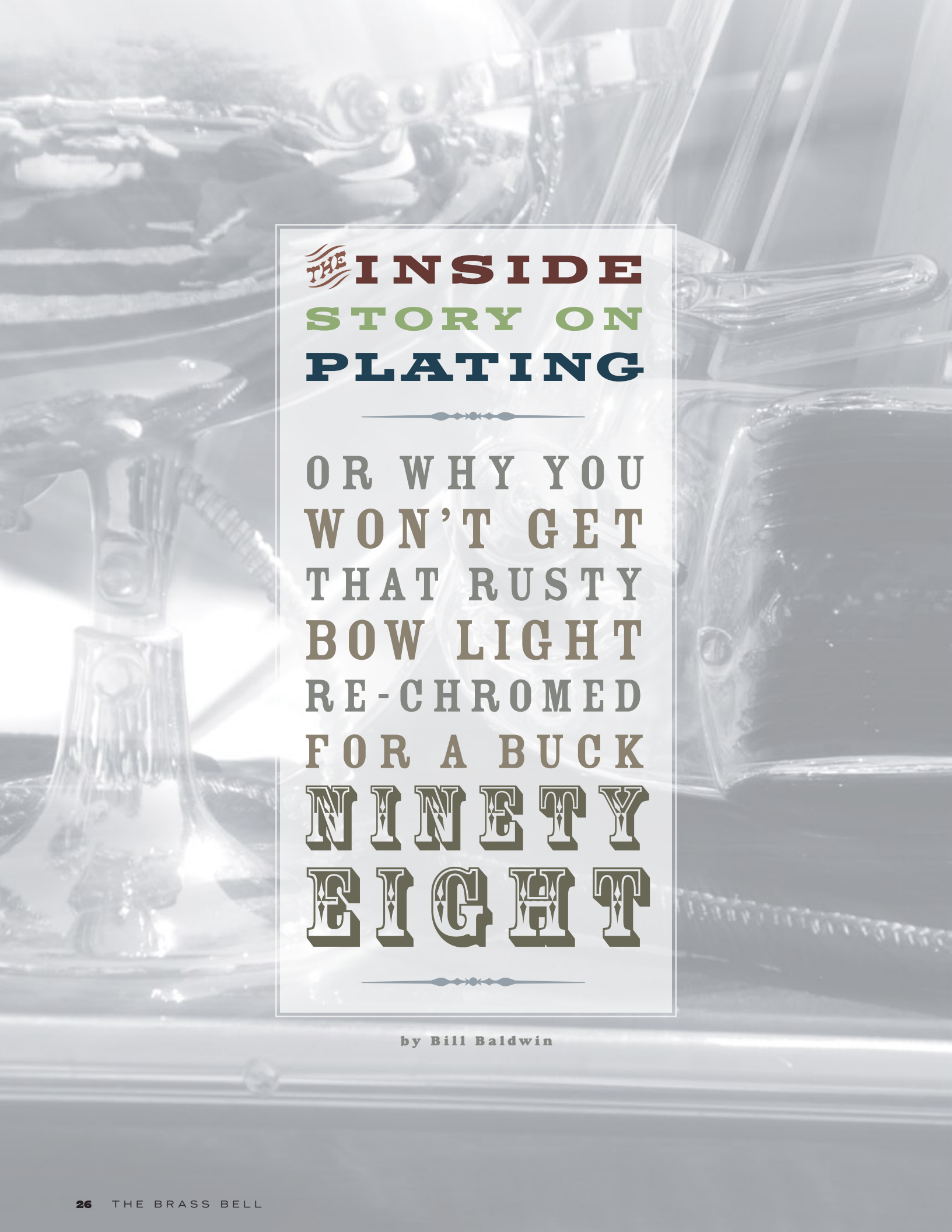

THE INSIDE STORY ON PLATING

OR WHY YOU WON'T GET THAT RUSTY BOW LIGHT RE-CHROMED FOR A BUCK NINETY EIGHT

by Bill Baldwin

"Hey, good to meet you, Bill," the man said, offering his hand with an easy grin, "but we're not really that much interested in the business you and your boat restoration buddies usually bring me."

That was my introduction to Jay Churchill, President of Jamestown Electro Plating Works, Inc. during a noisy cocktail hour at the exclusive Lakewood Sports Club on Lake Chautauqua in western New York. I'd heard previously of Jay's company — widely recognized for quality plating. "B-but why?" I stammered in real surprise: our *Brass Bell* reaches over three thousand potential chrome-plating customers, and I had been introduced as Editor.

"Because," Jay replied, again with the easy grin, "we're a production shop, geared for high output. It's simply a lot of hassle dealing with finicky, piece-at-a-time customers who have no idea what plating is all about. They think we charge too much, and that's not right."

Before I could further inquire, my host, ACBS member and close friend Bill Reynolds, whisked me away to meet more of the club's members and guests: an impressive gathering! Still, it was clear this smiling Churchill guy had a lot of important things to say, and I was determined to hear them. Later, during after-dinner drinks, Jay assured me he rarely turns down custom orders from antique boaters like myself, but before he does their work, he makes certain they know why custom chrome plating costs so much.

Fascinated, I managed to cadge one of Jay's business cards along with a promise that he'd sometime endure a tape-recorded interview at Electro Plating Works.

Nearly a month later, I phoned and discovered Jay was a man of his word; not only had he remembered me among the host of guests at that crowded party, he seemed more than willing to grant me that interview.

Accordingly, on a rainy morning the following week, I showed up at Jamestown Electro Plating, located in an old section of a much older town. You've seen places like it: uneven brick streets from a bygone age; grimy brick factories with arched, mullioned windows you can't see through; once-imposing industrial structures abandoned and empty, all victims of an economy long ago shifted elsewhere. Jamestown Electro Plating stood out like an island of life as I parked in one of the few available slots out front and made my way to the door.

Inside, the building belied its surroundings: modern, no-nonsense Bauhaus contemporary. Immediately, one recognized it as a place where people carry out a difficult, exacting business. To the left, the vestibule led into what was obviously a spotless chemical laboratory; to the right, a lobby with a single chair — no nonsense here! A secretary reigned imperiously behind a counter, clearly master of an imposing, business-like room filled with filing cabinets.

Intimidated for a moment, I immediately reminded myself that this was no ordinary industrial plant — this was a place where even a single accident could result in serious harm to the environment and to humans living in a significant area surrounding the site. According to finishing.com, which calls itself the "home page of the finishing industry:"

> "Chrome plating is done in concentrated (about 32 oz./gal) chromic acid, H_2CrO_4 — 'hexavalent chromium,"

the stuff that made Erin Brockovich a household name. Factories that use this stuff require exhaust ventilation, they require fume suppressants that are monitored every day. The workers require medical surveillance (frequent blood tests for absorbed chromium).

"If you do illegally dispose of chromic acid you will probably be caught because it leaches through the ground very readily and turns up in the aquifer, is not only detectable but visible at one part in a million, and all wells and water supplies are monitored for chromium."

"Dropped a beaker on the garage floor? That's enough to poison all of the wells for a few city blocks in every direction, and you don't have 'pollution insurance' in your homeowner's policy."

Tugging my collar, I stepped into the lobby, announcing I had an appointment with, "Mister Churchill." The receptionist's friendly nod took some of the edge

Jamestown Electro Plate Works on a rainy summer morning.

Works President, Jay Churchill, proudly poses with a rack full of recently plated drawer pulls for one of the many furniture manufacturers in the Jamestown Region. It's jobs like this that constitute Jay's "Bread and Butter."

Wayne Shelly, Chief Polisher. This man, a star in a proud dwindling profession, is the very heart of the plating process at Jamestown Electro Plating. He is surrounded by stacks of shaped disks that — when polished and plated — will serve on the ceilings of trucks and busses as bases for lighting fixtures.

from this grim-looking place, and less than a minute later, Jay's easy grin turned the rest of this office space into the kind of businesslike, secure environment I remembered from my days at Xerox. Big change — but behind everything was a sensation of watchfulness, even here in the executive suite. At no time during my interview — or the ensuing tour of the plant — did I feel that anyone was unprepared to deal with even the greatest emergency at a moment's notice. Plating is serious business.

Seated in Jay's comfortable office (decorated by aerial charts — Jay is an avid pilot), I laid my tape recorder and a sheet of questions on his desk; then we got down to business:

Baldwin: "Tell me, Jay, what's the difference between 'Hard Chrome Plating' and 'Decorative Chrome Plating'?"

Churchill: "We don't even do hard chrome plating," he said with a chuckle. "It's a different process that puts an extraordinarily thick layer of chrome on machine parts and things like that because of its hardness. The chrome plating we're going to talk about puts on a more reasonable layer of chrome: some 50-millionths of an inch — very, very thin."

Baldwin: "Please explain triple chrome plating — and the use of nickel and copper in the process."

Churchill: "'Triple Chrome,' we call it," Jay replied, "It's kind of the standard process. It means you put copper on first, then nickel, then chrome over the nickel. First you get a relatively heavy layer — three ten-thousandths of an inch — of copper on the substrate. By the way, on boat parts, that substrate is usually brass or bronze. Then we put three to five ten-thousandths of nickel, and fifty-millionths of Chrome, so there's really very little chrome on chrome-plated parts; they're really more nickel-plated."

Baldwin: "What's the difference, then, between Normal Chrome Plating and Show Plating?"

Churchill: "There's no difference in the plating chemistry — even though there might be more brighteners in the tank for 'Show' chrome. There is, however, better polishing in 'Show' chrome before the plating even goes on — and there may be more nickel put on the part in order to level any irregularities. But basically, the chrome you get from production plating is the same product as 'Show'; it may not be quite so heavily plated or polished so well.

Baldwin: "Okay, Jay, with that out of the way, I guess I'm ready for the five-hundred pound gorilla. Please tell us all about plating, itself: a process I'm lead to believe involves a zillion steps at least."

Churchill: "Hang on a moment", Jay said, dodging into the reception room. He returned a moment later with a two-piece-form. "First of all, you're right: plating is an involved process with a lot of steps and details. We keep track of what we're doing by using forms"

(See Figure 1.)

Cust Code:

Job No.	191590 - 0
Date Received	08/24/06
Date Required	08/31/06
Pcs	1
Finish	NI-CHROME

PO No.	Lot No.	PS No.	Ship Via		
H40807			BEST WAY		

Rack		Surface Area1	Surface Area2	Pcs/Load	Loads/Hr		
YELLOW RACK				90.00	2.00		1.8300

Spec's: POLISH NICKEL CHROME

Total Surface Area: 0.000000

Finish Code	Lower	Upper	Time/Ld	Amps/Ld	Amps/Ft
COPPER			2.00	500.00	
NICKEL			25.00	100.00	
CHROME			5.00	200.00	

Notes:

Spec Req: POLISH NICKEL CHROME

	Part No.	Description	Lot No.	Containers	Qty Rec'd	Weight
1	NB3724	NIPPLE			200	0

Op. Process ID: 1028 Base Metal: STEEL Date

STEP	PROCEDURE	GUIDELINE
1	VAPOR DEGREASE (IF REQUIRED)	1 - 5 MINS.
2	ELECTROLYTIC ALKALINE CLEAN	1 - 3 MINS.
3	CWR	5 - 30 SECS.
4	HYDROCHLORIC ACID	15 SECS. - 5 MINS.
5	CWR	5 - 30 SECS.
6	ELECTROLYTIC ALKALINE CLEAN	1 - 3 MINS.
7	CWR	5 - 30 SECS.
	REPEAT STEPS 2-7 UNTIL THERE ARE NO WATER BREAKS	
8	COPPER PLATE (IF REQUIRED)	AS PER SPEC.
9	CHLORINE RINSE (IF COPPER PLATED)	5 - 30 SEC
10	NEUTRAL RINSE " " "	5 - 30 SECS.
11	CWR " " "	5 - 30 SECS.
12	HYDROCHLORIC ACID (WEAK)	10 - 30 SECS.
13	CWR	5 - 30 SECS.
14	NICKEL PLATE	AS PER SPEC.
15	NICKEL RINSE	5 - 30 SECS.
16	NEUTRAL RINSE	5 - 30 SECS.
17	CWR	5 - 30 SECS.
18	STAGNANT CHROME RINSE I	5 - 30 SECS.
19	CHROME PLATE	AS PER SPEC.
20	STAGNANT CHROME RINSE I	5 - 30 SECS.
20	STAGNANT CHROME RINSE II	5 - 30 SECS.
21	INTEGRATED CHROME RINSE	5 - 30 SECS.
22	NEUTRAL RINSE	5 - 30 SECS.
23	CWR	5 - 30 SECS.
24	HWR	5 - 30 SECS.
25	BLOW DRY	

A row of plating tanks with fuming contents. Amazingly, the room has little odor; its air is much more breathable than the average printing plant.

Figure 1 (left). First page of the plating-control form used at Jamestown Electro Plating Works. Everything an operator needs to know before plating a particular job is contained in this sheet. After that, it's all about experience, skill, and excellent equipment.

"This one is an actual form we are using for a job that's going on in the shop as we speak. It comes out of our computer. Actually, it's a procedure sheet for our plater/operators. It tells them which racks to use: [YELLOW], the PO Number from the company: [H40807] and other important details such as: (a) How may pieces are in a load: [90], (b) How many loads per hour the operator is expected to finish: [2], (c) how much copper: [2 minutes in the copper bath at 500 amps], (d) how much Nickel: [25 minutes at 100 (That's actually 1,000) amps], and (e) how much chrome: [5 minutes at 200 (actually 2,000 amps)]. This form describes the entire process to come.

Baldwin: "Twenty-five separate steps?"

Churchill: "Correct, in nearly as many tanks. The first seven steps are only an initial cleaning process—and even there the operator's skill is of vital importance. He or she must repeat these steps over and over again until the parts are clean enough to be plated—and that is really clean.

"Next, they go into the copper-plating tank, 'as per spec.' In other words: the two minutes at 500 amps specified on the form above. Now, because the acidic copper bath contains cyanide, the newly-copper-plated parts go into a chlorine rinse to be neutralized. We follow this by a clean, cold-water rinse—then a Hydrochloric acid bath to activate the parts for nickel plating.

"After another cold-water rinse, the parts go into the nickel-plating tank, again "as specified" on the form. Following this, the newly nickel-plated parts go into a nickel rinse, a neutral rinse, and another cold-water rinse.

"Finally comes the chrome. We dip the parts in what we call a "stagnant chrome rinse" before suspending them in the chrome tank, again as 'per spec.' This is followed by two more stagnant chrome rinses, then—finally—an integrated chrome rinse. The chroming step is one of the bad players environmentally, so we have these three special rinses to remove the chroming by-products from our affluent. After that, we neutralize the parts again, follow this by cold and hot water rinses and finally blow them dry. "He smiled tiredly. "It's not exactly your 'Zillion' steps, but it is fairly complicated—definitely not 'dip and ship' as a lot of people like to think."

Baldwin: "And, as you said, 'That's only the plating part.' What comes before?"

Churchill: "Many more steps," Jay replied. "Let's begin when you bring in some old boat parts for re-plating. " He grinned. "I'm supposed to mention we did Alan Jackson's boat parts for Holiday Harbor Marina when they sold him his boat," he said, cheeks reddening.

Baldwin:"Sounds like something worth mentioning to me."

Churchill: "Anyway, you bring me the parts in a box—all in various stages of repair. First thing I do is call for one of our Polishers to look them over. Usually a Polisher sees special projects like that through to the end. He takes the parts and categorizes them to make sure they're all of similar substrates. If he were to attempt stripping plating from

A view through one of the plating rooms.

Plater/Operator Brian Watson raises a rack filled with parts that have just been plated.

Works President Jay Churchill confers with Chief Polisher, Wayne Shelly, about a custom re-plating job. Wayne's chief concern about this commemorative bell is how the re-plating process will affect the bell's delicate engraving.

a brass or bronze part the same way he strips a steel part, he could destroy it, so he takes magnets and checks that everything is actually the material we think it is. From that point, he puts the parts into various — correct — types of proprietary chemical 'strips' to get the old nickel, chrome, and copper coatings off. Before the Polisher is done, he's stripped each part right down to its substrate. Now he can take those parts and polish them.

"It's during the polishing phases that the part's geometry first becomes important. Imagine sitting down at a polishing machine and trying to do a great polishing job on some of your boat parts. The most difficult ones have concave surfaces and crevasses — like inside a chock. Think about polishing something like that, especially if you are trying to do it in a reasonable time."

Baldwin: "I've heard that polishing is so specialized and important — and requires such experienced polishers — that a whole sub-industry has grown up around this single step of the plating process."

Churchill: "That's correct," Jay said with a frown. "And we're worried because it doesn't seem that the skill is being passed along from generation to generation. The two best polishers in our polishing department are — well, one's more than sixty years old, and he keeps talking about retirement. The other is approaching sixty. Young people don't seem to want to come in and learn the trade any more. Granted, it's not very glamorous, but it is a very, very important, skilled trade. Actually we send some of our polishing work — never custom work like boat jobs — to specialized companies that do nothing but polishing. They'll have 30 or 40 polishing jacks as well as different polishing equipment. We tell them what we want; they return it that way.

Baldwin: "What additional steps are necessary for re-chroming something that has a badly damaged chrome surface?

Churchill: "A lot of people say, "Hey, I'm going to get my part sandblasted and then get it re-plated." We say, "No, way! Please — whatever you do, don't sandblast or bead blast it. That will just make more polishing for us — and expense for you!" We use chemical strips because they leave the part relatively smooth.

"After it's stripped, a badly damaged part goes for a long visit to the polishing department, where some material may even have to be ground off to make it smooth again. Next, we copper plate and polish it so the copper smears into and fills some of the damage. Sometimes we have to repeat this process a number of times. Eventually, though, the part becomes mirror-smooth, and we can plate it with our standard process.

"It's good to remember if a part isn't perfectly polished, all the flaws will be accentuated. Plating doesn't cover like paint does; plating only makes flaws look worse."

Baldwin: "What is 'pot metal'? What makes plating it so difficult and so much more expensive?

Churchill: "Pot metal is nothing but a zinc or aluminum diecast — and it's terrible. We don't like it. The only time that it pays to re-plate pot metal is if you can't

find that part anywhere else. Fortunately, you're not going to find a lot of it in the old boats—but admittedly, there is some. You find more of it on some of the older cars, and it creates a lot of headaches for us. The reason is because by its very nature it's a casting—and it's 'cheap,' I mean there's a lot of porosity throughout. When you go to strip the plating off the piece and get down to the die-cast substrate, there are pits. And in the act of polishing out one pit, you'll uncover ten more.

"The problem with pot metal is that you find pits all the way through. I mean, they're not just on the surface; they're everywhere. Now, we do have customers who say, "I have this part; it's die-cast, but I must have it fixed—and whatever the cost is, just fix it." There are ways to do that of course; we know them—most commonly by filling the pits with silver solder. It's about a 15-step process: you take a drill and you drill out each tiny, individual pit, then you put in a little drop of silver solder, grind it, then copper plate it. If you do this about 10 to fifteen times, eventually you'll have a part that might be able to be restored. But where the part originally coast the manufacturer a dollar, it may well add up to a $500 to $600 repair job.

"With pot-metal parts restoration, there is an alternative to consider, although the preservationists probably frown on it. Nevertheless, if I had to repair a part of that nature, there's a casting company nearby that does bronze casting, and they can recreate nearly anything. We then do our normal job of plating the new bronze casting, and you end up with your part for a fraction of the restoration cost. Now that may take away points if the judges say, "Well that isn't the original diecast," but what you now have is an improved version that is exactly the same size as the original—it's been "recreated." In my experience, using that casting is about an eighth as expensive as having to go through our silver-solder routine.

Baldwin: What do environmental regulations and restrictions add to the cost of plating?

Churchill: They add about 40 percent if the plater is doing it properly—and we do. In our own business, we employ two chemists and one chemist technician. We also pay hazardous waste taxes and environmental taxes. We've never had an incident here where there's been an environmental problem. We've been in business since 1921, and our investing so much money into prevention is part of the reason why. We are ISO-14000 Environmentally certified as well as ISO-9000 quality certified. The ISO-14000 is pretty noteworthy for a plating shop, but we do the due-diligence anyway, so we might as well hang the flag out that we're certified.

Baldwin: "All this started when we met at a party: I was introduced as a classic boater, you were introduced as a plater, and you joked, "You boaters aren't really worth my while."

Churchill: "Well…," he said, cheeks reddening again, "actually, we do have a better attitude toward boat chrome when customers come in and talk to us on our terms. A lot of 'em consider this business to be little more than just dropping off and picking up parts—like we're a dry cleaners.

"One of the basic reasons we don't really go after custom business is right here on the job sheet in your hand. First of all we get a job like this—pipe nipples for a fire-extinguishing unit. We do 90 pieces per load; we receive 200 (usually we get a thousand or more)—we charge a dollar, eighty-three each, and they're finished in about an hour. So for the amount of revenue and profit that goes into a mass production job, even one as small as this, very rarely do we ever get a reject. The customer loves 'em. Even if he finds a little 'chrome burn' or a little bit of a flaw on one or two, he'll simply ignore them.

"It's a whole different ball game when we deal with somebody who drops off a box of 1942 Chris-Craft parts and says, 'Now listen: these are near and dear to me. My grandfather had this boat'—and so on and so forth. In this case, we have his prized possessions, and we'd better do a perfect job because if we don't, he's going to be upset and won't pay us.

"Another thing is if an individual brings in a part and I say, 'That's a lot of work; I have to charge you a hundred and fifty dollars for that air vent.'

He says, 'A hundred and fifty bucks? Are you crazy?'

I say, 'No, that's the amount of work I'll have in it.'

At last, he says, 'Go ahead and do it,' and I do.

That's where expectations and personalities come into play. There's always a chance he'll come back and say, 'This isn't as good as I was hoping—so you're going to have to do it again,' and that will be at our expense.

It's a very exacting—'finicky'—business. If we wanted to be more in the custom chrome business than we are, we'd have to triple our prices in order to be as profitable as we are operating as a regular production shop. I don't want to sound greedy, but this is all a business; it's how we make our living. And as much as we'd like to forget it, in the end, we're responsible first to our employees and families.

Afterward, Jay led me on a thorough tour of his plant—which, surprisingly—had very little odor at all. Most printing shops I've visited smell a whole lot worse. I walked comfortably beside fuming vats where plating operations were taking place only a few feet beyond my nose. Everything was rigged for the utmost safety. Plating tanks in every room were built over vast, wood-covered pits in which water flowed every moment to pick up even the slightest spill of splash. It wasn't what you'd call an "attractive" place, but after all my past qualms, there wasn't a moment when I felt I was in even the slightest danger. Jamestown Electro Plating is a safe, clean operation—even a novice like me can tell by instinct alone.

As I shook hands with Jay and exited his plant into a misting rain, I looked around me, Across the street was a row of the same style houses I grew up in a million years ago: narrow, neatly kept, clothes lines in the back yard, pridefully kept pickup trucks at the curb. Clearly, the occupants felt Jay Churchill's operation posed no harm to them at all. Yet within 500 feet, operations were going on that, potentially, could threaten grave harm to them as well as the very environment they live in. It takes a lot of care and expensive equipment to assure that kind of safety. It's just one more reason Jay Churchill's prices contain a lot of hidden—but very necessary—costs. He definitely doesn't run a dry cleaners.