany the use of more conventional, stoichiometric oxidants such as chromium reagents and Swern systems.

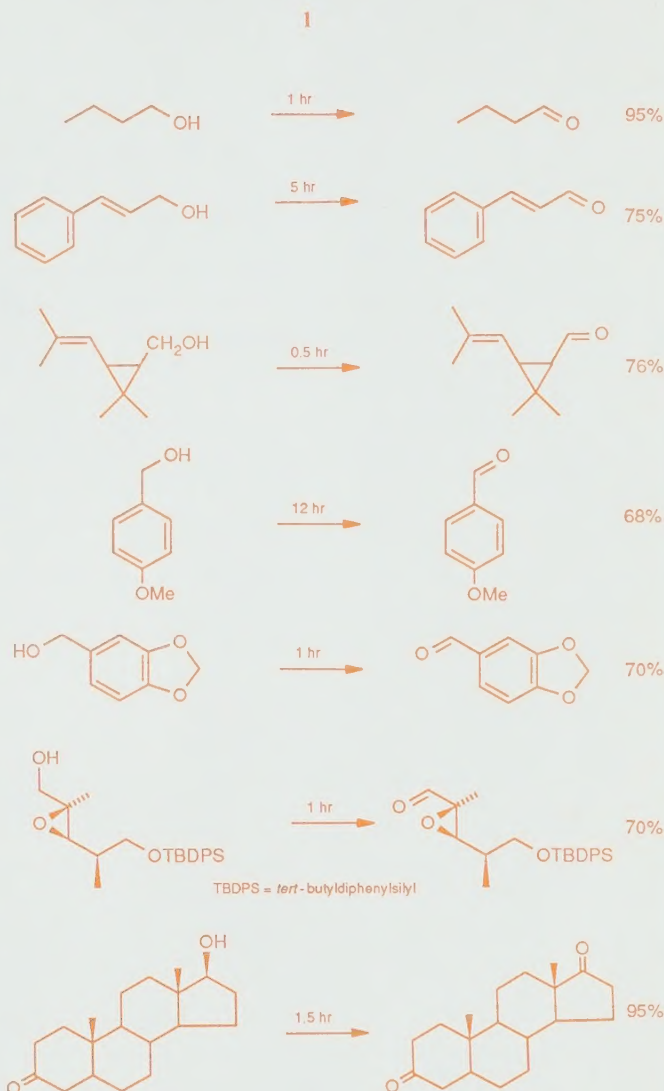
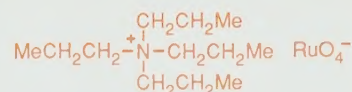
Typically, the substrate alcohol is dissolved in dichloromethane containing 4A molecular sieves<sup>2</sup> and NMO (1.5 equiv.). Solid **TPAP** (0.5 mole %) is then added and the resulting green mixture stirred until the oxidation is complete, as evidenced by TLC. The mixture is diluted with dichloromethane, washed with aqueous sodium sulfite, brine and aqueous copper(II) sulfate. The dichloromethane solution is then dried (MgSO<sub>4</sub>) and the product isolated by standard techniques.

Some examples of the versatility of **TPAP** are shown at right.

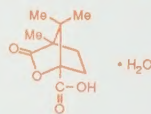
#### References:

- 1) Griffith, W.P.; Ley, S.V.; Whitcombe, G.P.; White, A.D. *Chem. Commun.* 1987, 1625.
- 2) Molecular sieves are employed to remove water generated in the reaction as well as water of crystallization of NMO. For reactions involving greater than 5 grams of substrate, it is better to pre-dry the NMO (dichloromethane solution over MgSO<sub>4</sub>).

33,074-4	<b>Tetrapropylammonium perruthenate (TPAP)</b>	250mg \$15.00; 1g \$46.75
22,428-6	<b>4-Methylmorpholine N-oxide, 97%</b> (NMO)	25g \$24.95 100g \$88.20
20,859-0	<b>Molecular sieves, 4A, 4-8 mesh</b>	1kg \$26.45 5kg \$92.75
20,860-4	<b>Molecular sieves, 4A, 8-12 mesh</b>	1kg \$26.45 5kg \$92.75
23,366-8	<b>Molecular sieves, 4A, activated powder</b>	500g \$15.00; 1kg \$24.50; 2.5kg \$48.55



## (-)-Camphanic Acid



There has been much confusion in the literature regarding the absolute stereochemistry of (-)-camphanic acid. The correct structure is shown above.

22,616-5 (1*S*)-(-)-Camphanic acid monohydrate, 99%  
1g \$11.55; 5g \$46.80

#### We also list:

32,822-7 (1*S*)-(-)-Camphanic acid, 99% 1g \$15.00; 5g \$51.00  
22,617-3 (1*S*)-(-)-Camphanic acid chloride, 98% 1g \$19.50  
5g \$81.15

## Still Available!

These products, inadvertently omitted from our 1988-1989 Catalog/Handbook, are *still available* from Aldrich.

32,992-4 **Tetrakis(trimethylsilyl)silane**, 98% [3704-46-9]  
Solid-state NMR reference standard 1g \$12.00; 10g \$62.00  
T7,573-6 **2,2,6-Trimethylcyclohexanone**, 98% [2408-37-9]  
1g \$22.10  
24,510-0 **2,2,6-Trimethyl-1,3-dioxen-4-one**, 95% [5394-63-8]  
(diketene acetone adduct) 100g \$16.40  
29,938-3 **2,2,6-Trimethyl-1,3-dioxen-4-one**, tech., 85%  
[5394-63-8] (diketene acetone adduct) 250ml \$13.30; 1l \$35.85  
27,201-9 **2,2'-Trimethylenebis-1,3-dioxolane**, 99% [6543-04-0]  
5g \$9.50; 15g \$29.95

ALDRICH HAS BEEN PASSING *ADVENTURES OF A CHEMIST COLLECTOR* AMONG EMPLOYEES, REQUESTING ANONYMOUS COMMENTS.

*"Everyone should read Alfred Bader's book, regardless of who you are or what you do in the Company. It offers good background as to how the Company started, flourished, and teaches a lesson that high Company management has to observe the rules just like anyone else and certainly to be aware of any impropriety or improper action, not in accord with correct procedures. In this case, it may have been 'acting before thinking of the consequences.' Was an extremely unfortunate incident, but it was done."*

EMPLOYEES' COMMENTS ARE AS DIVERSE  
AS THEY ARE INTERESTING:

*I'm glad I read the book; I really have a different impression of him now that I have it first-hand. I was told from someone in particular that he made a terrible mistake that led to his being "kicked out" and that he should have known that his action was unacceptable so he got what he deserves. I understand now what really transpired and cannot understand the action of the Board of Directors. Did someone have a grudge against him or what that they would take such drastic action? I have a difficult time understanding that. Otherwise, I enjoyed reading about his family, his travels, the people he knows worldwide, his love for art and his love for his wife, Isabel.*

Enjoyed reading Alfred's book and am now rereading certain chapters that I especially like. I can't tell you which parts of the book I enjoyed more than others; I think the flow and movement from early to later years is good. There were many things I had always been curious about that I learned.

*Nice to see old names from the past; brings back some good memories; nostalgic.*

The book is a well-written one, but of course, you have to keep in mind that it was written only from Alfred Bader's perspective.

*Alfred Bader's life has been fascinating; I wonder still what was the most dominating factor in his young life that led him to his occupation. Someone or something obviously exerted a dominating influence upon his personality; at times being very complex and other times just an ordinary man with unique talents.*

Dr. Bader has a way of romanticizing in his book. Besides being such an extraordinary business person, he emphasizes his emotions and interests vividly. He has an unusually remarkable memory, writing about incidents and situations with great detail. Yes, he must be a romantic, adventurous, mysterious and artistic person, yet practical. He is a man of many talents and traits, and it's good that he gathered everything together and wrote a worthwhile book.



Right on, Alfred. Like Tommy Thompson said, "stick it to 'em". You'll come out on top and have a right to be proud of yourself. Not many people have led a life such as yours, and I'd like to tell some of those "high and mighty" in St. Louis where to go. But it wouldn't do any good anyway; who am I?

*I find the book fairly easy to read, and it's a book that can be read at leisure and really enjoy it. Most everything is understandable and comprehensible.*

Well written - must have kept volumes of good notes or a diary in order to remember everything.

*I think Alfred should have been a little more aware of people's needs. I suppose I have the feeling, and maybe it's wrong, that he could have helped women in the chemical industry more. I haven't heard of any scholarships that he has set up to help them learn chemistry and science. Perhaps he has, but it's more difficult for women to break the barrier, the "glass ceiling", if you will. I know he has given freely and generously to many organizations and charities, but if people with his means could only see that women interested in the chemical field could use more encouragement and help, it would mean a lot to them.*

Interesting stories - nice to see most of your life history in a book.

*Alfred Bader's book is educational as well as incredibly interesting. It tells about a self-made man who stepped on a few toes during his lifetime, but when you start a business and try to make it go, sometimes you have to do what is necessary to keep that business. He made the only judgments he thought were correct at the time, and I believe he was a very wise, concerned individual. He tells about the hiring of a black lady with great compassion. I don't think he has a discriminatory bone in his body as far as that is concerned. He mentioned that when he first started his business, he didn't even cash his paycheck in order to pay his employees. That to me rather proves his allegiance to the employees working for him. I believe he did the best he could with what he had to work with at the time. He must have spent some sleepless nights back then worrying whether his small business could make it. I also believe he was a man of vision, determined, is religious, and is a man of great character.*

One of the interesting aspects of the book and quite sad is the part where Alfred Bader was "kicked off" the board of directors. Why did it happen to Marvin Klitsner also - What did he do? It's quite difficult for me to understand, after his explanation in the book as to what happened, there couldn't have been some understanding and "compromise", if you will, on the board of director's part. Why haven't they offered the public and the shareholders more explanation on this? I think they owe it to us, but time marches on and I suppose they think eventually it will be forgotten. But - it's a vital part of the corporation's history. Hardly anyone was to discuss it, and if Alfred Bader would not have written about it in his book, many people wouldn't ever have known what happened.

The first part of the report deals with the general situation of the country and the progress of the war. It is a very interesting and well-written account of the events of the year.

The second part of the report deals with the military operations of the year. It is a very detailed and accurate account of the military operations of the year.

The third part of the report deals with the political situation of the country. It is a very interesting and well-written account of the political situation of the year.

The fourth part of the report deals with the economic situation of the country. It is a very interesting and well-written account of the economic situation of the year.

The fifth part of the report deals with the social situation of the country. It is a very interesting and well-written account of the social situation of the year.

The sixth part of the report deals with the foreign relations of the country. It is a very interesting and well-written account of the foreign relations of the year.

The seventh part of the report deals with the internal affairs of the country. It is a very interesting and well-written account of the internal affairs of the year.

The eighth part of the report deals with the future of the country. It is a very interesting and well-written account of the future of the year.



Good book to read. Especially enjoyed the chapter on the ABC Library. Would have liked to have more emphasis put on this part of the book - in greater detail - did you envision a large library, and where do all the rare chemicals end up? This could have been expanded a bit more.

*Dr. Bader sure does know a lot of people throughout the world. He has a lot of acquaintances and friends, some very prominent and well-known, throughout the chemical industry and everywhere. I liked reading about all the different people he knows, what they do, where they live and how he met them. I wonder how many phone calls he gets just in one day. Does his wife answer all those calls at home? I wonder how many charitable organizations call him and write to him for donations because he is a very wealthy person. I wonder what he tells them and how he selects his charity. It was interesting to read that among all his talents, he teaches Sunday school.*

I am glad that I had a chance to work with Alfred Bader. He was very conservative, yet fair and straightforward. I hope he continues to enjoy life with his wonderful family and does just what he wants to do. He worked very hard during his lifetime to build up a company that employs many people so they can make a living. We should thank him for that. The fact of the matter is, if it were not for him, we would not be here today. Remember that. I pray that he and his wife, Isabel, enjoy life for many years to come. They are real nice people, and I'm glad to know them.

*If you want to know the "who, what, where, when, why and how" about Alfred Bader, just pick up his book! He marvelously addressed all my curiosities about him. Certainly, his life in his very early years was very difficult, but it teaches that if one really exerts his or her energies in the right direction, you can do what you put your mind to. But, like Alfred Bader, life is a constant learning experience; making mistakes, but learning from them and go on from there. Seems as though he had a few bad times and I don't know whether they were from being very independent or stubborn (the early years, Jack Eisendrath episode, where they parted and Eisendrath never spoke to him again), but he had to make a business decision that he thought was the best one. I now know how Aldrich Chemical got its name (from a toss up!) and how it became Sigma-Aldrich Corporation. This is a book of personal success in business, family and friends, and allowed me to understand what his life is all about. I wish him well in his future endeavors.*

After reading Alfred Bader's autobiography, I reread chapters that I found particularly fascinating; especially the "Aldrich" chapter, which tells about the merger between Aldrich and Sigma Chemical companies in 1975. It amazed me as I read, how he was involved in so many non-Aldrich activities while working so hard to keep the Company intact. He started a Jewish day school of which he was one of the first presidents - the "Hillel Academy", which flourished under his leadership. Both of his sons attended the school prior to high school. He managed to find the extra time somehow to be involved in other important activities. I found the entire book so interesting that I could hardly put it down once I started reading!

The first part of the paper discusses the general situation of the country and the position of the government. It is a very interesting and informative study of the political and economic conditions of the country.

The second part of the paper discusses the social conditions of the country. It is a very interesting and informative study of the social conditions of the country. It discusses the various social classes and their respective positions in society.

The third part of the paper discusses the economic conditions of the country. It is a very interesting and informative study of the economic conditions of the country. It discusses the various economic sectors and their respective contributions to the national economy.

The fourth part of the paper discusses the political conditions of the country. It is a very interesting and informative study of the political conditions of the country. It discusses the various political parties and their respective positions in the government.

The fifth part of the paper discusses the cultural conditions of the country. It is a very interesting and informative study of the cultural conditions of the country. It discusses the various cultural activities and their respective contributions to the national culture.

*Alfred Bader is a survivor. His story of his adventures told of some heavy blows dealt to him personally at a very young age and again later in life. Especially, his expulsion from the Sigma-Aldrich Board of Directors. He did a good job explaining in detail his position and the Board's decision, and I'm glad he put it in writing. I cannot for the life of me understand the fairness in the final decision and I can well imagine the effect it had on him. I think they were very narrow-minded, and also believe that Tom Cori, the leader, was determined to do it his mean-spirited way regardless of the consequences and the hurt it caused. It is my opinion that Tom Cori wanted Alfred Bader out of his way completely and that was the only method he had to do so. Jealously, perhaps? This is a case of not only surviving from being struck down, but not counted out. He was dealt a raw deal in the end which was not planned, but he did not collapse. He showed resilience and coped under the circumstances, attaining a healthy self image to the world. People admire him for his spirit and tenacity. Definitely a remarkable life adventure.*

*Adventures of a Chemist Collector is filled with inspiring success stories, from the beginning to the end. It seemed to cover everything - his personal life and life in the business world. His savvy as a business man is to be greatly admired. How he started out in the chemical industry, learning the ethical, legal, security and privacy issues as he went along. The more I think about it, the book portrayed his great potential from the very beginning. He believed in himself; had great faith and vision to build a business from a one product order/catalog to a worldwide corporation. Along the way, over the years, he met and interacted appropriately with many extremely knowledgeable, interesting people throughout the world, established a good relationship, and remained friends with them. I have never heard or read anything detrimental about Alfred Bader or his family. He's an immensely hard-working, dedicated individual with a tremendous amount of talent and expertise in his field of chemistry and art, which he applied very successfully.*

*One of the things I realized after reading the autobiography of Dr. Alfred Bader, founder of the Aldrich Chemical Company, is that he and his family had experiences and problems just as all of us have. I'm glad he wrote about his sons "David and Daniel". Being a mother of sons myself, I could relate to the day-to-day concerns and anxiety in raising them. They encountered discrimination and abuse in school; the oldest son was beaten up by some tough students during his first days of high school, and also had a reading problem. He wrote about their differences and their good times with their maternal grandparents in South Dakota. Just like a typical, common, down-to-earth "Czech" family. His sons have grown up, married and prospered. I'm sure he is very proud of them. I can imagine how devastated they were when their dear mother passed away, but nevertheless I was glad to read that they get along very well with Alfred's wife, Isabel. That's the way it should be. Anyway, yes, I am glad he told his story the way he did - upfront and forthright.*

He, undoubtedly, is one of the great communicators of all time! I believe he knows exactly how to evaluate every alternative in order to make the correct decision and, this of course, led to his success as a builder of a successful company. I would highly recommend everyone read this book.



*It must have taken a very, very long time to write his autobiography with all the information he accumulated about his boyhood and his life as a chemist and art collector. He traveled great distances in Europe trying to learn more about his family, encouraged by his wife, Isabel. I also liked the many photos that were connected with his life in some way. It's interesting reading about all of the personalities and also seeing what they actually looked like.*

You won't be disappointed; I encourage you to get the book and read it. It doesn't matter what you think of him personally; that's your prerogative. I think you will really get to know him after reading his autobiography. You'll learn about his applications, the strategy and techniques it takes to maintain control effectively. How important it is to surround oneself with good, hard-working, responsible and intelligent people, and how he made decisions every day that affected the business, employees, his and their families. The responsibilities he had, the concerns and worrying, his beliefs, his religious affiliation, discipline, and how to review and evaluate situations before taking action or investing. The immense knowledge and skill it takes to make the best decision and who to trust and not trust. What he is doing now and how he succeeded in doing something he really enjoys doing as a business and hobby as well. How and why he is on great demand for speaking engagements all over the world. I have read the many articles published about him in chemistry-related publications from their viewpoint, but take time to read the book; I guarantee you'll learn a lot.

*I don't have much education; I'm a janitor; quit school. My friend says read the book. Learn about your Company. It takes me a long time to read and understand but my friend is right, he knows a lot. My wife is reading it too. I've never read very much. My family just never had many books at home, just the ones we read in school and that wasn't much. Now we talk about it. We've never met the man, but I heard like because he is a Jew, Jews stick together and get anything they want. But man, he didn't have nothing to start with, he was real poor like a lot of us. I'm glad he done real good. He helped a lot of people like me, I have a good job that I come to every day and I try to work hard. I like working at Aldrich and I can keep this job for as long as I want to and maybe someday I can have a better job if I read and study, and learn things. If I ever met the man I like to shake his hand and say "thanks, man". I tell you more when I'm done (with) the book.*

I really can't say anything negative about Alfred Bader's autobiography. It's an especially good book from cover to cover. It's his way of communicating with the public and is a valuable addition to any library. He went through some real trying times, but he maintained a positive attitude and "weathered the storm". It's a good book for young people to read and, especially, current people associated with Aldrich Chemical. It gives major historical events and what it takes to attempt and succeed, building a company with it many competitors. It's very enlightening; I'm glad he authored a book and is available to anyone. It teaches many things: life depends entirely on one's perspective; God is testing us here on earth. Maintain the golden rule, and do the very best that you can regardless of what you do in life. Like an old clay jar, it may crack many times, but the more cracks in the jar, the more light that shines through.

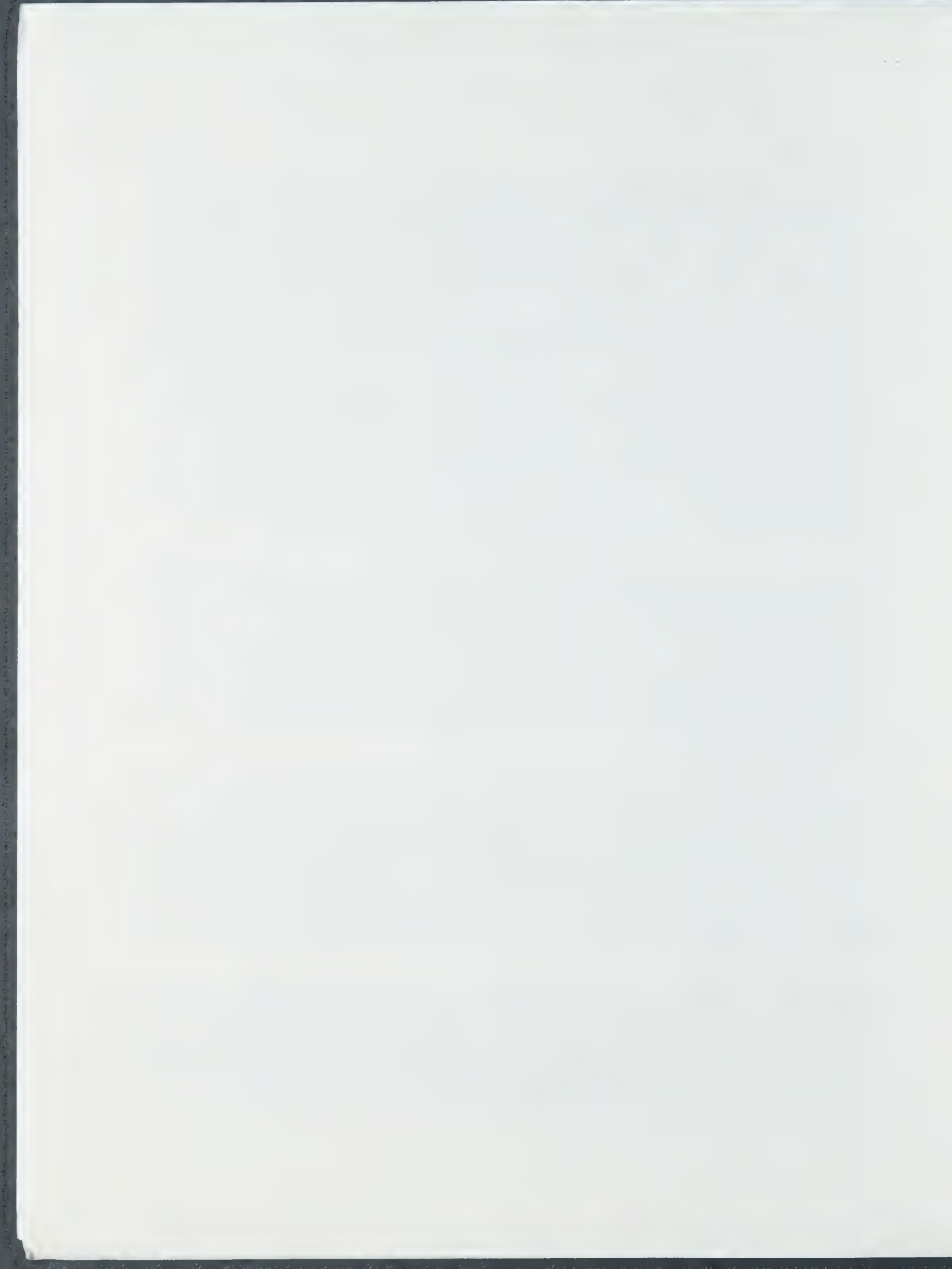


I do believe *Adventures of a Chemist Collector* is an invaluable source of reading. The historical facts and research takes one on a journey and the writing provides an enormous amount of revelation and information. It is characterized in extent, intensity and comprehensiveness. (There are some things that I say to myself only he would dare try to accomplish.) He is an unassuming, almost invincible man, and a brilliant chemist. At times I would say he used whatever means he had to justify the end results - perhaps at times using very convincing methods. However, all of us have our little idiosyncracies and way of doing; to think otherwise would be judgmental. It would have, however, been a nice ending to his career if he could have remained as a member of the Board of Directors of Sigma-Aldrich Corporation. I do not wish to comment on the action of the Board with regard to Bader's dismissal. He is now keeping busy in the community spending his time in the art field, time with his family and fulfills requests for numerous speaking engagements. He is to be highly commended for his and Isabel's most recent, impressive and awesome gift: the Herstmonceux Castle in Sussex, to Queen's University for the European campus. He has a remarkably entertaining personality with a vivid memory, and he will be remembered for his many achievements and contributions to science and industry. He gave a lot and I wish him well. Life goes on.

*Dr. Bader was an expert in his field and through his expertise, made it work. Regardless of his extremely meager beginning, he succeeded in doing what he started out to do and turned out very successful. He went through some real difficult times as a child and perhaps this played a part in his endeavor to succeed. I really enjoyed reading chapter after chapter, about his work, family, his love of art and history. He knows multitudes of interesting people all over the world. I know they must value his acquaintance and appreciate his extraordinary mind. I also know that he will never be a lonely man, and he never has anything to be sorry for. He has done a great job with his life and I wish him many more years of rewards.*

In regards to *Adventures of a Chemist Collector*, the story of Aldrich Chemical is one that should be shared with all employees. So often we have a limited reference point from which we can judge the advances (or downfalls) of our workplaces. For those of us who concentrate on doing our jobs, and not dwelling on those issues which we cannot control, I can now better understand why things are the way they are. While I realize that many a small company grew from similar circumstances, this particular story is even more fascinating to me because I have met many of the individuals mentioned and have seen the impact that they have had not only on Aldrich, but on the scientific community as a whole.

*Alfred Bader portrayed in his book character and steadfastness. His book is true and consistent with facts, irrespective of certain people's personal opinions about him. Nothing was invented by a product of his imagination or hypothetically assumed. He is possessed of a creative mind; however, to my knowledge, I believe the facts in his book are accurate. It was well-written and totally indicative of him. He's a good businessman-shrewd, acute in perception, perspicacious and, I believe inherently honest.*

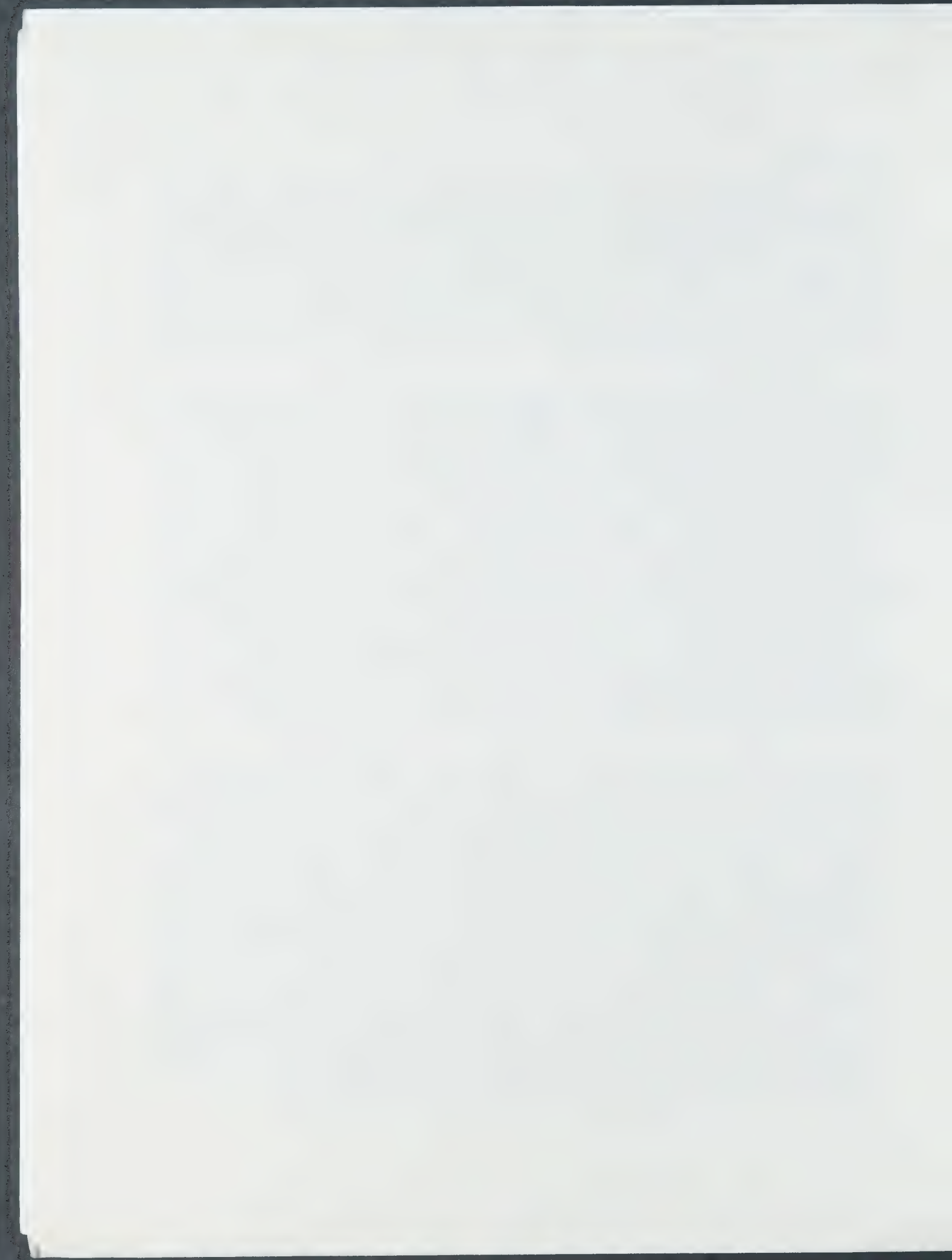




From the beginnings of his childhood, have to live years in camps without his parents, the schools he attended, the awards he received, the company he formed, his scientific mind, his business, famous people that he met and remained friends with, his disappointments, his rewards, his dealings with vendors and customers - exemplifies an extraordinary, profound person. His life was full of activity; displayed a rare person with unusual determination. From reading his thoughts, very factual; and including every phrase of his "chapters" of life, I give him a great deal of credit for publishing these facts for anyone to read. It was very enlightening to read his remarks of truth, some not very pleasant. But he told his story the way it was.

*Well, I hope the management of the Corporation realize now what a mistake they made in their decision of Alfred Bader's no longer having anything to do with Sigma-Aldrich. It would have been so good for the corporation to have him visit our customers, talk to scientists, and to identify what we can do for them and what they can do for us. He did a lot of that during the years he was with the company and that's what it takes. He knew a lot of important customers that were vital to our success and they were anxious to have him come. Now when we send company people to visit customers, it doesn't have the impact or effectiveness that it once did. I don't believe we will experience the growth that we once had; there is so much competition that it takes something very unique to change it. I think it was very important for Alfred Bader to meet our customers; it gave them a chance to tell the leader of the company firsthand what was needed. We don't have that anymore. We have complaints of our people appearing "arrogant" when visiting customers and they don't want to have anything to do with us anymore. Hopefully, this will change and our customers will be happy with us. I don't want to sound pessimistic, and of course we do have many customers who respond in their communication that we serve them well and are satisfied with our service.*

Alfred Bader's recent book is a very impressive life story. I would like to know now what he's doing now, but I'm sure he is still leading a very interesting life. What are his children doing; where are they? When I think of his chapter on "David and Daniel", it was real nice he wrote about them. I think he was right in saying he didn't spend enough time with them, although most leaders of business don't have the time to do the things they would like to do because of limited leisure time. Anyway, it sounds like they were brought up with good values and a nice mother and friends. They didn't get into a lot of trouble like some children do today when their parents are so busy leading their own lives that they don't know what their children are doing. Yes, I liked the book because it told just about everything he did over the years; his work and his joys, sometimes hardships, and disappointment in having to be told "get out of the company, they didn't want him anymore". Especially since it was Alfred Bader that started it and that it was he who hired and recommended many of the workers. Must have been an extremely difficult burden to bear. Also, one thing he did in his book was to tell some of the things he isn't so proud of. Many authors leave those things out, but all of us have done something in our lifetime that we aren't proud of; it's a human element that we can relate to. So that is to his credit. He isn't a braggart; it is sensitive and real, not fictitious.



I think *Adventures of a Chemist Collector* is a book that a lot of business men and business women should read. They will realize what this man had to go through in order to start a company and what it takes to survive. He didn't have a partnership and a lot of finances with which to build a company. Many of our businesses (not all, of course) are started by families that have great wealth. To form a company takes money for buildings, land, inventory, payroll, and benefits.

*I really am not completely finished with Dr. Bader's book. I have skipped over chapters that I will read later - the ones about the vendors, etc. So far what I have read is more than I expected to learn about him. Many people have told me about the founder of Aldrich and now I am really learning what a talented man he is. I think he is a truthful person and worked very hard his entire life. I feel bad about his expulsion from the corporation; he could have contributed some valuable experience in the years to come. Even offered to work without drawing a salary because the company meant so much to him, which I can understand. All I can say is, "It's their loss." I'm sure he is very involved with his family and art and I wonder if he actually misses the day-to-day activity of the chemical business. I will finish his book before the year ends because I want to read every word!*

Personally, I can say *Adventures of a Chemist Collector* was a real education for me. It's a good history of not only Aldrich Chemical Company and Sigma-Aldrich Corporation, but an excellent life story of Alfred Bader and his family.

*When I started reading his book, I thought this should really be interesting. I thought the entire book would be "one-sided" and incidents and explanations from his viewpoint only. It is not only interesting reading, but he tells the true facts just the way they happened. It gives a thorough explanation of how he formed a company that flourished as a result of vision, dedication, and making some good decisions along the way. After working for a paint company where he mainly had "one job" then trying to set up his own company with all the regulations and problems could not have been easy. He had to have a lot of expert opinions and people working at the company that were really loyal and hard-working. He told about one black woman he hired that stayed with him for years, so that says something - he is definitely not a prejudiced person. He just wanted people to put in a good day's work regardless of their color, nationality or religion. His company prospered and eventually came to the point where it merged with another chemical company to form a corporation. The really sad chapter was the unfortunate incident where the Board of Directors told him they no longer wanted him associated with the Corporation as a result of his selling stock and "betting against the company". It was their call and they have to live with it, but it took a lot of "guts" to do such a thing! All he did was give a generous gift to a University of stock that he owned. He didn't steal it from anyone. He will be remembered by most people, however, as the person who started a great company from nothing; he had no family to help him get started.*



# NOW AVAILABLE FROM THE ROYAL SOCIETY OF CHEMISTRY

Alfred Bader

## *Adventures of a* CHEMIST COLLECTOR

"... a remarkable story of a life full of drama."  
Financial Times, June 1995

"... If would-be millionaires with chemistry  
degrees would like to know how it's done, here  
is the recipe for success"  
Chemistry in Britain, July 1995

"... an inspiring and entertaining read for all  
chemists who regard their subject as the basis  
for a fulfilling and cultured life."  
Chemistry in Industry, November 1995



"The Alchemist" (Collection of A. Bader)

**Alfred Bader** is one of the most respected men in chemistry. In this heartwarming and inspiring book, he tells the fascinating story of how from his early life as a Jewish refugee from the Nazis and Canadian prisoner-of-war, he made good in the land of opportunity, the United States, where he was co-founder of Sigma-Aldrich, the world's largest supplier of research chemicals. Bader explores the development of the fine chemical business around the world between 1950 and 1990 and reveals his experiences with many chemists in both industry and academia during these years. In addition, he examines his fascination with art history and career as an art collector and dealer.

**Adventures of a Chemist Collector** is a fascinating and candid autobiography, which will prove compelling reading to people in the chemistry industry worldwide.

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1995

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Hardcover

£14.9

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Membership Administration Department  
The Royal Society of Chemistry  
Thomas Graham House, Science Park  
Milton Road, Cambridge SC4 4WF, United Kingdom

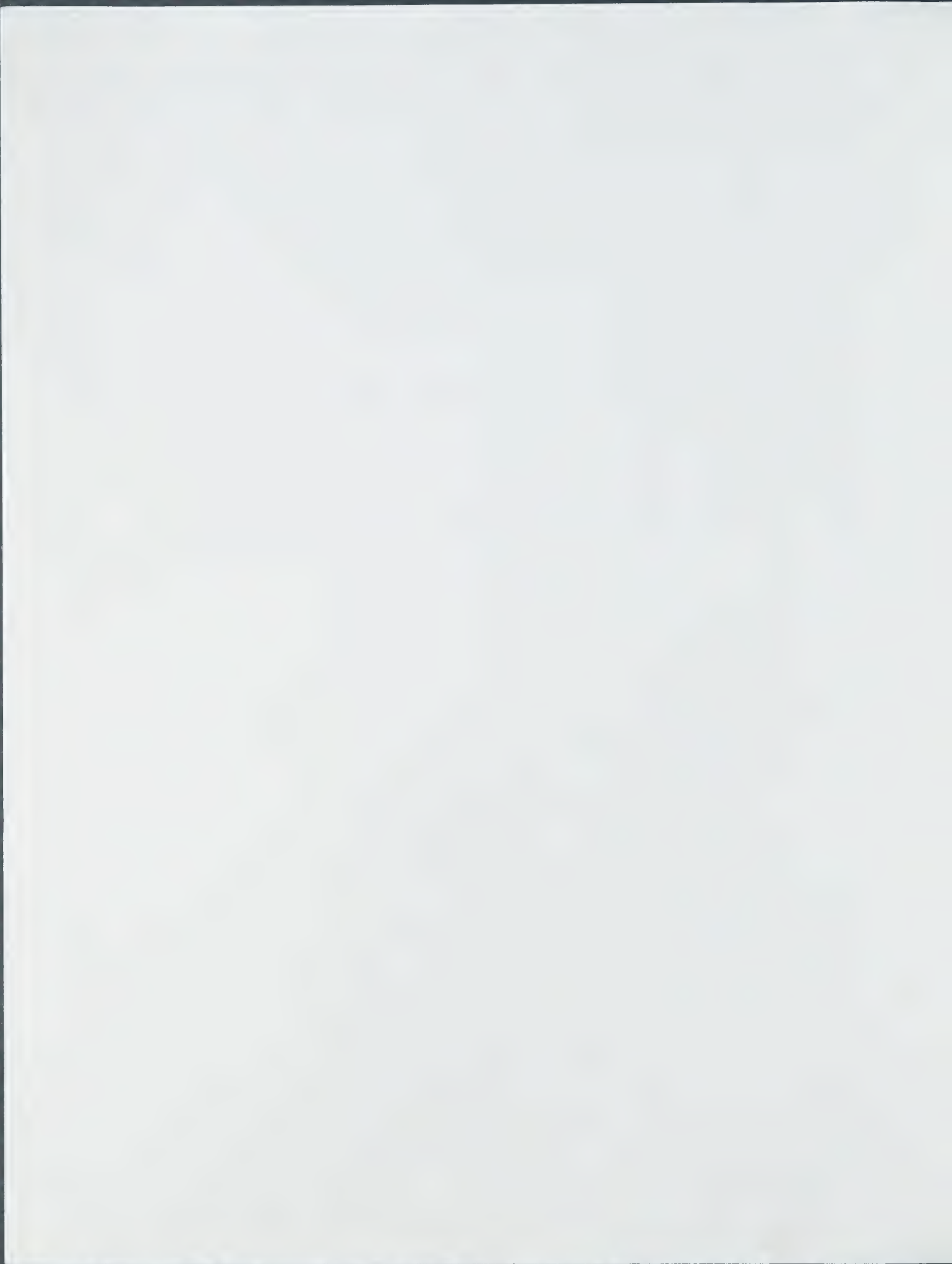


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*Aldrich* CHEMICAL COMPANY161 WEST WISCONSIN AVENUE  
MILWAUKEE 3, WISCONSIN

N-methyl-N-nitroso-N'-nitroguanidine for the preparation of Diazomethane is now being distributed for the first time anywhere by the Aldrich Chemical Company.

Diazomethane is an invaluable reagent for the methylation of carboxylic acids, phenols and enols, for the preparation of heterocyclic compounds and in the Arndt-Eistert reaction. It has hitherto been prepared through intermediates which are unstable and strong skin irritants.

Diazomethane can now be prepared most simply by the action of alkali on methyl nitroso nitroguanidine. (cf. McKay JACS 70, 1974 (1948); McKay et al, Can. J. Res., 28, 683 (1950); Organic Chemistry, Fieser and Fieser, 2nd. Ed. 178.

Methyl nitroso nitroguanidine is a crystalline compound, m.p. 118°C. which has been kept in brown bottles at room temperature for over a year without decomposition. The addition of this crystalline compound to a cold 50% aqueous potassium hydroxide solution covered with ether yields diazomethane in 70-90% yield. Numerous experiments have shown that when this ethereal diazomethane solution is distilled and added to an ethereal solution of a pure carboxylic acid, then evaporation of the resulting solution leaves the analytically pure methyl ester of the acid.

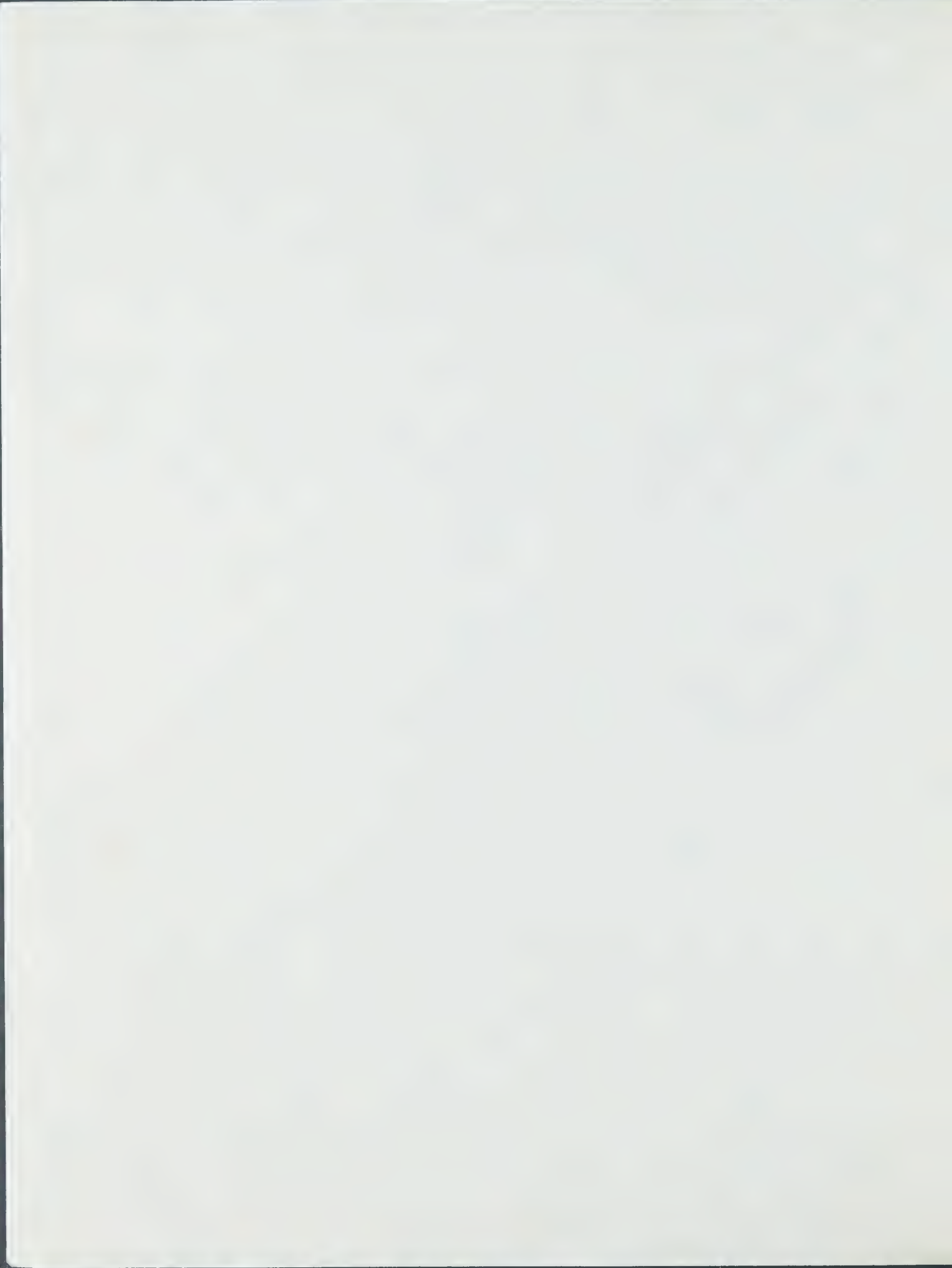
## N-methyl-N-nitroso-N'-nitroguanidine Prices:

10 gms.	\$ 5.00
25 gms.	10.00
100 gms.	25.00

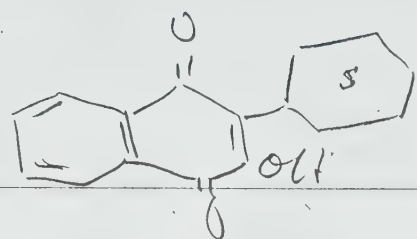
We shall be pleased to receive your introductory order.

ALDRICH CHEMICAL COMPANY

Catalog No 1 to p. 91, in ch. 7

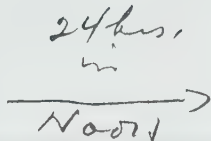






M-266

Red in alkali

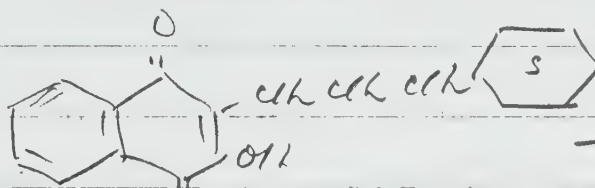


Yellow Isomer

Not a quinone.

Acidic  
yellow in alkali

2 good analyses.



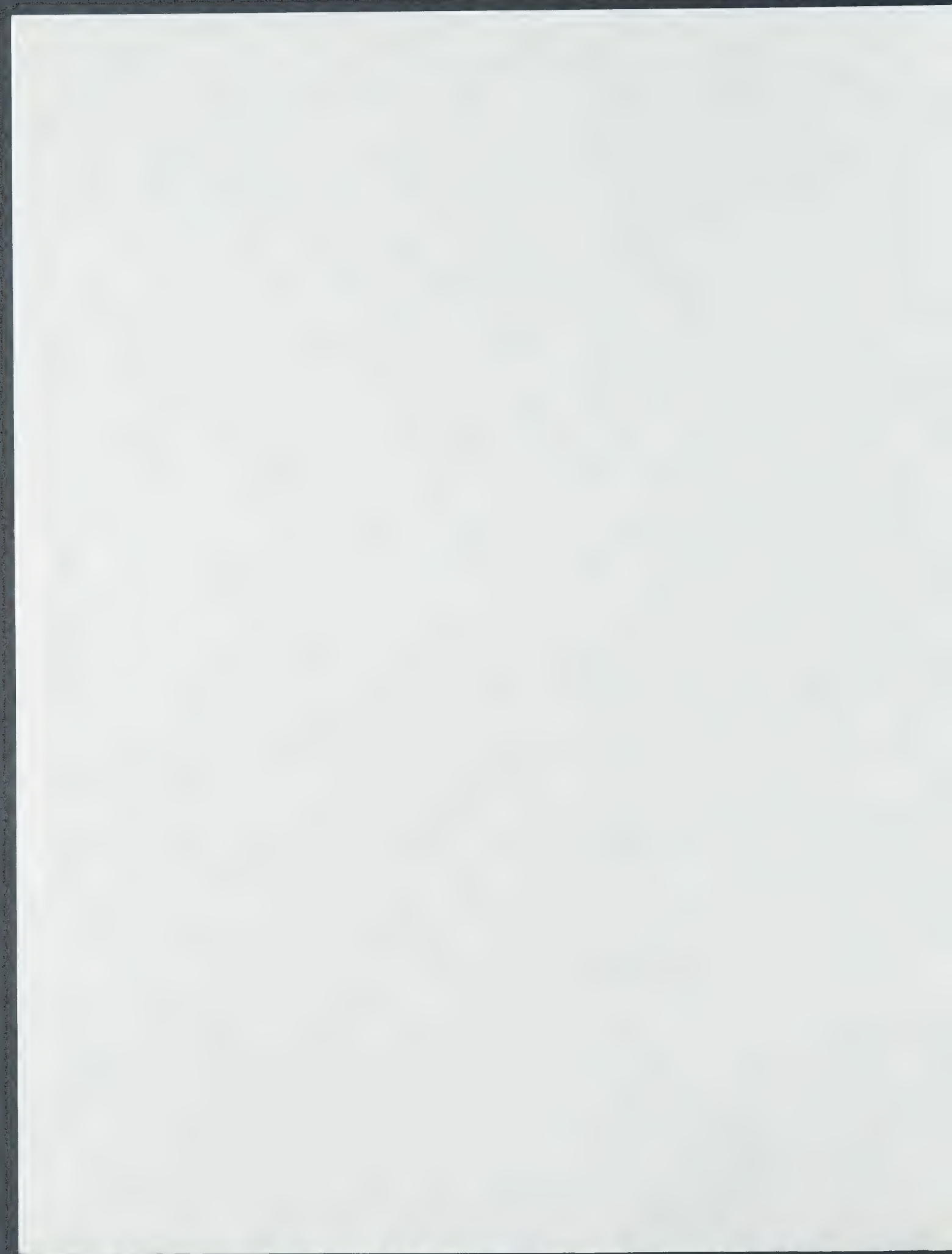
M-1911

Some  
acidic

largely  
destroyed.

Read:

- 1) Paper on Hooker Oxidn.
- 2) J. Am. Chem. Soc., 51, 940 (1929).  
51, 1896 (1929).
- 3) J. Am. Chem. Soc., 61, 3467 (1939).  
Conversion of vitamin K1 to  
phthiocol.



## Of things to come

Alfred Bader: Aldrich Chemical Company, Inc.

The most common question I am asked by friends, customers and stockholders—in fact almost invariably by anyone who discusses Aldrich with me for any length of time, is, "What will Aldrich be doing five or ten years from now?" This may seem like a simple question, and yet, could I have foreseen in 1958 or even in 1963 what we are like today? And why should our crystal ball be clearer now than then?

Nonetheless, a clear knowledge of what has happened in the fine chemical industry generally, and with Aldrich in particular, should allow us to make at least some intelligent guesses of what both will be like ten years from now.

Two fundamental changes have taken place in our industry in the last twenty years; a third is just taking place.

When I was a graduate student at Harvard in the forties, we looked into one catalog to see whether a required research chemical was available. If it was not, we made it ourselves. This catalog has remained essentially unchanged in format and size for the last twenty years. Today, however, several catalogs, American and European, offer many more chemicals, and the Aldrich catalog, listing our products not only alphabetically but also with structures and by classes of compounds and empirical formulae, makes finding a compound or class of compounds much easier.

The second fundamental change has been with purity of the compounds offered. Even only a few years ago, you could not be certain that a given chemical, particularly a liquid, in any of the standard catalogs, was pure. I venture a guess that as many as 30 or 40% of the liquids offered, while having reasonably close boiling ranges, were less than 90% pure, and a fair number would have had v.p.c.'s like Christmas trees. My old friend, Michael Carroll, the discoverer of the Carroll Reaction, said to me in 1952—"You will see, Alfred, gas-chromatography will make honest men of many of us." He was right, and gas chromatography, the greatly expanded use of spectroscopy (i.e., u.v., n.m.r.), thin layer chromatography and the scores of specific functional group methods of analysis have enabled our industry to assure high purity products.

The third change is just beginning; it is the impact of the computer on our industry. Not just the impact on inventory control and invoicing but particularly its impact on finding sources for individual products and groups of definite structural characteristics. Suppose that five years ago

a medicinal chemist had found that a cyclopropylamine had a very specific pharmacologic action, and he wanted to compare the action of other cyclopropylamines and perhaps of similar cyclobutyl—and cyclopentylamines also. Where could he have gone? He would have looked into the standard catalogs under *cyclopropyl* and he would have contacted chemists who have recently published on such compounds. Then he would have gone to the literature and made analogs himself. Today Aldrich can send him, at no charge, a complete computer print-out of all our cyclopropyl, or cyclobutyl or cyclopentyl compounds among the 14,000 compounds in our two catalogs; and before long we will be able to supply him with a print-out of all the chemicals in these categories available commercially anywhere. Soon, also, all of the compounds in Chemical Abstracts will have been computer coded and our catalog will list the C.A. code numbers of all of our products, so that it will be easy to determine just what has been published on every compound offered.

Just a few years ago, we bought our first building, and the six of us, who are all still with Aldrich, felt a little lost in the cavernous 27,000 square foot building which was ten times as large as the laboratory we had rented previously. Since then, we have added 160 employees, including nine Ph.D.'s among 40 chemists in all, and we are now housed in much larger buildings and in research and production laboratories specially built for our needs. Most of our expansion in the next ten years will probably come in distribution and in production. We are just moving into a much larger warehouse in New Jersey and will probably add warehouses in Washington, D. C. and other parts of the country. We are not likely to go into the large scale production of anything, but will expand our production facilities, rapidly to be able to make up to 25 kilo lots of many more products.

Ten years ago, our Catalog No. 8 was a simple 82-page compilation of our products listed alphabetically and by classes of compounds only; Catalog No. 9 was the first catalog also to offer compounds with empirical formulae, and Catalog No. 11 with structures. Our Catalog No. 19, ten years from now will probably not look so very different from our present catalog, but our Library of Rare Chemicals catalog will probably list some 25,000 compounds rather than only the 5,000 listed in our present library catalog. Ten years ago we offered only out-of-the-way chemicals; today we also offer several thousand common organic chemicals, and long before 1978 we will undoubtedly have a complete line of every common organic chemical.

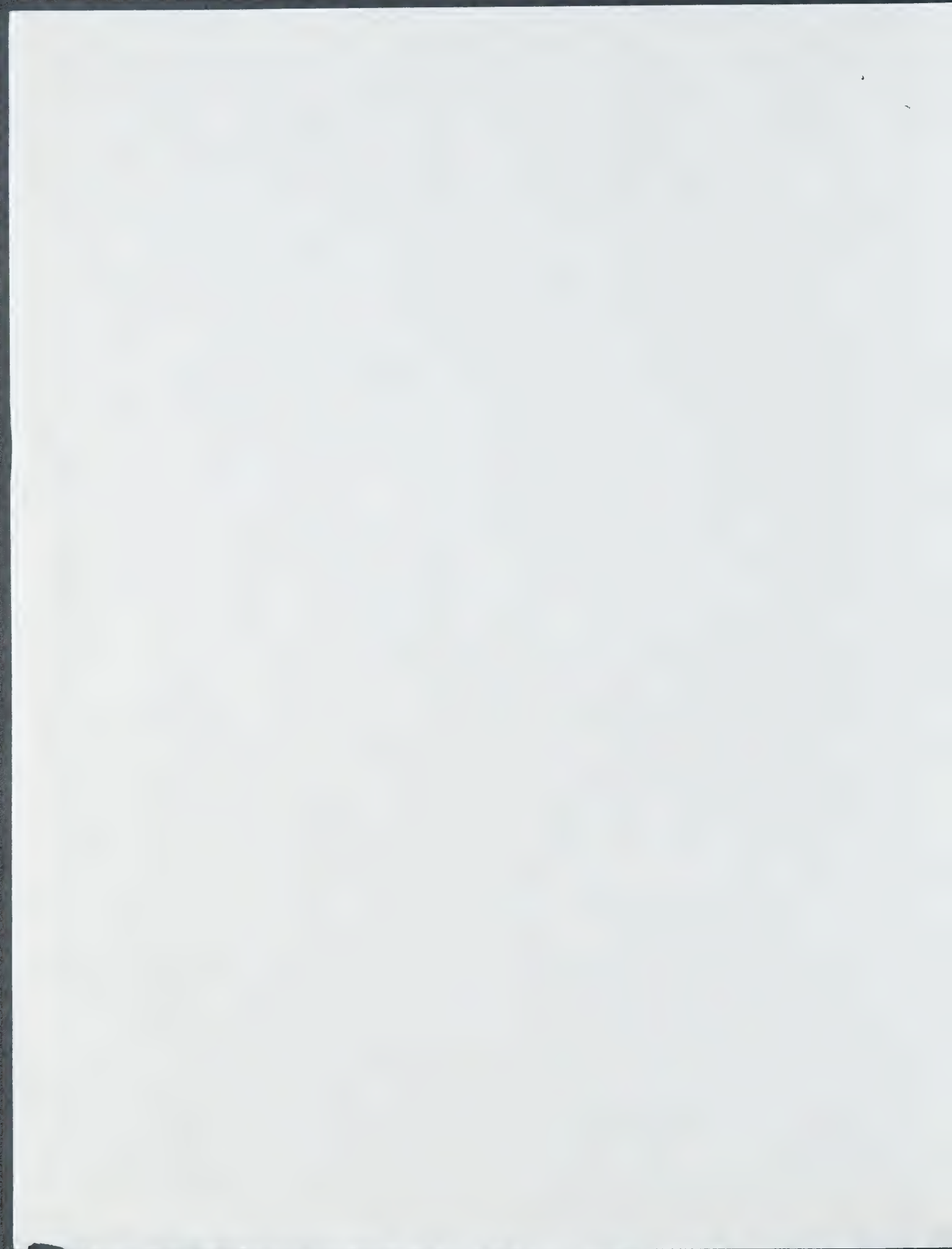
From Aldrich's Acta

1, 17 (1968). I suggest

that we use surely not,

in p 18. I'll provide clean

copy of your photo



The advertisement of Fig. 1, of five years ago, states one of our most important aims: the sale of fine organic chemicals used to support fundamental research. That we have saved chemists throughout the world millions of man hours of labor by supplying chemicals not available elsewhere, is obvious. But Aldrich is today the only major supplier of organic laboratory chemicals whose major—in fact, whose only—business is in organic chemicals, and we have plowed a good share of our earnings back into fundamental re-

search. Five years ago we had made only the modest beginning referred to in the ad. Today we have a Research Department headed by one of the country's foremost medicinal chemists, with some fourteen chemists turning out novel structural classes of chemicals of great significance to both organic and medicinal chemists.

Our dream is coming true.

*An English chemist in your name  
Proceedings of the Chemical Society*

PROCEEDINGS

FEBRUARY 1963

## ... of things to come!



Oil on copper, 5" x 5"

Hofstede de Groot No. 240

### THE SCHOLAR BY CANDLELIGHT

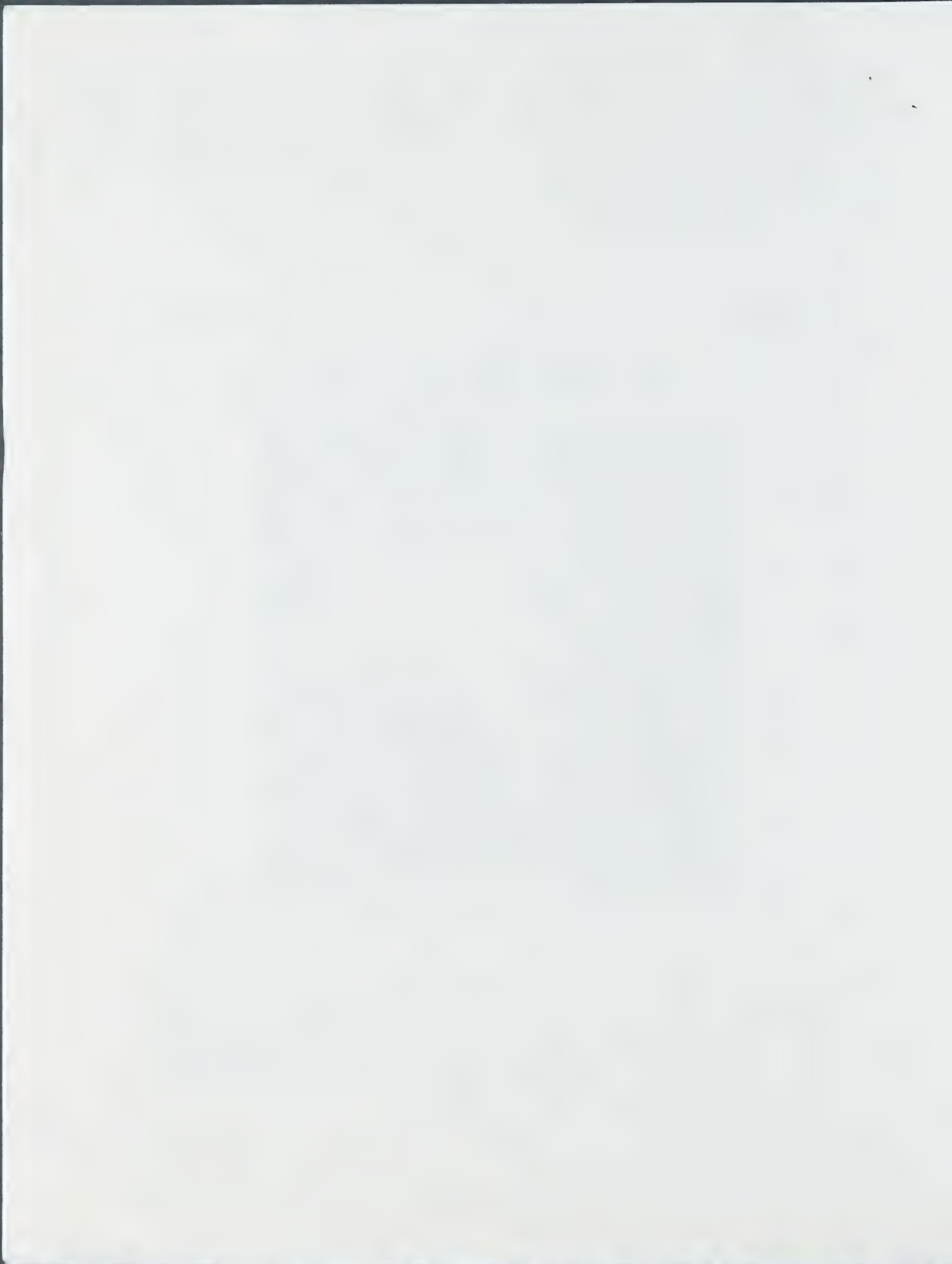
One of our chemists collects Dutch paintings and managed to pick up a small, early Rembrandt in Vienna some years ago.

Discussing this painting with us, he admitted that he would prefer a late Rembrandt portrait, and yet he almost got us to share his enthusiasm for this small piece of copper. Done in Leiden when Rembrandt was in his early twenties, it clearly foreshadows the great things to come: "The Supper at Emmaus," in the Musée Jacquemart André in Paris; and the "Self-portrait

Before the Easel," in Boston, painted only a year or two later.

Perhaps what struck us so forcefully about these comments was their likeness to our own dreams for Aldrich: a modest beginning—a new synthesis of indoles, our work on unsaturated phenols, on o,p'-DDD and cyclohexenones—foreshadowing the things to come: the sale of fine organic chemicals used to support fundamental research.

Figure 1



## For (and from) EXPERIMENTS IN ORGANIC CHEMISTRY

For many years Professor Fieser's "Experiments in Organic Chemistry" has been the book most quoted in the American chemical literature, and so we looked forward to the third edition, just published (D. C. Heath and Company, Boston, 1955). We were not disappointed for there is much of interest: simplified preparations, new methods, inexpensive apparatus, also an excellent photograph of Tio Pooh. Most important to us, there is a list of reagents, always with the pertinent references to their use. We have been making some of these reagents for a long time; others have just been added to our new catalog #7:

Acetaldoxime, for the preparation of aryl methyl ketones and aryl aldehydes.....	25 g.	\$ 6.00
Bromine-dioxan complex, for bromination of sensitive compounds.....	10 g.	4.00
1,2-Dianilinoethane, a reagent for aldehydes.....	25 g.	9.00
N-Methyl-N-nitroso-N'-nitroguanidine.....	100 g.	25.00
and		
p-Tolylsulfonylmethylnitrosamide, our "DiazaId", to generate diazomethane....	100 g.	6.00
Dicyclohexylcarbodiimide, for the preparation of peptides.....	25 g.	10.00
Diethylchlorophosphonate, for the synthesis of peptides.....	25 g.	12.00
Dihydropyran, for the protection of alcohols and phenols.....	100 g.	1.70
Diketene, to form acetoacetates.....	100 g.	10.00
3,4-Dinitrobenzoic acid, for the microdetermination of sugars.....	5 g.	6.00
2,4-Dinitrofluorobenzene, for the characterization of amino acids.....	100 g.	15.00
Diphenyl phosphoroisothiocyanatidate, to identify amino acids in peptides.....	10 g.	8.00
Ethanedithiol, for the preparation of thioketals.....	25 g.	11.00
Iodobenzene dichloride, to prepare cis-dichlorides.....	25 g.	6.00
Iodosobenzene diacetate, for the cleavage of glycols.....	25 g.	8.00
o-Iodosobenzene acid, for the preparation of disulfides.....	10 g.	15.00
p-Nitroso-N,N-dimethylaniline, to prepare ketones from alkyl halides.....	100 g.	6.00
Potassium nitrosodisulfonate (Fremy's salt) oxidizes phenols to <i>ortho</i> quinones....	100 g.	24.00
Propane-1,3-dithiol, for the formation of thioketals.....	25 g.	14.00
Pyrrolidine, for the protection of ketones.....	100 g.	3.00
Semicarbazide hydrochloride, for the characterization of carbonyl compounds....	100 g.	2.50
Tetraethyl pyrophosphate, for the synthesis of peptides.....	10 g.	9.00
Tetranitromethane, for the detection of unsaturation.....	10 g.	4.00
p-Toluenesulfonylhydrazine, to characterize sugars.....	25 g.	4.00
2,4,7-Trinitrofluorenone forms complexes with aromatic hydrocarbons.....	10 g.	7.00
Trityl bromide, to characterize primary alcohols.....	100 g.	10.00

★ ★ ★ ★ ★

Of course, Catalog #7 contains many other organics, and even some inorganics... over 1600, in fact. For instance:

Dicyclopropyl ketone.....	100 g.	\$19.00
2,6-Dihydroxybenzoic acid.....	100 g.	12.00
1,6-Hexanediol.....	500 g.	26.00
Sodium tetraphenylboron		
for the determination of potassium.....	10 g.	4.50

Write for free catalog.



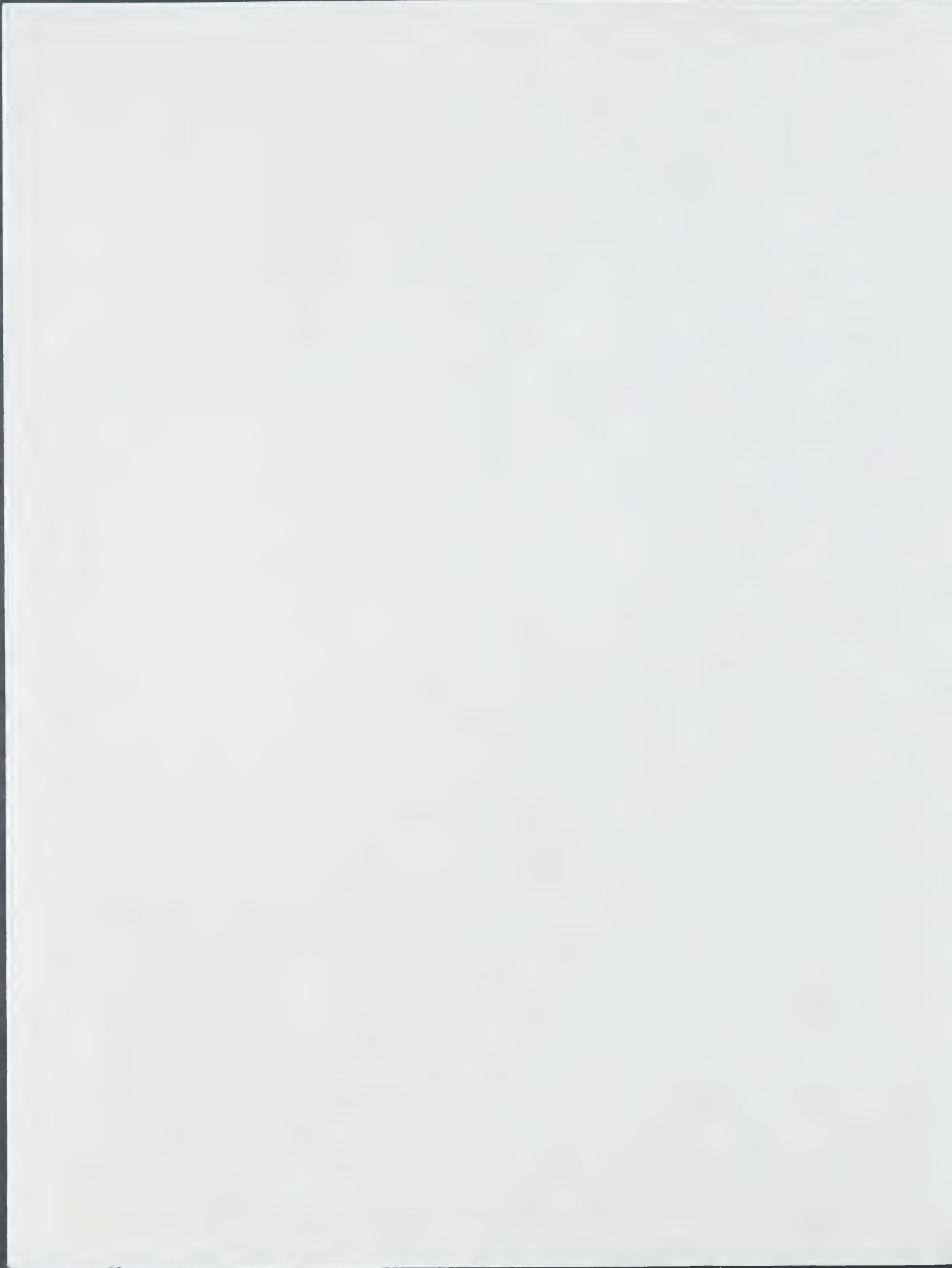
Terms: Net 30; F.O.B. Milwaukee

### ALDRICH CHEMICAL COMPANY

3747 N. Booth Street • Milwaukee 12, Wisconsin

To Ch. 8, p. 124

The ad which urged Mr. Fieser





3,4

# MNNG - CANCER RESEARCH TOOL, MUTAGEN, ANTIMALARIAL

No compound has excited our imagination as much as has N-methyl-N'-nitro-N-nitrosoguanidine (MNNG), the first compound ever offered by Aldrich. At first we sold it only as a precursor for diazomethane (1) for which our "Diazald"® is much less expensive and safer. The first biological activity discovered was the action against leukaemia L1210 in mice (2). Many analogues were evaluated, but MNNG proved to be among the most potent (3). Mutants of *Escherichia coli* S. selected for increasing resistance to MNNG, were also



## VITAMIN C?

On a winter Monday afternoon in 1839, Professor P. J. Robiquet ceremoniously presented the Académie des Sciences in Paris with a sample of sinigrin (potassium myronate), which had just been isolated by Bussy (1) from black mustard seed and thus became one of the early pure organic chemicals from plants. Yet it took 88 years till a reliable procedure (2) was described for the isolation, and 117 years before the correct structure I of sinigrin was proposed and established. (3)

# Sharpless Chemistry

In 1980, Professor Barry Sharpless and Dr. Tsutomu Katsuki introduced the titanium alkoxide/tartrate-catalyzed epoxidation of prochiral allylic alcohols as a versatile and highly enantioselective method for the preparation of homochiral 2,3-epoxy alcohols. The numerous publications which appeared within a few years following this initial report attest to its usefulness for the syntheses of biologically important organic

Application of the Sharpless Asymmetric Epoxidation/RuO<sub>4</sub> oxidation in conjunction with the titanium isopropoxide-induced ring opening of the derived glycidic acids has afforded selectively all four stereoisomers of the unusual N-terminal amino acid of amastatin, a tripeptide competitive inhibitor of aminopepsidases, from readily available achiral materials. OH

## Inspired by Gilbert Stork

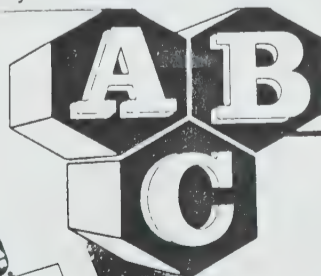
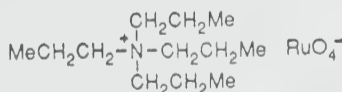
### Selected Synthetic Transformations {1971-1981}

In his long and distinguished career, Professor Gilbert Stork has pioneered some of the most creative synthetic methods to appear in the chemical literature. Aldrich salutes Professor Stork on his 35th anniversary! Below are some highlights of important synthetic methodologies developed by Professor Stork and his group during the last decade.

A recent paper introducing the regiospecific and stereoselective reductive alkylation of enediones (*i.e.*, 7-8) demonstrates several other important Stork synthetic techniques, namely, formation of the kinetic enolate of 4, the  $\alpha$ -silyl vinyl ketone annulation reaction (4+5-6-7), and the isoxazole annulation reaction (7-8-9). Reagent 5 is prepared from vinyltrimethylsilane.

## TPAP: a mild catalytic oxidant

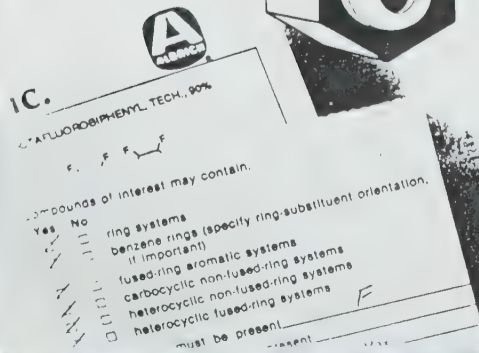
Professor Steven Ley, Dr. Bill Griffith and their colleagues at Imperial College, London, recently developed a novel reagent for the oxidation of alcohols to carbonyl compounds which promises to be a highly useful addition to the synthetic chemist's repertoire.

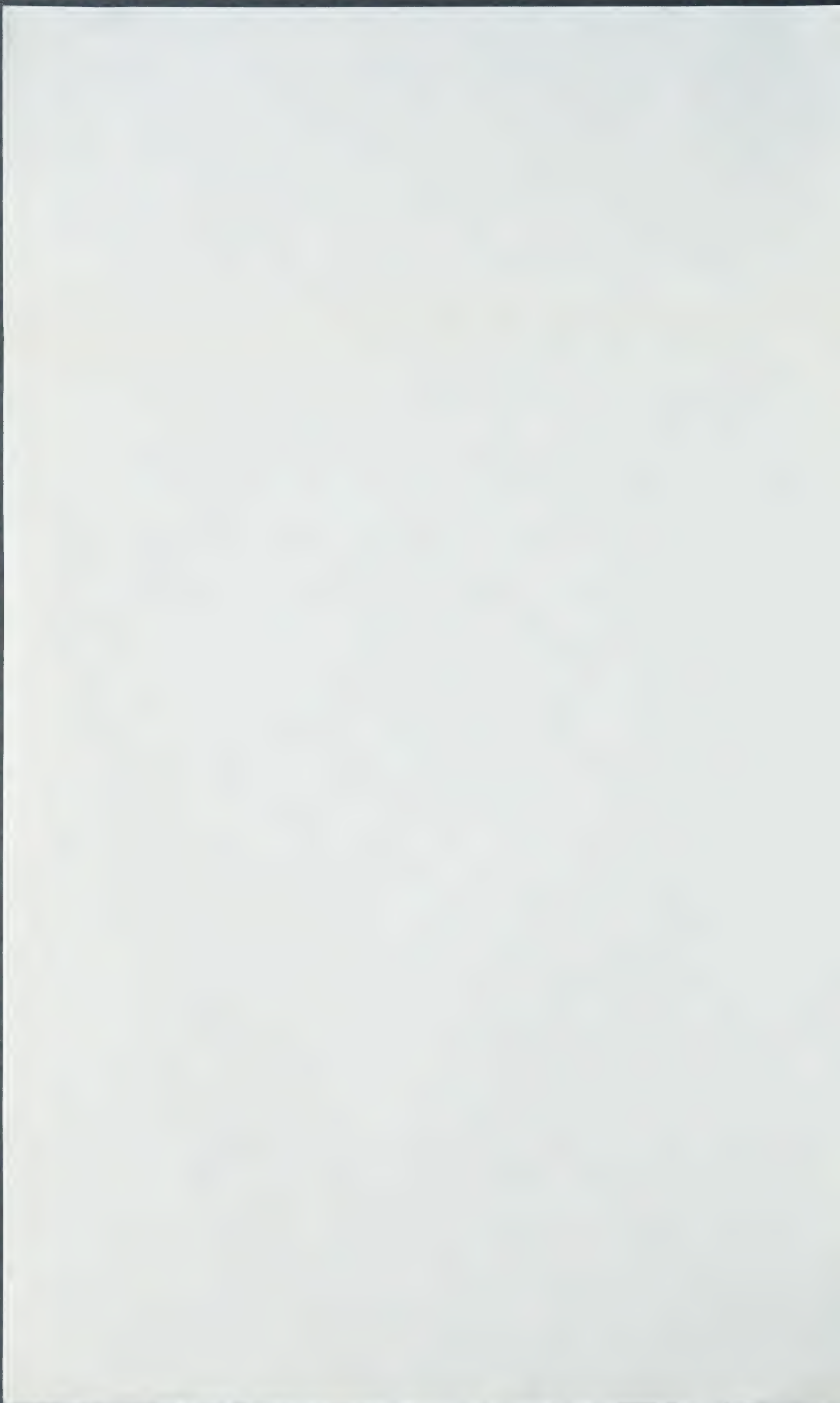


Alfred Bader Library of Rare Chemicals  
for your screening and research needs

What is the first thing that comes to a researcher's mind when he finds a lead?  
If only I had twenty or thirty related compounds, analogs, to test that lead!

Now he can have just that at a nominal cost. The Alfred Bader Library of Rare Chemicals (ABC) contains some 50,000 research samples acquired from all over the world — many from some of the world's ablest chemists — Professors R.B. Woodward, Tadeus Reichstein, Henry Gilman, L.F. Fieser, Melvin Newman, Oskar Jeger, George Wittig, Karl Dimroth, Ralph A. Raphael, to mention just a few.





## A Letter To Chemists

Many of my chemist friends around the world have contacted me to inquire why I am no longer with Sigma-Aldrich. It is difficult to respond to each of you individually and so I have chosen this means of replying.

Some of you know me as the man who founded Aldrich over 40 years ago and built it into your favorite supplier of research chemicals. Many of you know me as the chemist collector who finds paintings for Aldrich's catalog and Aldrichimica Acta covers. Some of you know of the ABC's of my life—art, Bible and chemistry and the Alfred Bader Chemical Collection of research samples from some of the world's greatest chemists. Many of you know me as the chemist who has visited your laboratory with Isabel, his wife, and asked: "What can we do better?"—and surely you know that we meant it. For years we have been an important link between research and Sigma-Aldrich, and many of your suggestions have led to new products for Aldrich and Sigma.

On November 20 of last year, my successor at Sigma-Aldrich as CEO, Dr. Tom Cori, and Dr. David Harvey, the Chief Operating Officer, flew to London specially, to demand that I resign as a director of the Company because, in their words, I had 'bet against the Company.' That 'bet' consisted of a sale of an option on 10,000 shares of Sigma-Aldrich stock. Dr. Cori said that all the directors, except myself and Marvin Klitsner, who was undergoing heart bypass surgery at the time, had held a long telephone discussion about that sale, and had decided that I was no longer fit to work for the Company. I was flabbergasted, refused to resign and attempted to point out how erroneous that interpretation was.

The events leading to this November 20th meeting are simple. In the summer of 1991, I heard about option sales as a conservative way of marketing a limited number of shares at a price somewhat above the current market. I have never personally sold any stock in Sigma-Aldrich but have given a great deal of it away to universities around the world, to the ACS, and to many other institutions.

For some months I had intended to make a gift to my alma mater, Queen's University. With the intention of maximizing the gift, I sold a call option covered by 10,000 shares of my Sigma-Aldrich stock. This option, which sold on August 15 for \$25 per share, gave the buyer the right until mid-January to purchase these shares for \$45 per share. The University's practice—like almost every institution's—was to sell stock immediately on receipt, and the market was then about \$41 per share. So instead, I turned over to Queen's the optioned shares and the option proceeds.

Interestingly, Dr. Cori sold 10,000 shares in August, Dr. Harvey, 7000, and Mr. Gleich, the Company's secretary and treasurer, 5000 shares, all at \$41%. The option which I sold was taken up in January at \$45, making the total proceeds \$47% per share, so that Queen's University received some \$60,000 more than Dr. Cori for the same number of shares. My gift represented less than one third of 1% of my 3,600,000 shares. Dr. Cori's sale of about 10% of his stock was a personal sale. As the only major individual stockholder who has never sold any of his stock, I have been 'betting with the Company'



Alfred Bader

with the biggest part of my assets. To accuse me of 'betting against the Company' is rubbish.

After the November board meeting in St. Louis just eight days before Dr. Cori's meeting with me in London, Dr. Cori and I had agreed that I should continue to work as chairman emeritus, without compensation, doing what I love doing—helping chemists and helping Sigma-Aldrich grow as a world leader in providing research chemicals. At that time, Dr. Cori said forcefully, "Keep working, Alfred; I have known many people who have retired

and were dead six months later." Then in the November 20th meeting in London, he said that a man who had 'bet against the Company' could not continue in any capacity.

Between then and the next board meeting in St. Louis in February, when the new slate of directors was approved for the annual meeting of stockholders in May, I tried to explain to Dr. Cori and the directors that I had not 'bet against the Company.' I gave a short presentation to the nominating committee stating that I would love nothing more than to continue working for the Company, not primarily for my sake but in the best interests of chemists and Sigma-Aldrich. Minutes later, the committee presented to the board a previously prepared resolution in which Marvin Klitsner and I were excluded from the slate of directors. Marvin and I cast the only dissenting votes.

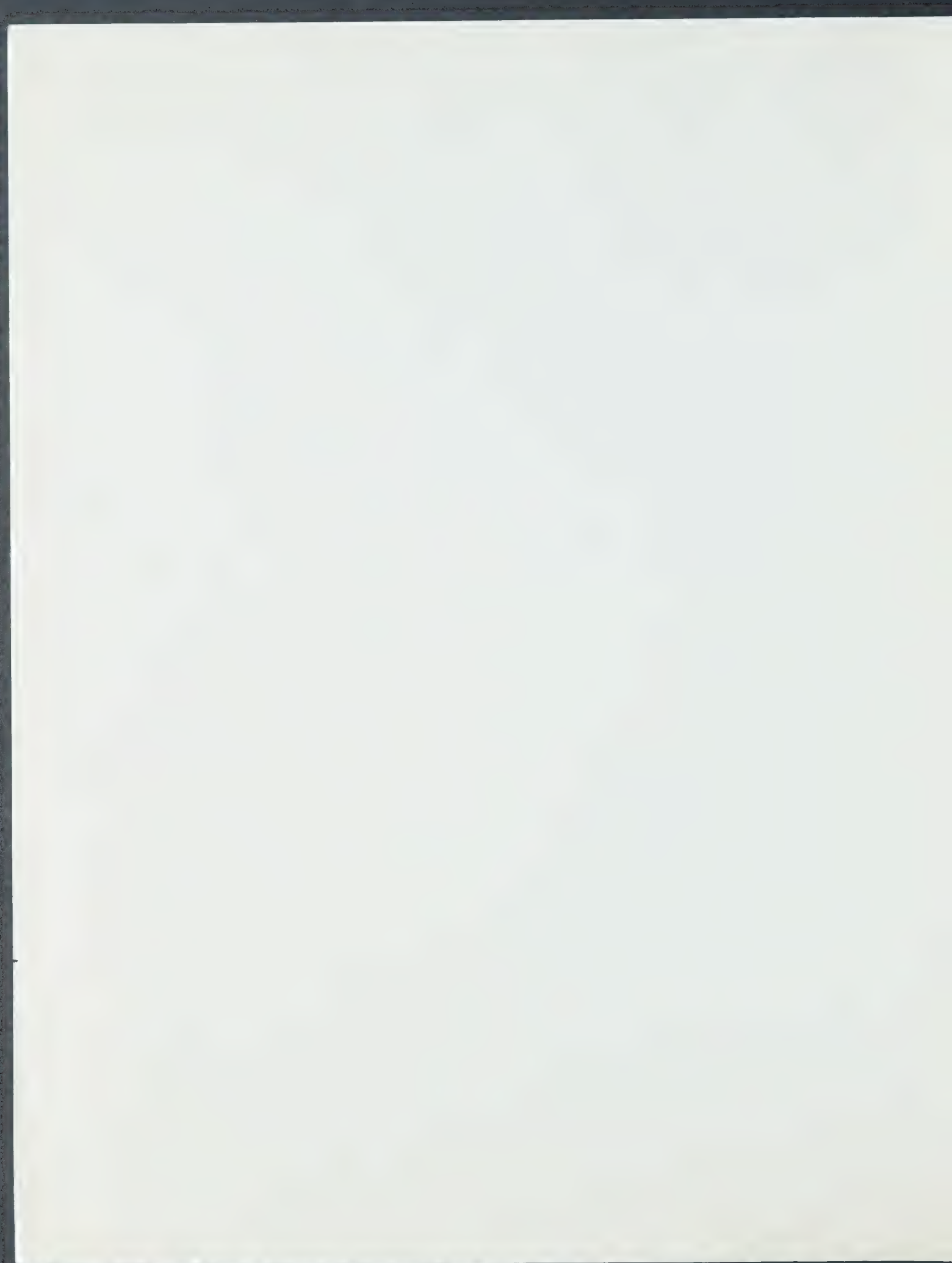
Ever since November 20th, I have wondered why Dr. Cori decided that I must stop working for the Company, even though I had agreed to work without compensation. This is at his discretion. Many of you have heard my lecture "The Challenges at Sigma-Aldrich," which outlines the history and aims of the Company, and know how supportive I have been of our management; so Dr. Cori's decision seems absurd, and I believe we will all be the losers. For many decisions there are *stated* reasons and *real* reasons. The stated reason is that I had 'bet against the Company.' Did he have other reasons? Only he knows and he has not told me.

I will miss my visits with many of you and the excitement in your work which you have shared with me. I would be happy to continue to respond on a personal basis to any calls for help and advice you may care to make; my fax number at home is 414 962 8322.

Above all, Isabel and I want to thank you for the many wonderful experiences we have had with so many of you. Our lives have been so much richer because of you, and we hope that chemistry world wide has been better because of our work.

Sincerely yours,

Alfred Bader  
P.O. Box 93225  
Milwaukee, Wisconsin USA 53203



7th September, 1940.

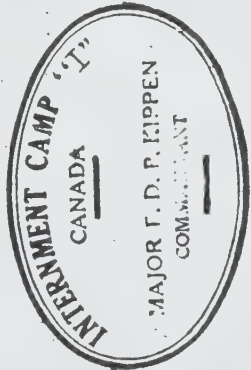
TO... ALFRED BADER.....INTERMENT CAMP "I" SERIAL NO...156.....

Your recent complaint regarding lost articles and baggage has been noted and a full investigation is now being carried out as far as that is possible. As you will understand there are many difficulties in the way and it may take some considerable time to ascertain where and under what conditions such articles were, as you stated, lost or stolen. A great deal of the baggage was handled some 7 to 9 times before it arrived in this Camp and this is one of the great difficulties now being encountered in tracing lost pieces. Alleged thefts of money, watches, e tc. by soldiers who carried out bodily searches is also being investigated. In any case you may rest assured that every effort has and is being made to effect recoveries.

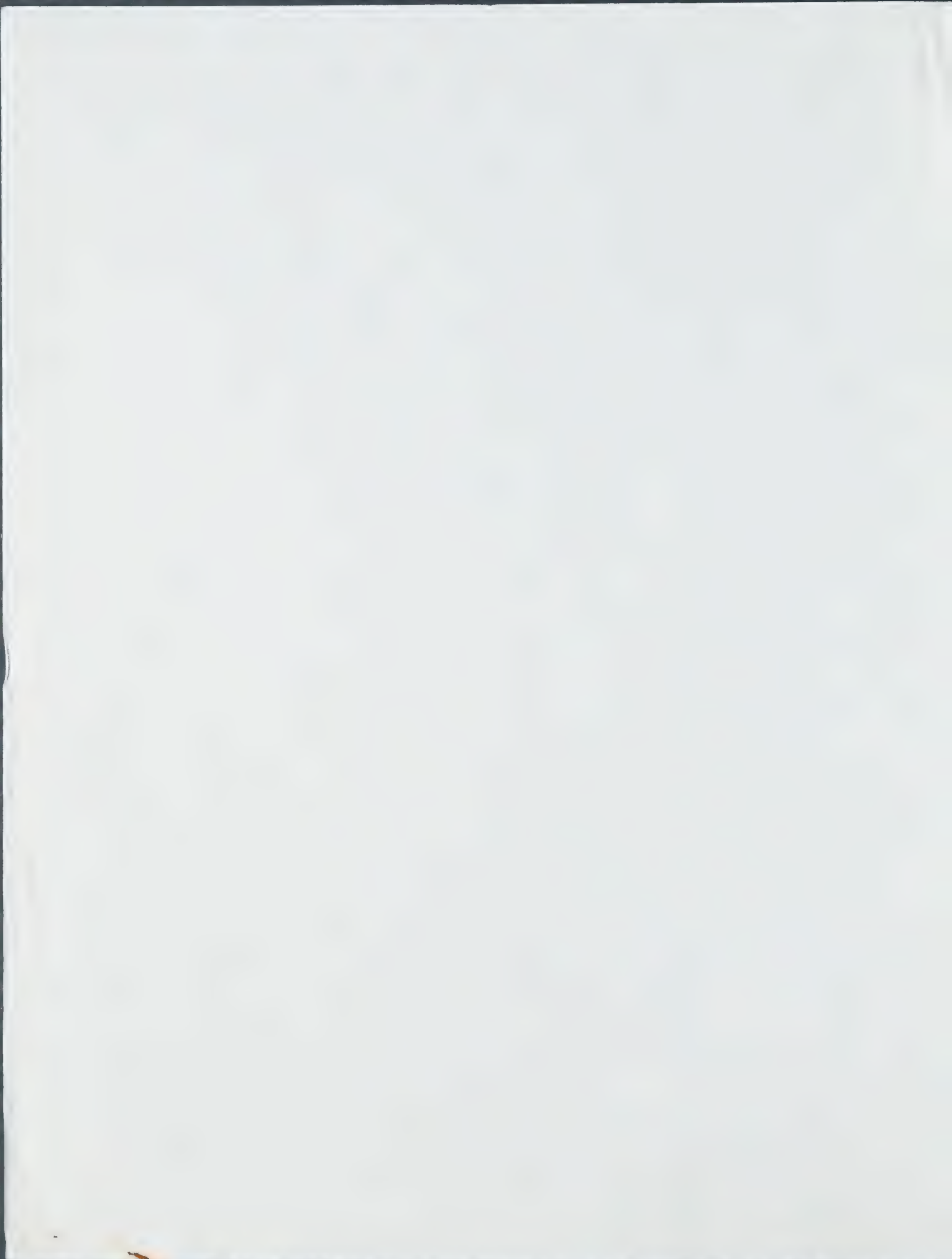
It is pointed out again to all concerned that the Canadian Military Authorities do not accept any responsibility whatever for any losses or damage sustained to your belongings or baggage.

*Handwritten signature*

The Commandant,  
Interment Camp "I"



To Ch. 2, 9, 20



3/9/92  
M.T. → T.T.

## Dear Shareholder:

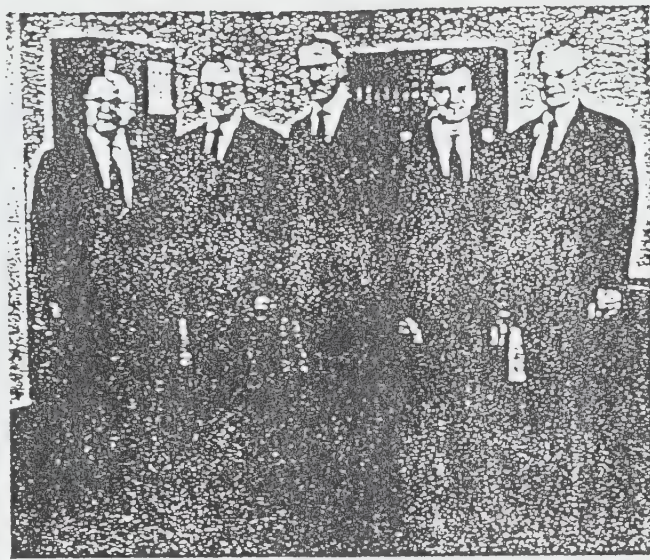
I am pleased to report that 1991 was another good year for Sigma-Aldrich. Our sales increased 11.4% to \$589.4 million and net income rose by 12.1% to \$79.8 million. Net income per share was \$1.60, a gain of 11.1% over the \$1.44 for 1990.

In 1991, the quarterly dividend rate was increased, effective with the January 2, 1992 payment, from 5 1/2 cents per share per quarter to 6 1/4 cents per share per quarter — a 14% increase. This is the sixteenth consecutive year of dividend increases.

Chemical sales increased 13.2% in 1991 through the continued introduction of new products as well as greater penetration of existing markets and expansion into several new foreign markets. The first full year of operations for our SAF Bulk Chemicals unit brought higher growth in bulk sales. In the second half of the year the growth rate in chemical sales was reduced by a stronger dollar compared to a year ago. Metal product sales increased only slightly from 1990 because of lower construction demand. Overall metal sales were aided by the full-year results of Kin-Line, Inc., which was acquired in August 1990, and by the acquisition of Saunders Communications in September 1991.

Profit margins improved slightly as a result of additional emphasis on productivity. By closely watching employment levels, sales per employee increased. The productivity improvement from our employees offset other cost increases related to expanding international operations and new facilities. Staff additions were made selectively in those areas with the greatest opportunity for future growth.

Capital expenditures in 1991 of \$26 million were mainly for expansion within existing facilities. These expenditures, while less than prior year amounts, will help assure continued growth and future productivity gains and enable us to remain in compliance with numerous safety, health and environmental requirements. A major land acquisition



Sigma-Aldrich Officers  
Tom Cori, Pete Gleich, Kirk Richter, Tom Tallarico, David Harvey

was also completed for a future plant site in Greenville, Illinois.

Offering a broad range of high quality products and providing the highest level of service to customers continues to be our approach to achieve continued growth. During 1991 we added 5,000 new products to better serve customers in 1992 and beyond. With many of our products used in the healthcare, medical research and environmental fields, we do not expect the current weak economic conditions to affect our business as much as they

have with so many others. With the resources, organization and determination of our employees, we remain optimistic about our future.

A review of Alfred Bader's many achievements during his 41 years with Aldrich Chemical and Sigma-Aldrich follows this letter. Dr. Bader, named Chairman Emeritus in 1991, and Marvin Klitsner will not stand for reelection to the Board of Directors in 1992. We have gained from their many years of dedicated service and are grateful for the important contributions they have made.

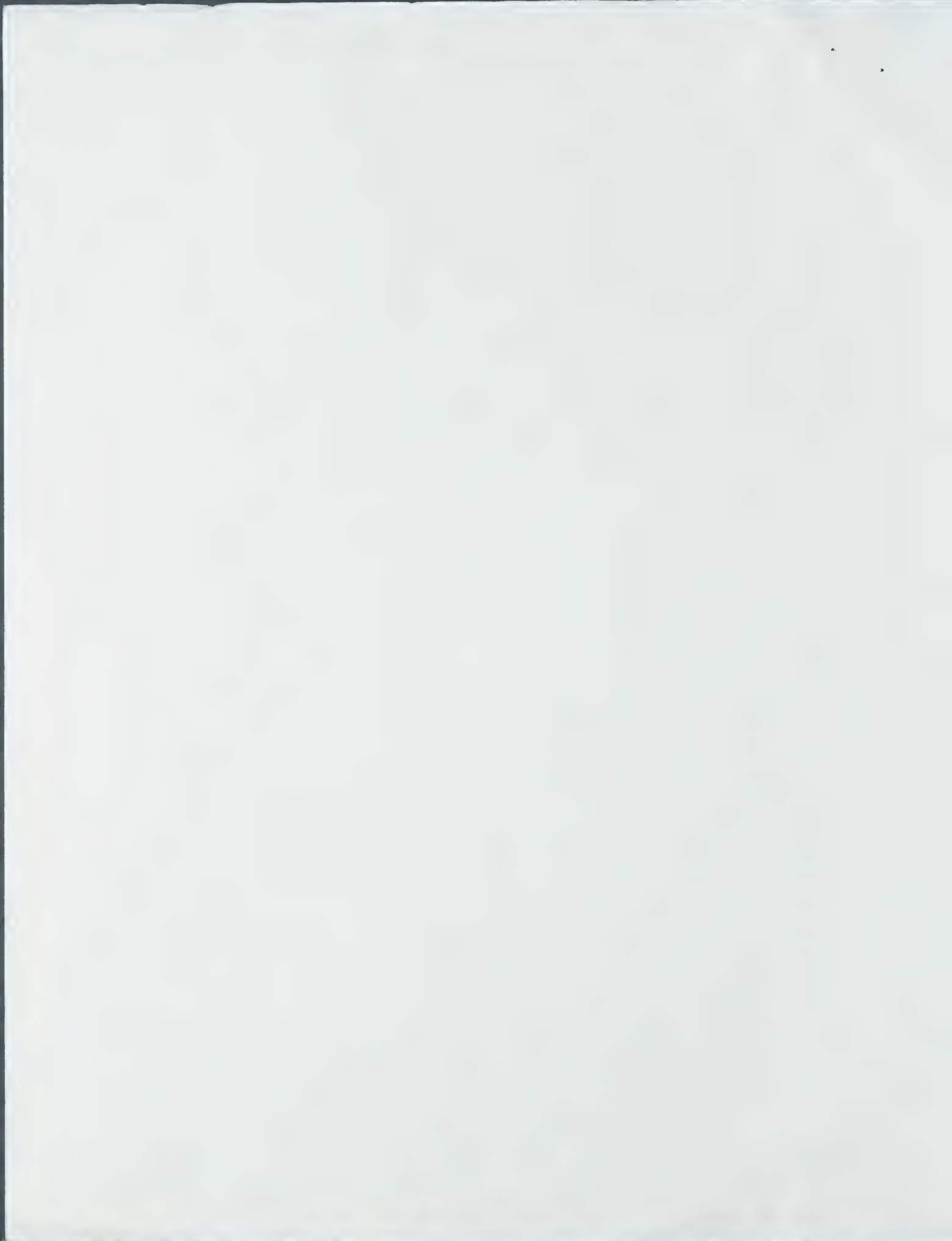
We are frequently asked how Sigma-Aldrich will maintain the record of growth and financial performance. Our response is that there is no magic formula, just hard work. We succeed through an uncompromising commitment to customers' needs and by paying attention to many small things that are important to earn a customer's loyalty.

With continuing commitment and outstanding performance by our employees and the support of our customers, we are confident about the future. On behalf of the Board, management and employees, I thank you for your continued support.

Tom Cori

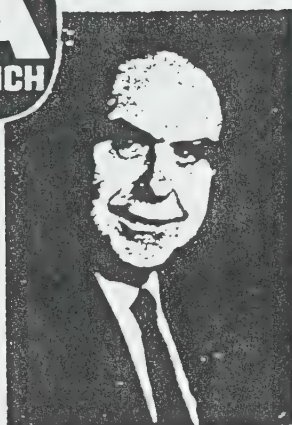
TOM CORI  
Chairman, President and Chief Executive Officer







## Alfred Bader



Dr. Alfred Bader has had a long and very distinguished career.

Since founding Aldrich Chemical Company 41 years ago, Dr. Bader has been instrumental in building Aldrich into one of the world's foremost suppliers of high quality, fine organic and inorganic chemicals.

A native of Austria, Dr. Bader went to England and eventually to Canada,

where he received several degrees from Queen's University in Ontario. Later he also earned a PhD. degree from Harvard University in Cambridge, Massachusetts.

While working in Milwaukee, he received permission from his employer to start a small business on his own, which he did in 1951 in a rented garage. When, in 1954, his employer decided to move its Milwaukee operations to Pennsylvania, Dr. Bader opted to remain in the city he had grown to love and formed Aldrich Chemical Company. It grew and prospered under his able leadership and guidance.

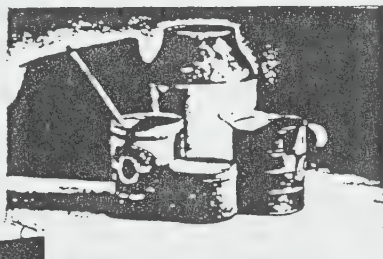
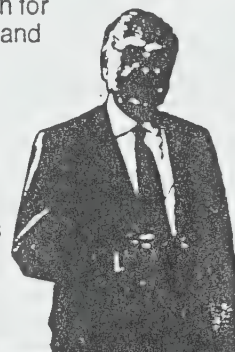
The early success and growth of Aldrich was due to his enthusiasm and creativity which attracted other able chemists and to his stamina and drive which were widely admired by his co-workers.

In 1975, he and Dan Broida, then the President of Sigma Chemical Company in St. Louis, led the effort which resulted in a merger of Sigma and Aldrich that year to become today's Sigma-Aldrich Corporation. Dr. Bader served as President of the new Sigma-Aldrich Corporation, with Dan Broida as Chairman. In 1980, Broida stepped aside and Dr. Bader became Chairman, a position in which he served with honor and distinction until his recent retirement.

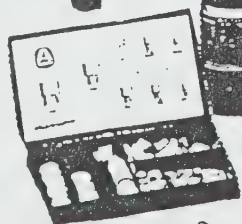
Throughout his career, Dr. Bader has traveled extensively meeting customers and suppliers, giving lectures and becoming well known among leading chemists throughout the world. He has been the driving force in accumulating a collection of 39,000 rare chemicals which Aldrich makes available to the research community. Over the years, he has also personally helped many deserving chemists at universities with grants to underwrite their research.

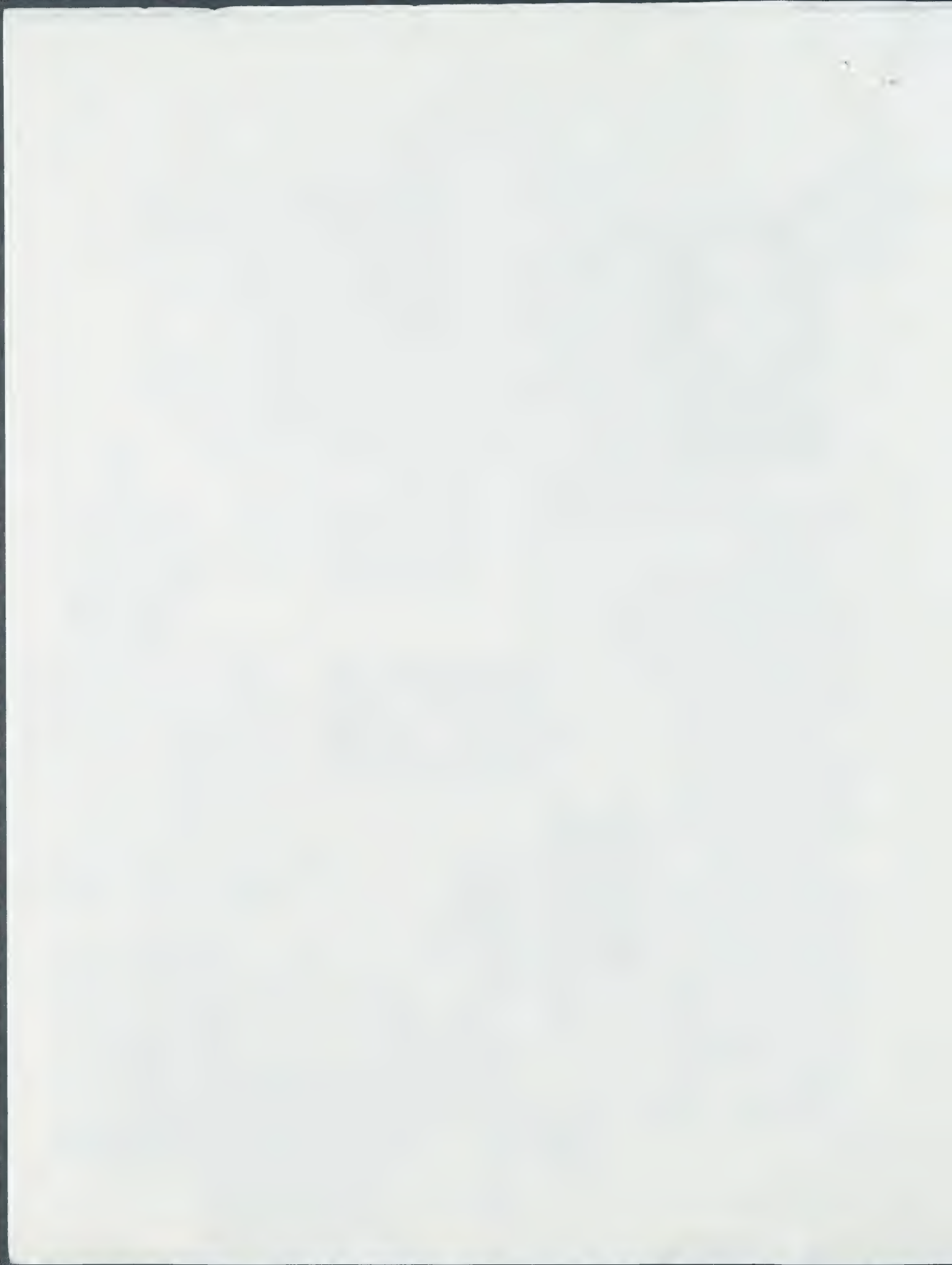
Dr. Bader also has won renown as an art historian and a student of the Bible. His collection of the works of seventeenth century Dutch Masters is considered one of the finest private art collections in the world. He was named a fellow of the Royal Society of Arts in London for his achievements as an art collector and historian and for his research in art restoration.

Sigma-Aldrich has benefited significantly through the years from the influence and guidance provided by Dr. Bader. The entire Sigma-Aldrich organization is deeply grateful for his valuable contributions.



Please  
Bother  
Us.





*Carlos Seoane Prado*

DOCTOR EN CIENCIAS QUIMICAS

CATEDRATICO DE UNIVERSIDAD

Fax: -34-1-5433879

*Auda. de El Ferrol, 2 - 9.º 1*

*Telefono*

*28029 Madrid*

Dr. Alfred Bader  
2961 N Shepard Avenue  
Milwaukee  
53211-Wisconsin  
U.S.A.  
FAX: 07-1-414-962-8322

8.4.92

Dear Alfred:

Not very often in a lifetime does one receive such a deeply engaging letter. A Letter to Chemists that a chemist, husband and father feels compelled to read, disturbed, to his family at the dinner table as a teaching of life.

A sad event, very true. But not a sad life.

Not many people can show such a full, fruitful and rich life.

Not many people can start with nothing, less than nothing, at fourteen and build Aldrich.

Not many people can have and deserve thousands of friends around the world, a whole profession indebted to him for his help of decades, to whom send a letter knowing it will be understood.

Not many people has created a new concept in his field and is unique in his approach to something.

Not many people can show excellence in chemistry, business, art and life.

Not many people, deprived from C, can still have A and B as a happy and essential part of an exemplary life. (And let's wait until September to see whether C is there).

Not many people has the privilege of pursuing and enjoying a passion no one on earth can spoil. Not many people can loose so much and keep still more.

Not many people has helped two generations in a family and made such a lasting impression in both of them.

And, certainly, not many people has a gift named Isabel.

A man like that does not have the right to complain. He must be grateful for a life very few people can have. He has the duty to be happy, the duty to Chemistry, to Bible, to Art, to his friends, to his family, and to himself.

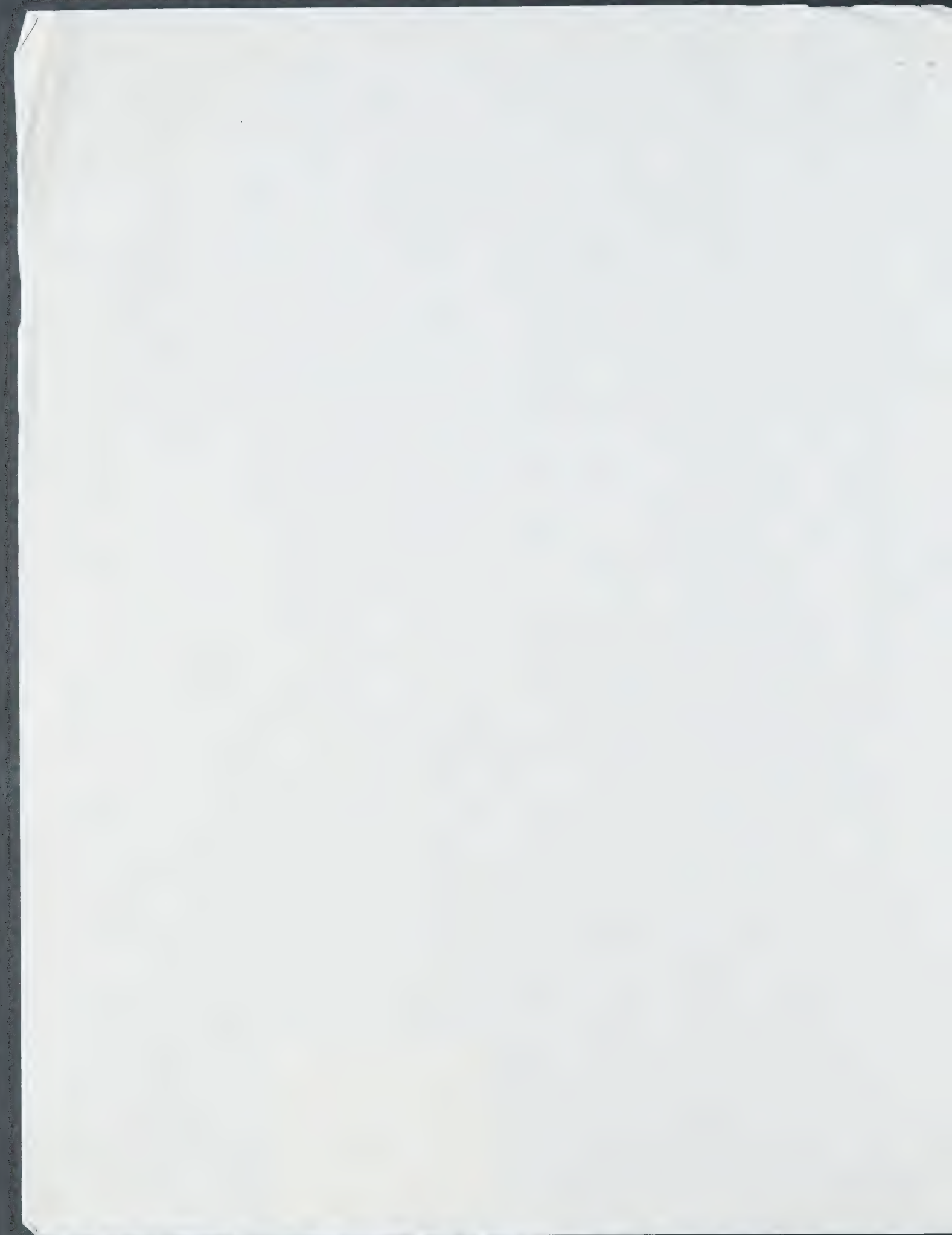
For us, chemists of the world, as always and forever, a bit of Alfred's soul will pop out every time we open an Aldrich bottle.

From now on, it is your turn: Please, bother us.

Un abrazo muy fuerte.

*Carlos*

*For p. 164  
Dict. chemist  
Please*



289 3616

MEMORANDUM

*Alfred,  
I suggest you not  
request permission -  
Mark*

TO: Marvin E. Klitsner  
FROM: Ralph H. Lane *RHL*  
DATE: August 23, 1994  
RE: Alfred Bader

*JS: See pp. 2-3-4*

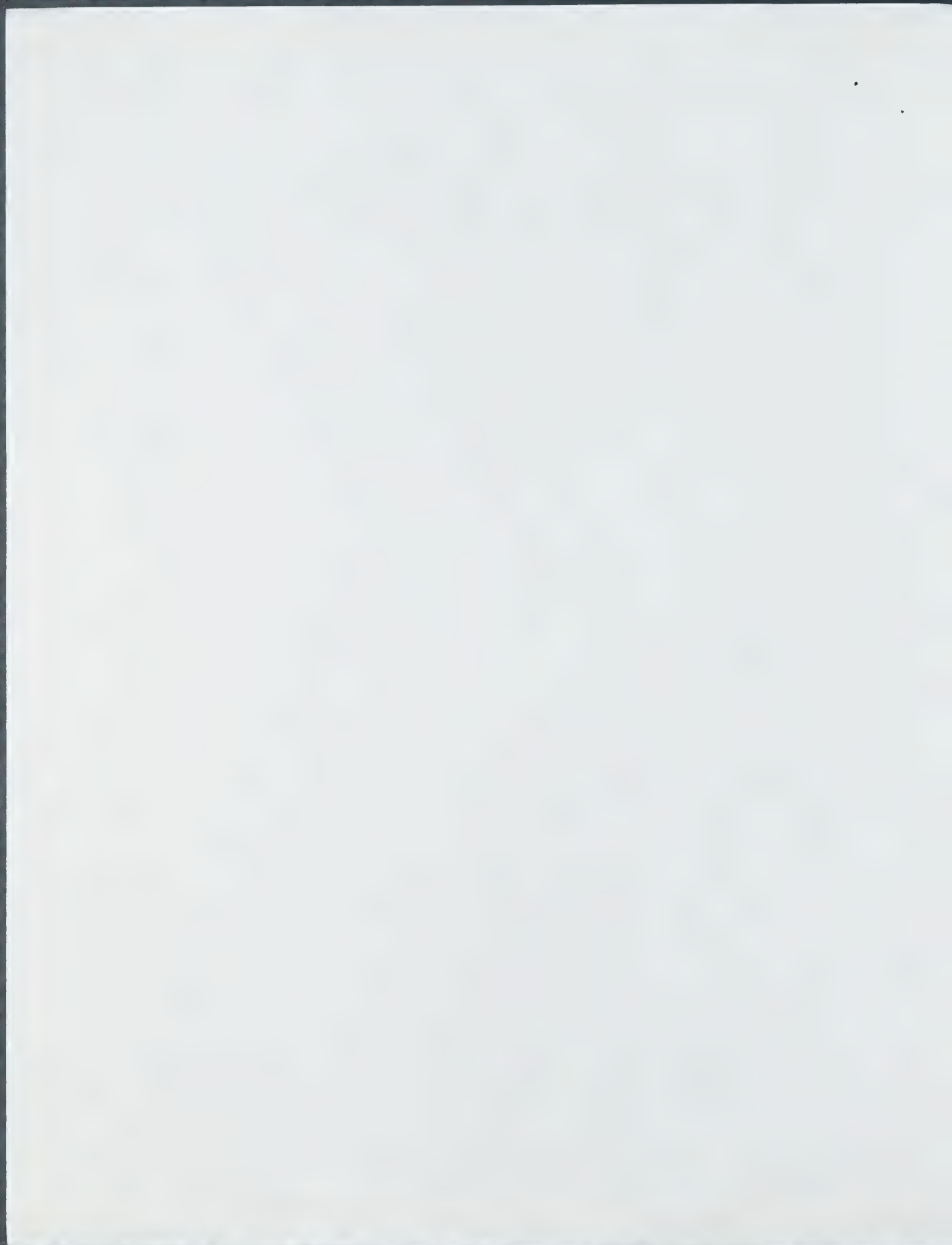
This will respond to your questions on the right of the former CEO of Aldrich Chemical Company to publish, without the company's permission, articles which he wrote for company publications and which were in fact published by the company. You have also posed questions on reproduction and distribution of artwork -- old masters -- which have appeared on the covers of company publications.

Approaching these questions from the standpoint of copyright law, it is important to note that the copyright law changed significantly in many of its provisions as of January 1, 1978. By either version of the law, however, the first question would be whether your client wrote the articles as a part of his duties to the corporation or as an independent endeavor. Some of the tests used to determine the answer are whether they were written on one's own time, in one's own home, and with one's own equipment, rather than during work time, in the office, and with the company's facilities. For example, did his secretary type the manuscripts?

Even if these articles were written for the company and would be considered "works made for hire", there is still the question whether the company obtained copyright and then the further question whether the company maintained its copyright. Here, the date of the first publication will be significant, because of the change in the law.

Before January 1, 1978, obtaining copyright was rather mechanical, and it was very easy to forego copyright by making a simple mistake. To obtain copyright under the old law, the work would have to be "published with notice", that is, distributed to the public with a proper copyright notice ("Copyright" or "Copr." or "©", followed by the year of publication and the name of the copyright holder). Moreover, the copyright notice would have to be placed at the statutorily prescribed place, which would be on the title page of the work or on the back side of the title page.

After January 1, 1978, copyright was deemed to exist as soon as the author would lift the pen from the paper; that is, as soon as the work had been created. However, a copyright notice was still required on any publication of the work, to avoid loss of the copyright, with a "saving" provision that would allow correction of



an omission of the notice from a relatively small number of copies to be made within five years after the publication without notice. This requirement for notice under the new Act was relaxed as of March 1, 1989, and since that date, no notice has been required at all -- although its use provides some advantages which are otherwise lost.

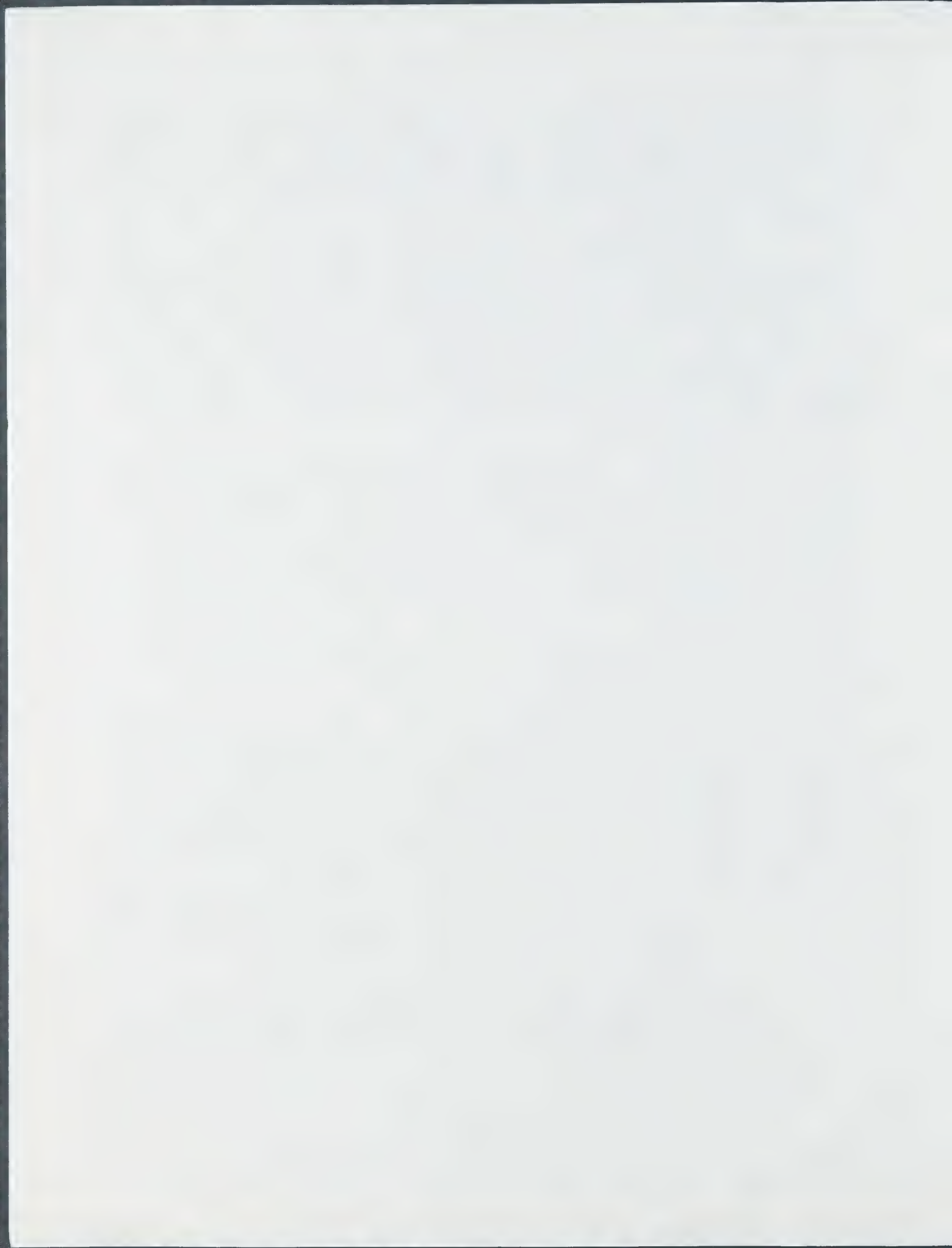
With you, I have inspected a few of the materials that the client wishes to reproduce. We found several facts which are relevant to these rules. In particular, the company's catalogs sometimes carry the copyright notice, and sometimes they do not. From this fact, it can be concluded that the safest course would be to choose for republication those articles which were published prior to January 1, 1978 in publications which bore no copyright notice or which were published before 1984 without a copyright notice (that is, five years before the 1989 abolition of the copyright notice requirement).

To publish any other articles would run the risk of a claim by the company that the works were "works made for hire" and that any new publication would violate the copyright of the company. As you know, the copyright is really a bundle of rights: to make copies, to distribute the copies, to make a derivative work, to display the work publicly, and (for appropriate media) to perform the work publicly. If your client would edit the work, have his edition printed, and distribute the edition publicly, he might thereby have violated three of the rights of the copyright.

Of course, it is often possible for the individual writer to obtain permission from the copyright holder, but uncooperative copyright holders cannot be forced to extend this courtesy.

Even if the company were deemed to be the copyright owner, and if permission to reprint were not requested or were denied, there would still be an opportunity to publish portions of these under the doctrine of "fair use". This doctrine, developed under the common law, has been codified under Section 107 of the Copyright Act of 1976 (the version which went into effect on January 1, 1978). That section requires that, in determining whether the use made of a work in any particular case is a fair use, the factors to be considered shall include:

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and





*Additional Acta ip peru free*

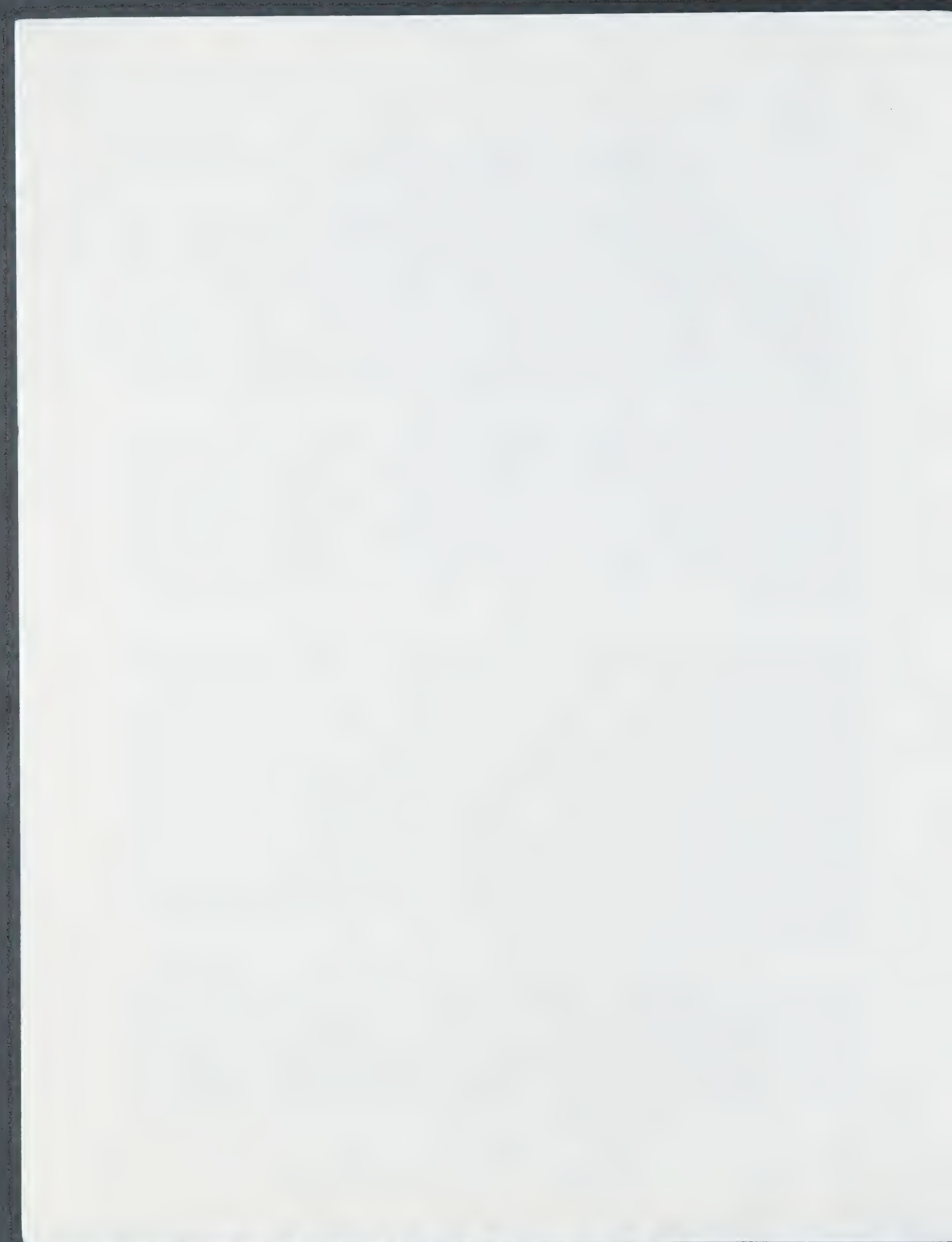
4. the effect of the use upon the potential market for or value of the copyrighted work.

Applying these tests, which essentially all boil down to the single test of depriving the copyright holder of his market for selling his own copies, it would seem that your client would claim "fair use" as a defense to his publication (or republication) of copyrighted works, in view of their educational character in his publication, their educational character in the original publication, and the fact that he would not be depriving the copyright owner of a market for reprints. The argument would become even better for your client if he would severely limit the amount of the article he would reprint, so it would not comprise a substantial portion of the copyrighted work.

The "old master" paintings on the covers of the catalogs present an entirely different issue, and an easy one to resolve. If the old master paintings were in any way altered or combined with other materials, the resulting new work would be considered a "derivative work" and would be subject to a new term of copyright protection. However, inspection of the covers of the catalogs of the company indicates that the master paintings regularly occupied the entire surface of the cover. In my view, these were not derivative works and did not enjoy any separate copyright protection.

Is there any other protection which would be available to the covers, in the absence of copyright protection? A theory could be made out that the chemical profession has become accustomed to identifying publications bearing "old master" paintings on the covers as being the publications of the company. By this theory, the presence of an old master work on the cover of a catalog would tend to function as a trademark, indicating its source of origin or, at any rate, distinguishing such catalogs from the catalogs of other companies. No registration would be required to have such trademark rights recognized. However, in my view, it would be difficult for the company to succeed with such an argument, if it were to make it. If a particular painting were used on all of the covers, issue after issue, it would be another matter. However, each cover bore a different artwork, as I understand, and so the company would have to argue for a trademark in a style, rather than in a particular image. In my view, that would be a difficult argument, under the trademark law.

As a refinement to that argument, the company might suggest that the use by another person of its cover style would constitute unfair competition. That law is summarized in the Trademark Act, Section 43(a), which really has nothing to do with trademarks necessarily and serves as a codification of the federal unfair competition law. That section says, in essence, that the use of any word, term, name, symbol, or device that is likely to cause confusion or mistake or deception as to the affiliation,



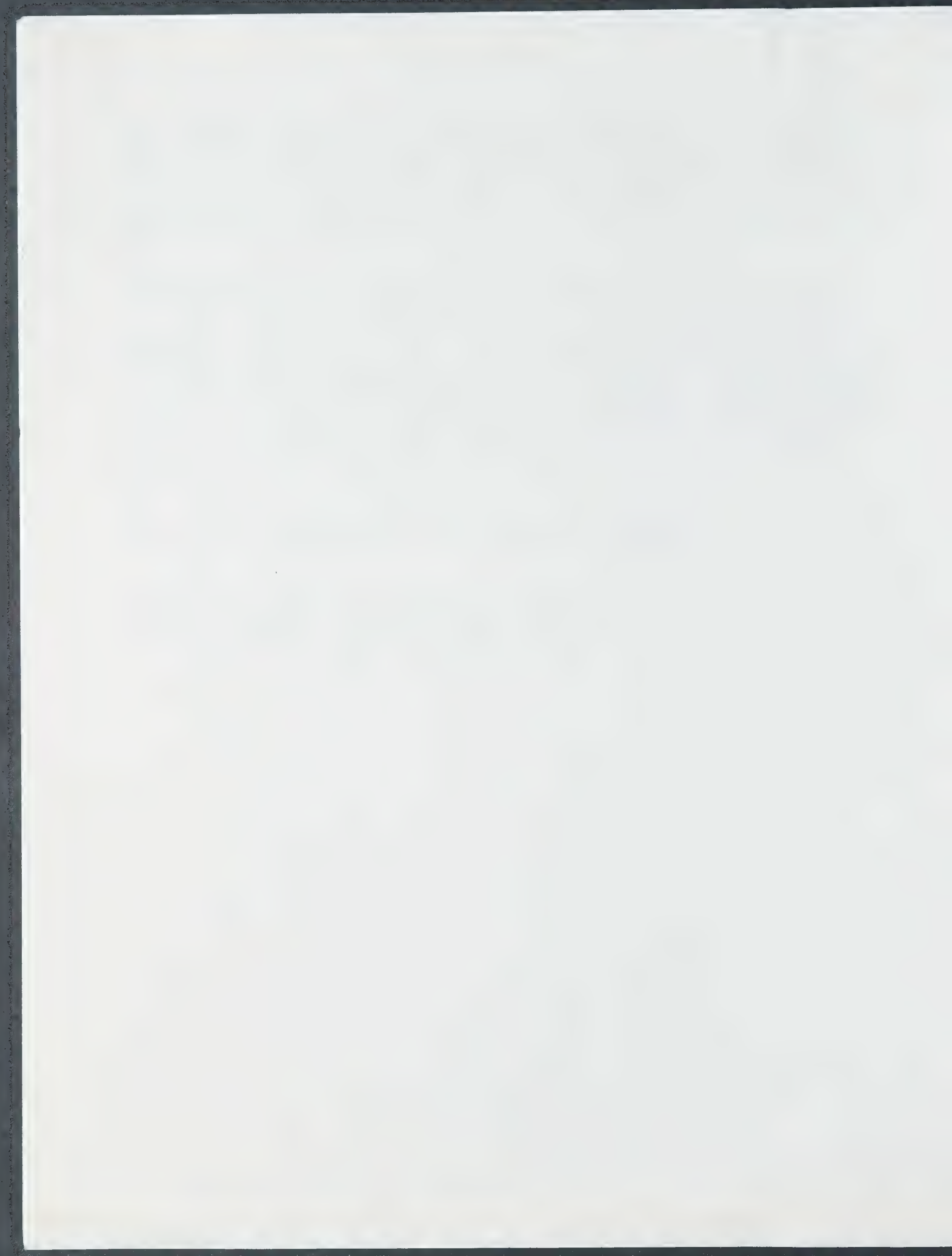
connection, or association of the goods is actionable. Under that standard, the question would be whether the members of the chemical profession, upon seeing the republication, would conclude wrongly, from the appearance of the familiar style of "old master" paintings, that the client's publication came from the company or was otherwise sponsored or approved by the company or affiliated with it.

As I understand, the client's use of the covers would be in the context of an autobiography which is clearly his own and which would clarify the circumstances of his publishing it now. In view of the sophistication of the readers and the close attention which they could be expected to pay, even to details in a written text, I should think it would be highly unlikely that a significant portion of his intended readers would be likely to be misled in this regard. Therefore, I do not think that a finding of unfair competition would be likely to arise, merely from the republication of the old master paintings in the context of an autobiography.

From these observations, I draw these conclusions:

- Republishing the "old master" paintings as illustrations in the autobiography would be acceptable.
- Publishing small excerpts of the articles, or the entire articles in the case of those which were published before March 1, 1984, without copyright notices, would be the safest course.

*Covers  
is OK*



# Reviews

## Adventures of a chemist collector

A. Bader

London: Weidenfeld & Nicolson, 1995

Pp 288 £14.99 (Hb) ISBN 0 297 83461 4

This is the autobiography of a remarkable man. Alfred Bader is one of the world's richest chemists, and founder of Sigma-Aldrich, the leading supplier of research chemicals. He is also a major player in the art world, and has built up a famous collection of old masters. Bader has led a life full of drama, and *Adventures of a chemist collector* tells tales of tender love and tough negotiations, of contacts who befriend, and colleagues who betray. Put them all together and you have one of the most fascinating books I have ever read.

Bader was born in Vienna in 1924, the son of a Jewish father and a Catholic mother. His father was murdered soon after Alfred was born, and his mother was disowned by her family because of her runaway marriage. Unable to support her children, she agreed that Alfred should be raised by his aunt. Despite all this, Bader had a happy childhood, but his world fell apart when the Nazis took over Austria in 1938.

Bader was lucky in that he was able to leave his homeland in December that year, as one of 10 000 Jewish children who were allowed to come and live in the UK. He continued his education at the East Hove Senior School for Boys, followed by Brighton Technical College.

After the defeat of the allied armies in France in 1940, the UK government, fearful of spies and saboteurs, rounded up all refugees from Nazi-occupied Europe. Bader was deported to Canada, but there he continued his studies, struggled to get to university, and eventually was accepted by Queens. He has never forgotten the kindness he found there, and he has since lavished on it gifts of paintings, massive donations and a castle – Herstronceaux in Sussex – which is now its European campus.

Bader did his PhD with the great Louis Fieser at Harvard, and then went to work in Milwaukee, for the paint division of the

Pittsburgh Plate Glass Company. There he became frustrated by the take-it-or-leave-it attitude of the major chemical supplier, Eastman Kodak, and so with a friend, Jack Eisendrath, they started their own company, Aldrich, and ran it from a rented garage. It soon gained a reputation for speedy and reliable service, and grew to become the billion dollar business empire we know today.

If would-be millionaires with chemistry degrees would like to know how it's done, here is the recipe for success: find your niche and follow Bader, paying special attention to customer relations. Bader

himself became Aldrich's greatest advert and asset, touring the world asking chemists at the bench what they wanted, seeing that they got it, and sometimes buying what they themselves had made. I must confess that I found some of the details of business negotiations in this book rather hard going, but then comes a riveting chapter. In it we learn how, on 20 November 1991, disaster struck while Bader was at the Russell Hotel, London, and his life's work was wrested from him.

In a curious way, *Adventures of a chemist collector* resembles a book of an Old Testament prophet, with its tales of greed and deception, love and loyalty. In this latter category was his love affair with his present wife, Isabel, which began as a shipboard romance and progressed through unexpected coincidences, heartbreaking letters, and even a prophetic dream.

There is also Bader's claim that Josef Loschmidt was the first to work out the structure of benzene, rather than Kekulé. This brought Bader the sting of academic venom when he wrote about it in *Chemistry in*



The entombment by Rubens; Bader bought it at Christie's, and then sold it at a profit to the Getty Museum

*Britain*. He entertains us with extracts from a reader's letter to the editor, which naturally could not be published.

Another of Bader's tales is the embarrassing one of what can happen when you try to give money away to help students. What appears so easy turns out to be rather difficult when you do it for the chemistry department of Sheffield University. Readers there would be well advised to skip chapter 22!

Much of the book is devoted to Bader's other life as an art collector. In recent years he has bought and sold individual paintings worth millions of dollars, but it is his joy at finding hidden masterpieces that he recounts in most detail.

Few people write their autobiography so well and with such candour as Bader. He includes details that a normal writer would judiciously avoid, but when you are a multi-millionaire, you can afford a few small luxuries, like telling the whole truth. This is what really makes the *Adventures of a chemist collector* such compelling reading.

J. EMSLEY

## Stereochemistry of organic compounds

E. L. Eliel and S. H. Wilen

Chichester: Wiley, 1994

Pp 1267 £29.95 (SB) ISBN 0 471 05446 1

Generations of organic chemists grew up with Ernest Eliel's *Stereochemistry of carbon compounds*, published in 1962. Eliel's new work on stereochemistry, co-authored by Samuel Wilen with a chapter on *Stereoselective synthesis* by Lew Mander, surpasses even the first book in its scholarship and depth of coverage. This is a book that can be opened and read profitably anywhere, and continuously rewards close study. The quality of the writing and the clarity of explanations and illustrations are exemplary.

Witness the description of the determination of specific rotation, or the story of the

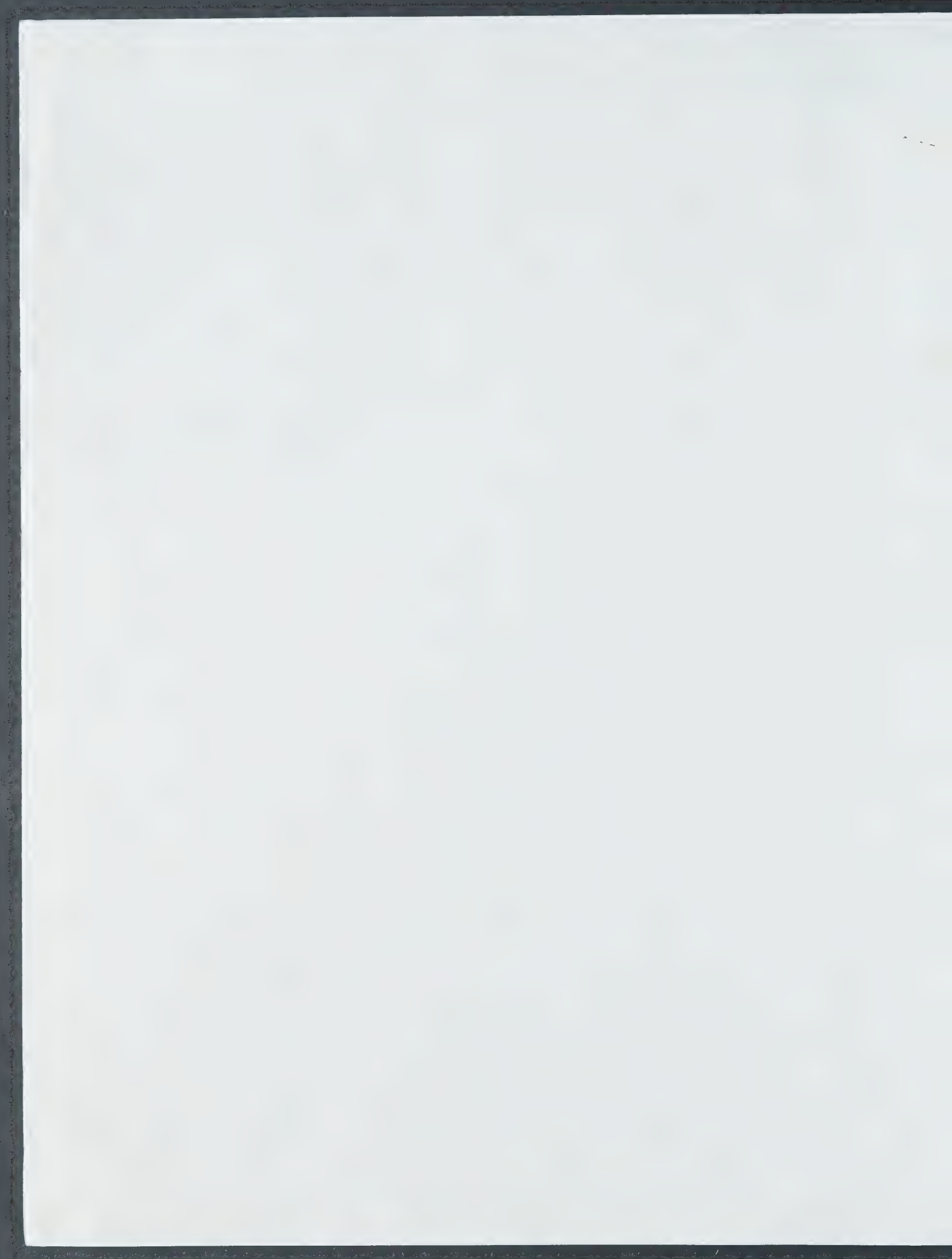
conformational analysis of 1,2-dibromoethane, a problem that we learn was only solved (but how cleverly and in 1950!) by Raman analysis of specifically deuterated 1,2-dibromoethanes. In a subject where terminology has proliferated (are terms such as eutomer, distomer and eudismic ratio really necessary?), and where clear definitions have sometimes proved elusive, the lucid glossary should settle such controversies as the correct use of stereoselective and stereospecific.

There are concise essays on contemporary topics such as that entitled *Biological properties*, which covers, *inter alia*, chirality in the context of drug action. The book has short but adequate accounts of many specialised topics, eg Baldwin's rules. There are many useful tables of data, such as functional group conformational energies. The book is strong on history – we discover the story of H. Sachse, who

could not defend against attacks on his insightful conformational analysis of cyclohexane because of his premature death in 1893. It is even stronger on the present, with its extensive treatment of key topics such as prochirality, enantioselective synthesis (the fine chapter by Mander), and stereoisomer analysis, with references up to 1994.

Despite its heavyweight 1267 pages, I can safely recommend this book to undergraduates and especially postgraduates, and it is an excellent companion for the tedious train journey from Newcastle to London. In the BBC radio programme *Desert Island discs*, a celebrity selects music and books for his or her solitary confinement; the obligatory Mozart or Presley, Bible and Shakespeare would now be passed over by any chemical celebrity, for the new 'Eliel' will suffice.

B. T. GOLDING



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TN39 3ER

Phone & fax

1 424 222223.

The Business Editor and  
Mr. James Prodes

London Sunday Telegraph.

1 Canada Square, London E14 5DT.

Dear Mr. Prodes

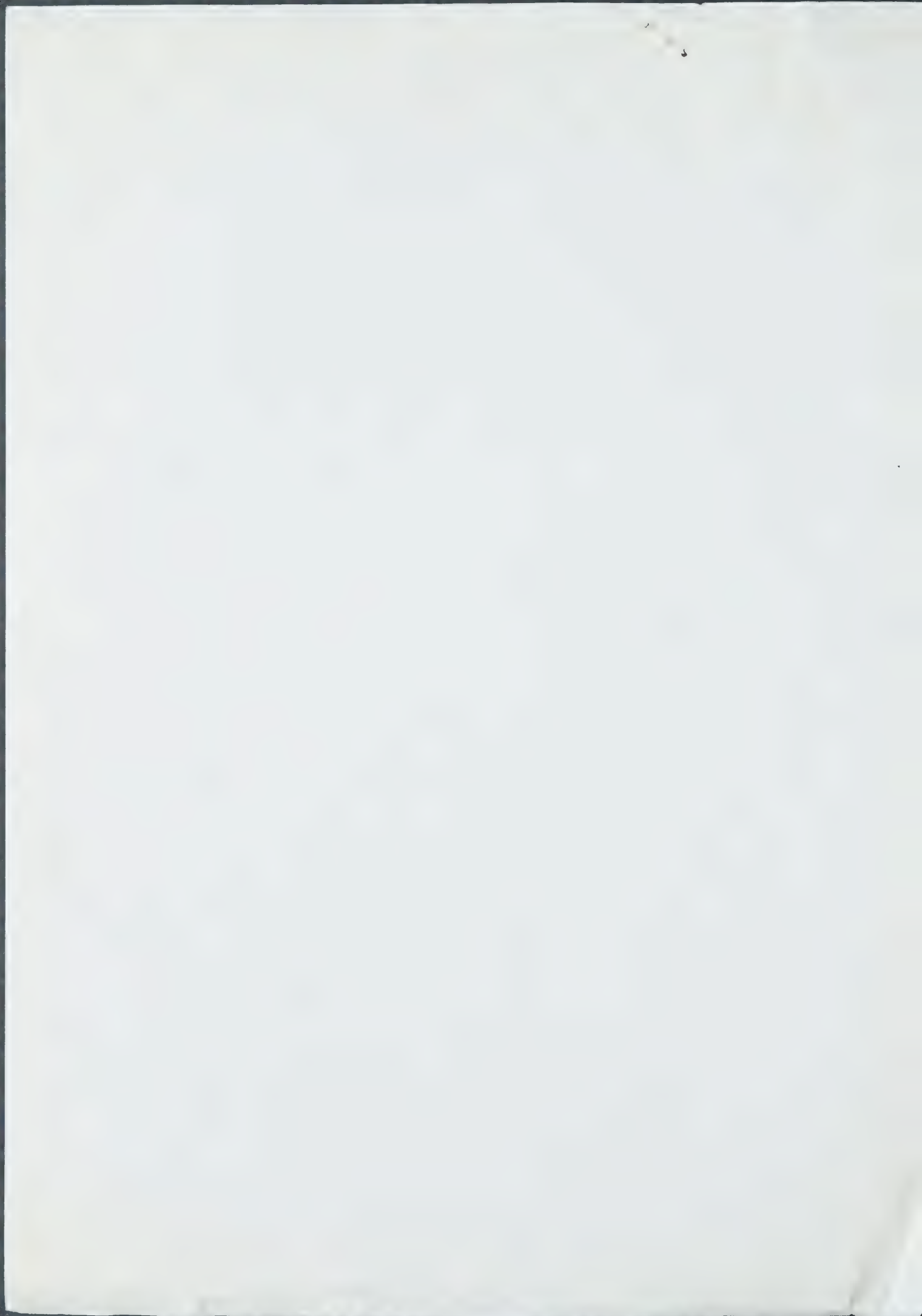
The May 30 1995 Sunday Telegraph  
published your interesting article "Pigma finds  
the formula".

Sadly for stockholders (of whom I am  
the largest individual stockholder) Pigma -  
Aldrich has not done particularly well since;  
1994 was the first year ever with flat  
earnings. You will find pages 170-171  
in my autobiography (review enclosed) relevant  
and you might like to review it

Best wishes

Alfred Bader

July 23 1995





## TELEFAX COVER SHEET

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## MESSAGE:

DEAR ALFRED  
GOOD TO SEE YOU & ISABEL AGAIN. SINCE WEDNESDAY I HAVE  
BEEN REVISIONING THE CASE AND THE TEACHING NOTE. I WANT  
TO INCORPORATE SOME COMMENTS BY JAMES SROOGS - E.G.  
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# Sigma finds the formula

CONTRARY to reports elsewhere, America's manufacturing base is not split between old, clapped-out and uncompetitive heavy industries and Silicon Valley high-tech brainstormers.

There are plenty of middle-range companies adapting nicely to the new rigours of the world market-place. As a rule, success stems from aggressive marketing, innovative staff incentives to raise productivity and keeping customers happy.

Sigma Aldrich is a St Louis maker of research chemicals used by scientists and technologists around the world. Born of a 1975 merger of two older firms, the company's \$700 million sales and \$2.8 billion market value put it just inside the *Fortune* 500 list of United States businesses.

Yet it is a company to watch: its 22 per cent compound return to shareholders over the last 10 years is a performance which only about 30 other *Fortune* 500 companies can match.

"The company has not had a down year since its merger," says Merrill Lynch analyst Robert Hardiman. He and others believe Sigma can double both sales and profits (\$5.5 million last year) over the next five years.

Productivity and efficiency are what Sigma Aldrich are about. At least, that is what its chairman, Tom Cori, is all about.

Cori, 57, is a PhD chemist and the son of two Nobel laureates, Carl and Gerty Theresia Cori, who shared the 1947 prize for their work on carbohydrate metabolism and enzymes. A boxer in his college days, Cori combines a pugilist's personality and a scientist's intellect. He also has an aversion to the press and a fondness for epigrams such as "a closed mouth gathers no feet", and, more telling, "a dollar saved is worth four dollars in new sales".

"He has a rough edge and it takes a certain kind of person to work for him. But they are there and they do work for him," says Hardiman.

That is true of a 4,500-strong workforce of whom more than 2,000 have science degrees and 200 have PhDs.

Pay is high. But managers also have share incentive plans, with the company paying cash to cover taxes on the awards which are linked to profits and which vest after five years. Cori, for example, last year was given 11,586 shares as a reward for results achieved in 1985. The shares were worth more than \$570,000 at prevailing share

WALL ST. VIEW

by James Srodes



ma's success is its close relations with its clients — a big achievement as it offers more than 60,000 products.

Sigma's St Louis plant makes products extracted from yeasts and other organic sources for diagnosis and research. It still pays collectors a penny apiece for fireflies. The Aldrich branch, in Milwaukee, makes chemicals used by scientists in the drug and petro-chemical industries.

While the quantities and dollar price volumes are tiny (the average sale is less than \$200), there is nothing of the local chemists shop about Sigma Aldrich. The St Louis plant receives 4,400 orders per day and 97 per cent of them are completed the same day, most within two hours of receipt. Customers can place orders on a 24-hour toll-free telephone line and can consult specialists about problems.

First Analysis Securities analyst Allan Cohen, himself a PhD chemist, says: "They do not just make chemicals. They are into diagnostic testing; they make kits for forensic testing, for environmental testing. It is a non-cyclical industry."

Hardiman says: "Sigma Aldrich is in a razor blade kind of business. Laboratories need reagents to do experiments and it is easier to have someone make up the compounds per order than to have a big inventory of expensive stock."

The item purchased is a tiny cost of running such a laboratory but it also is essential.

So it is not price sensitive. The customer is more interested in fast delivery, purity of product, the huge catalogues [each division sends out more than one million copies of each] and the ability to call someone on the



Cori: looking for business domination

telephone when you have a problem."

With factories in Britain and Europe and distribution in Japan and Israel, Sigma has four times as many products as its smaller competitors. But Cori is not satisfied until the firm can achieve dominance.

To do that, Sigma is expanding its product line and its markets. In 1989, it paid \$39 million for Swiss company Fluka Chemie which had 4,000 chemicals not offered by Sigma.

Last month, Cori opened a plant in Scotland and, a fortnight earlier, he paid \$55 mil-

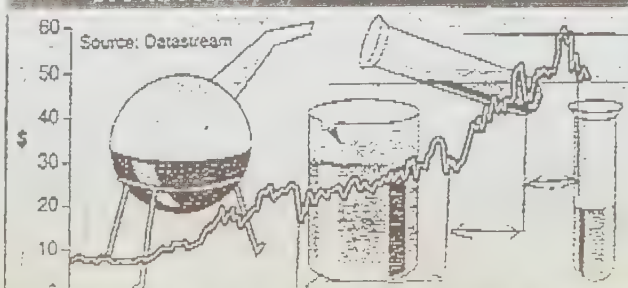
lion for Rohm and Haas's chromatography products arm.

Cohen says: "This fits in at the end of the line for both Sigma, which produces products for biological research, and for Aldrich, whose products are for the synthetic chemistry researcher since chromatography separates and purifies both kinds of compounds. It will be a source of growth."

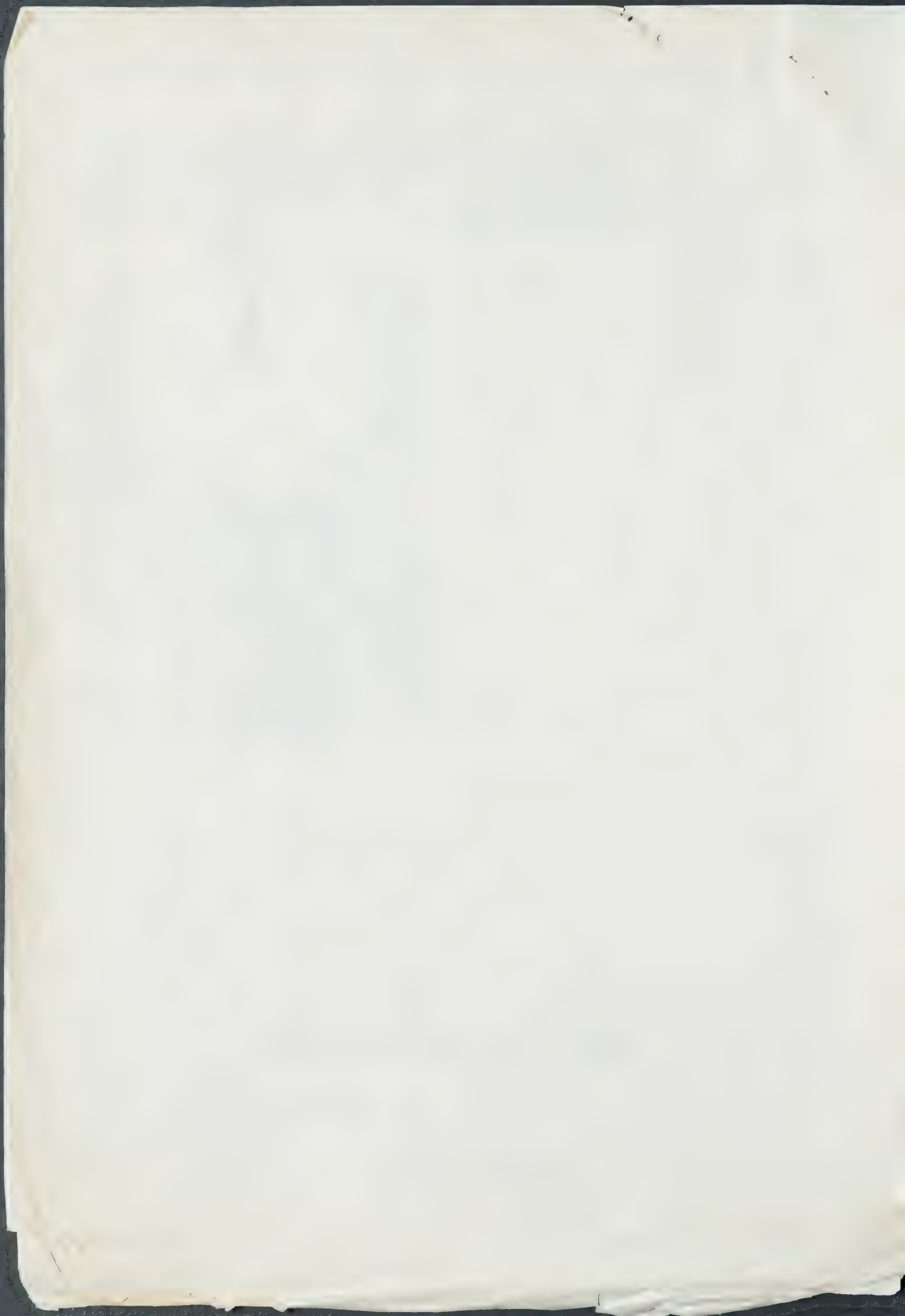
In one sense, Sigma may even be counter-cyclical in its ability to lift sales during lean times. Cohen says: "Some analysts worry that new rules from Washington will make it harder for drug companies and chemical manufacturers to grow and that they will not buy as much from Sigma Aldrich."

"But the way I look at it, while it would be nice if the customers were raining money, it also is true that the way to beat government price controls on drugs and environmental controls on other products is to develop new products. To do that you have to do more research. To

## SIGMA ALDRICH SHARES SOAR



London Sunday Telegraph May 20 1993



## Masterpiece of a master

Chemistry & Biology December 1995, 2:803-804

**Adventures of a Chemist Collector** by Alfred Bader. Weidenfeld & Nicolson Ltd, 1995, 288 pages. \$25.00 hardcover (ISBN 0-297-83461-4).

It was said of Goethe that his life was his greatest masterpiece. That applies as well to Alfred Bader. His is an intriguing and inspiring story of hard work and worthy obsessions. Now famed for his philanthropy, his art collecting and his remarkable career as a chemical entrepreneur, Bader vividly portrays the several intertwined worlds he has explored with zest and élan over seven decades.

Born in Vienna in 1924, he faced many daunting vicissitudes. His father, "described as a charming, shiftless gambler," was murdered two weeks after Alfred's birth. His mother, a devout Catholic rejected by her family because she had married a Jew, was nearly penniless. Extraordinary inflation had set in, and his mother, in return for financial help, gave up Alfred for adoption by his father's sister, a childless widow. The early years of his boyhood were happy; he recalls fondly his enjoyment of soccer, stamp collecting, adventures with schoolmates, Jewish rituals and summer visits to Moravian villages. At the age of 10 he began buying drawings with money he'd been given for gifts or ice cream cones; this resulted in an examination by a child psychologist, with a reassuring verdict. But soon his youthful idyll was overwhelmed by the financial collapse of the Depression and by mounting anti-Semitism.

Luckily, Bader was among 10 000 Jewish children allowed to emigrate to Britain after Hitler took over Austria in 1938 and blatantly attacked synagogues. Bader left Vienna, at age 14, carrying one American dollar and a small suitcase with his stamp collection; he was not to see his aunt or his mother again. After the fall of France, in 1940, when Britain feared an imminent invasion, Bader was deported to Canada and interned with other "enemy aliens" along with captured German soldiers in a prisoner-of-war camp. After more than a year, he was released and his diligent pursuit of education was rewarded by admission to Queen's University in Ontario. As well as earning BS and MS degrees in engineering chemistry with distinction, Bader won prizes for debating and helped to raise funds to buy a house for the Hillel Foundation. During summers and for a year after graduation, he worked for the Murphy Paint Company and took a BA in history "extramurally."

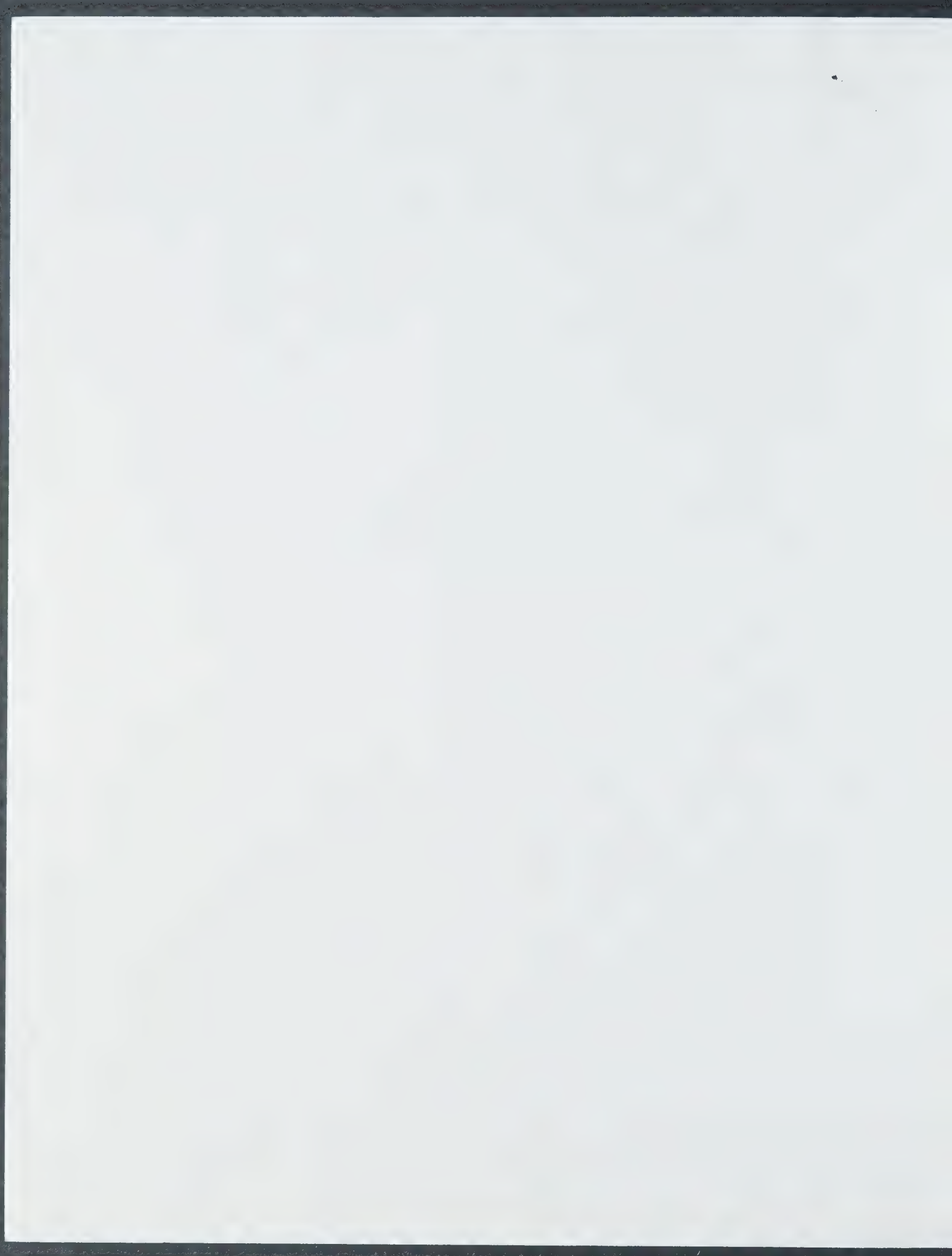
Deciding to go for a PhD "at the best school that would admit me," Bader accepted a fellowship to Harvard and undertook research with Louis Fieser. In his first year, he failed all eight cumulative exams. Undaunted, he passed



the next six exams and completed his PhD in well under three years.

Since he felt morally obligated to Murphy Paint, for helping him pursue graduate study, Bader took a job with the Pittsburgh Plate Glass Company, which had purchased Murphy. That brought him to Milwaukee in 1950, where the paint research division was located. Soon, in partnership with a friend, he launched as a sideline the Aldrich Chemical Company, incorporated with the minimum required capital of \$500 and run from a garage. The impetus came from his experience as a graduate student, when he found that Eastman Kodak, then the only substantial supplier of organic research chemicals, was capricious and cavalier. After one year, with no salaries paid, Aldrich posted a profit of just \$20; but after three years, Bader dared to commit himself full-time and bought out his partner. By dint of rapid, reliable, enterprising service to customers and astute judgement, over the next 20 years he built Aldrich into a thriving business. In 1975, Aldrich merged with Sigma, a biochemical supplier; the combined company now has annual sales of a billion dollars.

The intricacies of Bader's business adventures are well told and instructive, including the bizarre episode of his dismissal from the board of Sigma-Aldrich in 1991. Most striking, however, is Bader's earnest humanity, exemplified in what he terms the ABC of his life: "art, bible, and chemistry." It is exemplified also in his focus on the host of friends and family who have shared in his odyssey; the index lists about 600 names. Characteristic is the story of his first Saturday in Milwaukee. He



inquired at the Jewish Reform Temple whether there was need for a Sunday School teacher, and thereby undertook a commitment to teaching 5th and 6th graders which he continued for 32 years.

In developing Aldrich, Bader was likewise evangelical. He personally sought out chemists all over the world, to find out what they needed and what new substances they could provide that he might market. Moreover, his interest was not limited to marketable items. He also established a Chemical Library, to preserve rare research samples that otherwise might have been lost. These efforts have greatly fostered research in synthetic chemistry.

The same sustained, personal devotion is manifest in his "buying, selling, trading, and giving away paintings. . . as many as 200 a year during the past decade." He slyly describes this as "a natural extension of my dealing in stamps," but confesses that "I am never happier than when hunting for dirty old paintings that might be hidden treasures," and provides a lively chapter detailing how he found many such treasures.

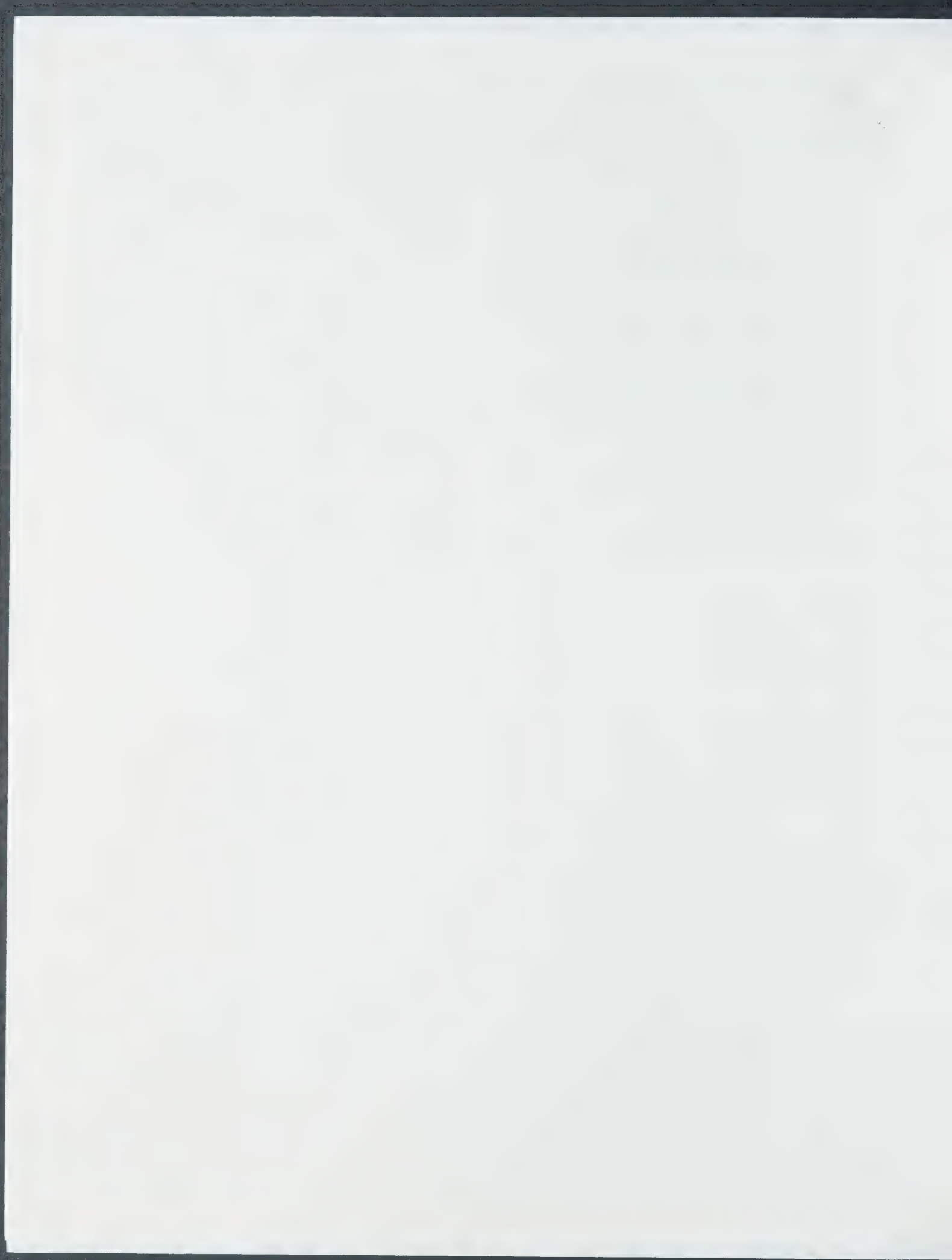
Foremost among Bader's treasures is his wife Isabel. Their romance is the most uncanny of his many remarkable

tales: it involves a shipboard courtship, over 400 ardent letters, prophetic dreams, a separation of 25 years and other elements apt for an opera or fairy tale! Among many benefactions, Alfred and Isabel have indeed recently made a fairy-tale gift to Queen's University. This provided funds for the purchase and renovation of Herstmonceux Castle in Sussex, to serve as Queen's European campus.

This is a fine book about a wonderful life, written with verve and Pepys-like frankness. As remarked to me by Professor Michael Henchman, it is particularly to be recommended to young people, "to emphasize the importance, not of talent and social advantage, but of enterprise and resolve." It also emphasizes gratitude, joy and faith. In his final remarks, Bader says: "Whenever I have contemplated any achievement in my life, I have marvelled how many and how diverse are the people who have made it possible. . . With Isabel's vision, and if the Lord gives us time, we will find other great things to do."

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02138, USA.





The headmaster [at boarding school] was a priest, and he took pains to shape the more responsive boys into his image. By the age of 13, I was ready for Greek and Hebrew and the priesthood. . . .

The vocation of the priesthood lingered with me through the adolescent years. Certainly, I felt that I must give my life to some noble cause. Eventually this noble cause became science in general and chemistry in particular. The discipline of constant study came easily to me, and from the age of 18 onwards, I have not stopped. — Derek Barton (pp. 107-8)

I reported to Harvard on a Saturday afternoon and found [Louis] Fieser with his trademark, the dirty laboratory towel dangling from his laboratory coat, and carrying out some experiments in his office on the second floor of the Converse building. I was struck with awe. He was 51 at the time. I got a room at 12 Sumner Road, a 5-minute walk from the laboratory, and started my life in Cambridge, Massachusetts, by spending most of the time at the bench, days and nights. During lunch break, I would go to shops to purchase clothing to send home. Financially, it was impossible to bring my family to the United States, and I ended up living alone for two years. — Koji Nakanishi (p. 22)

In the summer of 1985, shortly before I was about to embark on another such period of physical exertion and psychic housecleaning, this time to cross Tibet into Nepal, Jeffrey Seeman invited me to contribute to this volume. I agreed with the same mental shrug I give when someone invites me to speak on some distant date, because it is simply too far away to worry about. But instead of flying to Asia, on the day of my intended departure I came out of anesthesia after a 5-hour cancer operation with tubes in my nose, arms, and belly. The weeks in the hospital provided another type of reflection, which, originating in the depth of depression, made me come to terms with my own mortality. — Carl Djerassi (p. 162)

My late colleague Joel Hildebrand was fond of pointing out that few people have only one good idea; they have either none or many. — Andrew Streitwieser (in press)

## Reviews

### *Collector of Chemicals and Paintings*

**Alfred Bader.** *Adventures of a Chemist Collector.* London: Weidenfeld Nicolson; North Pomfret, Vt.: Trafalgar Square, 1995. 289 pp. \$25.95; £14.99. (Also available from the American Chemical Society.)

"Alfred," exclaimed Harvard's Louis F. Fieser, "you haven't made up your mind yet whether you want to be a chemist or an art collector." Fieser encountered Alfred Bader, the future founder of the Aldrich Chemical Company, taking a break from his doctoral work in the late 1940s to attend a lecture at the Fogg Museum. Evidently he wanted to be both, and in the end, he became both.

When Bader founded Aldrich, Eastman Kodak was the one convenient supplier of organic research chemicals. If it wasn't in the Eastman catalog, you made it from something that was. No longer. Bader, as head of Aldrich, asked chemists in their labs what they would like to have and proceeded to make it. They in turn helped build the Alfred Bader Chemicals Library, which now includes famous sample collections, among them Henry Gilman's and Robert B. Woodward's. Compilers of spectra found the ABC samples an organic gold mine.

Bader grew up in Vienna, amid paintings in his home and in the city's museums. His collecting instinct focused first on stamps, then broadened out to paintings and chemicals. In December 1938 he left his family in the *Kindertransport* for England with one American dollar in his pocket—but in his small suitcase he also carried his best stamps to help him, a fourteen-year old, to survive. He was ever resourceful. At sixteen he was shipped off to Canada in response to Britain's fear of a "fifth column."

When he took up art dealing, he first concentrated on paintings overlooked by the big collectors, some of which proved to be by important artists. He moved up to art auctions, and he tells of acquiring a Rembrandt at Sotheby's and selling it to the Rijksmuseum. Alfred Bader Fine Arts now buys, sells, trades, or gives away two hundred or so paintings a year.

Bader describes the growth of Aldrich, its acquisitions of other domestic and foreign companies, its joint ventures, its linking with Sigma to enter the biochemi-



*Alfred and Isabel Bader enjoying Herstmonceaux Castle, once the home of the Royal Greenwich Observatory and now, thanks to the Baders, an international study and conference center. Courtesy Alex Meyboom Photography.*

cal field, and the painful story of his eviction from the company he created. He tells also of his fascination with two chemists spurned by August Kekulé but nevertheless never totally forgotten—the Viennese Josef Loschmidt and the Scot Archibald Scott Couper—as well as of his admiration of and respect for two of his contemporaries, Herbert C. Brown and Woodward. He loaned some of his paintings to Purdue for an exhibition honoring Brown's eightieth birthday, and he talked CHF into mounting its Woodward traveling exhibit, for which he raised most of the funds from corporate and individual Woodward enthusiasts.

Last, but not least, Bader and his wife Isabel are generous philanthropists. They have made major contributions to the ACS Project SEED (Summer Educational Experience for the Economically Disadvantaged) and to similar research opportunities for disadvantaged young people at University College, London, and elsewhere; created university fellowships; and made art donations to Bader's alma mater, Queen's University in Kingston, Ontario. To top it all, he purchased for Queen's the vast, partly medieval, moated Herstmonceaux Castle in Southern England for use as an international study and conference center. It was once the home of Britain's

Astronomer Royal and the Royal Greenwich Observatory.

The book, written in a most engaging style, shows the warmth of the author's personality and the depth of his affection for his friends and the members of his family.

### *A Chemical Crusader*

**Germaine M. Reed.** *Crusading for Chemistry: The Professional Career of Charles Holmes Herty.* Athens/London: University of Georgia Press; Durham, N.C.; Forest History Society, Inc., 1995. xvi + 474 pp. \$45.00.

The papers of the Georgia-born chemist Charles Holmes Herty (1867–1938) at Emory University are a little-known but rich resource for understanding many important trends in the development of chemistry and the chemical industry during the first third of the twentieth century. Germaine Reed, associate professor of history at the Georgia Institute of Technology, has thoroughly (perhaps too thoroughly) mined the 150-plus boxes of Herty's manuscripts to tell the story of this fascinating academic, administrator, and entrepreneur.

After earning his Ph.D. at Johns Hopkins University under Ira Remsen in 1890, Charles Herty taught at the universities of Georgia and North Carolina. His career came to maturity, however, just as the chemical profession and chemical industry were being transformed by World War I—the “chemists’ war.” As president of the American Chemical Society in 1915–16, and editor of the *Journal of Industrial and Engineering Chemistry* for 1917–21, Herty led the ACS into new realms of political and educational activity. He spurred efforts to lobby for tariffs on synthetic dyes and pharmaceuticals (enacted by Congress in 1922), to combat a ban on chemical warfare (the Geneva Protocol was defeated in the Senate in 1926), and to establish the National Institutes of Health (created in 1930). He also aggressively popularized chemistry via the ACS News Service, founded in 1919, and the Prize Essay Contests, held 1923–31, which exposed millions of students to the wonders of chemistry. As a close advisor to the Chemical Foundation, an organization founded after the war to prevent the return to Germany of German-owned U.S. chemical patents, Herty influenced the distribution of millions of dollars for

chemical research, publication, and education. He spent the last decades of his life in business serving as president of the Synthetic Organic Chemical Manufacturers’ Association and as the founder and promoter of the southern pine-pulp newsprint industry.

Germaine Reed’s meticulously documented biography of Charles Herty is a useful contribution to the history of chemistry in America. However, some readers will feel overwhelmed by the masses of detail that clog the book and disoriented by the lack of thematic background.

DAVID RHEES  
The Bakken, Minneapolis, Minnesota

### *On the Path to Superconductors*

**Kostas Gavroglu.** *Fritz London: A Scientific Biography.* New York: Cambridge University Press, 1995. 299 pp. \$69.95.

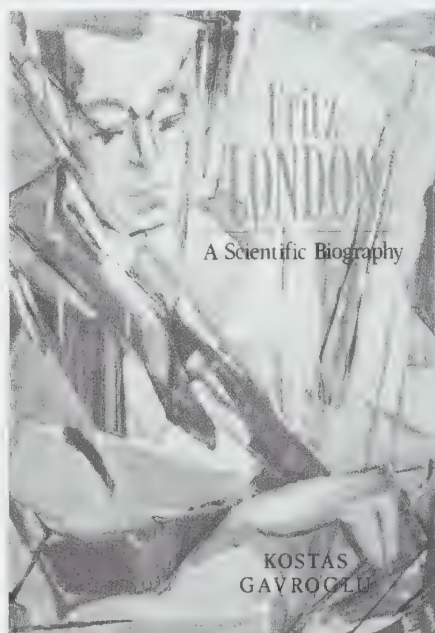
Superconductors are a hot research frontier. Electric conduction with no electrical resistance and at not too low temperatures suggests vast commercial profit.

Superconduction was first discovered by Heike Kamerlingh Onnes in 1911 in helium, which he had managed to liquefy three years earlier after cooling it below  $-267^{\circ}\text{C}$ . The liquid has the most peculiar properties, such as the ability to creep

uphill. It will not solidify under its own pressure even at 0 K. “By far the most important step toward understanding the[se] phenomena” writes John Bardeen in an afterword to Kostas Gavroglu’s *Fritz London: A Scientific Biography*, “was the recognition by Fritz London that both superconduction and superfluid helium are macroscopic quantum systems.” It was Bardeen who with J. Robert Schrieffer and Leon Cooper finally explained superconductivity in 1957, for which they received the Nobel Prize in 1972.

Quantum mechanics had been developed to explain chemical bonding and other phenomena at the atomic and molecular level. Fritz London, who began as a student of philosophy before becoming a physicist in Munich under Arnold Sommerfeld, had proposed with Walter Heitler a quantum-mechanical explanation of the covalent bond. Ever since, Van der Waals forces have also been called London forces. Few people imagined that one day physicochemical phenomena would be observed that were not explainable in terms of atoms and molecules. Yet London, according to Bardeen, made “the leap from the microscopic world of atoms and molecules” to quantum systems on a macroscopic scale. Superfluids must be seen as vast molecules, and London even conceived a further extension of this idea to biology. Perhaps even the human organism can be understood as “one big inhomogeneous molecule (not a crystal) of macroscopic dimensions” (p. 193). Believers in “auras,” electric fields around organisms, will be delighted when they learn this. A somewhat parallel phenomenon occurred in organic chemistry when Roald Hoffmann and Robert B. Woodward explained the stereochemistry of electrocyclic reactions through quantum mechanics. Without quantum mechanics, structural theory could not account for the products of those reactions.

London was born in Breslau (now Wroclaw, Poland) in 1900. After his studies in Munich he moved to Zurich, where he met Heitler, then to Berlin, where he worked under Erwin Schrödinger. Nazi anti-Semitic laws drove him and his wife, the artist Edith London, to leave Germany. They moved first to Oxford, then to Paris, and finally to Duke University in North Carolina, where London taught until his death at age fifty-four. He was a quiet and intensely private person, yet concerned with and much worried about social and political issues.



*Edith London's painting of her husband constitutes the cover of this new biography. Courtesy Edith London.*

# A chemist turns detective

Unlike the name of August Kekulé, the names Josef Loschmidt and Archibald Scott Couper will probably mean little to most chemists. But, as **Alfred Bader** explains, perhaps it is now time to reconsider who should take the credit for some of the great man's discoveries

**W**INSTON CHURCHILL ONCE SAID that 'Men occasionally stumble over the truth, but most of them pick themselves up and hurry off, as if nothing had happened'. Fortunately, this does not apply to Richard Anschütz,<sup>1</sup> whose detective work includes revealing the role of Austrian school-teacher Josef Loschmidt in predicting the circular structure of benzene (*Chem. Br.*, February, 1993, p 126). Although neither man has become a household name, some chemists may remember the Anschütz thermometer or the Loschmidt/Avogadro Number from their physical chemistry lectures. However, few of us know that Anschütz revolutionised the history of chemistry by following leads during the preparation of his biography<sup>2</sup> of August Kekulé published in 1929.

## Testing times

August Kekulé is a household name; he was one of the most famous German chemists of the 19th century, and Anschütz was his assistant and successor as professor of organic chemistry at Bonn University. Kekulé's fame rests on two great discoveries. First, in a paper<sup>3</sup> in May 1858, he showed that carbon is tetravalent and

that one carbon atom can be linked to another. Secondly, in 1865 he showed benzene as a cyclohexatriene<sup>4</sup> – a ring of six carbon atoms – an idea that he claimed 25 years later had come to him in a dream.

It was through Anschütz's researches into this latter discovery that chemists first became aware of the significance of an earlier publication by Loschmidt, and the continuing controversy<sup>5</sup> over who first predicted the circular structure of benzene (*A. J. Roche, Chem. Br.*, May 1993, p 401). Less well known, but equally significant, Anschütz's persistence has also led to a question mark beside Kekulé's earlier claim to fame over the tetravalency of carbon, and brought to light the work of another virtually unknown chemist, Archibald Scott Couper.

Couper's name first came to Anschütz's attention in the early 1880s, long before he started on his biography of Kekulé. At that time Anschütz was studying the reaction of salicylic acid with phosphorus pentachloride. Some great chemists, Kekulé and Kolbe among others, as well as a young Scot, Archibald Scott Couper, had previously studied this reaction. Couper claimed<sup>6</sup> to have obtained a phosphorus-containing compound boiling around 290°C. Kekulé had tried<sup>7</sup> to repeat Couper's work over 20 times, always in vain. No one was successful until Anschütz and one of his students, George Dunning Moore, proved that Couper was correct.<sup>8</sup>

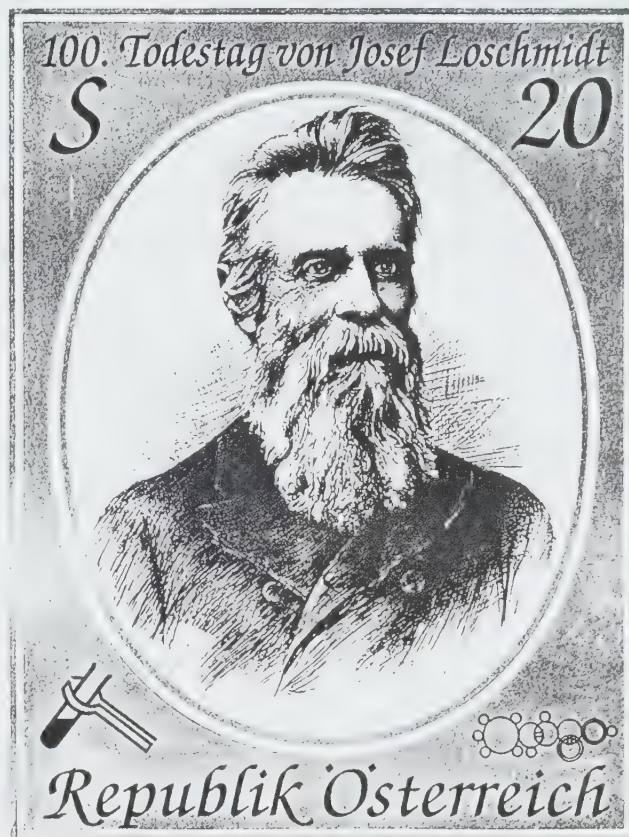
Couper suggested<sup>6</sup> that the product was a

cyclic structure (1), one of the first heterocyclic structures ever proposed, but it took over 100 years before the alternative structure (2), considered probable by Anschütz,<sup>9</sup> was proven unambiguously by Pinkus and Waldrep.<sup>11</sup>

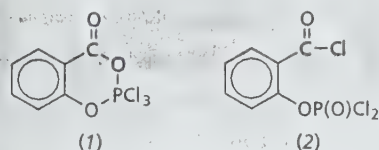
## Investigating Couper

Early this century, when he began work on his biography of Kekulé, Anschütz became aware of other more important papers by Couper. The most important, entitled *On a new chemical theory*,<sup>11</sup> proposed the tetravalent nature of carbon and its ability to link together to form C—C bonds. Anschütz was struck by the similarity of this paper with Kekulé's prestigious paper of May 1858 on the same subject. Couper had given his paper to his French professor, Adolph Wurtz for submission to the French Academy. However, publication was delayed, perhaps because Wurtz was not yet an academy member, and the paper was not presented until June 1858, by the famous French chemist Jean Baptiste Dumas.

In the meantime, Kekulé's paper,<sup>7</sup> submitted on 16 March, 1858, was published in May,



An Austrian stamp issued in 1995 in honour of Loschmidt. The structure on the bottom right is of cinnamic acid, one of Loschmidt's many correct aromatic structures



The incorrect (1) and correct (2) product structures suggested to result from the reaction of  $\text{PCl}_5$  and salicylic acid





The young Scottish chemist Archibald Scott Couper (1831-92)

although Couper's paper had almost certainly been submitted first.

Intrigued by the brilliance of Couper's work, Anschütz wrote to chemists he believed might have known and/or worked with him. He learned from one of Couper's former colleagues, Albert Ladenburg, that 'Couper was very angry, he questioned Wurtz and became insulting. Wurtz would not put up with that and dismissed him from his laboratory'.<sup>12</sup>

### Righting the records

In August 1858, Kekulé had publicly attacked<sup>13</sup> Couper's claim to have developed a new chemical theory, saying that he had done so first and asking Dumas to note his complaint. He also wrote to Wurtz declaring that: 'As a matter of principle, I will never claim priority for theoretical views as long as that can be avoided. Also, I will not, à la Couper, sound a big horn to proclaim my views as a "nouvelle théorie chimique". I will leave it to posterity and the legal sense of others to establish whether the views belong to me and to what extent'.<sup>14</sup>

Anschütz believed<sup>15</sup> that Wurtz should have stated that Couper had given him his paper some time before Kekulé's work was published. Wurtz failed to do that. It was almost 50 years before the significance of Couper's claim began to be realised, thanks to work by Anschütz, joined by Alexander Crum Brown, professor of organic chemistry at Edinburgh University.

Their work was taken up by Leonard Dobbin, assistant to Crum Brown and later a reader at Edinburgh University. While preparing a paper on Couper, Dobbin wrote to Anschütz, who replied in December 1931:

For Crum Brown's successful investigations about Couper's life, I was only the catalyst. Crum Brown was a doctor of medicine and had the idea to check with insane asylums about Couper; in that he succeeded.

I noted with pleasure that the Scots celebrated Couper's 100th birthday from an essay *A. S. Couper of Kirkintilloch: a remarkable Scots scientific centenary* in the *Journal of the Society of Chemical Industry* of May 8, 1931. To my deep regret, nothing was said therein about Crum Brown's work to discover Couper's fate.<sup>16</sup>

Anschütz was not one to blow his own horn.

Dobbin's article, *The Couper quest*,<sup>17</sup> describes step-by-step, letter-by-letter, how Anschütz enlisted the help of Crum Brown to find out about Couper's life, family and final illness. He includes a letter of July 1906 to Crum Brown from Couper's German friend, Gustav Berring who stated: 'Couper afterwards wrote to me from Paris that he had made a discovery which Professor Kekulé in Heidelberg also claimed for himself, although wrongly, since priority undoubtedly belonged to him Couper'.

My own interest in Couper<sup>18</sup> began as a student at Harvard, when I first heard about him from Robert Burns Woodward, who knew Anschütz's biography and *The Couper quest* Woodward later made clear his views during a Cope award lecture in 1973.

In 1858, Archibald Scott Couper was a 27-year-old Scotsman, studying chemistry in the laboratory of Adolph Wurtz in Paris. He had toyed with philosophy and architecture before settling down to chemical studies. Having pursued the latter for, I believe, something on the order of little more than a year, he prepared a paper entitled *On a new chemical theory*, which, after some delay, was published in the *Comptes rendus* of the French Academy of Sciences. In that literally astonishing paper, one may see presented, for the first time, structural formulae, identical with those we use today – and these are, of course, the most fundamental theoretical tools of organic chemistry.

Now, August Kekulé is rightly given credit for his recognition of and insistence upon the quadrivalency of carbon, and for his brilliant later proposal of the structure of benzene. [Unfortunately, Woodward was unaware of Loschmidt's work]. But he was not, as many believe, the father of structural chemistry. Indeed, in his famous 1858 paper *On the constitution and metamorphoses of chemical compounds and the chemical nature of carbon*, he makes very clear his belief at that time that chemical substances adopted diverse structures in response to the influence of attacking reagents; and for many years thereafter, he continued to use, in his own papers, the cumbersome and often obscure 'type' formulae of Gerhardt and Laurent. He was, in truth, too much under the influence of the theoretical and physical chemists of the time, who were inordinately opposed to the idea of fixed chemical structure – so much so that, until 1886, the infant *Berichte d. Deutschen Chemischen Gesellschaft*, born in 1868, would only print structural formulae using dotted-and-dashed lines; the use of solid lines to represent nearest-neighbour relationships would have imputed too much reality to an hypothesis which leading theorists of the day simply would not accept.

So, Archibald Scott Couper deserves recognition for the introduction of structural formulae as we know them ...

### Woodward surmised that:

Couper has received little credit for his brilliant contribution, no doubt largely because not long after his paper was published, he returned to his mother's home in Scotland, went mad, and played no further role in chemistry'.<sup>19</sup>

We cannot tell whether Couper's mental illness was triggered largely by his expulsion from Wurtz's laboratory or by a subsequent sunstroke, but certainly Anschütz was correct when he ended his biography of Couper with:



The inquisitive Richard Anschütz (1852-1937)

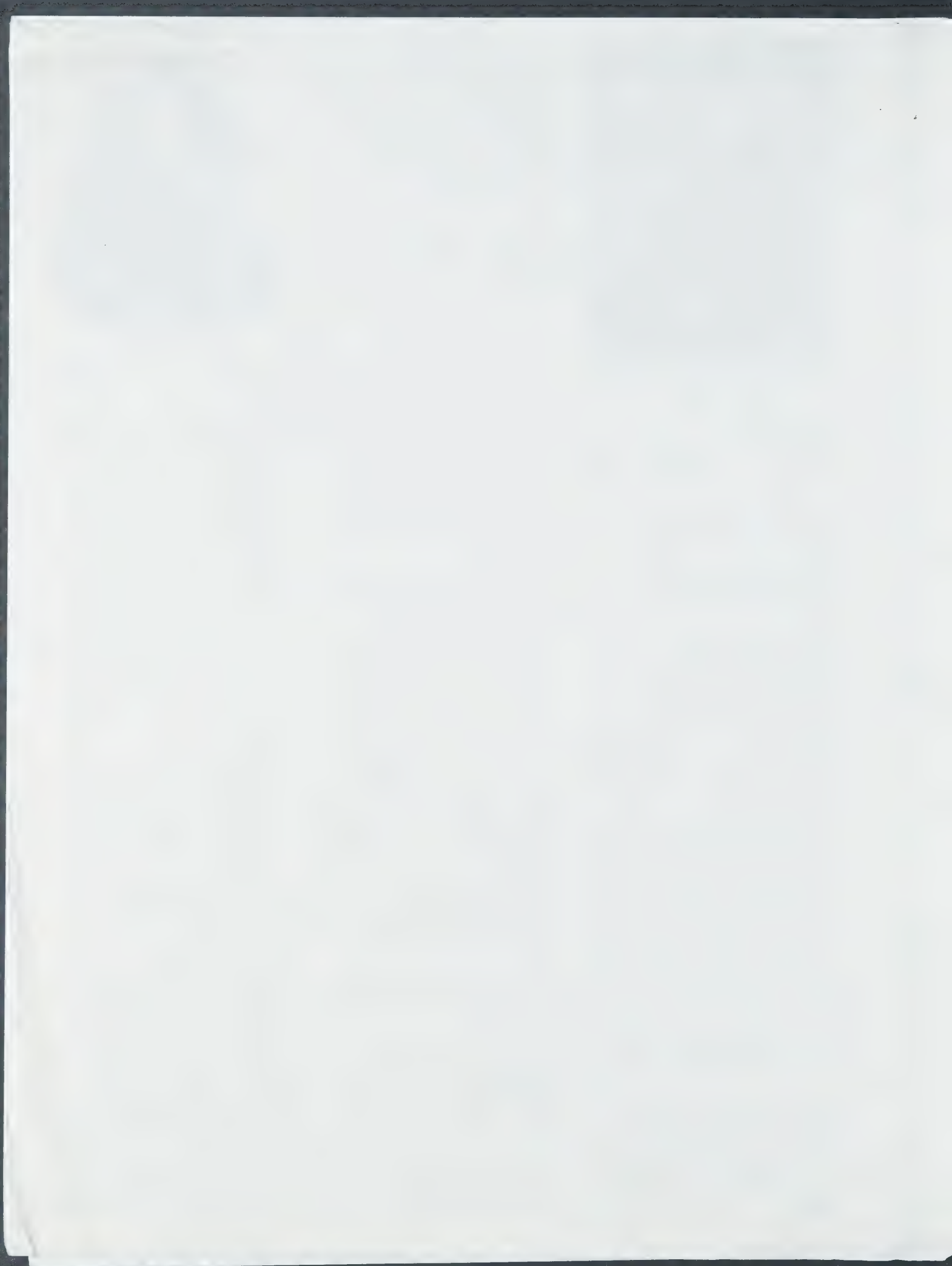
'In the history of organic chemistry, the sorely tried Archibald Scott Couper deserves a place of honour beside his more fortunate fellow-worker, Friedrich August Kekulé'.

Thanks to such publicity Couper had become sufficiently well-known to be honoured with Kekulé at the 100th anniversary of the foundation of the structural theory.<sup>20</sup>

Kekulé's fame rests on two pillars,<sup>21</sup> both questioned by Anschütz's detective work. Couper was silenced by his mental illness, and Loschmidt chose to remain silent. Anschütz believed<sup>21</sup> that this was 'because of the undemanding modesty which was an integral part of his character. The discovery of *Chemische Studien* ... he left to chance' and luckily to Richard Anschütz. Without Anschütz's persistence, we would know little about Couper's work and life and nothing about Loschmidt's chemistry.

### References

- G. B. Kauffman, *J. Chem. Ed.*, 1982, **59**, 637, 745
- R. Anschütz, *August Kekulé*, vols 1 and 2. Berlin Verlag Chemie, 1929
- A. Kekulé, *Ann. Chem. Pharm.*, 1858, **106**, 129
- A. Kekulé, *Bull. Soc. Chim.*, 1865, **3** [2], 98
- G. P. Schiemenz, *Naturwiss. Rundsch.*, 1993, **46**, 85; G. P. Schiemenz, *Sudhoff's Arch.*, 1994, **78**, 41
- A. S. Couper, *Compt. rend. Acad. Sci.*, 1858, **46**, 1107
- A. Kekulé, *Ann. Chem. Pharm.*, 1861, **117**, 145
- R. Anschütz, *Liebig's Ann. Chem.*, 1885, **228**, 308
- R. Anschütz, *ibid.*, 1906, **346**, 286.
- A. G. Pinkus and P. G. Waldrep, *J. Org. Chem.*, 1966, **31**, 575.
- A. S. Couper, *Compt. rend. Acad. Sci.*, 1858, **46**, 1157
- R. Anschütz to A. Crum Brown, unpublished letter dated 22 July 1906
- A. Kekulé, *Compt. rend. Acad. Sci.*, 1858, **47**, 378
- R. Anschütz, *August Kekulé*, vol 1, p 158. Berlin Verlag Chemie, 1929
- R. Anschütz, *Proc. Roy. Soc. Edinburgh*, 1909, **29**(IV), 218.
- R. Anschütz to L. Dobbin, unpublished letter dated 19 December 1931.
- L. Dobbin, *J. Chem. Ed.*, 1934, **11**, 331.
- A. Bader, *Adventures of a chemist collector*, chap 16 London: Weidenfeld & Nicolson, 1995.
- Quoted from the unpublished manuscript of R. B. Woodward's August 1973 Cope lecture in Chicago, courtesy of R. Hoffmann and the Chemical Heritage Foundation
- H. C. Brown, *J. Chem. Ed.*, 1959, **36**, 104
- J. Loschmidt, *Chemische Studien I*, republished by R. Anschütz in *Ostwald's Klassiker der exakten Wissenschaften*, no. 190, p 109. Leipzig 1913; reprinted by Aldrich Chemical Co., 1989, cat. no. Z18577-9



FAX FROM



*DR. ALFRED BADER*  
Suite 622  
924 East Juneau Avenue  
Milwaukee, Wisconsin 53202  
Telephone: 414/277-0730  
Fax: 414/277-0709

*8/21/97*

August 21, 1997

Page 1 of 2

To: Ms. Christina Winfield  
Little, Brown Publishers  
Fax: 416/967-4591

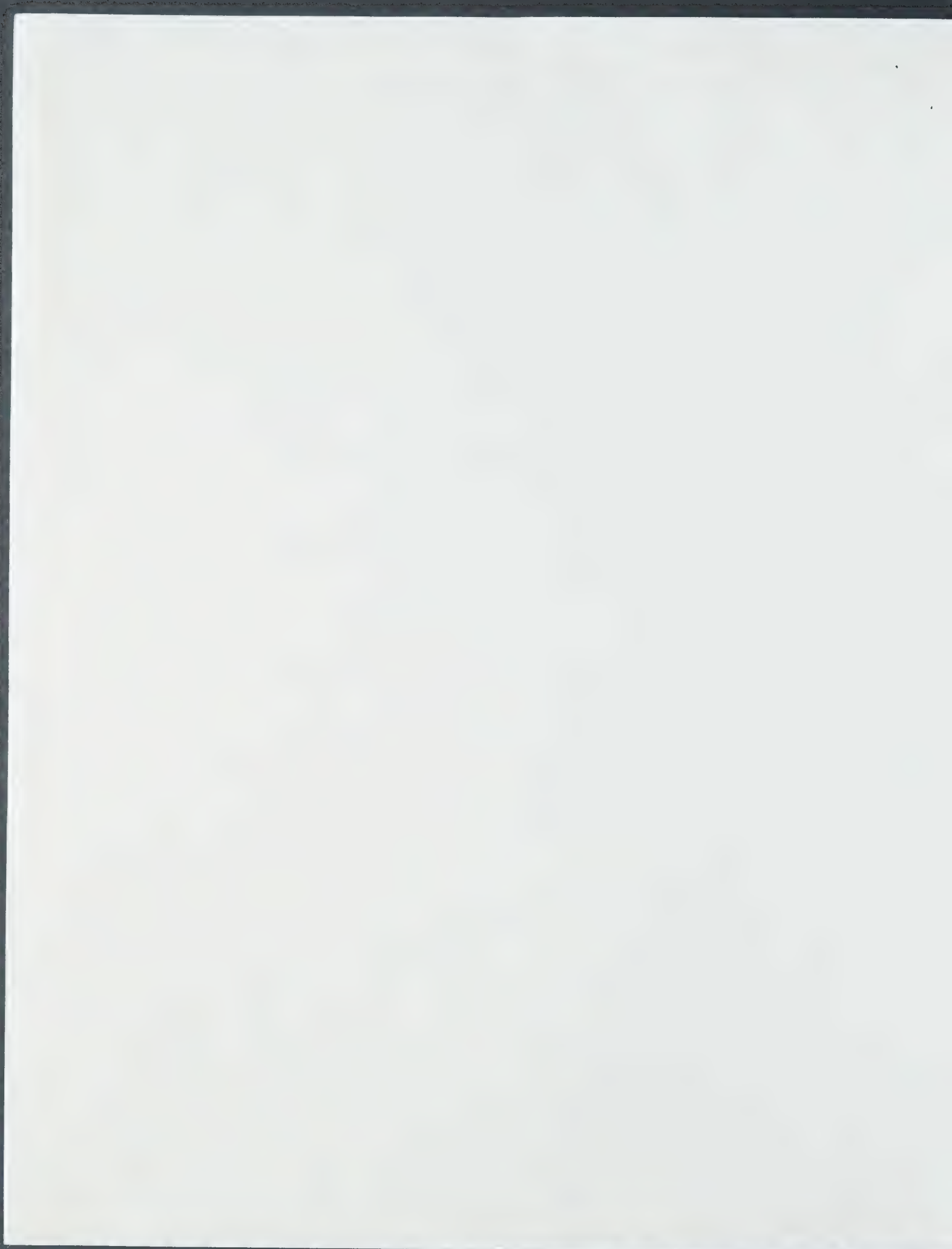
Dear Ms. Winfield:

I hope my inquiry of August 12th, copy enclosed, did not get lost.

With many thanks for your help and best regards, I remain,

Yours sincerely,

AB/cw





FAX FROM



*DR. ALFRED BADER*  
Suite 622  
924 East Juneau Avenue  
Milwaukee, Wisconsin 53202  
Telephone: 414/277-0730  
Fax: 414/277-0709

August 12, 1997

Page 1 of 2

To: Ms. Christina Winfield  
Little, Brown Publishers  
Fax: 416/967-4591

Dear Ms. Winfield:

You may recall that last year we corresponded and talked to each other about Little, Brown selling my autobiography, *Adventures of a Chemist Collector*, published by Weidenfeld & Nicolson, in Canada.

Since then, I believe early this year, Weidenfeld & Nicolson moved its distributorship in Canada from Little, Brown to Douglas & McIntyre, who are now selling my book in Canada.

In May, I was dismayed to find that a bookseller in Ontario, Chapters, was selling my book as "remaindered" at Can.\$7.99 per book. Of course, I purchased all the books they had and enclose a copy of my invoice.

When I complained about this, Mr. Michael Dover at Weidenfeld & Nicolson explained that his "guess is that some small numbers of Orion/Weidenfeld books which were untransferable because they were not in parcels but had been split for packing were sold off cheaply at the transfer and because the numbers were small no one was notified."

That is a reasonable explanation. However, as I own the books (and of course, do not want to have them offered as "remaindered"), I would like an accounting of this matter.

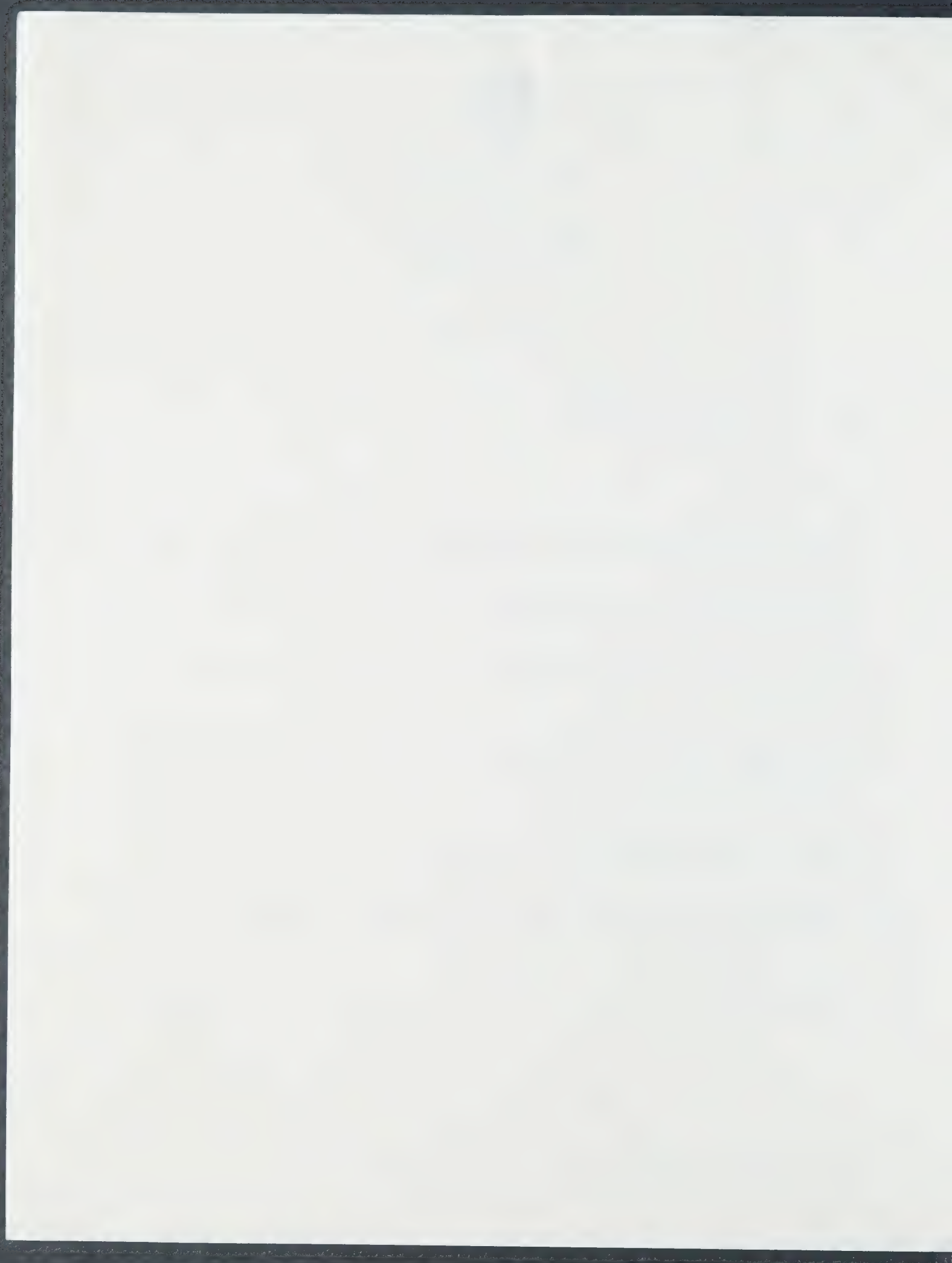
Therefore, could you please tell me specifically how many books were remaindered by you? Were they sold only to Chapters, or were some sold to other firms, and perhaps even exported out of Canada?

With many thanks for your help and best regards, I remain,

Yours sincerely,

AB/cw

cc: Mr. Jeffrey Simmons (via fax)



FAX FROM:

B & K ENTERPRISES, INC.  
Astor Hotel - Suite 622  
924 East Juneau Avenue  
Milwaukee, Wisconsin 53202  
Telephone 414/277-0730  
Fax 414/277-0709

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January 8, 1998

To: Ms. Charmaine Schaff  
Fax: 703-6143

Page 1 of 2

Dear Charmaine:

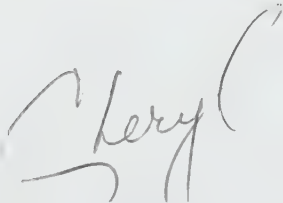
As I am sure you will recall, the lease between B & K Enterprises, Inc. and the Kohl Corporation, dated May 13, 1982, specifically Article VI, Section 6.2, provides that Kohl Corporation is responsible for reimbursing B & K Enterprises the excess of the current year's Real Estate taxes over the base year of 1981.

I am enclosing therefore a copy of the 1997 Real Estate bill for the Town of Mt. Pleasant in Racine, Wisconsin, totalling \$63,409.71. The base year of 1981 is \$37,876.85. In accordance with the lease provisions, please remit now the additional amount due B & K Enterprises of \$25,532.86. Please voucher this amount for payment.

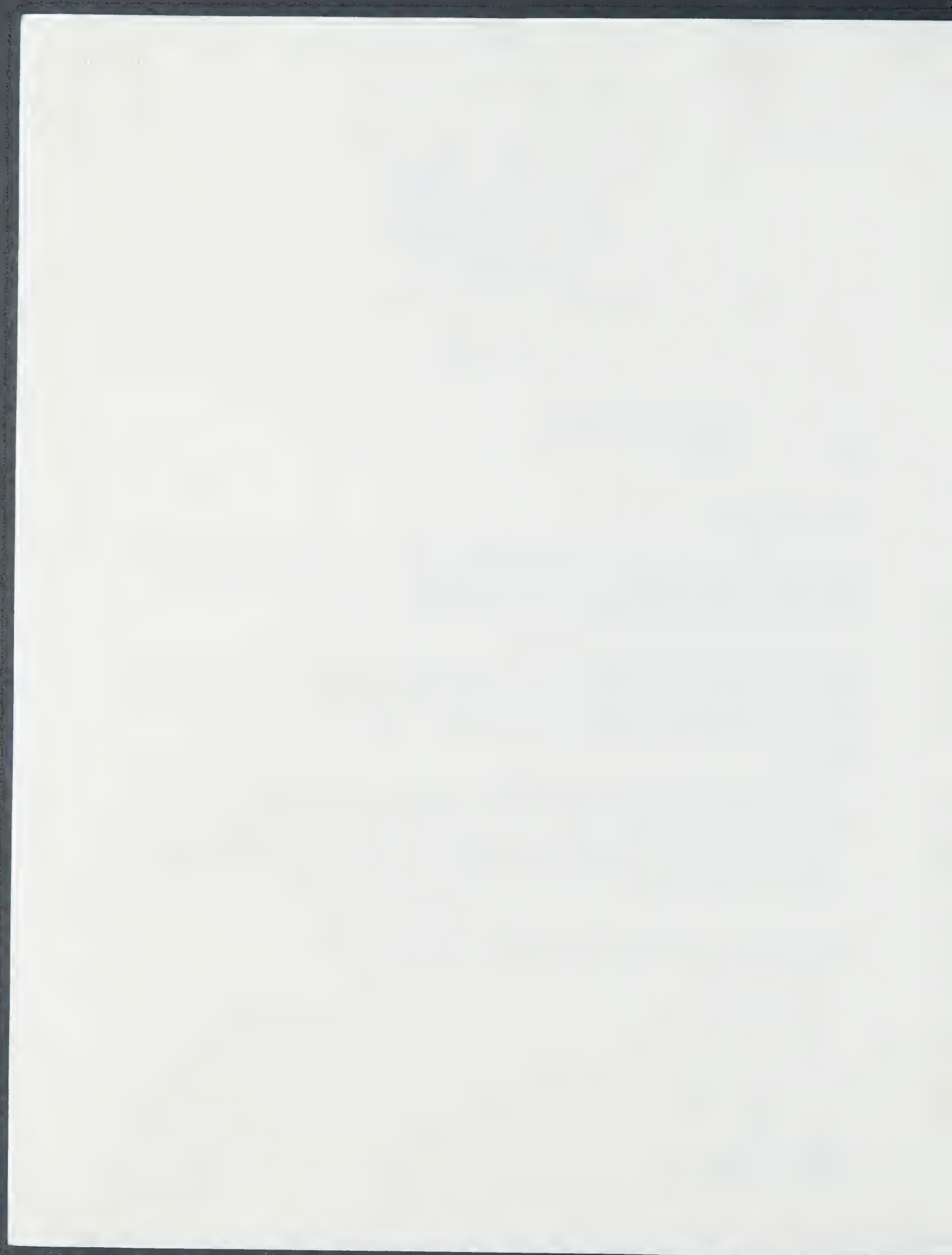
Also, Article IV (RENT), particularly Section 4.2, calls for a percentage rent payment of 1 ½ percent of gross sales in excess of \$12,500,000. At your earliest convenience (so that I can share the information with our accountant), could you please fax me the 1997 sales for the Racine store, broken down by month, as always? We will then bill you for the percentage rent due, or you can calculate and voucher that amount as well.

With thanks for your assistance and best regards, I remain,

Yours sincerely,



Cheryl Weiss  
Office Manager



## Contributors to the Chemical Enterprise

# C&EN's Top 75

**Editor's Note:** Over the course of three months in 1997, we asked C&EN readers to nominate their choices for C&EN's "Top 75 Distinguished Contributors to the Chemical Enterprise" during the 75 years of C&EN's existence. Using a ballot in the magazine, readers could nominate up to 20 people, living or dead. We urged nominators to think broadly and globally. Readers nominated more than 1,200 individuals. The result—a readers' choice of "C&EN's Top 75"—follows. The list was compiled and researched by Diana Slade and Maureen Roubi at C&EN headquarters in Washington, D.C.

The top four vote getters by far were Linus Pauling, Robert B. Woodward, Glenn Seaborg, and Wallace Carothers. After that, the votes were close. The list includes 32 living scientists and contains 35 Nobel Prize winners, 28 recipients of the American Chemical Society's prestigious Priestley Medal, and 10 winners of the ACS Arthur C. Cope Award. Collectively, the group holds 25 National Medals of Science and three National Medals of Technology. The list is a "Who's Who" of outstanding researchers, people who helped transform the nature of the chemical industry, and influential teachers.

Readers have come up with a superlative group of contributors, representing the diversity within the far-flung chemical enterprise. Chemistry is an endeavor populated by an extraordinarily large number of exceptionally talented people. Thus, it is inevitable that the list does not contain all the many well-known and brilliant contributors to the chemical enterprise—including many Nobel Prize winners—in industry, academe, and government.

C&EN's goal in its 75th anniversary year is to highlight the important contributions that chemists and chemical engineers have made to society at large. We thank our readers for helping us do just that, we salute all of the contributors to the chemical enterprise, and we invite you to attend the Presidential Event at the ACS national meeting in Boston on Aug. 23, where ACS President Paul H. L. Walter will celebrate and honor C&EN's Top 75.



**Roger Adams**

Jan. 2, 1889–July 6, 1971; born in Boston  
**Education:** A.B., 1909; A.M., 1910; Ph.D., 1912; all from Harvard University

**Major contributions:** Developed uniformly active palladium and platinum catalysts; structural elucidation of natural compounds; toxic alkaloids; organic synthesis; synthetic polymers; studies in steric hindrance and racemization; directed 184 doctoral theses

**Major prizes:** 1946 Priestley Medal; 1964 National Medal of Science; member, National Academy of Sciences



**Alfred Bader**

Born April 28, 1924, in Vienna, Austria  
**Education:** B.S., 1945, Queen's University, Kingston, Ontario; B.A., 1946, Queen's University; M.S., 1947, Queen's University; M.A.,

1949, Harvard University; Ph.D., chemistry, 1950, Harvard University

**Major contributions:** Founded Aldrich Chemical Co. in 1951; cofounded Sigma-Aldrich Corp. in 1975

**Major prizes:** 1995 ACS Charles Lathrop Parsons Award; 1997 Gold Medal of the American Institute of Chemists



**Derek Harold Richard Barton**

Born Sept. 8, 1918, in Gravesend, Kent, England

**Current affiliation:** Texas A&M University, College Station  
**Education:** B.S., 1940; Ph.D., organic

chemistry, 1942; D.Sc., organic chemistry, 1949; all from Imperial College, London

**Major contributions:** Pyrolysis of chlorinated hydrocarbons; molecular rotation correlations; conformational analysis; phenolic radical coupling and biosynthesis; invention of radical reactions; selective functionalization of saturated hydrocarbons

**Major prizes:** 1969 Nobel Prize in Chem-

istry; 1959 ACS Roger Adams Medal (first awardee); 1971 Award in Natural Product Chemistry of the Chemical Society of London (first awardee); 1995 Priestley Medal; 1995 Lavoisier Medal of the French Chemical Society



**Arnold Orville Beckman**

Born April 10, 1900, in Cullom, Ill.

**Education:** B.S., 1922, University of Illinois; M.S., 1923, University of Illinois; Ph.D., photochemistry, 1928, California

Institute of Technology

**Major contributions:** Developed pH meter; founded Beckman Instruments

**Major prizes:** 1988 National Medal of Technology; 1989 National Medal of Science; member, National Academy of Engineering



**Ronald C. D. Breslow**

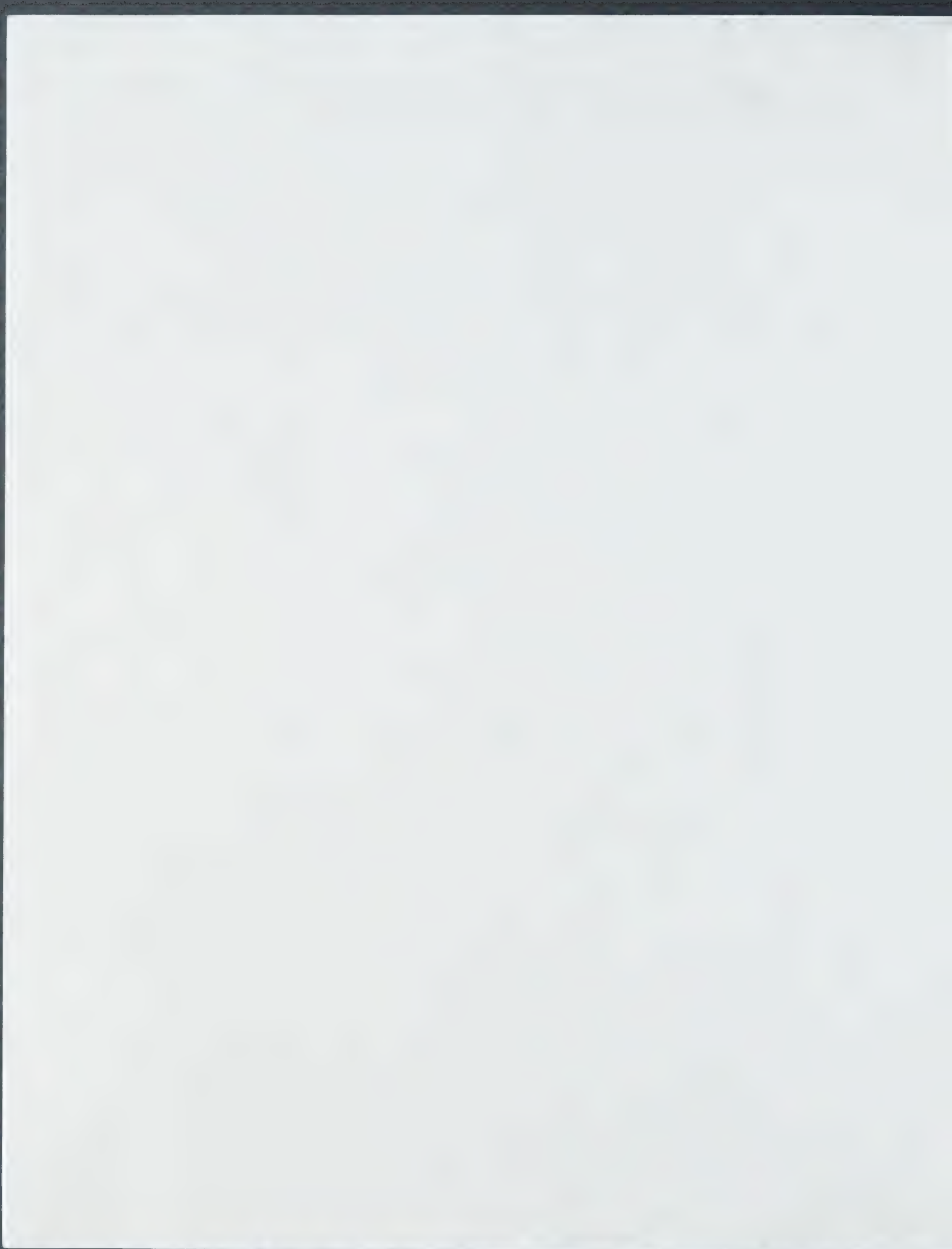
Born March 14, 1931, in Rahway, N.J.

**Current affiliation:** Columbia University  
**Education:** A.B., 1952; A.M., 1953; Ph.D., chemistry, 1955; all from

Harvard University

**Major contributions:** First extended monocyclic aromaticity away from six  $\pi$  electron cases; proposed and demonstrated antiaromaticity; discovered chemical and biochemical reaction mechanisms; invented effective artificial enzymes; invented biomimetic functionalization methods; applied hydrophobic effect to chemical synthesis and mechanisms; invented electrochemical methods for carbon cation, radical, and anion energies; invented novel cytodifferentiation agents

**Major prizes:** 1987 ACS Arthur C. Cope Award; 1989 National Academy of Sciences Award in Chemical Sciences; 1990 Swiss Chemical Society Paracelsus Medal; 1991 National Medal of Science; member, National Academy of Sciences



FAX FROM:

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Astor Hotel - Suite 622  
924 East Juneau Avenue  
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Fax 414/277-0709

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January 20, 1998

To: Mr. Dan Campbell  
Fax: 703-6143

Page 1 of 2

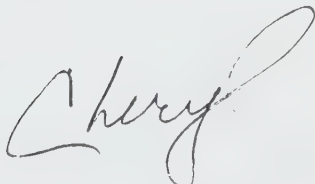
Dear Dan:

As you will recall, the lease between B & K Enterprises, Inc. and the Kohl Corporation, dated May 13, 1982, specifically Article VI, Section 6.2, provides that Kohl Corporation is responsible for reimbursing B & K Enterprises the excess of the current year's Real Estate taxes over the base year of 1981.

I am enclosing therefore a copy of the 1997 Real Estate bill for the Town of Mt. Pleasant in Racine, Wisconsin, totalling \$63,409.71. The base year of 1981 is \$37,876.85. In accordance with the lease provisions, please remit now the additional amount due B & K Enterprises of \$25,532.86. Please voucher this amount for payment.

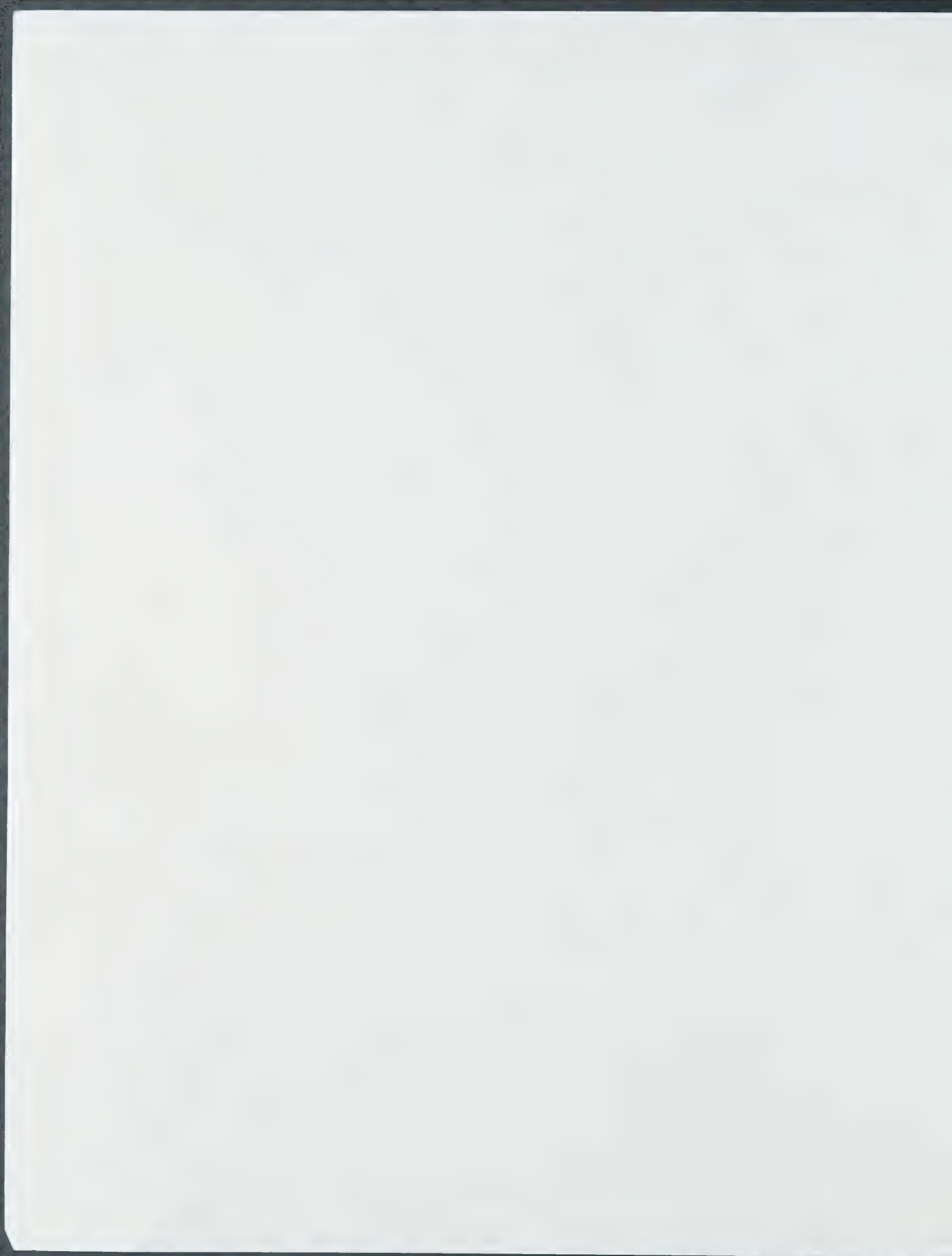
With thanks for your assistance and best regards, I remain,

Yours sincerely,



Cheryl Weiss  
Office Manager

Enclosure





# COMMENT

## America the fair?

JOHN EMSLEY

To celebrate its 75th anniversary, *Chemical & Engineering News*, the magazine of the American Chemical Society, polled its readers on who were the 75 most influential chemists of the past 75 years. Last month it published the results. The vast majority of the 75 were Americans, with Britons next, although there were only six of them on the list: Derek Barton, Francis Crick, Dorothy Hodgkin, Christopher Ingold, Robert Robinson and Geoffrey Wilkinson.

The brief for selecting this pantheon of chemical worthies was that they should be 'distinguished contributors to the chemical enterprise' and readers were told to think globally. In fact, they mainly thought patriotically. Madeleine Jacobs, editor of *C&EN*, told me that readers had put forward 1200 names, but assured me that all entries had been carefully scrutinised to ensure no ballot rigging.

So what did she think of the outcome? 'I was disappointed that our readers did not nominate more people from the international community,' she said. 'Chemistry is an endeavour populated by an extraordinarily large number of exceptionally talented people. Thus it is inevitable that the list does not contain all the many well-known and brilliant contributors to chemical enterprise — including many Nobel Prize winners.'

Perhaps we should not be surprised that Americans favour fellow Americans, but it doesn't explain why we Brits did so badly. After all, we speak the same language, so communication is not the problem. I searched for other ways of assessing chemists, to support my belief that we should have ranked more highly.

Turning to a listing of Nobel Prize winners, I discovered that the UK has had more than its fair share — 21 in the past 75 years. Yet few make the *C&EN* list, though it does include 35 Nobel laureates, chosen rather selectively. For example, of the chemists who shared the 1996 prize for  $C_{60}$ , Richard Smalley features, but not Harry Kroto. Here, surely, was evidence of US parochialism.

Perhaps I was being paranoid — so I consulted Professor Steve Ley of Cambridge University. What did he think of the chosen 75?

'While I agree with many of the people on the list, I'm puzzled why other British Nobel

prizewinners in chemistry were not cited,' he said. 'For example, I would have expected to see Frederick Sanger, who won two Nobel Prizes for chemistry, as well as Aaron Klug, Alexander Todd, and both R G W Norrish and George Porter, who were the founders of photochemistry. Then again, where on the list is Richard Ernst, of NMR fame, and what about Otto Diels and Kurt Alder? They won the 1950 Nobel Prize for the reaction which bears their name.'



Dr who? ACS members didn't rate Harry Kroto

Clearly not only British, but European, geniuses had been overlooked, and the same was true of our industrial chemists. Naturally I expected to find such eminent people as Alfred Bader, Henry Dow, Pierre DuPont and George Eastman, but where was Fritz Haber, and the giants who built up European companies such as ICI? And while *C&EN* members honoured Wallace Carothers for nylon, they ignored Rex Whinfield and James Dickson, the two Britons who discovered the world's best-loved polymer, polyester.

The Institute for Scientific Information in Philadelphia also assesses chemists. It notes every research paper published and records the number of times it is cited. I asked David Pendlebury of ISI which chemists had been most cited in past 15 years, and he came up with a list of the top 50.

Dear Alfred - not quite as pointed as I intended but it made the same points nevertheless. It provoked a letter from Peter Morris who works at the Science Museum and who seems to think Pople was on the C&EN's top 75  
Best regards  
John

Heading it was theoretician John Anthony Pople, whose work at Carnegie Mellon University, Pittsburgh has collected 14,000 citations. Second on the list with 13,100 was Richard Robert Ernst, who won the 1991 Nobel Prize for chemistry for his work on high-resolution NMR. Third was George M Whitesides of Harvard University, whose work had amassed 12,300 citations.

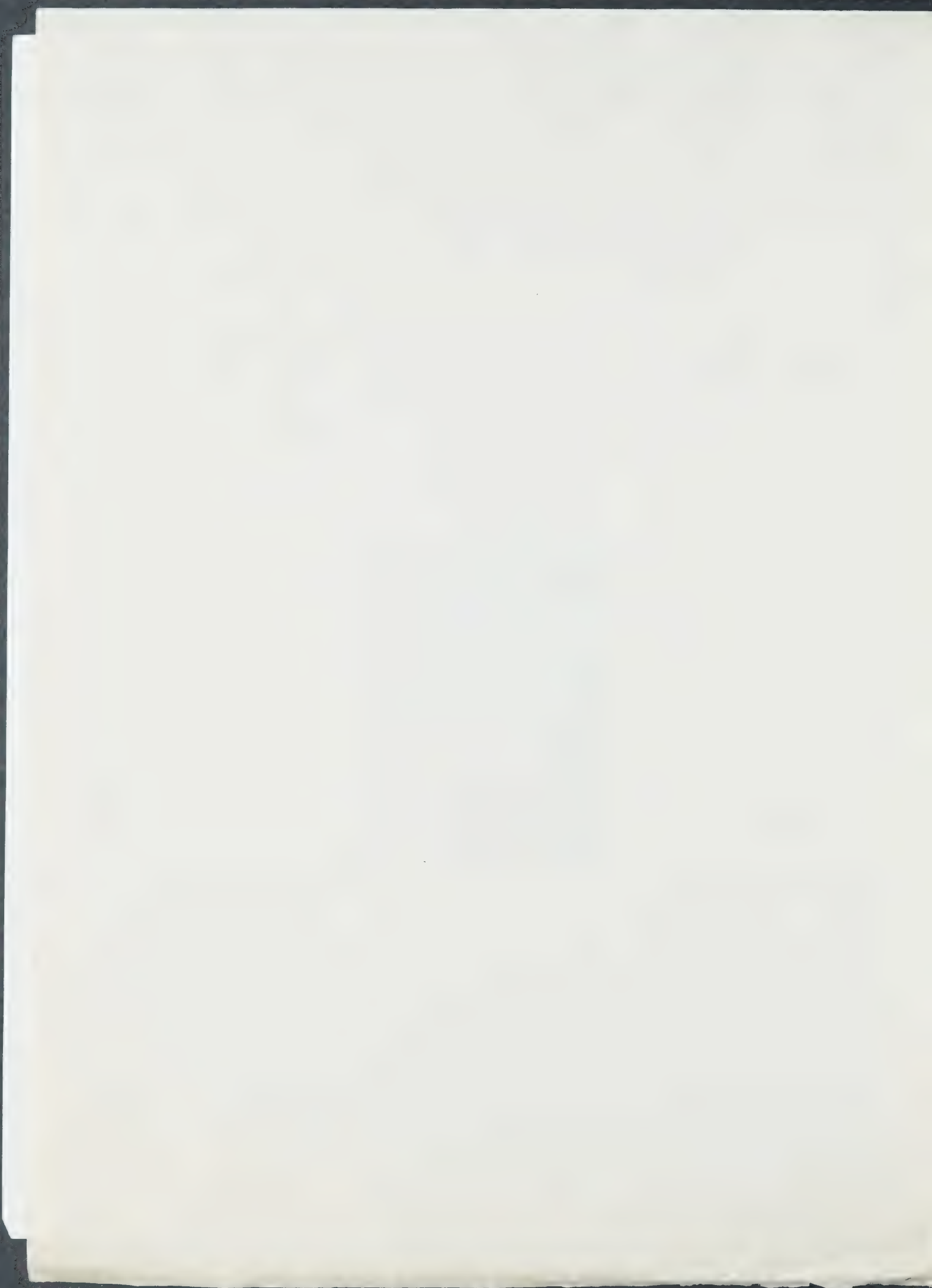
All were absent from the *C&EN* list, so perhaps the missing Brits were in good company. In fact, I had to go down to chemist number nine, Jean-Marie Lehn (10,800 citations), before I came to a name the readers of *C&EN* had elected. However, what I found most disconcerting was that the ISI list contained almost no Britons.

So what is happening? I don't believe that there is a lack of brilliant British chemists, so why do they not get international recognition? Somehow our best chemists fail to achieve the high profile they need in order to be noticed. The answer, I feel, lies deep in the British psyche. Perhaps we really are a nation of back-stabbers and whingers, more often criticising our colleagues than applauding them. If so, then we really are going to have to change if we want the world to take note of what we achieve, and to give it due recognition.

As we approach the new millennium we need to take stock of our position. A generation ago, British chemists were internationally acclaimed and well represented at every conference, and often carried off Nobel Prizes. In addition we had a highly profitable and innovative chemicals industry, and this we still have — just.

But the world moved on, and we rested on our laurels. That phase, I believe, has now run its course, and I am reassured in thinking this is so by the attitude of the young chemists I meet. They are no longer seen as stereotyped 'boffins', no longer frightened of publicity and the media, no longer willing to let others win the race. I believe that in the new millennium the Americans — and the world — will find it impossible to ignore them.

Dr Emsley is science writer in residence at the Department of Chemistry, University of Cambridge.





TO: Investor Limited Partners  
FROM: Beverly L. Bergman  
DATE: February 17, 1998  
RE: **NANTUCKET ISLAND ASSOCIATES LIMITED PARTNERSHIP**  
**(the "Partnership")**

---

The purpose of this correspondence is to inform limited partners that Winthrop, on behalf of the Partnership, has recently hired an unaffiliated third party broker to market for sale certain of the properties in the Partnership's portfolio, specifically, the White Elephant Hotel, the Harbor House and the Boat Basin (the "Properties").

As reported, the Partnership has completed substantially all of the proposed capital improvements to these Properties utilizing funds raised in connection with the Partnership's Preferred Rights Offering. The general partner believes that as a result of the recent renovations, the Properties may be well postured for sale. In addition, now is an advantageous time to actively market these Properties for sale due to the improvement in the hotel industry and the recovery of the overall area economy.

Proceeds generated from the disposition of the Properties must first be used to pay down a portion of the debt encumbering the Properties in accordance with the terms of the financing. Remaining proceeds will be distributed to the Preferred Unitholders and the balance, if any, to the Unitholders in accordance with, and pursuant to, the terms of the Amended and Restated Limited Partnership Agreement.

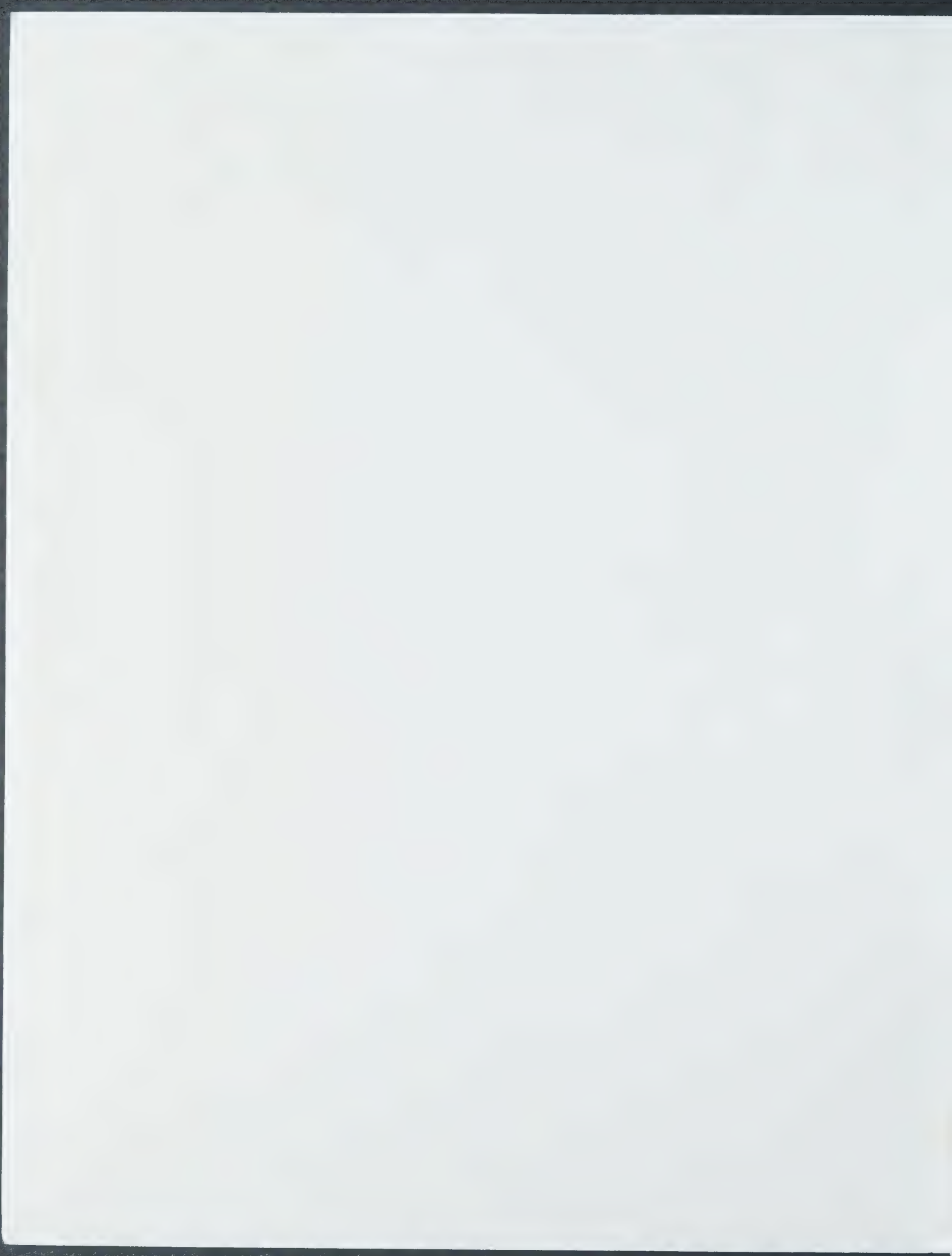
The retail properties owned by the Partnership are not currently being marketed for sale. The general partner believes that the retail market will continue to improve and that marketing the retail properties today would be premature. The retail properties continue to be 100% occupied in a solid commercial market commanding increasing rents.

We will continue to keep limited partners apprised of developments as they transpire. In the interim, please do not hesitate to contact me at (617) 234-3007 if you have any questions.

*Copy to MK*

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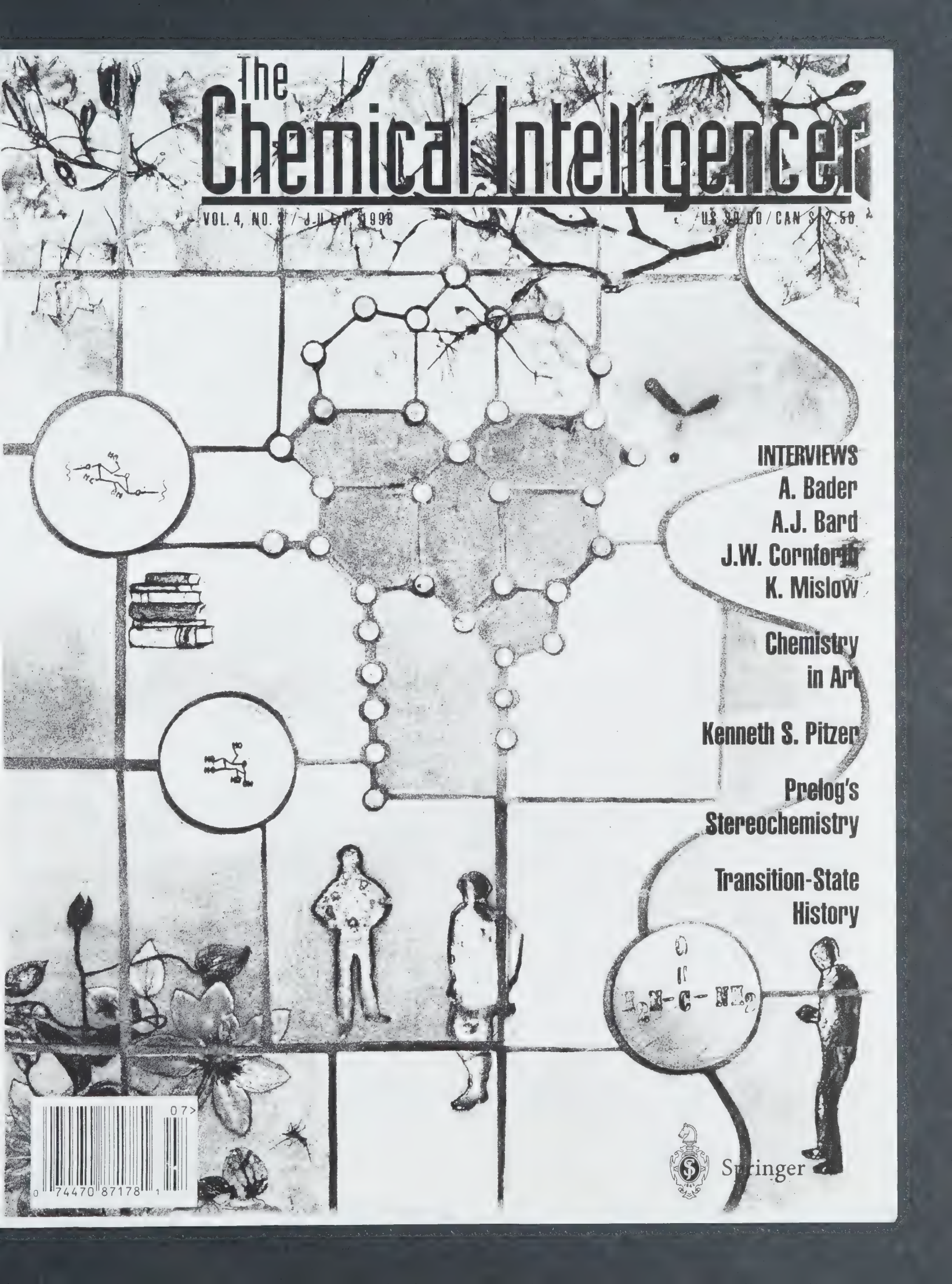
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San Rafael, CA 94901-5529  
415-460-6497



# The Chemical Intelligencer

VOL. 4, NO. 7 / JULY 1998

US \$9.00 / CAN \$12.50



**INTERVIEWS**  
A. Bader  
A.J. Bard  
J.W. Cornforth  
K. Mislow

**Chemistry  
in Art**

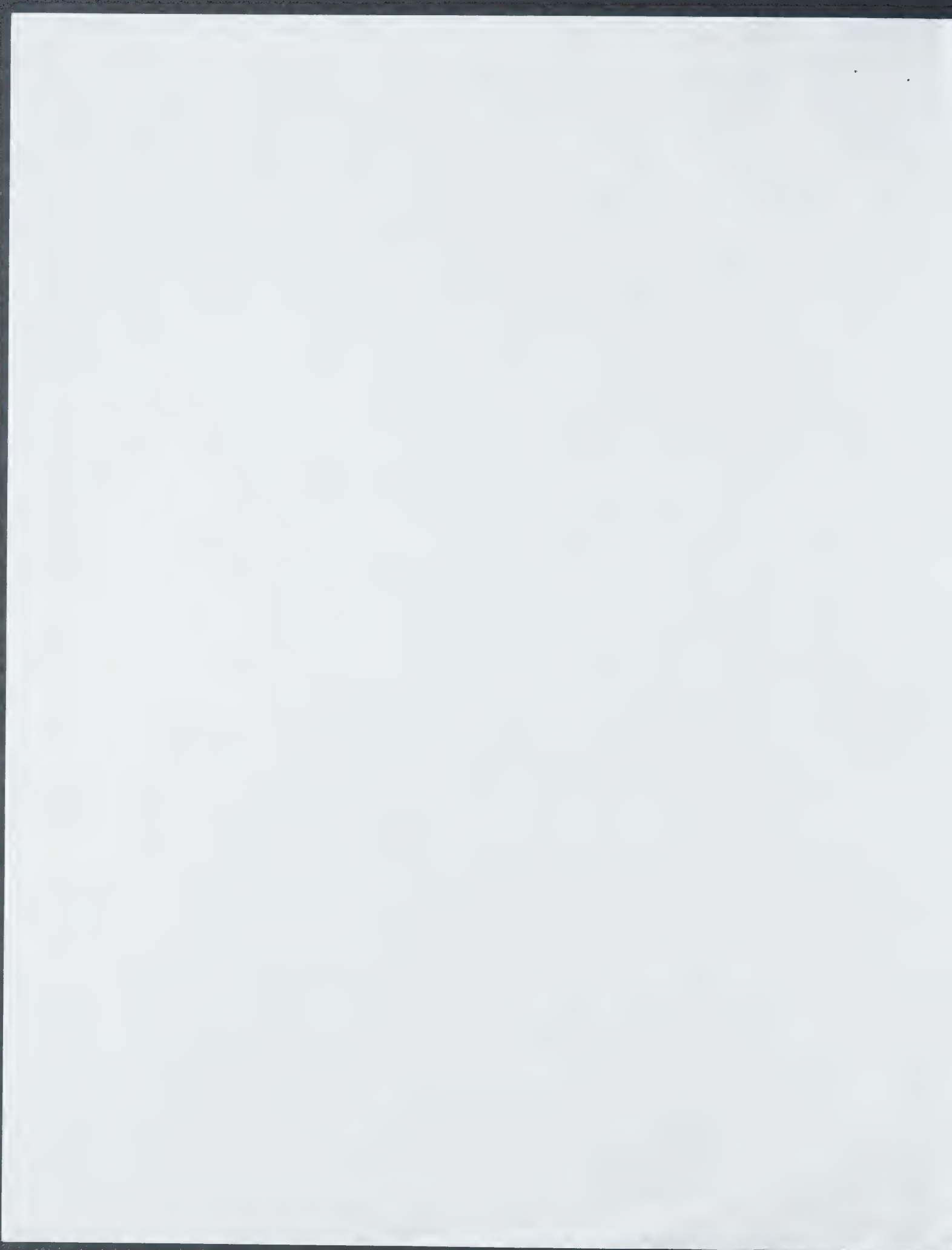
**Kenneth S. Pitzer**

**Prelog's  
Stereochemistry**

**Transition-State  
History**



Springer





# Alfred Bader

I S T V Á N H A R G I T T A I

*Alfred Bader (b. 1924 in Vienna, Austria) went to Britain in 1938 in a children's refugee group. In 1940 he was interned and sent to Canada. In 1941 he entered Queen's University and earned an M.Sc. degree in engineering chemistry. He did his Ph.D. work in synthetic organic chemistry at Harvard University under the supervision of Louis F. Fieser between 1947 and 1949. He cofounded the highly successful Aldrich Chemical Company in 1951. Following an eventual merger with the Sigma Chemical Company, Sigma-Aldrich is now the world's largest supplier of research chemicals. After 40 years of an extraordinarily successful career, Dr. Bader was forced out of the company [this was the topic of a previous article: P. Bruce Buchan, "Three Boards and 'A Bet Against the Company,'" The Chemical Intelligencer 1996, 2(4), 24-29, 41]. Since then, Dr. Bader has continued to pursue his other long-time interest as an art collector and dealer. His autobiography has been published [Alfred Bader, Adventures of a Chemist Collector; Weidenfeld and Nicolson: London, 1995]. Our conversation was recorded in Dr. Bader's gallery and in the Baders' home in Milwaukee on November 8, 1995, and a note was added by Dr. Bader in February, 1998.*

**ISTVÁN HARGITTAI (IH):** I would like to ask you about your work in chemistry. Not only did you create the famous company Aldrich, found *Aldrichimica Acta*, and build up a remarkable art collection, but you have also done a considerable amount of research in organic synthesis.

**ALFRED BADER (AB):** I first became interested in research in my senior year as an undergraduate at Queen's University. There was a very good teacher, Professor Norman Jones, a famous spectroscopist. He allowed me to do a research project, which I enjoyed. Then I got a very fine job with a paint company in Montreal, and a year and a half later the president of the company suggested that I go on with my studies and offered me company support. I did my Ph.D. studies at Harvard in

1947-49 with Louis Fieser, who traveled so much at that time that his students saw very little of him. But there were many able chemists, students and faculty, who were very helpful.

Louis Fieser simply said to me, "Here's a quinone; in alkali it turns red, overnight it turns yellow. Find out what happens." A year and a half later, he came into my lab and asked me, "How is that project going?" I said I'd solved it. Fieser said "Give a seminar." He was satisfied, said, "write it up for a paper," and there it was. So all went well, but I realized one thing: I was not a world-class chemist. I was a very good experimentalist, but there were many things I didn't understand in theoretical chemistry.

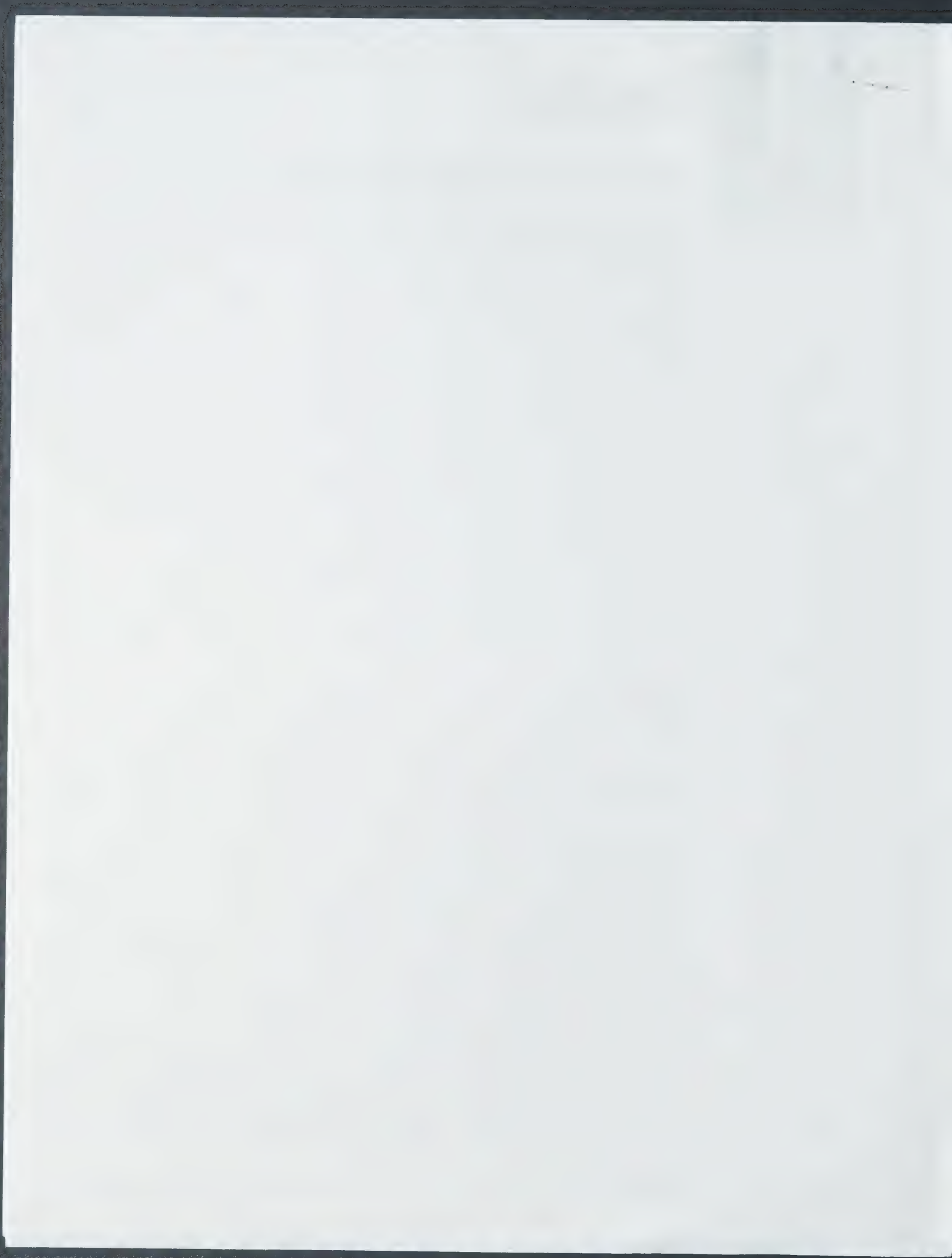
I felt obligated to go back to the paint company in Montreal,

but it had been bought by the Pittsburgh Glass Co., whose paint research was concentrated in Milwaukee. So that is how I came here in January 1950. The company gave me a job but had no idea what to do with me. All the research they did was oil chemistry—linseed oil, soybean oil—and here was a Ph.D. chemist from Harvard trained in synthetic chemistry. But they left me alone, and I got interested in producing monomers from inexpensive starting materials—phenol with butadiene, cyclopentadiene and isoprene, for instance. The literature said that chemists had tried the reactions and they didn't work. But I found that if I controlled the catalyst concentration carefully, I could make them work. We had a whole series of unsaturated phenols, easily made from starting materials costing pennies.

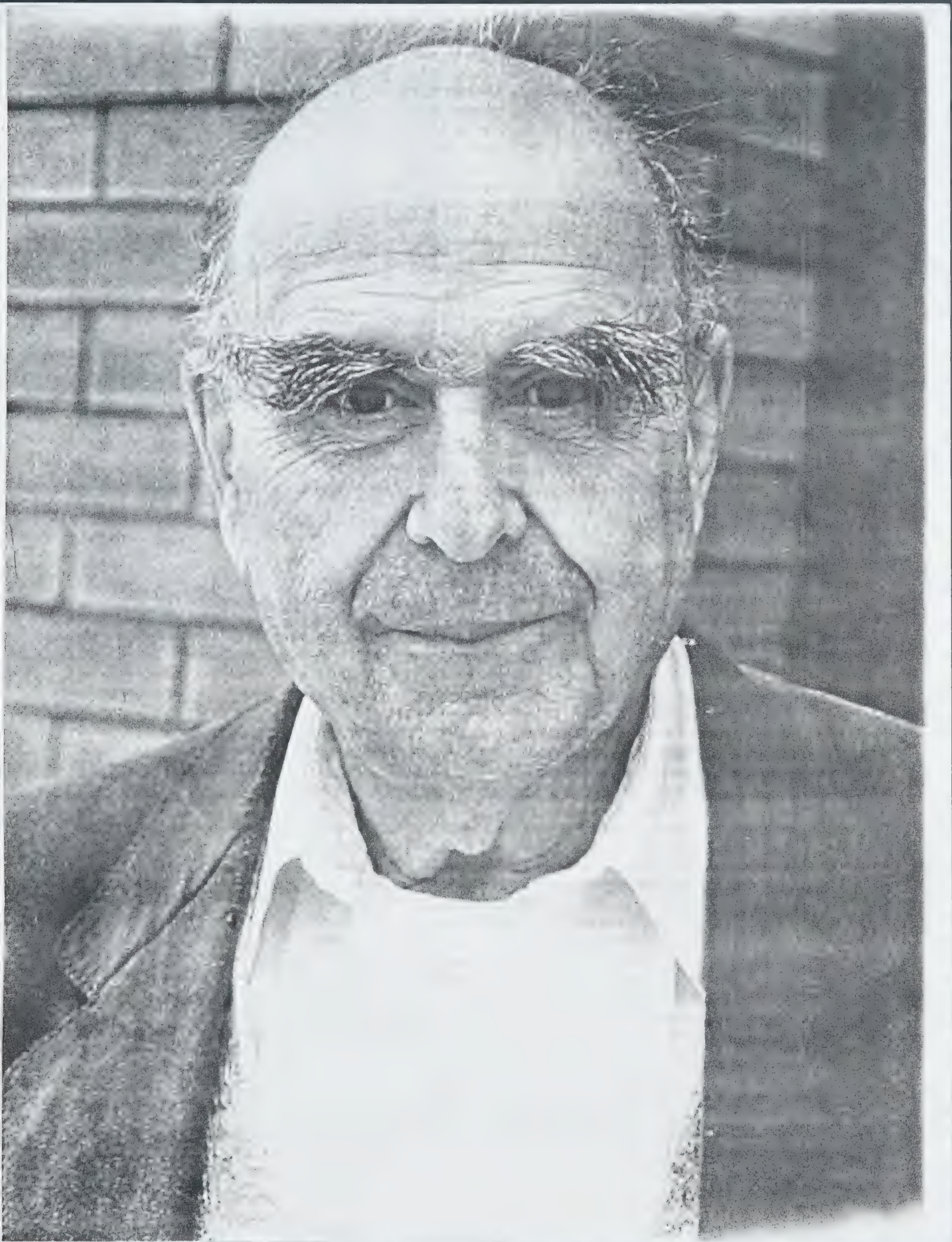
One day a salesman from Quaker Oats stopped by and said levulinic acid would soon be available very inexpensively from Quaker Oats. The moment I heard that, I made the bisphenol by reacting levulinic acid with phenol to make what is now called diphenolic acid. A few weeks later, I sent a note off to *JACS*. Soon Johnson Wax wanted to buy the patent for which we'd applied. Our director of research asked me, "What should we charge for this?" I said "It was two days work; if we got ten thousand dollars, we would be well paid, but they must want it very badly, so ask for a million!" Well, he got it. Then, of course, lawyers descended on my lab to make sure everything I worked on was really patented, but I had already seen to that.

In 1954, PPG decided to move its research to Pittsburgh, but I didn't want to go there, left the paint company, and devoted myself full time to Aldrich. Shortly after arriving in Milwaukee, I had asked my direc-

Alfred Bader in front of his home.  
(Photo by I. Hargittai.)











In front of a painting of his "Mother" (his father's sister, Gisela Reich, née Bader, painted by Tom von Dreger in 1917).

tor of research whether he would allow me to start a small fine chemicals division. At that time, Eastman Kodak had a monopoly but offered only 4000 compounds. I thought we could easily make 250 compounds a year that were not in the Kodak catalog. I was told that PPG was not interested; nobody could compete with Kodak. Yet today Kodak is no longer in the fine chemicals business. I felt that Kodak was not doing a good job and that chemists would be glad to have another source. So a lawyer friend and I set up a small company, Aldrich, very much a weekend operation with a capital of \$500.

In the mid-1950s, when I visited customers, they would say, "Aldrich, you're the cheap people." Kodak was very expensive, and they didn't really care about their fine chemicals business. They even had an ad in which

they admitted their service was poor. As a response, we published an ad saying "Please, bother us! We hope we never get so big that you can't talk to us."

**IH:** You've built up a library of chemicals. Where is it now?

**AB:** At Aldrich. It's close to 100,000 compounds. We have many famous chemists' research samples. For instance, Louis Fieser's, Bob Woodward's, Tadeus Reichstein's, you name them. A great many good things have come out of this library. Suppose that a medicinal chemist has an idea that a given bromolactone has some medicinal effect. He can contact Aldrich and get a computer printout of every bromolactone and order whichever he wants at \$40 a sample.

Some years ago a medicinal chemist in California, Dr. Summers, believed that acridines might help in the treatment of Alzheimer patients. He asked for our list of acridines, ordered some of each, and then he came back wanting 100 grams, then a kilo, then 10 kilos of one particular acridine. Years earlier, a Viennese chemist, Dr. Pickholz, working in London, had said to me, "I've got this acridine, aminotetrahydroacridine; I think it's important in brain chemistry, I don't know how, but take a little, and we'll teach you how to make it." For years, there was little interest in it until Dr. Summers came along. The rest is history: THA was, I believe, the first drug licensed by the FDA in the treatment of Alzheimer's disease.

**IH:** Should there be a universal library of all compounds?

**AB:** If there were a universal library, it would be run by some government agency, and it would be much more cumbersome to get samples. With Aldrich, it's very simple. It used to be called the Alfred Bader Library or the ABC Library, but when I was thrown out of the

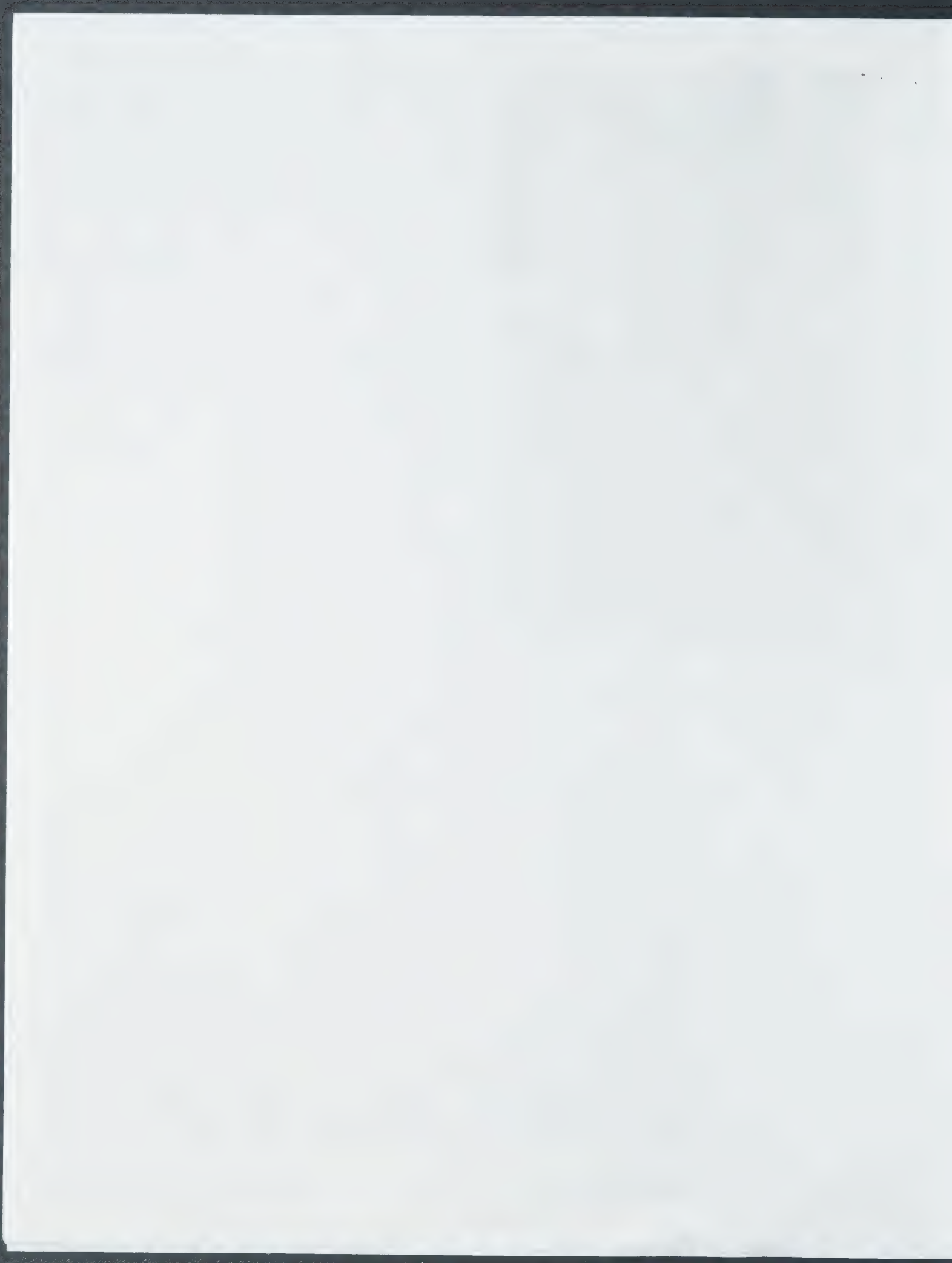
company, they dropped the Alfred Bader. Even ABC was too close; it's now called the Sigma-Aldrich Library, but it's still the same. Sales now exceed 2 million dollars a year, with many thousands of samples going out.

**IH:** What are the criteria for a compound to get into this library?

**AB:** It must not be in the Aldrich catalog, and it must be clearly labeled. We don't analyze for the library, but we buy only from reputable researchers. Maybe two or three percent of the compounds are not what the researcher thought 20 or 30 years ago, and about 10% are not very pure.

**IH:** You said you didn't want to be so big. Why then did you merge with Sigma?

**AB:** It seemed to me in the late 1960s, early 1970s—but now I think I was mistaken—that organic chemistry had peaked. Woodward had synthesized strychnine; what more was there to do? This was before I really understood H.C. Brown's hydroboration. This was before Barry Sharpless's epoxidations. There's so much that has been done since. But I thought that most of the research funds would come to biochemistry and biomedical applications. I visited Sigma in St. Louis in the late 1960s and proposed a merger, and they almost threw me out physically. Then Sigma went public in 1972 and had some bad publicity and its stock dropped from 22 to 11. They were very thin in top management. At that point they listened to me, and the merger was very good for everybody. Only Dan Broida, the head of Sigma, was against the merger. He was very dictatorial, but immensely hard-working, and you could call him day and night, collect. He'd built Sigma sales to about 30 million dollars a year. Our combined sales then were about 45 million dollars. This





Isabel and Alfred Bader in their living room.

year the sales of Sigma-Aldrich will be close to 1 billion dollars.

**IH:** You are still a stockholder; does it give you any say in company matters?

**AB:** I'm the largest individual stockholder, but it doesn't give me any say whatever.

**IH:** For decades you've been visiting synthetic chemistry laboratories in the best universities. Can you share some of your experiences with us?

**AB:** I don't see great differences among the countries where I used to go. Funding is very much more difficult in Britain than in either Germany or the United States. The laboratories and the equipment are very much better in Germany and in the United States than in Britain. If you compare 1995 with 1950, a good chemist nowadays could finish my Ph.D. work in a month; it took me a year and a half. There's so much more

equipment around now. Then NMR was unknown, and there was no mass spec. We had an infrared spectrometer at Harvard; it was a big instrument and was on the blink 20% of the time, but it worked. It was amazing to listen to Bob Woodward or Gilbert Stork interpreting the spectra.

Today, synthetic work can be done in so much smaller quantities than then. In our library of research chemicals, I can tell by looking at Woodward's students' bottles when the compound was made. In the 1940s and 1950s, you had gram quantities; in the early 1970s, you had 100-milligram quantities. Today 5 or 10 milligrams suffices.

**IH:** What do you think about the image of chemistry?

**AB:** There has been a tremendous change, much for the worse. If you had gone to Harvard Square in 1947 and asked people on the street, "What's your first reaction to chemistry?" they would have said, "vitamins, new plastics, new drugs." Do it today and they answer, "pollution and carcinogenic chemicals." We have not done a good job pointing out how much chemistry does. This is terrible—not for chemistry but for the world. When young, brilliant students see, for instance, the world sinking into a cesspool of toxic chemicals on the cover of *Time* magazine, why should they want to become chemists? We rely on the media, and the media have done badly. I remember a headline in the *Milwaukee Journal* saying "Benzene Found in a Well near Chemical Company." But the details in the text were that two parts per billion of benzene had been found. This is crazy. It's next to nothing. Our analytical ability has changed so that today we can show that everything is everywhere.

It's also true that there have

been chemical industries that have done very wrong things, and then tried to hide them. The word chemistry has become an ugly word, but everything is chemical.

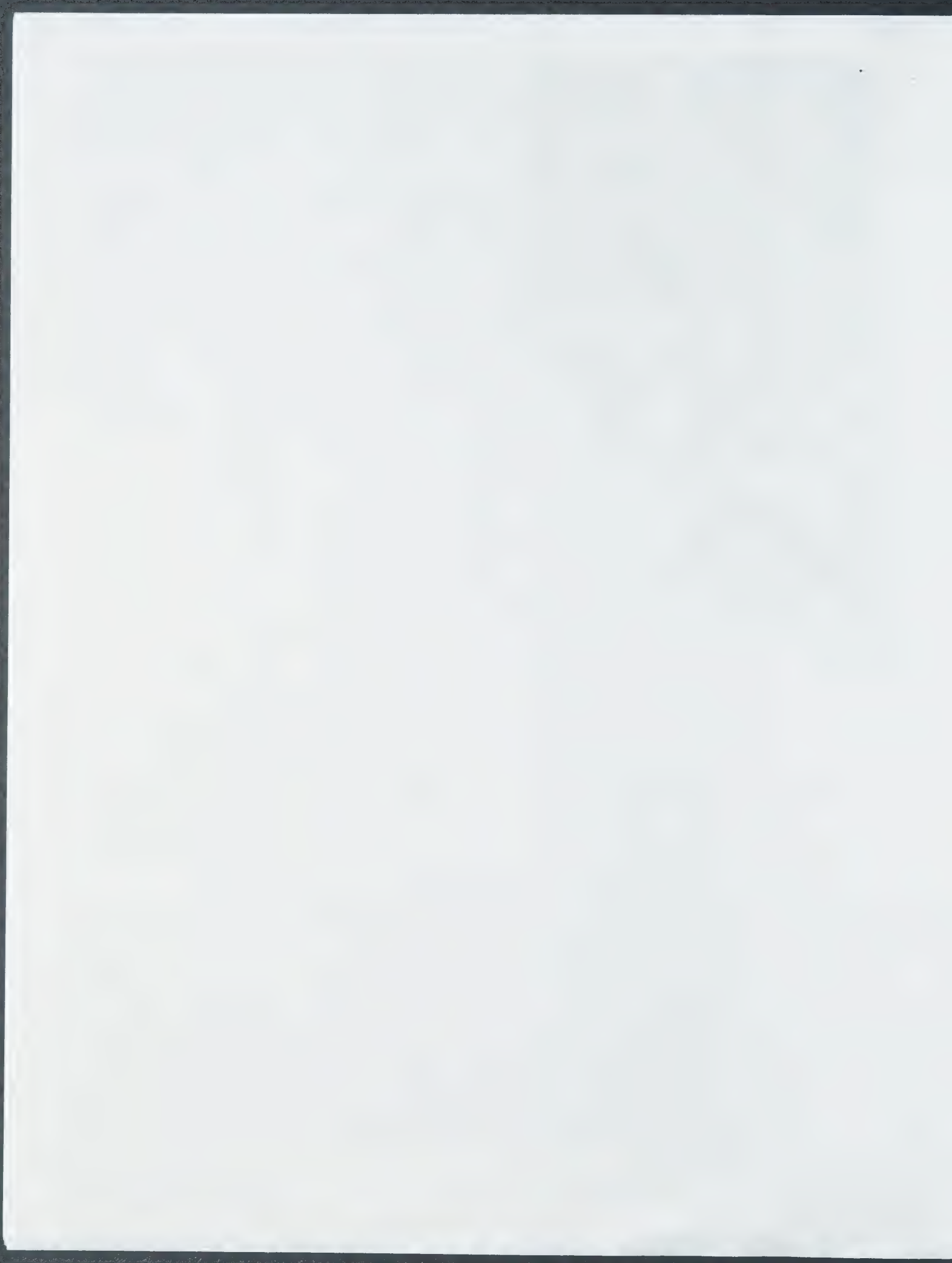
**IH:** To how many addresses is *Aldrichimica Acta* delivered?

**AB:** It's free of charge, of course, and it goes to about 200,000 scientists worldwide. We have had very good papers in it. Over the years, we have established a number of awards in America, Canada, Britain, and the Czech Republic. We used to ask the award winners to submit papers on their award addresses.

**IH:** Is there any connection between your collecting chemicals and collecting paintings of old masters?

**AB:** These are completely separate matters. Take the chemicals first. No chemist wants to throw out his research samples. Unfortunately, when a professor dies or retires, these are often discarded. I could tell you story after story. For instance, Professor Haworth's compounds at Birmingham—I feel so unhappy thinking about this every time I go to Birmingham. Here were thousands of his crystalline sugars, so difficult to crystallize. Some bureaucrat got worried, and they put many of these samples together into biscuit tins, poured in cement on them, and threw them out. Imagine the idiocy of throwing out these crystals because some fool was afraid of these sugars!

Some years ago we went to Ames, Iowa, where all the Henry Gilman samples were stored in one big room, thousands of them. A company wanted \$8000 to remove them. I offered to pay for the chemicals and send a truck to pick them up. The only mistake we made was that the truck we sent wasn't big enough so we had to send it twice. There were 20,000 bottles. We immediately discarded



about 12,000 because these were chemicals which Aldrich listed. There were another few thousand where the labels had fallen off or the materials had decomposed. We were still left with 3,000 chemicals and we published a little yellow catalog of the Gilman samples, just as we published a blue catalog of Woodward's samples.

About collecting paintings, when I was a kid, I lived in a home surrounded by paintings, but they were modern Austrian, and I didn't like them. In time, I realized that I liked Dutch historical paintings and Dutch portraits best. In the early 1950s, I started buying pictures that I liked and that I could afford. Today I'm a dealer as well as a collector. I buy about 200 paintings a year. Last month I bought a very fine Rembrandt and yesterday I bought a beautiful Ter Borch, probably the best outside of a museum. But I'm trying to have a nonelitist gallery. I have many pictures here from a hundred dollars up. On the other hand, the Rembrandt cost several million dollars, but we never bring such expensive paintings to Milwaukee. I spend about a third of my time buying and selling paintings, another third writing, and the remaining third working with chemical companies. I invest in them, consult and advise them. I'm trying to find customers for them and suggesting new products. I just bought a 10% interest in a large but very ailing English company, called Anglo United, which owns Coalite. I know Coalite Chemical very well, and I think I may be able to help them.

**IH:** Do you now do 100% what you like to do?

**AB:** Yes. I'm far happier today doing what I'm doing than I was four years ago. Then I had to work with the top management of Sigma-Aldrich in St. Louis. In the hundreds of meetings in

hundreds of days in St. Louis, there was never a day that I really enjoyed myself there.

**IH:** What do you miss from those days?

**AB:** The most enjoyable part of my work was the 50% when my wife, Isabel, and I simply walked from lab to lab, talking to students, asking them, "What are you making that Aldrich should be offering? What do you need? What should we add to our Catalog?" My last such visit was early in 1992, before I was thrown out of the company, and I really miss those visits.

The most productive visits were to the top schools. We realized early on that 90% of the best research is done in 10% of the universities.

We would spend a most enjoyable day on the sixth floor of Chandler at Columbia University, for example, talking to each of the Gilbert Stork students, learning what they were doing and what they needed. Then a year or two later, I'd meet the same students as post-docs at the ETH or Cambridge, and two years later they'd have their first Assistant Professorship at an American university. It was a wonderful give-and-take. I was far better at that than I ever was as research chemist.

**IH:** You give a great emphasis in your autobiography on your being Jewish. But you are Jewish by choice. You might have become Catholic like your mother's side of the family.

**AB:** I was adopted by my father's sister, a Jewess. I also studied Judaism. At the time of the *Anschluß*, I was a boy of 14 in Vienna and saw all the propaganda of how terrible Jews were. I ask myself the question, "What if these people are right?" So I felt I had to study Judaism, and it became clear to me that the Nazis weren't right. I'm a convinced Jew and my two wives, Danny and Isabel, who both came from religious Protestant

backgrounds, became convinced Jewesses.

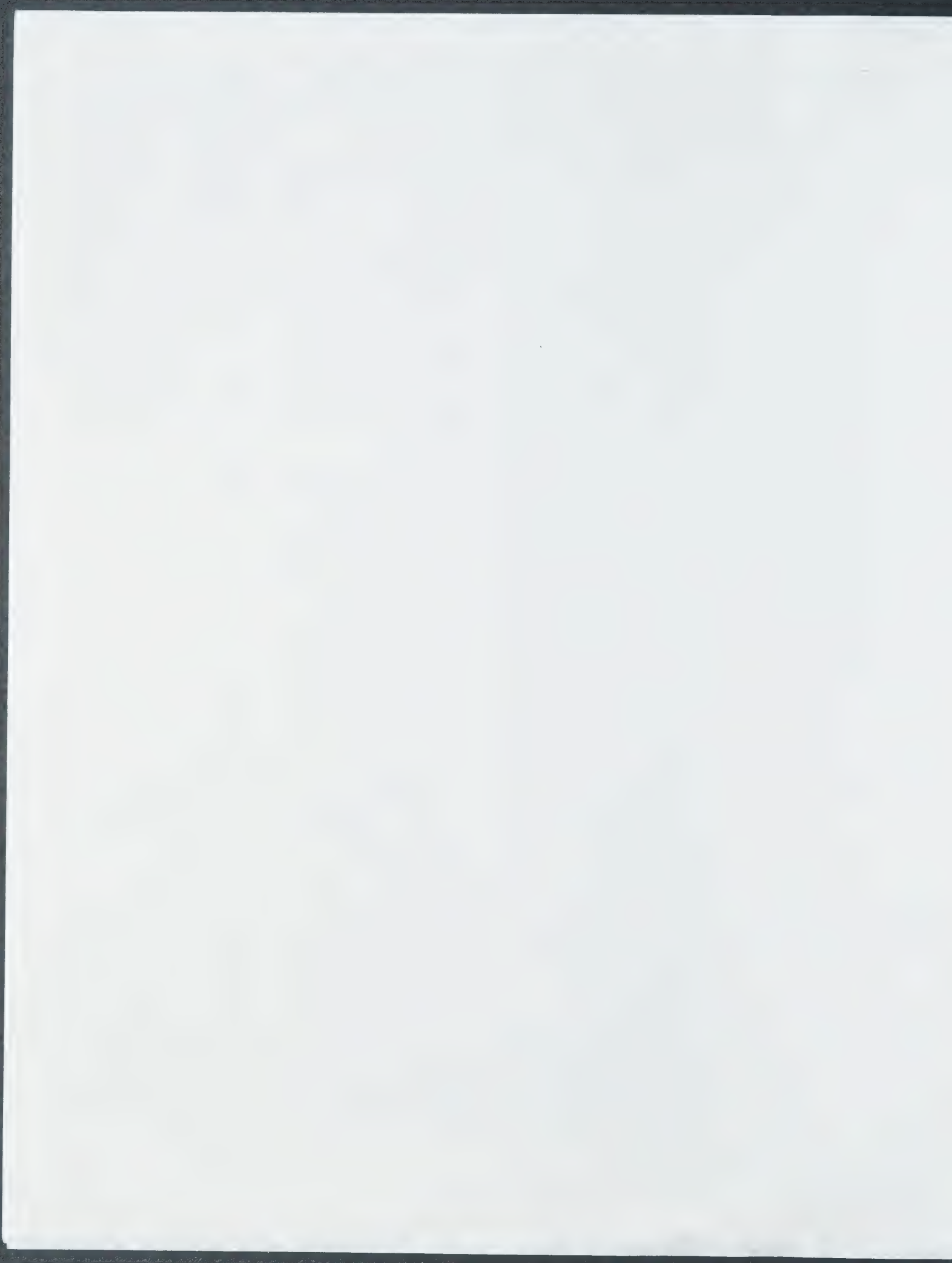
Coming back to the question about my Catholic mother, I hardly knew her. She would come once a month to the house, and occasionally she would say, "Bobby [as I was called then], anyone who could be a Catholic and isn't is going to go to Hell." I didn't really know her as a person. I very much wanted to visit her in October of 1947. She was then very sick and I asked Louis Fieser for three weeks off. "No," he said, "if you go, you'll lose your fellowship. Go next summer." Sadly, my mother died in April of 1948.

**IH:** Referring to your two interests, what do you find common to chemistry and art?

**AB:** First of all, there is the restoration of paintings. This relies heavily on the knowledge of chemistry. Second, for hundreds of years, artists have tried to create something beautiful. Many artists today are desperately trying to create something new. They often use chemistry in their search for new materials.

People often ask me whether I restore my own paintings. I never do. When I buy a dirty old painting, I determine whether there is much nicotine on it. Often just saliva will take a lot of dirt off. But I stop at that point and work with two very competent conservators. I have just acquired a painting which may be a late Rembrandt, with a terrible varnish. When it is cleaned, we'll know better.

The conservators have to choose the right solvents, which usually take off the varnishes easily. The cleaning has to be done very carefully, and it may take a very long time. Often there is overpaint that has to be removed. Today we realize that all restoration should be reversible, but it wasn't so 200 years ago. Today competent inpainting is done over an easily removed varnish. Years ago, re-





storers often painted oil on oil. Almost all paints were based on linseed oil, which takes 300 or 400 years to polymerize completely by oxidation. If a painting from the sixteenth century was overpainted in the seventeenth century, that overpaint has also polymerized and is very difficult to remove.

When I say overpaint, I'm not speaking of painting a new picture over another one. In the past, paintings were not so valuable, and possible damages and paint losses may have been corrected in an unprofessional manner. The restorers may have just been house painters, who overpainted much more than was needed. I have seen a little book, published in London in 1752, entitled *How to Be a Butler*. It advises that if the master has a dirty painting, the butler should take a bucket of wood alcohol (i.e., methanol) and a sponge. This would take off the dirt, but also the varnish and the top of the paint layer. There are so many paintings that have been skinned because the top layers have been removed.

I like nothing better than to find a seventeenth-century painting to which nothing has been done. After 400 years, the polymerized paint film is practically indestructible, so the paint film holds the canvas together. But most paintings have been relined because over the years the canvas became as brittle as old paper. Restorers came along and backed the original canvas with a new canvas, putting glue in between. They'd put the painting face down, add a layer of glue, and the new canvas. Then they would use a hot iron to make sure that the new canvas adhered to the old. But when you do that to a thickly painted picture, the paint film gets flattened out, and this is terrible. Today, of course, competent restorers, if they have to reline, do it on a vacu-

um table so that the paint film doesn't get flattened out, but it is preferable to avoid relining altogether.

**IH:** What was the biggest mistake you made in the building of Aldrich and Sigma-Aldrich?

**AB:** We had some great chemists, but I didn't treat them well enough financially, and they left.

We started the company in 1951 with a capital of \$500, and I had to be penny-pinching. This was nothing new to me. I had never had any money, and even now I am still careful on a personal level. I realize that I should have been more generous with our best people.

**IH:** Was there any question in our conversation that you'd like to return to?

**AB:** Yes, concerning Aldrich. Clearly, my heart is with the company. I'm very proud of having founded Aldrich. Today research is different from the way it was in 1950 because Sigma-Aldrich supplies so many thousands of chemicals. We've made research very much easier and saved chemists of the world millions of hours that they can now devote to their own research rather than to making starting materials. I'm very proud of what I've done and of the many friends I've made around the world.

*Added on February 23, 1998:*

It is great fun—and instructive—to read what I said two-and-a-half years ago.

Fundamentally, nothing much has changed. Isabel and I now divide our time four ways: working with small chemical companies—and actually being involved in the start-up of two—takes about one-third of our time.

Of course I am proud of the service that Sigma-Aldrich has provided to chemists, but I had really no idea quite how many friends we had among chemists

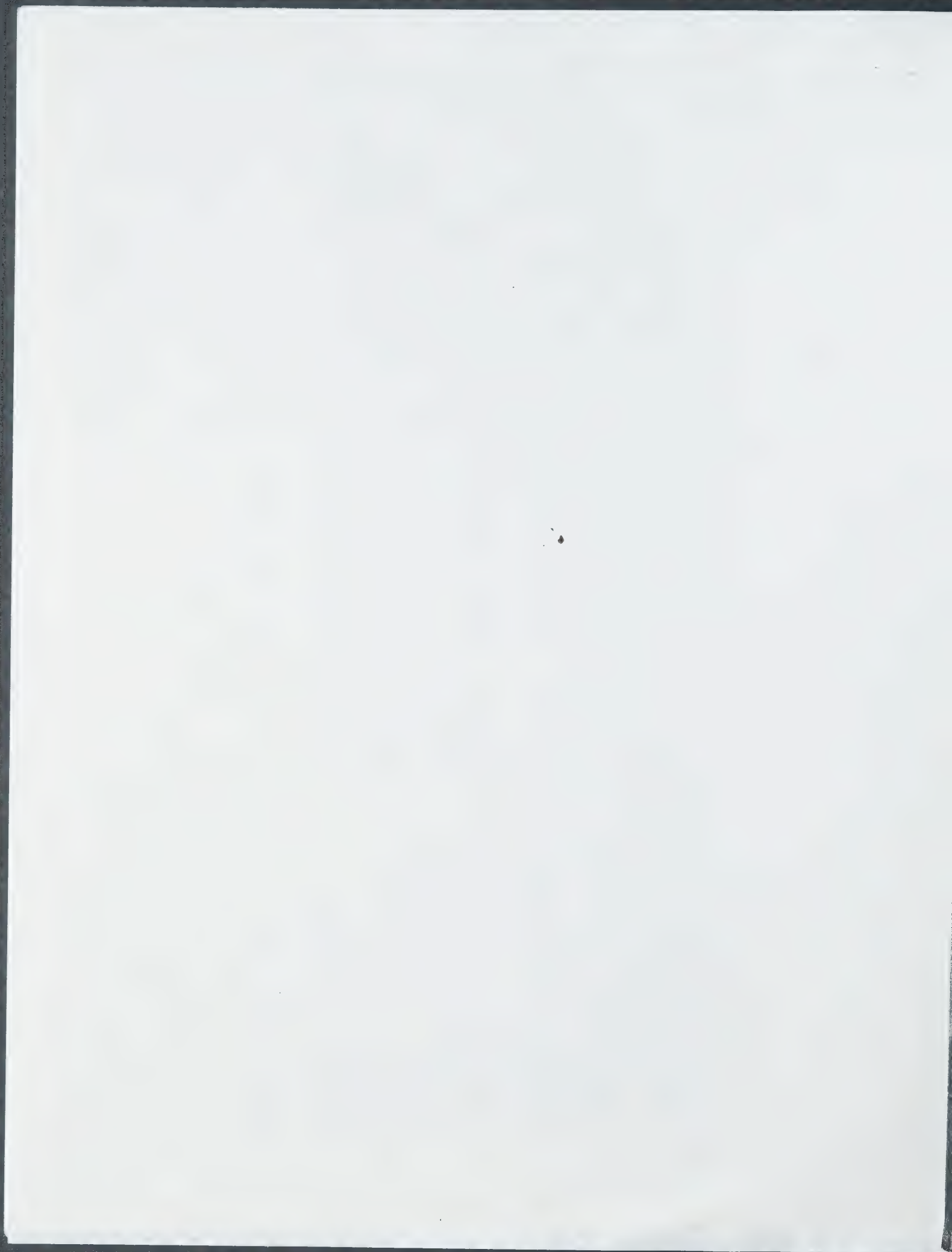
worldwide. So I was staggered when I learned that I was elected one of the top 75 distinguished contributors to the Chemical Enterprise (*C&EN*, Jan. 12, 1998), a surprise sweetened by my friends at Aldrich congratulating me in an ad—as daring as kind.

My fine arts business has expanded considerably—the Rembrandt I bought in 1995 now hangs in a museum in Aachen, and just last month I bought another beautiful Rembrandt portrait and also an exciting Rubens, both at Sotheby's in New York. An excellent art historian and dealer in New York, Dr. Otto Naumann, handles most of the important sales, so I am more involved in finding than in selling great art. And I still find three or four great paintings a year for our own collection.

There are still many invitations to give lectures, both on the history of chemistry and art. I am particularly proud of my work on Josef Loschmidt, who is finally being recognized as a great chemist.

We now also spend more time helping people, both the ablest and the neediest through bursaries, scholarships, fellowships and awards. We are trying to improve our inner cities and to help the traumatized, for instance in Bosnia. Our biggest effort was to acquire Herstmonceux Castle for Queen's University. At first it created many problems for Queen's, but the International Study Centre is now running smoothly, and meeting hundreds of students there gives us such pleasure.

Our first granddaughter, Helena, is now three, and we are eagerly awaiting the arrival of two more grandchildren shortly. Time flies—but what a time it is when you watch your grandchildren. There is such a foolish saying: time is money—time is life that none of us can buy.



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This special issue is dedicated to

**Dr. Alfred Bader**

on the occasion of his 80th birthday

*Associate Editor: Victor A. Snieckus*

Le présent numéro est dédié à

**Alfred Bader**

à l'occasion de son 80e anniversaire de naissance

*Directeur scientifique associé : Victor A. Snieckus*

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## BIOGRAPHY / BIOGRAPHIE

Born in Vienna, Alfred Bader fled to England at the age of fourteen, ten months before the outbreak of World War II. Although a Jewish refugee from the Nazis, he was interned in 1940 along with other 'enemy aliens', and sent to a Canadian prisoner of war camp.

Today, Dr. Bader is one of the most respected men in his field. In this heartwarming book, he tells the fascinating story of how he made good in the land of opportunity, the United States.

It was a case of hard study and hard work. Obtaining release in 1941, he was accepted at Queen's University in Kingston, Ontario, where he studied engineering chemistry. There followed a fellowship in organic chemistry at Harvard. He worked in Milwaukee as a research chemist for the Pittsburgh Plate Glass Company and in 1951 co-founded Aldrich, which today, as Sigma-Aldrich, is the world's largest supplier of research chemicals.

He spent forty years building Aldrich's distinctive reputation and the extraordinary story of how he was eventually thrown off the board of Sigma-Aldrich will be of key interest to people in the chemical industry worldwide, as well as to students of business.

After leaving Sigma-Aldrich, he continued a fruitful career as an art collector and dealer, and he has some very pertinent and amusing things to say about his experiences in the art world.

Alfred Bader and his family have earned a reputation as generous benefactors, notably in the fields of chemistry, education, and Jewish interests. Dr. Bader's personal philanthropy has been particularly directed towards helping students of chemistry and art history. He recently gave £6,000,000 to Queen's University to purchase and renovate Herstmonceux Castle in Sussex (the home of the old Royal Greenwich Observatory) – one more 'thank you' to the Canadian institution that had enabled him to take the first step on the road to success, so entertainingly described in this book.

*(Alfred Bader, Adventures of a Chemist Collector. Weidenfeld & Nicolson, London, 1995)*

Né à Vienne, Alfred Bader s'enfuit en Angleterre à l'âge de 14 ans, dix mois avant qu'éclate la Seconde Guerre mondiale. Réfugié juif des nazis, il est quand même interné en 1940 avec d'autres « ressortissants de pays ennemis » et déporté au Canada dans un camp de prisonniers de guerre.

Aujourd'hui, Bader figure parmi les plus respectés de son domaine. Dans ce récit attachant et émouvant, il retrace les événements qui lui ont permis de faire sa marque dans un pays d'avenir, les États-Unis.

C'est l'histoire d'un solide engagement envers les études et de persévérance. Libéré en 1941, il étudie le génie chimique à l'Université Queen's. Il fait un stage postdoctoral en chimie organique à Harvard. Il travaille à Milwaukee à titre de chimiste de recherche pour la *Pittsburgh Plate Glass Company*. En 1951, il cofonde l'*Aldrich Chemical Company*, aujourd'hui la *Sigma-Aldrich Corporation*, le plus important fournisseur de substances chimiques employées dans la recherche du monde entier.

Malgré le fait qu'il consacre quarante ans de sa vie à cultiver la réputation d'excellence d'Aldrich, il se fait exclure du conseil de Sigma-Aldrich, une histoire qui est sûre d'intéresser tous les intervenants de l'industrie, sans compter les étudiants en administration.

Il quitte donc Sigma-Aldrich pour poursuivre une carrière fructueuse en tant que collectionneur et marchand d'œuvres d'art. Il a d'ailleurs des anecdotes fort amusantes et très pertinentes à raconter à propos de ses expériences dans l'univers des arts.

La très grande réputation de bienfaisance et de bonté d'Alfred Bader et de sa famille, notamment au profit de la chimie, de la pédagogie et de la culture juive, n'est plus à démontrer. Parmi les plus importants bénéficiaires de leur générosité figurent les étudiants en chimie et en histoire de l'art. Un autre grand bénéficiaire de la philanthropie des Bader est l'Université Queen's, qui s'est vu remettre la somme de 6 000 000 £ pour acquérir et rénover le château Herstmonceux, B Sussex (le site de l'Observatoire royal de Greenwich) – une autre façon de « remercier » l'établissement canadien qui lui a permis de faire un premier pas vers la réussite, tel que décrit de manière si divertissante dans cet ouvrage.

*(Alfred Bader, Adventures of a Chemist Collector. Weidenfeld & Nicolson, Londres, 1995)*



## TRIBUTE / HOMMAGE

It is a great privilege and honour for us to write the dedication for this Special Issue honouring Alfred Bader. Alfred Bader, a true visionary, has had a profound effect on the way chemists do research. But Alfred Bader's influence is much broader than chemistry as he is an entrepreneur, businessman, art collector, Rembrandt expert, and philanthropist.

Throughout his childhood and teenage years Alfred faced great adversity. He was born in Vienna in 1924 and two weeks after his birth, his father died. In November 1938 following the anti-Jewish demonstrations on Kristallnacht, Alfred's mother sent him to the U.K. He lived in Sussex and entered Brighton Technical College in 1939. In May 1940, the British government, given the escalating conflict with Germany, arrested German and Austrian males including Alfred and put them in internment camps. The Canadian government agreed to accept custody of some of the interned individuals comprising prisoners of war and strongly anti-Nazi refugees as well as German civilians. Alfred Bader was one of those interned in Canada and was sent to a fortress on an island on the Richelieu River near Lake Champlain. While there, he and some others were determined to continue their education and Alfred passed both the Junior and Senior Matriculation exams before being released in 1941. Bader applied to several universities and was accepted by Queen's University in Kingston. Alfred enjoyed his studies at Queen's and to earn money to continue university and go on dates, he worked at Murphy Paint Company in Montreal on the formulation of enamels and lacquers. There, he also learned to appreciate industry and entrepreneurship.

Bader recognized the need for a research chemicals business while he was a graduate student at Harvard working with Louis Fieser, a leading organic chemist. At that time nearly all chemicals came from Eastman Kodak, which had a product list of 4000 chemicals. Although others tried to discourage him, Alfred persevered and together with a friend, Milwaukee attorney Jack Eisendrath, incorporated Aldrich Chemical Company on August 17, 1951, each putting up \$250. The first home of Aldrich was a garage they rented for \$25 per month. They were two part-time employees, their catalogue was a mimeographed sheet with one offering, and sales in the first year was \$1705.

The company moved to 1000 square feet of rented space where Bader single handedly carried out all the syntheses. In 1955 Aldrich expanded into medicinal chemistry, which gave Alfred tremendous satisfaction. Alfred's hard work and determination paid off and by 1958 they had a staff of 12 and purchased a three-story building. What was so impressive was the commitment by Alfred to deliver chemicals in a highly efficient manner. It was clear by then that Bader's vision and integrity coupled with his determination and dedication would lead to a highly successful career.

The company continued to grow at a tremendous rate and by 1962 had sales of one million dollars, up from \$5,400 a decade earlier. In 1990, Aldrich merged with Sigma to become Sigma-Aldrich, the 80th largest corporation in the US, employing over 4,000 people with subsidiaries in many European countries, Israel, and Japan. After serving as Chair of the Board from 1980 to 1991 he "officially retired" but became chairman emeritus.

One of Bader's key recommendations to those building a business is "listen carefully to your customers". This personal approach was the cornerstone of Alfred's success. The trademark Aldrich advertisement had a picture of Alfred with the heading "Please Bother Us". He and his wife Isabel travelled tirelessly to laboratories throughout North America and around the world where he listened attentively to problems chemists were having with syntheses and offering advice and proposing solutions. Bader comments in his book *Adventures of a Chemist Collector* "Although all of our visits to universities begin in the hope of getting to know our customers and perhaps finding exciting new compounds, they often become pure personal pleasure for Isabel and me". My (Anne's) first encounter with Alfred Bader was in 1966, discussing with him over breakfast in the Windsor Hotel in Montreal, the possibility of making a diazo compound in larger quantities than the few mg I had amassed after a lengthy process. The research went in another direction and Aldrich did not make the compound but I will never forget my first meeting with Alfred and Howard's and my good fortune in getting to know Alfred and Isabel in the years following.

Bader's vision and accomplishments go far beyond chemistry and the chemicals business. Bader calls himself an "inveterate collector" beginning with stamps at 8, drawings at 10, and paintings at 20. When Alfred was a child in Vienna his mother's apartment was filled with paintings, 19th and 20th century Viennese works. He knew he did not like these but became very interested in painting. Bader has been buying selling, trading, and giving away paintings for many years. When Aldrich was on a firm footing and he could give a little more time to what he calls an enjoyable pastime, he established Alfred Bader Fine Arts and since 1992 has devoted more and more of his time to it. Although he now trades in very expensive art including works by Rembrandt and Rubens, he always considered it much more fun to pay a few thousand dollars for a work that might prove great and valuable after cleaning. He loves discoveries not only of material value but also of great beauty. Bader has shared his love of paintings with others. On his visits to universities and at every Aldrich exhibit booth, he distributed prints of some of the paintings in his vast collection. Chemists will remember the Alchemist well and each year a painting appeared on the cover of the Aldrich catalog. He thus served a very important role in art appreciation for the chemical community.

In addition to Bader's impact on chemistry and his contributions to art collecting, art history, and art conservation, his generosity of spirit will leave a lasting impact. He gives back to the discipline of chemistry, to Queen's University that accepted him when other universities did not, and to other institutions and foundations. It started with small no strings attached grants to chemists in need of funding around the world. Many of these have become internationally recognized scientists. He has established prizes, scholarships, and awards for students in Canada, the United States, Britain, and the Czech Republic recalling the benefit such awards provided him when he was a student. He established the Alfred Bader Award in Organic Chemistry for the American Chemical Society (now known as the Aldrich award) and the Canadian Society for Chemistry and the Royal Society of Chemistry in the UK. More recently he endowed the ACS Alfred Bader Award in Bioorganic or Bioorganic Chemistry and supported the ACS Project Seed to enable undergraduate chemistry students to experience laboratory work.





Bader's donations to Queen's have included: Chairs in Organic Chemistry and Art History, outstanding paintings from his collection for the Agnes Etherington Art Centre, and seed money for a new museum. Bader Lane at Queen's connects the Chemistry Building with the Agnes Etherington Art Centre. Perhaps the most unusual gift to Queen's has been Herstmonceux Castle, a moated castle in Sussex England parts of which date from the 15th century. In addition, Bader has supported many Jewish educational projects and set up charitable foundations in Milwaukee.

Alfred Bader has been recognized for his work by a number of Honorary Doctorates from different universities including Simon Fraser University and the University of Ottawa, an honorary Fellowship in the Royal Society of Chemistry, and the ACS Charles Lathrop Parsons Award, given in recognition of outstanding public service by a member of the ACS. He is also a Honorary Fellow of the Chemical Institute of Canada.

Another facet of Alfred, and Isabel, is their remarkably intense romantic relationship. Several years ago, a new book was published by Isabel entitled "A Canadian in Love". It contains some beautifully composed letters by Isabel to Alfred and at the end of the book, a letter from Alfred to

Isabel dated April 18, 1975. One paragraph in the letter states:

"You had not written to me from September 11, 1950 until August 11, 1951, your last letter to me for 24 years. I have read that letter so often that I know it by heart and it has torn me apart these many years. What power you have over me! Your last words to me were "God bless you, Alf" and of course you meant this with all your heart. And God has indeed blessed me by giving me you as a beacon in my life. Whatever important I have done, I have thought of you, and done the right thing. As David said-"Whither shall I go from your spirit, or whither shall I flee from your presence? If I ascend into heaven, you are there, and if I make my bed in hell, behold, you are there". All of us have part of God in us, and the great goodness in you is so plain to me".

Following his retirement from Aldrich, Alfred was able to devote nearly all his time and energy to his activities as an art collector, lecturer, and philanthropist. Alfred says that getting to know people involved in art has enriched his life. Those of us who have been fortunate to know Alfred have had our lives enriched by him.

Anne Alper  
Howard Alper



### Unwrapped

for Alfred Bader and a city

by Roald Hoffmann

I didn't expect  
to receive it  
watching "The Third

Man." to hear it  
in Anna's schmal-  
tzy lines, in her

black and white walk  
down the allée. No,  
it would have made

more sense for it  
to surface in  
the angle of cut

of the vines still  
strapped to wires.  
Or at night. But

if one is in-  
clined to sadness,  
it plain takes over --

like an arch, all  
of-a-sudden  
perceived as off-

center, like the  
leaping buck in  
my lights. Until...

you realize you  
have been granted  
a gift, the salty,

loosening gift  
of the road in  
to the father -

no chance, then,  
to mourn: the  
time rending

gift, Vienna, her;  
The gift I wish  
would pass from me.

Memorandum

To: Mr. Tolson

From: Mr. [Name]

Subject: [Topic]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]

[Text]



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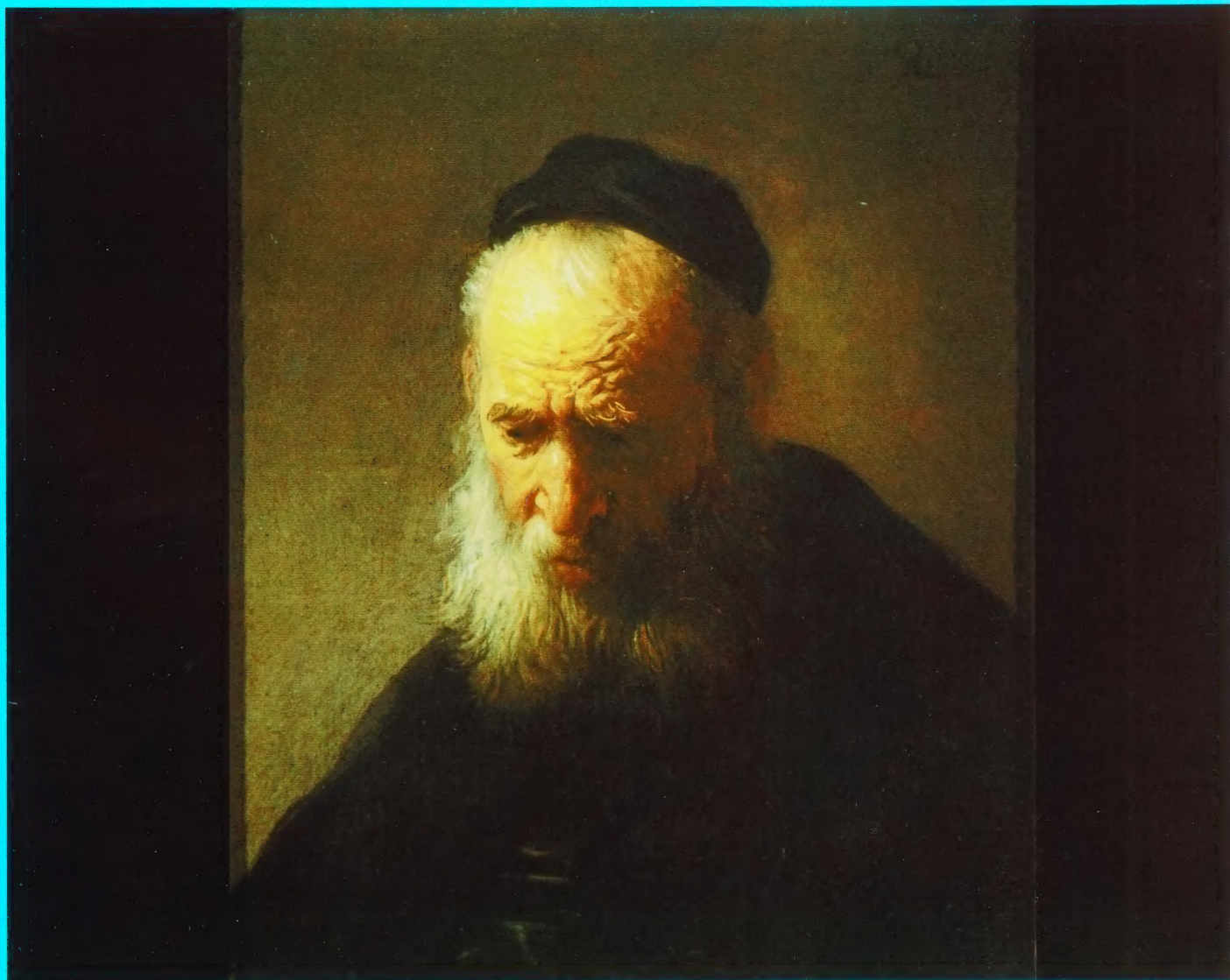
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