

Color and
Appearance
Division



CAD NEWS

PUBLISHED BY THE COLOR AND APPEARANCE DIVISION OF THE SOCIETY OF PLASTICS ENGINEERS

CHAIRMAN'S MESSAGE



WHO ARE YOUR HEROES?

As a young boy, my heroes included Bobby Orr, the famous Boston Bruins defenseman (*and arguably the best hockey player who ever played*) and Robert Redford who played the incredibly cool Johnny Hooker in 'The Sting' (*I can still play the first eight bars of 'The Entertainer' if you would like to hear them!!*). Growing up, I reluctantly began to accept my Father as my hero when I realized how he managed to emerge/escape as the last of nine children from a poor farm family to get an education, raise a family and have a successful career. As an adult, my two children who have successfully negotiated the incredibly complicated minefield of 'growing up' to become very impressive young people are my heroes now.

In my business life it's not that easy to find heroes in a world still living with an 'Enron Hangover' followed up by the disaster known as 2008/09 (*and hopefully not 2010*) but I do have some. My heroes are the numerous volunteers that I work (and play) with on the SPE Board of Directors. Firstly, there are the individuals that put their name on the list to run and get elected to the Color & Appearance Board of Directors. That group of individuals very successfully puts together the Color RETEC® every fall and the ANTEC™ sessions every spring. By my estimate, the costs of these events are reduced by about 50% because of all the volunteer hours that the BOD members put in. That's a significant number and worth some 'hero worship'!!

TABLE OF CONTENTS

Chairman's Message	1
Invitation to Attend our Board Meetings	2
Professional Networking	2
Mission Statement	2
CAD Voting Link	2
ANTEC™ 2010	3
PreConference Tutorial	4
Sponsorships	5,6
Membership Grade Update & Info	7
Your Company, Our Division	6
Election Information	7
Sponsorships	8
MemberGetA-Member	9
Technical Article - Spies and Dyes	10,11,14-18
Invitation to Attend our Board Meetings	10
CAD CD Archive	12
Upcoming ANTEC™ & RETEC® Dates	12
Cad Website Info	13
Your Company, Our Division	13
RETEC® Announcement	13
CAD BOD Directors Listing	19

The 'Pinnacle' is awarded by the Society of Plastics Engineers to SPE Divisions to 'recognize achievements by SPE Divisions that successfully create and deliver member value'. There are two levels; Gold and Silver. The Color & Appearance Division (CAD) has been awarded the 'Gold' level for 2009. It should be noted that ever since the Pinnacle Award program has been in place (*for about 4 years now, I believe*), the CAD has achieved the 'Gold' level every year. 'Pinnacleites' (*I am sure that is a word in some dictionary!!*), you are my heroes. A special thanks to Scott Heitzman who put everything together and made the submittal this year.

The 'Communications Award' is a new award this year. It is given to 'recognize Sections, Divisions, and Special Interest Groups that carry out highly effective communications within their groups'. It covers how we communicate with our membership (*ie newsletters, website, etc.*). Our Color and Appearance Division received the 'Notable Achiever' level. Tracy Phillips, the head of our

continued on page 2

DON'T FORGET TO VOTE!

Visit the link below on the website to cast your vote.



[CLICK HERE](#)

<http://www.specad.org/index.php?navid=71>

If you don't want to vote online, you may vote by fax or mail. Simply download the pdf version of this ballot, complete it, and fax or mail it per the instructions on the downloaded version (*return ballot only, no biographies*).

The deadline for voting is April 16, 2010. Faxed or mailed ballots must be received by April 16, 2010. If there are any questions, please contact Earl Balthazar (email ebalthazar@tx.rr.com) or call 817-719-0224.

CHAIRMAN'S MESSAGE - CONTINUED

Communications Committee along with her committee members, Joe Cameron, Jamie Pryzbylski, Sharyl Reid and Sharon Ehr are my heroes for making this award happen.

Lastly, there are the CAD members that achieve the prestigious status of 'Honored Service Member'. Two of our members have been awarded the HSM this year; Sharon Ehr and Sharyl Reid. The HSM is given to members that make a significant contribution to both the Division they participate in as well as in SPE overall. The HSM is only granted to about 1/2 dozen SPE members each year and there are only 297 HSM's in total so this achievement is truly significant. Sharon and Sharyl, you are my heroes too. Be someone's hero today.

Colourfully Yours,
Howard Kennedy

CAD Chairperson



Color and Appearance Division

SPE COLOR & APPEARANCE DIVISION MISSION STATEMENT

The Color and Appearance Division of SPE strives to educate, train, inform and to provide professional interaction opportunities to the global community involved in visual performance and aesthetics of plastics.

Non-SPE Websites: Professional Networking Groups

In general, you must be a registered user on these websites to join the SPECAD Group hosted there. These websites are not affiliated with SPE. To find the SPECAD group, go to the Groups directory and search for "SPE Color and Appearance Division". Or, go to www.specad.org home page for a link to the groups on each website.



www.Facebook.com

www.Linkedin.com


www.Myspace.com
Group URL: <http://groups.myspace.com/specad>

INVITATION TO ATTEND OUR CAD BOARD MEETINGS

The Color and Appearance Division regularly holds Technical Program Committee (TPC) and Board of Director (BOD) meetings at the ANTEC™ and the RETEC®. In addition, a Summer BOD and TPC meeting are typically held about 6-weeks prior to the RETEC®, and a Winter BOD and TPC meeting are held in early January. The Summer meeting is scheduled in various locations; the Winter meeting is typically held at the site of the RETEC® that is a year and a half away.



Any SPE/CAD members who wish to attend are welcome at these meetings. Contact the Division Chairman (*see the back cover*) for information on the location and times of any of these meetings.



By Sharyl Reid



May 16-20
Orlando World Center Marriott Resort & Convention Center
Orlando, Florida USA

The Annual Technical Conference (ANTEC™) of the Society of Plastics Engineers is the largest gathering of individuals representing industry, academia and government in the fields of plastics and synthetic polymers. Engineers, scientists, professors and business professionals attend ANTEC™ to share ideas, to learn about the latest advances in technology and to network amongst their peers. ANTEC™ 2010 will take place May 16-20 in Orlando, Florida and we expect excellent attendance and hope you will join us in this experience.

The Color and Appearance Division (CAD) of the Society of Plastics Engineers (SPE) will be hosting our annual technical session during this conference and would like to encourage you and your company to participate by attending the conference. We have a full program of interesting and informative presentations for you this year on Monday, May 17th and they are as follows:

"Get Green Without Paint: Molded-In-Metallic
Engineering Resins for Appearance Applications"
Ticona - Bruce Mulholland

"Color Trends for Consumer Packaging"
Americhem - Doreen Becker

"Optimizing Flavor Perception in Plastics"
A. Schulman - Kari MacInnis

"The Optical Impact of Low-Index Inorganic Fillers on
the Performance of Plastic Articles Pigmented with TiO₂"
DuPont - Dr. Austin Reid

"Interaction of HALS and Colorants Part II"
BASF - Dr. Steve Goldstein

"What Is New in Laser Marking Additives"
EMD Chemical - Scott Aumann

"New Options in Special Effects Pigments"
Sun Chemical - Scott Heitzman

"Optimal Pigmentation Strategies for Near-Infrared
Effecting Pigments"
Heubach - Lutz Frischmann

"The Color Matching of Weatherable Co-extruded Films"
GE - Hongyi Zhou

"A Necessary Step-Separating the Spectral Bandpass
Correction from Tristimulus Integration"
Color Science Consultancy - Jack Ladson

"Color Trends"
BASF - Tad Finnegan

Immediately following the final paper on Monday afternoon the CAD Board of Directors will host our annual business meeting and all are welcome. For more detailed information regarding the conference and for on-line registration, please visit the website www.4spe.org.

Sharyl Reid
ANTEC™ 2010 CAD Technical Program Chair
A. Schulman, Inc.
(864) 915-7253
sharyl_reid@us.aschulman.com

Pre-Conference Tutorial at RETEC® in Nashville

"Colorants for Plastics" by Bob Charvat



TUTORIAL TOPICS

- Colorant technology definitions
- Colorant groups by chemical type
- Colorant manufacturing overview
- Physical properties and effects
- Advantages and disadvantages
- Mixing and dispersion issues
- Usage guidelines
- Performance parameters
- Environmental Issues

TUTORIAL LOGISTICS

Dates:

Part 1 Monday September 13, 2010

🕒 Time: 1:00 pm - 5:00 pm

Part 2 Tuesday September 14, 2010

🕒 Time: 8:00 am - 12:00 pm

Cost: \$450.00

Contact Bob Charvat for further details, questions and registration procedures:
rcharvat@msn.com

The Color and Appearance Division is proud to host on Monday, September 13 from 1 - 5pm, Bob Charvat's popular "Coloring for Plastics" Seminar. Bob is a nationally renowned color science authority. Bob is a Fellow of the Society of Plastics Engineers has been a member since 1957.

MORE ABOUT BOB

Bob retired early from Engelhard Corporation to form his consulting organization, Charvat and Associates, Inc. where he continues his coloring of plastics career. He works with clients to solve coloring of plastic's problems. Charvat and Associates, Inc. also provides educational seminars on Color Theory and Colorant Science and Technology. Bob has taught coloring of plastics as a member of the faculty at Terra Community College in Fremont, Ohio - the country's only "Coloring of Plastics" Program. Bob serves on the Terra Community College Foundation Board of Directors where he is a member of the Board's Executive Committee.

Bob is listed in "Who's Who in Plastics and Polymers". He is a member of The Inter-Society Color Council (ISCC), The Detroit Colour Council (DCC), The Society of The Plastics Industry (SPI), The Vinyl Siding Institute (VSI) and The Color Additives & Compounding Division (CACD) of SPI. In summary, Bob really knows how to color plastic.



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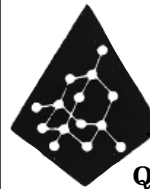
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Thank you and Happy Spring!



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UPDATE YOUR SPE MEMBERSHIP GRADE

(CONTRIBUTED BY EARL BALTHAZAR)

The Society of Plastics Engineers (SPE) offers a variety of membership grades to recognize your professional experience and educational achievements. If you have not done so recently, please take the opportunity to log into the SPE website, check and update your information, and upgrade your membership if qualified. The Color & Appearance Division's membership list shows an extremely high number (~79%) of affiliate (AFF) and member (MEM) grades; in many cases for long time members with extensive experience. Please review the grade descriptions and credit structure (Table 1) below to determine what your proper grade should be. A request for upgrade can be made once you are logged in to your member account on the SPE website. Note that you must be a Senior member to qualify for Honored Service Member or Fellow of the Society.

SPE Member Grade Descriptions

Student Member:

Regularly enrolled, full-time student carrying a minimum of 12 credits per semester and engaged in a course of study for a future in plastics. Student members receive a discounted dues rate.

Student Affiliate:

A one-year transitional grade between Student and Affiliate grade to cover the graduate Student members while they establish themselves in the industry. Student affiliates receive a discounted dues rate.

Affiliate:

Are you interested in the plastics industry but just starting out? Join SPE as an Affiliate member to become part of the world-wide network of plastics professionals. Credits: 5 and below. All new members receive an affiliate grade upon joining and have the option to request an upgrade.

Member:

Once you've established yourself within the industry and you've accumulated at least 6 credits (combination of work and education experience) you are eligible for an upgrade to Member.

Senior Member:

After a minimum of two years continuous membership and at least 12 credits (*combination of work and education experience*) you are eligible for an upgrade to Senior member. Please note: Lapsed members forfeit their Senior Member status and can request an upgrade once two years of continuous membership have been completed.

Emeritus Status:

A member of the Society who has accumulated at least twenty years of membership and is either (1) over the age of sixty-two and retired, or (2) is over the age of seventy. This grade receives a discounted membership along with full member benefits upon request and approval. Emeritus Status is combined with the grade prior to Emeritus eligibility to determine member grade. For example: The member grade for a Senior Member eligible for Emeritus status will be Senior Member Emeritus.

Honored Service Member:

This grade is reserved for those members of the Society who have demonstrated long time outstanding service and support to the Society and its goals. Requires a minimum of six years continuous membership and 18 experience credits (*You must be nominated for this grade and an additional application and approval process is required*)

Fellow of the Society:

This grade is reserved for those Society members who have demonstrated outstanding achievements in the field of plastics. Requires a minimum of six years continuous membership and 18 experience credits. (*You must be nominated for this grade and an additional application process is required*)

Distinguished Member:

SPE Past President or SPE member with distinguished contributions to plastics; elected by Past Presidents. Complimentary Dues.

Honorary Member:

Non-member selected for outstanding achievement or professional eminence; elected by Past Presidents. Complimentary Dues.

Table 1

EDUCATION CREDITS ARE COMPRISED OF THE FOLLOWING:

6 credits	PhD - Science, Chemistry, Tooling, Engineering
5 credits	Masters- Science, Chemistry, Tooling, Engineering
4 credits	BS - Science, Chemistry, Tooling, Engineering
3 credits	Associates - Science, Chemistry, Tooling, Engineering
2 credits	PhD, Masters, or BS in anything other than plastics related fields
1 credit	Associates in anything other than plastics related fields
Work Credits are comprised of the following:	
1 credit	A credit is given for each year spent working 100% in the plastics profession

To log in to your account on www.4SPE.org just follow the Login prompts on every page. You will need your SPE User ID and Password to log in. Your User ID is your SPE Member ID number. You'll find your SPE Member ID number on your SPE membership card. Unless you have previously changed it your password is your last name.

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<http://www.4spe.org/member-get-member-campaign>



Member-Get-A-Member Campaign

You know first-hand the value of being a member of SPE. Share your personal and professional experiences with colleagues so they too can discover the benefits of membership. We'll even reward you for it!

What is Member-Get-A-Member (MGM)? SPE members network with their peers to recruit new members.



For each new paid member you recruit between now and May 1, 2010, you will receive a choice of rewards.

The Section and Division he/she joins will receive an incentive. The more you recruit, the greater the reward. Check out the rewards.

Your new recruit joins for only \$109 for the first year, a \$35 savings, and gains the benefits of SPE membership. Student member rate is \$31.

How does it work?

Identify people you know who are not SPE members.

Send a personalized email directly to your colleague or download an application, sign the "Recommended by" line, and give to your colleague.

Your colleague joins online through the link in the email or completes and submits the printed application.

Important: For tracking purposes, your name and member number must be in the "Recommended by" line on the application to earn rewards. At the end of the program, you will receive an email that lists the number of new members you recruited and your rewards eligibility.

What is the best way to recruit new members? Check out our helpful hints and tips on how to recruit by clicking on the following link: <http://www.4spe.org/recruiting-tips>

What are the program rules?

Student members are eligible to participate and join.

With the exception of students, this program only applies to members recruited at the special rate of \$109.

To receive credit for each new member, the recruiter's name and SPE member ID number must appear in the "Recommended by" section of the new member's application.

A new/reinstated member will receive the reduced dues rate only if acceptance code **MGM-R** is entered on their application and dues are paid in full.

All applications must include acceptance code **MGM-R** to be counted toward the program.

All applications and membership dues must be received by May 1, 2010, to be counted toward the program.

Rules and rewards are subject to change by the SPE Membership Department.

<http://www.4spe.org/recruiting-tips>



SPIES AND DYES

BY ROBERT J. BAPTISTA (<http://www.colorantshistory.org>)

Industrial intelligence gathering was as important in World War I as military intelligence. This was the first high tech war involving airplanes, submarines, motorized artillery and chemical warfare agents in battle. The secrets of the underlying technologies for these systems could be used by the Allies or the Germans to gain military and economic advantages. Spying took place on both sides of the Atlantic, with industrial chemists having a key role in the acquisition of highly classified information regarding dyes, high explosives, poison gases and synthetic rubber, all critical to waging war. Several of these escapades are discussed here.

I) Du Pont Snares German Dye Technology Before World War I, Germany dominated the global chemical industry, supplying 80 percent of the world's synthetic dye and chemical demand. After hostilities broke out, the British naval blockade prevented German dye shipments from reaching the United States. The resulting dye famine threatened to shut down the textile industry. Dyes were desperately needed for military uniforms, camouflage and smoke bombs. American companies struggled to produce dyes but there were few American chemists with the requisite know-how, presenting a major technology barrier. Some emerging companies, such as the Beckers Aniline & Chemical Co. of Brooklyn, New York, had the advantage of an experienced founder like William G. Beckers. Beckers was a native German with a PhD in chemistry and experience in the dye industry. He emigrated to the U.S. before the war and began producing a range of dyes, including Chrome Blue B needed for Navy uniforms.

Other companies recruited Swiss chemists during the war, since Switzerland was the second leading exporter of dyes after Germany. The Standard Aniline Products Co., of Wappingers Falls, New York, hired Swiss chemists Dr. Paul Strubin as plant manager in 1916 and Dr. Edwin A. Meier as manufacturing supervisor in 1917. These men were instrumental in starting production of the sulfur dyes needed for khaki military uniforms.

The demand for domestic dyes was insatiable during the war and selling prices rose spectacularly. In 1914 sulfur black, one of the largest volume dyes used in the textile industry, sold for \$0.20 per pound. During 1915 the price soared to \$2.75-3.00 per pound. Dye-making suddenly became one of the most profitable industries in the U.S., attracting investment by both small and large firms. Du Pont, primarily a gunpowder manufacturer before the war, decided to throw its hat into the ring. In 1917 a multi-million dollar dye plant was constructed in Deepwater, New Jersey. The facility, which stretched along the Delaware River, became known as the Chambers Works. The first production target was sulfur black because of the huge market and the assumption that it was simple to manufacture. But the first batches were either off-shade or could not even be applied to cotton.

Dr. Elmer K. Bolton, director of Du Pont's research laboratory, was summoned to Chambers Works to solve the sulfur black production problem. But he was just as mystified as the other American chemists. The German patents, which were confiscated by the U.S. government during the war, could not be duplicated by Du Pont's chemists. The patents were written in a purposely vague manner with key information omitted. It was apparent that the patents could only be worked by a chemist "*skilled in the art*", meaning an experienced German chemist. For many years this obfuscation helped Germany dominate the global dye market and frustrated U.S. attempts to enter the field.

In 1920 Du Pont embarked upon a cloak and dagger mission to obtain the services of German chemists. Dr. E.C. Kunze, a Du Pont representative in Zurich, convinced four Bayer chemists in Leverkusen to bolt Germany for the U.S. and accept jobs at Du Pont. They each signed five-year employment contracts for \$25,000 a year, which was a staggering sum in 1920 and equivalent to \$267,000 today. The German chemists filled a trunk with process information, equipment drawings, plant layouts and dye samples. In December 1920 they were spirited out of Germany by Dr. Kunze. But at a Dutch border checkpoint the trunk was opened. The suspicious looking contents resulted in seizure of the trunk and notification of German authorities. The Cologne prosecutor issued an arrest warrant for the four chemists for industrial espionage. The charges against the chemists included "*illegally appropriating valuable recipes, formulae, etc., to which they had access by virtue of their positions of trust and confidence*". Protection of dye manufacturing secrets had led Germany to the extreme step of prohibiting the issuance of passports to German chemists. The German public was outraged about the incident and newspaper headlines screamed "*Four Traitors*", "*An American Plot Against German Dyestuff Industry*", and "*The Power of the Dollar*".

continued on page 11



Despite the arrest warrant, two of the German chemists, Dr. Joseph Flachslander and Dr. Otto Runge, managed to board the Dutch steamer Ryndam on December 31, 1920, bound for New York. On January 3, 1921 the ship was met by Richard Sylvester, Du Pont security officer, and Dr. Bolton, then head of the Organic Division. When the two men failed to disembark, Sylvester posed as the Honorary President of the International Association of Chiefs of Police and demanded to see the men. The Ryndam's captain refused to release the passengers, citing the outstanding arrest warrants from Germany. Sylvester and Bolton called for help. After discussions took place between Washington, DC, Wilmington, and officials at Ellis Island, Drs. Flachslander and Runge were released after a few days and began their new careers at Du Pont.

The remaining two chemists, Dr. Max Engelmann and Dr. Heinrich Jordan, had greater difficulty leaving Germany. Du Pont resorted to its political and military contacts for help. In May 1921 an Army officer and a company of soldiers escorted Dr. Engelmann and Dr. and Mrs. Jordan from unoccupied Germany to the American sector. This mission was successful despite

surveillance of the chemists by the German police. They boarded the U.S. Army transport Somme, arriving in Hoboken, New Jersey on July 5, 1921.

Du Pont now had four talented German dye chemists working in the Jackson Research Laboratory (**Fig. 1**) in Deepwater, New Jersey. The company would soon become the leader in the U.S. dye market, a position it held until it exited the business in 1980.



Fig. 1 German Chemists at Du Pont's Jackson Research Laboratory Led Entry into Dye Market Photo: Harrison Hale, American Chemistry, 1921

II) German Spies and Saboteurs in the United States Anti-German hysteria and tales of German conspiracies, real and imagined, were prevalent in America during World War I (**Fig. 2**).



Fig. 2 U.S. Army Intelligence WW I Poster Warned Americans About German Spies. Photo: Library of Congress

After the U.S. declared war on Germany in 1917, the assets of the Bayer Company were seized as enemy property, including the Rensselaer, New York plant which manufactured dyes and aspirin, and patent rights. In late 1917 Federal Judge A. Mitchell Palmer, the Alien Property Custodian, announced his intention to 'thoroughly Americanize' the company and named four new members to the board of directors. Palmer claimed to have uncovered a conspiracy involving board members who violated the Trading with the Enemy Act. In August 1918 five company officials were arrested and charged with diverting profits to a dummy corporation in Rhode Island and thence to Germany. The purpose was to enable Bayer to reestablish its dyes and pharmaceuticals business in the United States when the war ended. The men arrested were Herman C. A. Seebohm, director and secretary; Dr. Robert J. Pabst, manager of sales; A. Reiser, manager of the dummy corporation Williams & Crowell Color Company of Providence, Rhode Island; Dr. Albert Segin, head of pharmaceuticals; and Dr. Rudolph Hutz, a former company director and manager of the Boston sales office. At the time Hutz was staying at his summer home on Pine Island, Lake Winnepesaukee, New Hampshire. Secret Service agents found a boat and rowed out to the island to make his arrest at 1:30 AM. They found him sleeping in bed and immediately handcuffed him. He had four medal decorations from the German government in his possession, along with a large photograph of the German Emperor. Hutz was charged with violation of the Trading with the Enemy Act and espionage and was interned first at Ellis Island and then at the prison camp in Fort Oglethorpe, Georgia. Dr. Arthur Franz Felix Mothwurf, chief chemist and assistant manager of the Bayer Rensselaer plant, was arrested for his alleged

continued on page 14

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hiding of an ownership position in the Williams & Crowell Color Company. These dramatic arrests were followed by the firing of Rensselaer plant employees suspected of sympathizing with Germany.



Fig. 3 Ad Stressed Bayer Aspirin is Made in U.S. to Counter Anti-German Hysteria New York Times, 1918.

Anti-German sentiments mounted with rumors spread that aspirin was formulated to cause flu outbreaks. Bayer tried to counter the negative publicity with the ad shown in Fig. 3, touting aspirin as a pure, American made product.

This situation accelerated efforts by the government to sell the seized German company to an American firm. The Alien Property Custodian sold the business in 1918 to Sterling Products Inc., a drug manufacturer of Wheeling, West Virginia. Sterling Products immediately sold the dye-making portion of the company and plant to the Grasselli Chemical Company of Cleveland, Ohio.

In 1919 Francis P. Garvan, then Alien Property Custodian, announced details of the German spy system in the U.S. during the war. The address took place at the annual banquet of the National Cotton Manufacturers, an influential lobby group. Garvan reported that the Hamburg-American and North German Lloyd shipping lines collected information about U.S. ship movements and cargo which were reported to Germany.

Garvan believed the emerging American dye industry was the principal target of the espionage. Thirty German chemists were being interned at the time. Garvan regarded Dr. Hugo Schweitzer, the president of the Bayer Company, as a master spy and propagandist leading a group of German agents who monitored and reported details of American business life in daily coded messages to Berlin. Garvan said Schweitzer was given the secret service number 963,192,637 by the Imperial Minister of War, emigrated to the U.S. to become a citizen, and eventually was named head of the Bayer Company.

Schweitzer had employed Walter Scheele in the New Jersey Agricultural Chemical Company of Bogota, New Jersey, where he invented mustard gas in 1913. Scheele transmitted the formula through Capt. Von Papen, the military attaché in Washington, to Germany as soon as the war broke out. Garvan said *"This is the mustard gas which laid low your brothers on the plains of France."*

Garvan then revealed details of an elaborate German scheme to divert a key raw material away from munitions production in the U.S. In 1915 Thomas A. Edison invented a process to synthesize phenol, the starting material for picric acid which was used as a high explosive in artillery shells. The American Oil and Supply Company of Newark, New Jersey was the sales agent for phenol, which was in very tight supply. Schweitzer wanted to control this supply and contracted with the company in June 1915 to purchase 6,000 pounds of phenol daily until the end of 1915, and 40,000 pounds daily in the first quarter of 1916. The price was almost double the normal market price. Schweitzer put up \$100,000 in cash and a \$25,000 surety bond to guarantee fulfillment of the contract. Schweitzer had a total of \$1.5 million at his disposal, given to him by Dr. Heinrich F. Albert, commercial attaché at the German embassy in Washington.

In order to disguise doing business in his own name, Schweitzer formed the Chemical Exchange Association to purchase the phenol and deliver it to the Heyden Chemical Works where it was converted to salicylic acid for pharmaceutical products. Heyden Chemical Works had a large plant in Garfield, New Jersey and an office in New York, which were seized in July 1918 by the Alien Property Custodian as enemy property. The German ownership of Heyden Chemical had been concealed by company officials.

In praising Schweitzer's development of this scheme, Albert is quoted by Garvan as saying *"Now one should picture to himself what a military coup would be accomplished by an army leader if he should succeed in destroying three railroad trains of forty cars, containing 4,500,000 pounds of explosives."* Albert and von Papen were deported to Germany in 1915. Schweitzer died suddenly in November 1917.

Continued on page 15

SPIES AND DYES - CONTINUED



German chemists working in the U.S. came under increased surveillance. German-born Louis Hihn was head chemist of the Martin Dyeing and Finishing Company of Bridgeton, New Jersey for five years when he was arrested in July 1917. He was charged with stealing valuable formulas and dye samples from the company, a large manufacturer of khaki and other cloths used for military uniforms and tents. His subordinates knew him as "*the silent chemist*". The police said Hihn was preparing to flee to Mexico with the dyes and formulas and was ready to withdraw \$900 from his savings bank.

The proliferation of chemical plants and munitions works in New Jersey made it an attractive target for German saboteurs. In July 1918 two Germans were discovered, by Department of Justice agents, planting a bomb at a munitions factory in Irvington, New Jersey. They were Frederick W. Bischoff, a dentist and chemist, and William Heineman. The plot was discovered after Bischoff was observed spreading propaganda among American workers. An undercover private detective posed as a German sympathizer and befriended Bischoff. As a result, Bischoff and Heineman were caught red-handed in the dead of night laying a bomb alongside the power house of the Gould & Eberhardt Company, manufacturing machinists for the munitions industry. The intent was to destroy both the Gould & Eberhardt factory and the adjoining Keyport Engineering Company which made ammunition and had a powder magazine. The Keyport Engineering factory was the original target, but when the plotters went there the previous night, they saw that it was well-guarded and decided to bomb the Gould & Eberhardt factory instead.

Bischoff had a dentist's office in Newark and Perth Amboy and was living at the Robert Treat Hotel in Newark at the time. He was also a chemist and an expert in explosives. He admitted to building the bomb, a brass cylindrical device one foot in length. A search of his rooms revealed plans and blueprints of bombs in addition to coded letters from the German military. He was sentenced to 25 years in prison for the attempted sabotage and an additional 10 years for conspiring to defame the character of returning American Red Cross nurses and soldiers. His associate Heineman was sentenced to 15 years in prison.

U.S. government agents were particularly interested in the activities of the German founders or executives of companies. In March 1918 Wilhelm Andreae, a German connected with the A & B Export and Import Corporation of New York, was arrested on a Presidential warrant and was interned at the Fort Oglethorpe, Georgia prison camp (**Fig. 4**).

Andreae was suspected of serving the Prussian secret service for twenty years. He arrived in the U.S. in 1915 at a time when the empire was allowing no one to leave except for special reasons. He had been in Paris in 1914 but left hastily a week before World War I broke out and was suspected of being recalled by the German military authorities. Andreae started the A & B corporation in 1917. He had a brother in the German Army and another brother who was interned in England. Carl Feldman, president and general manager of the Berlin Aniline Works, was seized in August 1918 as a dangerous enemy alien. He was held at a Massachusetts detention camp for questioning. Custodian of Alien Property Palmer confiscated all the stock of the company. Oswald Kunhardt, a local representative of the company's office in Boston, was arrested the previous month, after leaving a train in Manchester, Massachusetts. He was interned at the East Cambridge jail. In 1918 the Alien Property Custodian seized the Williamsburg Chemical Company of Brooklyn as enemy property and made plans for its sale. The company manufactured a group of basic colors including malachite green, brilliant green, methylene blue, and safranin. The government claimed that German interests owned 56 percent of the company. Company owners Richard G. Blumenthal and Richard Heyder were interned. In 1927 the Calco Chemical Company of Bound Brook, New Jersey purchased the company and benefited from its unique line of dyes.



Fig. 4 German Chemists and Executives Interned at Fort Oglethorpe Prison Barracks, 1917 Photo: U.S. Marshals

Adolphus H. Ney was a German chemist with a Ph.D. from the University of Zurich. He was a descendant of Marshall Michel Ney of Napoleon's army. Ney came to the U.S. in 1898 and worked for the leading dye manufacturer Schoellkopf, Hartford and Hanna of Buffalo during 1902-1905. He later became a consultant in dyes and explosives, with an office in New York. During World War I Ney consulted for Standard Aniline Products (Wappinger Falls,

Continued on page 16

SPIES AND DYES - CONTINUED

NY), Sherwin-Williams Paint (Chicago), Holland Aniline (Holland, MI), Federal Dyestuff and Chemical (Kingsport, TN) and the Bayer Company. (Rensselaer, NY). After failing to register as an enemy alien, and displaying suspicious behavior while under government surveillance, he was arrested in December 1918 and imprisoned at Ellis Island. In March 1919 he was transferred to Fort Oglethorpe (**Fig. 5**). Ney was paroled in December 1919 and allowed to join the Sepoy Color Co. (Scranton, PA).

When World War I ended, there were about 2,500 civilian enemy aliens interned in the U.S. Those regarded as the most dangerous, such as the bomb plotters and propagandists, were deported to Germany and Austria. Herman Seeböhm, former director of the Bayer Company in the U.S., was returned to Germany and became director of the Chemikalienwerk Griesheim GmbH of Frankfurt, a company that later became part of I.G. Farben. Enemy aliens accused of less serious infractions, such as transmitting business information to Germany, were generally allowed to stay in the U.S.



Fig. 5 Fort Oglethorpe Prison Camp
Photo of Interned German Chemist
Adolphus H. Ney-March 19, 1919
Photo: Fort Oglethorpe Prison Files,
Courtesy of S. Motley

Dr. Arthur Mothwurf, former chief chemist of the Bayer Company Rensselaer plant, became head of research in 1921 for the Garfield Aniline Works, a small dye producer with a plant in Passaic and a laboratory in Garfield, NJ. He later became president of the American Bemberg Company, a rayon manufacturer with plants in Elizabethton, TN, which was owned by a German firm. In 1929 some 5,000 textile workers struck the plants, crippling production for six weeks. Mothwurf, who was openly anti-union, was fired by the board of directors in 1930.

Dr. Rudolph Hutz, a former director of the Bayer Company, became general manager of the Grasselli Chemical Company after his release from internment. In 1919 this firm had purchased the Rensselaer dye factory once owned by the Bayer Company. The dyestuff business of Grasselli Chemical eventually became known as General Aniline, whose parent company was I.G. Farben. Hutz was vice president of General Aniline and Film Corporation when the company was seized as enemy property in 1942. Hutz and other German board members, regarded as sympathetic to Nazi Germany, were fired and replaced by American directors.

III) British Manufacturers Capture German Dye Secrets The Daily Mail of London proudly announced this breakthrough for British manufacturers in January 1918. Two men in the textile trade, John Leyland and Richard Baldry, accomplished the feat. They heard of a chemist in Switzerland who possessed the recipes for aniline dyes made by Badische (BASF). With the help of the British Government, Leyland and Baldry engaged F.M. Row of the Manchester School of Technology to visit Switzerland and test the recipes, which were found to be satisfactory. The Foreign Office even dispatched a Consular officer to witness and certify the experiments. Leyland reported that their agent was followed by German agents on each trip to Switzerland. His baggage was stolen and he was drugged and thrown into a gutter. Once he was followed all the way to Harve, where he alerted the French authorities who captured two German agents. The dye samples and recipes were finally brought to England.

Leyland and Baldry refused commercial offers to purchase the secrets and intended to sell the information to the British Government which had established British Dyes Ltd. in Huddersfield in 1918. The goal was to alleviate the dye famine in England, which had impaired the textile industry whose annual sales were £200,000,000.

IV) The Mysterious Case of Guido Meisel Guido Meisel was a German born chemist who emigrated to the United States in the late 1800s. In 1902 he married Marion Barnes of Atlanta, who had studied music in Germany 1895-1900. In 1905 he established with two partners the Southern Graphite Company, which mined graphite deposits in Alabama and North Carolina. In World War I, Meisel joined the Atlantic Dyestuff Company, headquartered in Boston, with a manufacturing plant in Newington, New Hampshire, near Portsmouth. Atlantic Dyestuff was one of the many small firms established in the U.S. during the World War I dye famine. It was initially a very successful supplier of sulfur dyes and other colors for cotton and wool fabrics. The Atlantic sulfur black was highly regarded for its quality. Meisel became a naturalized citizen in 1920.

In the early 1920s, however, the business began to erode. Two vice presidents and three chemists left for positions in other chemical companies. Larger scale dye producers, with broader dye ranges and lower manufacturing costs, took sales away from Atlantic Dyestuff. The company lacked the know-how to produce vat dyes, which were discovered in

Continued on page 17



Germany in 1901 and had superior fastness properties compared to sulfur dyes. By 1925 the company was in bankruptcy proceedings with \$50,000 in claims from creditors. The company was reorganized as the Portsmouth Dye and Chemical Company, which apparently tried to enter the emerging rubber chemicals market. The company held several U.S. patents in this field by 1927, so it had some expertise of its own.

In June 1927 Guido Meisel was arrested and jailed in Germany on industrial espionage charges. Curiously, most newspaper reports and the American Dyestuff Reporter did not name the company he represented. But one report indicated he was director of the "Portsmouth, New Hampshire Dye and Chemical Company." Another report said he was a representative of the "Portsmouth Dye and Chemical Company". A third news story reported Meisel *"was charged with trying to penetrate dye secrets in behalf of American chemical interests"*.

The German authorities also said Meisel was interested in discovering formulas for the treatment of rubber, a field in which Germany was conducting much research at the time. They claimed he advertised in the Chemische Zeitung for *"A chemist experienced in producing and utilising modern accelerators."*

Meisel had been traveling in Europe, apparently trying to recruit a skilled chemist to work for his firm. He was preparing to leave Cherbourg, France for the U.S. when he received a telegram suggesting a conference with a man who was willing to accept the position. When Meisel showed up for the meeting with the German chemist in Dusseldorf, he was immediately taken into custody. Meisel had been duped by the head of the German dye trust's investigation department, who answered his ad under an assumed name. He was charged with violating the German law which prohibits the hiring of an employee already under contract.

Germany held Meisel virtually incommunicado and did not publicize the arrest until November 1927. Bail was denied and the 52 year old chemist suffered serious health problems while he languished in jail. His wife was allowed to visit him only once a week and they had to converse in German with a prison guard present. His friends charged that he was being persecuted by German business rivals who plotted his arrest. The American Embassy in Berlin investigated the allegations made against Meisel but did not interfere with the due process of German law. The jury trial finally took place in February 1928. The trial was held in secret because of the fear that German dye know-how would be made public. After several days of proceedings, Meisel was convicted of commercial espionage and sentenced to a year in prison and a fine of 5,000 marks (equivalent to \$1,250 at the time). He was also sentenced to pay 2,000 marks indemnification to each of the complaining firms: I.G. Farben, Leopold Cassella & Co., and Kalle & Co. The Court declared that Meisel had been conducting industrial espionage periodically since 1920, naming leading German chemical plants as the victims. (Ellis Island records indicate Meisel travelled to Europe in 1922 and 1923). He was charged with having negotiations with German confederates in Heidelberg, Mannheim, and Switzerland. The Court said Meisel was guilty of *"having through unscrupulous methods injured the German state and one of its most vital industries, which is indissolubly linked up with the nation's welfare."* The German chemists Paul Schmidtnaegel and Dr. Rudolf Reiss, co-defendants of Meisel, were sentenced respectively to five and two months' imprisonment and given nominal fines.

Meisel was released on bail of 11,000 marks and ordered to remain in Germany. He was finally freed in May 1928 after paying the 5,000 marks fine. He and his wife Marion quickly returned to the U.S., settling on a farm in Poughkeepsie, New York. By 1930, his former employer, the Portsmouth Dye and Chemical Company, was out of business. It is not known if Meisel worked again in the chemical industry. His wife opened a restaurant in Poughkeepsie and later operated a photography studio in New York City.

Meisel's treatment in Germany was exceptionally harsh considering that he actually never hired a German chemist. His punishment most likely represented retribution by the German dye industry for the earlier defection of four chemists to Du Pont. The German dye trust had sent a clear message to the world of how seriously they guarded trade secrets.

IV) I.G. Farben Thwarts Spying Stolen dye manufacturing know-how from German plants brought high prices. In August 1927 three employees of the Hoechst plant in Frankfurt were caught trying to carry trade secrets to England in their socks. A contract found on the men showed the purchase price of the information was over \$200,000. The contract provided for air passage to England, steady employment and a share of the profits. In September 1928 I.G. Farben discovered a well organized spy ring operating in its Leverkusen chemical works. Three chemists were arrested. The espionage system was uncovered by the intelligence department of I.G. Farben which had placed agents in its plants throughout Germany. The arrested men said that almost every I.G. plant employed several Germans who were spying for the French secret service. But

Continued on page 18

SPIES AND DYES - CONTINUED

I.G. Farben reported that only unimportant formulas for aniline dyes made their way to France. There was evidence that information relating to new processes, such as coal liquefaction and Indanthrene dye manufacture (**Fig. 6**), was actively being sought by the spy ring. I.G. Farben expressed confidence in their basic approach to prevent the theft of industrial secrets. Information was tightly compartmentalized and no one employee had access to complete information regarding any one process which was not public property.

V) Conclusion. The daring exploits of chemists, dye manufacturing companies, and governments on both sides of World War I demonstrated the importance of chemical industry trade secrets to the outcome of the war. But also at stake for the victor was the domination of the global economy by superior technology. The war ended the German monopoly of the dye industry, with the U.S. emerging as the world leader. The secrets learned from unraveling the chemistry of synthetic dyes led to new developments in pharmaceuticals, fibers, rubber, plastics and many other products. The U.S. economy is still the world's largest based on continuing advances in research and technology.

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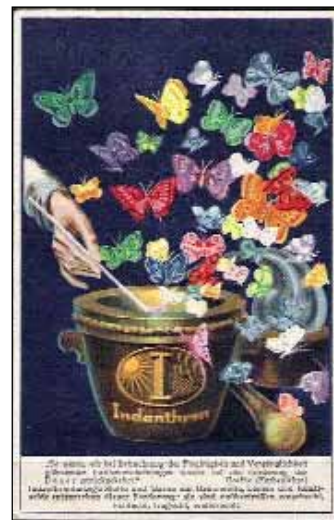


Fig. 6 German Postcard, ca. 1922, Promoting Indanthrene Dyes. The Excellent Fastness Properties of the Dyes Motivated Industrial Spies to Seek the Know-How.

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