

The Cafe - Former

Official Organ of The Society for the Defense of Tradition in Pyrotechny

I.: O.: O.: J.:

“Magna est Veritas et prævalebit.” – I. *Esdras*, iij: 41.

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FAMA ET CONFESSIO FRATERNITATIS

*Die Strählen der Sonnen
vertreiben die Nacht,
zernichten der Heuchlers
erschlichene Macht.*

–E. SCHICKANEDER

Last July, at the apex of that frenzied time of the season when the Fourth, Lower Hay Lake and preparations for the convention all seem to run together into some congealed mass of pyrotechnic overkill, something arrived in my mailbox that I actually noticed. It was just a foldover mailing, innocent enough for all appearances, but it bore a LaCrosse postmark, and it had been sent by the “Friends of the PGI,” so it deserved a better fate than simply to be cast onto the ever growing pile of ads, bills and other crap that accumulates on my coffee table every summer until after Labor Day.

Now we all received one of these pieces of propaganda, so I don't have to elaborate on its contents, and we all recall who sent it, so I needn't name any names. I know that I wasn't alone in my feelings of shock, disgust and outrage upon perusal of this prime example of a horse turd. It was not so much the mailing itself, but more that it seemed to be the culmination of a wave of strange goings-on within the PGI-political meddlings, attacks on fireworks tradition, goofy safety restrictions and myriad other gusts of some ill wind that had been blowing for the last couple of years.

The usual pre-convention excitement was dampened by anxiety and fear, and I soon discovered that I was not the only Guild member with some awful questions looming in my mind:

- What would happen if the bogus straw poll presented by the “Friends” obtained the results they were looking for?
- Were there more of them than there were of us?
- Did this mean the end of *Pyrotechnica* and the death of the autonomy of our local clubs?

- Was our beloved Guild undergoing some horrible metamorphosis into a society of politically ambitious addlepates, safety fakers, fuse lighters, UFO chasers and dipshits who value their own egos more than fireworks?
- Where would we fit into such an organization?
- Would the convention become a gathering of self aggrandizing sandal wearers in approved safety goggles and flak jackets lighting cheap class C for an entire week?

Thank God, our fears were unfounded. The convention saw the Guild's elected officers steer us out of harm's way and proved that the general membership possessed great confidence in their abilities. But the question remained, how long would this stable situation last?

Out of the summer's maelstrom of anxiety and confusion, the seed of an idea was born - partly out of the necessity for a contingency plan should the PGI suffer the fate of old paste and go sour, partly out of mischievous sense of adventure fueled by countless bottles of the fine product of the August Schell Brewing Company. Those of us who banded together for fellowship, unity and the display of true skill in Pyrotechny needed somewhere to turn, some sort of loosely structured organization without dues, without serious rules, without political aspirations, and open only to those who could get along together for the purpose of furthering the cause of pyrotechny, out of a demonstrated love of fireworks, freedom and all that it could represent. Thus was conceived the “Society for the Defense of Tradition in Pyrotechny,” better known to its members as the I.O.O.J. The Auburn convention saw the first manifestation of its existence, and the initiation of its first members.

It is a unique honor to be inducted into our number. You have been chosen for membership because you represent what is best in the world of fireworks, and because your opinions, ideas and companionship are valuable to others of a like mind. While we implicitly trust your judgement and do not intend to impose restrictions on your behavior, please use common sense to guide your conduct.

The I.O.O.J. is certainly not for everyone, and there is no need to even mention its existence to anyone who is not a member. Please stand by your fellow adherents to our obligation and always work to defend the traditional principles of pyrotechny.

The future looks quite rosy for our order – membership has been growing steadily since the convention, and a number of activities are in the offing for the 1991 convention in LaCrosse. Count on target practice and probably a party on Saturday after the convention proper is over. The Public Display for 1991 promises to be phenomenal, with many contributions from our members. I am confident that I speak for all of us when I say that I look forward to gathering in LaCrosse. May Vulcan smile down on us all!

BIANCO GASOLINI



ON THE FORCED DRYING OF PYROTECHNIC DEVICES

Felix qui potuit rerum cognoscere causas.

—VIRGIL

No truly accomplished pyrotechnist is without patience. Indeed, the masters I have observed at work are patient and meticulous almost beyond reason – ramming countless spolettes, stringing and pasting innumerable pupadellas, all to be consumed in a few brilliant moments. To this, add the fact that all stars and components of artifices which are pasted need to dry thoroughly, and it is apparent that pyrotechny is hardly an endeavor of instant gratification.

The drying process may be speeded somewhat, of course, by an increase in heat, decrease in humidity, and increase of circulation of the surrounding air. Yet there are limits to the degree to which these conditions may be safely enhanced, as I discovered one June day over twenty years ago.

On that day, my lifelong friend and colleague, Stephano Flowarti and I were engaged in the construction of about a dozen marvelous yet lamentably obsolete devices known as cherrybombs. At that time, a company named Caseco sold the cardboard casing halves, along with the chemicals for flashpowder, 3/32" underwater fuse, and booklets for the construction of cherrybombs and myriad other infernal devices. All by mail, all without questions or need of a license – a blast from the past.

Ideally, the casing halves would be filled with the surprisingly virulent flashpowder we concocted by using three parts potassium perchlorate, two parts bright aluminum (600 mesh), and one part sulfur – measured by volume, usually with the kitchen's measuring cups and spoons. To assure intimacy of mixture, we ground the flash powder in a porcelain

mortar and pestle; a practice I eventually came to grief from, but that's another story. Once filled and glued together, a hole was punched in the sphere and a length of 3/32" Visco type fuse was inserted. The cherrybomb was then dipped in Elmer's glue, dunked in a mixture of Elmer's and sawdust, and allowed to dry. To make them aesthetically complete, we spray-painted them red.

Fine and well, except that they took their sweet time drying, and didn't work optimally otherwise. Unfortunately, (and many I.O.O.J. members will surely sympathize) sometimes the uplifting of the spirit and brightening of the day that can only be brought about by a neighborhood-rocking explosion simply cannot wait for drying time.

On that day in June, our prescription for the doldrums was a batch of cherrybombs. The immediacy of our need to blow something up led to our fateful decision to dry our wares in Mrs. Flowarti's oven. We reasoned that on a "warm" setting, we could increase temperature. So into the oven, atop a cookie sheet, went roughly a baker's dozen of cherrybombs. We looked in on them through the window often, anxiously at first, but after a time, (half an hour, an hour, who knows) we gained confidence that our reasoning and method was sound, brushing aside our concerns over the observations that those fuses certainly seemed a much darker green and had lost their shininess.

After ignoring the cherrybombs for a time, comfortable with their quiescence, Stephano warned that his mother would soon be home, and while Mrs. Flowarti was and is a kind and tolerant lady, we saw no reason to test those fine qualities. It just wouldn't have done to have had her glance into the oven to see our work like that. She was already becoming annoyed with the way seemingly everything in the house, especially the kitchen utensils, were turning silver, and with our noisy experiments in general, not to mention the attentions of Officer Maccini due to them.

And so, as Mrs. Flowarti drove into the driveway, we opened the oven door. In retrospect, we should have known we were doomed as we entered the kitchen, with its smell of scorched paper, but as it was, we watched with ghastly astonishment as all the fuses lit in unison. We glanced at each other with mirrored expressions of pop-eyed, gape-jawed, disbelieving terror, in the the best traditions of Wiley Coyote. Stephano slammed the oven door and we sprinted for the back porch door. As we cleared it, which was just about the time Mrs. Flowarti approached the front door, the oven blew. It was a colossal roar that came from the kitchen. It wasn't the usual joyous concussion, but the bellow of big, big trouble, followed by the crashing dismemberment of the oven door. We ran through the back yard and into the tall woods atop the rocky hill behind Stephano's house, chests heaving.

Moments later, we heard Mrs. Flowarti shrieking Stephano's name, along with several highly uncharacteristic expletives. We understood that we were hopelessly, irrevocably, abysmally screwed, and so we shambled out of the woods, shoulders hunched, heads low, only to see Mrs. Flowarti emerge from the roiling cloud of white smoke that billowed from the porch door and kitchen windows.

It could have been worse; no police or fire department, and thanks to the warm day and open windows, no broken glass. But then again, no more even, thus no more allowance. The oven looked more like a pillow than the flat-walled box it had been, and its splintered wooden framework required much attention. It never really looked the same.

Mrs. Flowarti was never the same either. Two decades later, as we recounted misadventurous tales from our upbringings with her, we still couldn't raise more than a bitter ghost of a smile from her on that one.

Stephano and I have speculated endlessly over the mysterious physical and chemical mechanics of the incident. It seems evident that the lacquer-covered fuses, their ends somewhat frayed, had reached a kindling temperature lower than that of their black powder cores, requiring only the oxygen provided by the door opening to bring them to life.

Another puzzle is the mass-detonation of our cherrybombs. Although we have no way of confirming this, save the chilling prospect of repeating the experiment, it sounded as though there was but a single blast. There should have been a brief staccato of smaller explosions, since we cut our fuses with scissors, measured by eyeball. One possible explanation is that explosive and pyrotechnic compositions increase in sensitivity as their temperatures approach their reaction thresholds, and thusly we may have baked our cherrybombs to a horrifyingly high value of sensitivity, the first to explode detonating the batch in full.

As for us, Stephano and I have continued to exhibit all the symptoms of terminal pyrotosis. Yes, they took our chemicals and supplies away, but we acquired more. And yes, I blew myself up and spent two weeks in the hospital, but we all know that after being thrown from the horse, the best remedy is to get right back on...and so I did. Our knowledge grew as we did, likewise the magnitudes of our explosions. Newspaper articles, along with investigations of our efforts at some frightening levels, have reduced our activities considerably, though not entirely.

Still, all these years later, the stark nightmare image of all those fuses lighting simultaneously remains forever, indelibly scored upon my memory. No doubt my arrival at the Gates of Hell will be saluted by the apparition of an oven full of cherrybombs.

EDUARDO TELLERINI

FLAMING JUSTICE

Jus est ars boni et aequi.

-JUSTINIAN

*My purpose all-sublime,
I shall achieve in time,
is to make the punishment fit the crime,
the punishment fit the crime.*

-W. S. GILBERT

The recent emphasis on the "War on Drugs" prompts my recollection of an incident a few years ago, illustrating the possible application of pyrotechnics to this social crusade. I recount it here with great hope that it might inspire others to take similar action.

A close friend of mine was, at the time, a security guard in an apartment complex in a rather run-down section of one of the mid-South's rather run-down major cities. For the purpose of this story, we'll call him Mike (his real name). There lived in this complex a negress of mammoth proportion. Being white, and somewhat of an authority figure, Mike was a natural target for the constant verbal abuse of the obese she-gorilla. After several weeks of continuous harassment, Mike took note that the aroma of marijuana was one of the more prominent smells always emanating from "Aunt Jemima."

Being a man of good humor, and possessing a knowledge of the practical aspects of pyrotechnic materials, it occurred to Mike that he could extract a bit of revenge and at the same time strike a blow against drug abuse. With a broad smile and the drive of a man possessed, Mike simply fashioned a bogus joint out of two strands of heavy, dusted, black match, and a common cigarette paper. The loaded "joint" was then left where his tormentor was sure to find it. She soon did find it, and thinking it was heaven-sent, returned back into the squalor of her own creation to enjoy her new-found good fortune. POOF! - flaming justice - with the result that madame went on such a murderous, screaming tirade that Mike was called in to investigate and fill out a report. This he did while fighting a losing battle not to appear amused!

In his own words, "you wouldn't think those big old liver lips could get any fatter, but they did!" It took several weeks for the severe second and third-degree burns to heal - very quiet, pleasant weeks for Mike. Eventually the verbal assault resumed, but Mike would just politely smile and walk away, knowing he truly had enjoyed the last laugh.

SBIRO DA PULIZIA



CHLORATES AND SULPHUR — MENACE OR BUGBEAR?

Conservative, *n.* *A statesman who is enamoured of existing evils, as opposed to the Liberal, who wishes to replace them with others.*

—AMBROSE BIERCE

*And the Gods of the Copybook Headings said,
Stick to the devil you know.*

—RUDYARD KIPLING

The instability of mixtures of chlorates with sulphur, sulphides, or sulphates is widely feared by pyrotechnists. The experience giving rise to this fear commenced almost immediately after the first synthesis of potassium chlorate by Comte Claude-Louis Berthollet in 1786. The vigorous oxidizing capability of this compound was quickly discovered, and by 1788 the attempt had been made to substitute it for saltpetre in the manufacture of gunpowder. Experiments showed the chlorate gunpowder (variously reported to contain four, six, or seven parts of potassium chlorate to one part each of sulphur and charcoal) had superior explosive and propellant characteristics compared to conventional black powder. It was in that year that an horrendous accident took place at the French government powder mill at Essonne, taking six lives including those of the mill superintendent and his daughter. The powder was being prepared by stamp milling, then in use for all powder in France. What is remarkable about this occurrence, in view of current pronouncements upon chlorate/sulphur mixtures, is that the accident did not happen at once as stamping began. Several previous batches had been made without incident, and on the day of the explosion, milling had started before breakfast; the observers had left the site to take their meal, and returned to the mill, whereupon it exploded. Recognizing the demonstrable sensitivity of chlorate/sulphur mixtures to friction and shock, it is a point necessary to bear in mind that eighteenth-century stamp mills often exploded whilst preparing ordinary black powder.

The Essonne disaster is said by Brock and others to have dampened, for a time, the interest in potassium chlorate as an oxidizer in pyrotechnic compositions. However, the sensitivity to shock and friction of such mixtures was first exploited by Alexander Forsyth (1807) for the percussion priming of firearms, followed by variations on the theme such as those of Manton, Westley Richards, and Pauly. John Walker (1826) produced the first strike-anywhere matches. The first chlorate color formulæ were published by Ure (1821), showing sulphur as the principal fuel. As the use of such mixtures spread, accidents began to happen.

Nineteenth-century records are replete with accounts of spontaneous combustion of chlorate/sulphur

mixtures. F.M. Chertier, in his first book published in 1836, recounts the spontaneous combustion of a mixture of barium chlorate and sulphur in 1834, which nearly destroyed his house, and did destroy his notes and records, compelling him to repeat much of his research. Chertier strongly encouraged the substitution of fuels such as shellac for sulphur, in his subsequent works published in 1843 and 1854. While Websky introduced lactose, and Tessier suggested rosin and even such unusual substances as pine pollen and powdered dried beef blood, these suffered, as did shellac, the defect of high price, and the use of sulphur as a general-purpose fuel in colored flame compositions continued through the late nineteenth century. Brock describes numerous factory explosions during that period, the consequences of which were aggravated by the typical location of the factories in multi-story buildings situated in densely-populated industrial districts. It was in response to such devastating and tragic events that the British government first passed the Explosives Act of 1875, which incorporated the first "tables of distances," now a feature of explosives regulations in most countries; and then promulgated the famous order-in-council of 1894, which has stood since that time, prohibiting the admixture of chlorates with sulphur or with certain sulphur compounds in fireworks.

The British regulation takes the extreme step of forbidding not only the described combinations, but also chlorate/sulphur "contacts" such as occur when a chlorate star is primed with a sulphur-containing meal powder, or when a Japanese-style round star contains adjacent layers of a chlorate color and a sulphur-containing streamer composition. In other countries, the regulations are different or non-existent; in the United States, chlorates are banned from any but a few sharply restricted uses in Class "C" (shop goods), but largely permitted in Class "B" (display fireworks). Even where formal restriction is absent, as in the latter case, there is a general reluctance to combine chlorates with sulphur or its compounds except in certain very specialized applications.

An informed caution is not, however, the same as an irrational fear, a "taboo," or a bugbear. Many people, especially those who are ill-informed, display the latter rather than the former, not only with respect to chlorate/sulphur mixtures but with respect to any use of chlorates whatsoever. One of the present writer's friends was solemnly warned by a college chemistry instructor against spilling any potassium chlorate upon his clothing, which he was assured would spontaneously burst into flame were he so to do. Regrettably, strident and overblown warnings, not far different from this one, have been heard from persons, heavily bedecked with formal credentials, posing as authorities on pyrotechny. As for mixing chlorates with sulphur, this is heresy

and witchcraft, directly related to a quick-term contract with the devil.

My purpose in this short essay is to explore *why* chlorate/sulphur mixtures have caused accidents, and how the informed pyrotechnist may, short of complete avoidance of their use, work safely. Three reasons for caution in approaching chlorate/sulphur combinations may be identified: sensitivity to shock, sensitivity to friction, and potential for spontaneous combustion. The two former may be objectively established and quantified, as indeed has been done by Shimizu. The last-named is more problematical, and deserves further examination.

Undoubtedly, spontaneous combustion, being unpredictable and hard to understand, was the hazard most feared in the late nineteenth century when the British order-in-council was promulgated, and when, if the historical record may be presumed accurate, the widespread use of chlorates with sulphur began to be abandoned in other countries even without the pressure of regulation. Pyrotechnic compositions do not explode from friction or shock when undisturbed in storage, nor even when gently handled by skilled workers. If, however, they spontaneously ignite, they can create great damage. Well before 1894, it was thought that such occurrences were traceable to acidic sulphur, and therefore, stress was laid upon avoiding the use of "flowers of sulphur," prepared by sublimation and having impurities of sulphur oxides that, in the presence of dampness, formed sulphurous and sulphuric acids. "Washed sulphur" was advocated by many nineteenth-century writers for use with chlorates. According to Domenico Antoni:

"...even sulphur in rolls or loaves can contain traces of acid, and to eliminate this totally, it is subjected, once pulverized, to a thorough washing with boiling water in which is dissolved 1% of potassium carbonate. Once cooled, this is decanted, and the sulphur washed twice with cold water. At last, the sulphur is emptied into a large cloth sack and hung up to drain and dry in the sun, or by artificial heat."

In retrospect, it is evident that the use of washed sulphur was not adequate to eliminate all problems, since ultimately the use of sulphur with chlorates was largely abandoned. Why problems with instability persisted then became a moot point as far as most pyrotechnists were concerned. It is a question that deserves attention, especially in view of the good safety record of the match industry, which routinely uses chlorate/sulphur mixtures in specifically friction-sensitive applications, and in quite large quantities. Undoubtedly the match industry is a comparatively sophisticated field as contrasted with fireworks, and its safety must in part be attributable to this. The fact remains that it is using materials deemed *in-*

herently unsafe by many authorities, whose judgment has been enshrined in legislation governing the fireworks industry.

Shimizu indicates that potassium chlorate by itself "does not react with nitric acid, but if there is potassium chloride present in the potassium chlorate, it causes a violent reaction with the generation of chlorine dioxide. Accordingly, the amount of potassium chloride as an impurity is significant." In addition, some years ago a correspondent brought to the attention of the writer that the British Home Office seemed to think that calcium chlorate might be especially prone to spontaneous combustion, and had therefore ruled that hard water should not be used to damp star compositions because of the possibility that this compound might be formed by metathetical reaction between the potassium chlorate of the composition and the calcium salts in the water. These two observations lead to a review of the processes by which potassium chlorate was historically manufactured, with the thought that these might have had an effect.

Berthollet's first process for producing potassium chlorate involved passing chlorine gas through a solution of potassium carbonate. Later a solution of potassium hydroxide was used. The result was a mixture of potassium chloride, hypochlorite, and chlorate in water; these were separated by crystallization, the chlorate being the least soluble in water. Yields of chlorate were poor. Justus von Liebig introduced a process whereby calcium chlorate was produced by passing chlorine through hydrated lime (calcium hydroxide). Other chlorates were prepared by reacting the calcium chlorate, *e.g.*, with potassium chloride to produce calcium chloride and potassium chlorate, and separating the resultants by crystallization. The Berthollet and Liebig processes would likely have led to the presence of either some potassium chloride, some calcium chlorate, or both, in the final product, depending upon the process used and the level of quality control.

Electrolytic production of chlorates was introduced in Europe in the 1880's. The National Electrochemical Co. of Niagara Falls, started its production based upon processes used in England by its parent company, Allbright & Wilson, Ltd. North American Chemical Co. of Bay City, Michigan, undertook manufacture of sodium and potassium chlorates under processes licensed from United Alkali Company of England. Nearly all chlorates used in the United States prior to World War I were domestically manufactured. All perchlorates, on the other hand, were imported prior to 1910; in that year, Oldbury began domestic production. Imports increased after World War I. Between 1926 and 1933, all potassium chlorate was imported. In 1933 domestic production resumed, and by 1940, two plants satisfied the domestic market. Today, domestic production of potassium chlorate appears to have ceased, and Spanish,

Swiss, and Swedish products have been imported at various times to fill the demand.

Sources of sulphur also changed in the late nineteenth century. Until the development of the Frasch process, which made possible the extraction of deep sulphur deposits through liquation with superheated steam and subsequent pressurized pumping to the surface, all sulphur came from superficial deposits found in association with volcanic activity. Sicily was a great source. Volcanic sulphur, unlike Frasch sulphur, is typically associated with metallic sulphides (including those of antimony and arsenic), and these are difficult to remove either by liquation or by sublimation. In contrast, Frasch process sulphur is frequently pure enough to be usable without further refinement. The present writer, while travelling across Canada, has seen huge piles of it, by appearance quite pure, awaiting loading rail cars.

Does it not, then, suggest itself that firework accidents might be correlated with the use of chlorates and/or sulphur as produced by specific manufacturing processes? The availability of these materials has varied, but at least at some periods must have been limited to a traceable source (i.e., all foreign or all domestic). It might be harder to tabulate firework manufacturing accidents, as accounts of these would not have been very widely circulated before the rise of the wire services and the ascendancy of the "newsghoul." Certainly, however, they heyday of spontaneous combustion accidents, which was also the heyday of chlorate/sulphur compositions, was the middle nineteenth century, when electrolytic chlorates were not available and the Liebig process was perhaps most widely used. Additionally, volcanic sulphur containing many impurities (e.g., arsenic, antimony, and iron sulphides) unremovable even by washing was mixed with these probably impure and unstable chlorates.

The nature of nineteenth-century chlorate/sulphur compositions also deserves consideration. Most of them were star compositions in which sulphur formed a considerable proportion – between ten and twenty percent. They were dampened to make cut or pumped stars, often using a soured solution of gum arabic! The potential for reaction in the dampened state must have been considerable.

The present writer has had opportunity to examine a substantial number of unpublished manuscript documents containing firework formulæ and production notes. Those prepared in the middle nineteenth century include chlorate/sulphur colored star compositions quite similar to those in contemporary firework books. Information from the period just prior to World War I and following cites star compositions much like those still in use today, without sulphur. The only instances in which chlorate/sulphur admixture occurs at this period is in flash or dark report compositions. A key element in the conversion, although its exact date is unknown to me, appears

to have been the introduction of red gum (accroides resin), an inexpensive substitute for shellac. Since the potential for spontaneous combustion is increased in a situation where the composition is dampened, chlorate/sulphur combinations in star compositions posed more threat of spontaneous combustion than did such combinations in compositions used in a dry condition, such as flash powder. This, and the use of unreactive "varnish" grades of aluminum in early flash powders, explains the retention of sulphur in such applications at a time when it had been eliminated from star compositions.

Recapitulating and concluding:

- 1) Spontaneous combustion arising from the use of chlorates and sulphur was a greater fear, and a greater real hazard, in the nineteenth century, than was sensitivity either to shock or to friction. Spontaneous combustion occurred largely with star compositions that were dampened, permitting reactions to take place in solution that would not have taken place in a dry condition.
- 2) Acidity of sulphur owing to adsorbed sulphur oxides was not the sole cause of spontaneous combustion accidents. Impurities in the chlorates used – principally potassium chloride and calcium chlorate – also added to the instability, as did the presence of arsenic and antimony sulphides in the sulphur. These impurities were present because of the sources or processes from which the chlorates and sulphur were derived.
- 3) Today's electrolytic chlorates and Frasch process sulphur contain very little impurity compared to nineteenth-century chemicals. It is probable that the susceptibility of mixtures of modern chlorates and sulphur to spontaneous combustion is thus much reduced in comparison with comparable mixtures in the late nineteenth century.
- 4) The sensitivity of chlorate/sulphur compositions to shock and to friction is well-established, and should be borne in mind if such mixtures are to be made.
- 5) Dampening of chlorate/sulphur should be avoided, and hard (calcium-containing) water should be avoided in dampening any chlorate-containing mixture.
- 6) Flash powder and dark report compositions containing potassium chlorate may be used if handled carefully – and are sometimes essential in certain applications. Effort should be made to confine them to such essential applications.
- 7) Contacts between chlorate-containing star compositions and sulphur-containing meal powder primes do not appear to pose the hazard that straightforward mixtures of chlorates and sulphur do. However, any stars so primed should

be dried as quickly as possible, by techniques well-known to the craft, *viz.*, spreading in this layers on paper-lined, screen-bottomed trays, well-exposed to an atmosphere of moderate temperature (70°-80° Fahrenheit), well-dehumidified and maintained in constant circulation. Care should be taken in sifting excess meal from the dried stars.

Chlorate-containing mixtures, including a few chlorate/sulphur combinations, retain an appropriate place in fireworks. Chlorate stars using resinous fuels are particularly useful by virtue of their simplicity of preparation, ease of ignition, excellence of color, large flame envelope, and vigorous, speedy combustion that renders them unlikely to be blown blind ("high critical wind velocity").

Many of the anti-chlorate pronouncements the writer has heard are sweeping and uncritical. They more resemble the tub-thumping of an itinerant eyangelist on the sawdust trail, than they do either the measured and sceptical analysis of the dispassionate scientist, or the seasoned advice of the experienced craftsman. It is ironic that many such declarations come from persons who, equally uncritically, embrace ammonium perchlorate compositions, often featuring metal fuels, and rejecting dichromate buffering ("too toxic") although dichromate buffering is the only sure way to avoid spontaneous combustion! The as yet undiscovered hazards of such compositions brings to mind the difference illustrated by Ambrose Bierce in the epigraph to this essay. ♪

ERNST PFANTODT

EDITOR'S NOTE: Class "C" fireworks were clearly meant to be used with a certain sort of carefree abandon; recent PGI conventions have, unfortunately, eliminated much of this element, and Class "C" shooting has become a regimented activity. Certain individuals have even converted the burgeoning concern for safety into an opportunity for entrepreneurship by first contriving, for example, to institute rules requiring the use of safety paraphernalia, and then setting up to sell the same. The writer thinks the rot set in six or eight years ago, and has steadily progressed. He recalls his first serious run-in was at Ithaca in 1985, when he had been given a few pieces of the Japanese "senko hanabi" to try. Upon walking through the gate to the track he decided to try one, but within a few seconds of lighting the tiny firework he was accosted by an orange-vested wannabe commissar, who descended upon him shrieking "YOU CAN'T DO THAT HERE! CAN'T YOU SEE HOW CLOSE THE MAGAZINE IS?" (it was about 100 yards away).

The following article presents a proper view of the use of class "C" fireworks, which is in stark contrast to current attitudes within the Guild. Those of us who have actually witnessed an exemplification of the recommended technique can attest to its effectiveness.

ALCOHOL, TOBACCO, AND CLASS "C"

Omne tulit punctum, qui miscuit utile dulci.

-HORACE

Do you yearn for a good Class "C" shoot reminiscent of some of the early PGI conventions? Do you despise the wimpy, no-account, candy-ass bullshit regulations infesting more recent attempts at Class "C" shooting? Well, all aboard then, folks, because here we go!

Fired in the proper manner, Class "C" fireworks can be fun, stimulating, and even worthwhile. The most important steps are these easy-to-understand points:

- A. Quantity of Class "C" devices.
- B. Methods of priming devices.
- C. Type of Class "C" devices.
- D. The correct frame of mind in which to view a Class "C" display properly.

I would consider 200 lbs. of Class "C" as a reasonable minimum for a Class "C" display. The optimal scenario would be a dumptruck full of Class "C" dumped on a bonfire - maybe a whole bargeload all primed up!

The decent methods of priming include commercial powders (2F, 4F, meal, etc.) with nitrocellulose lacquer, gasoline, and campfires. In fact, when properly primed, the cases of Class "C" don't even have to be opened.

The types of Class "C" devices are also important. Since you can't make too much noise with them, try to get items that throw things as far as possible and make lots of sparks and light. Candles, birthday-cake items, and spinning fireworks such as New Sound Colorful Birds are preferred. Whistling items can also work nicely to accentuate the obnoxious factor. If you can simultaneously light and launch into the air large quantities of Class "C", so much the better (*e.g.* the now celebrated Dusterwinke Candle Mine).

The final and perhaps most important point is the proper frame of mind for viewing a Class "C" shoot. For this, whether or not your safety glasses have been Officially Approved, you will need a quart of Jack Daniels, a good cigar or a good chew, and a supply of powdered-sugar doughnuts. Of course, the CPSC and others have so limited the type and amount of composition in every Class "C" device that we can be assured that all of these activities are perfectly safe.

Good luck, and happy shooting! ♪

IMBIBO N. BOURBONINI

 **BUY** 

Arm & Former

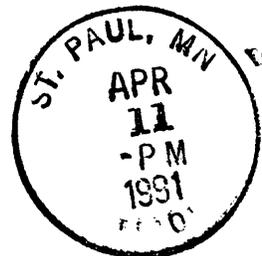
**BRAND
CHEMICALS**

-  Chlorates of potash and baryta
-  Paris green
-  Oxide and nitrate of lead
-  Benzene and hexachlorobenzene
-  Bichromate of potash
-  Calomel

Absolutely everything to aggravate the Safety-Fakers



I.: O.: O.: J.:



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