Glass Bottle Cleaning

By Russ Parkin

Introduction

This article originally appeared in Issue 28 of the *Antique Bottle Collector* (www.abc-ukmag.co.uk). It is reprinted with permission.

In the beginning

I started bottle collecting in the 1970s, and, like many other diggers, continually searched for methods to bring my drab bottles back to their sparkling original condition.

I avidly read books, like Fletcher's "Bottle Collecting," which told me to use soda crystals and plunge my bottles into buckets of sand and fine gravel to remove stains! Needless to say, I had very little success because most of my bottles were suffering from a seemingly impossible to remove "white sickness." Applying oil or varnish helped to disguise the problem, but left me with an obviously doctored bottle. The "comedian" who told us that hand-polishing bottles with cerium oxide (a fine polishing powder, a.k.a. "Jewellers Rouge") was the answer certainly had a good sense of humor. I managed to wear half an inch off my fingers with no apparent effect on the glass, but desperation drove me to keep searching for an answer. I soon learned that the majority of Victorian glass bottles were made of cheap soda glass, which is a mixture of silica, soda and lime, and the later two ingredients dissolve very slowly in water. So, when bottles are buried for years in damp alkaline soil, the soda and lime leech out of the glass leaving a corroded hard surface crust of silica. As the bottles dry, this crust, which can be quite thick, turns opaque and even when the effect is very slight, the glass ends up with a rainbow surface iridescence that spoils the look of the bottle.

The cleaning issue has dominated the hobby for many years and because bottle collecting is essentially about its aesthetic appeal, most people find that displaying scabby sick bottles, no matter how rare, mars their appeal. Over many years, a small band of collectors toiled away in their workshops like apprentice wizards at Hogwarts trying to resolve the cleaning problem. These secretive modern day alchemists learned that certain acids remove a layer of glass, leaving a shiny surface (more of which later). Meanwhile, in the U.S.A., other inventors were experimenting with tumbling, a process based on the well-known pebble polishing methods used by lapidary enthusiast. This is essentially a constant, gentle mechanical erosion of rough surfaces to produce a fine, polished finish. Today, we have these two different methods of removing silica crusts, scratches and scuffing from bottles. Which is better? Well, there are two pros and cons for both, and I will leave you to decide - but I would like to thank all the pioneer cleaners who have developed these processes: we have all benefited by your innovative efforts and in some cases, sheer bravery!

Removing mud and muck

There are a few obvious precautions to take when dealing with freshly dug bottles that have been buried for a hundred years or so. Firstly, leave them to acclimatize to their new atmosphere for a few days. It is not a good idea to plunge them immediately into red hot baths of soapy water as this causes them to commit suicide, shattering into pieces. Start with a tepid soapy water bath and a good quality bottle brush to remove surface dirt. This may be enough for most bottles and a few rinses with clean water will leave them looking good. More persistent muck and rust stains can often be removed with diluted hydrochloric acid. I soak them in a bath for 24 hours, but they can be left for much longer if necessary. I am talking about using proprietary brick and patio cleaners available at most DIY (hardware) stores that contain at most 1% - 2% acid. Even with these weaker solutions, you should follow sensible safety precautions that include wearing protective rubber gloves and safety glasses plus following the manufacturer's instructions.

Acids come in different strengths, but it is essential to use diluted concentrations. I do not recommend strong hydrochloric acids **[Figure 1]**. These need professional handling and are extremely dangerous, requiring correct personal protection equipment and health and safety considerations. Hydrochloric acid in stronger solutions gives off hydrochloric vapors, which can cause serious burns and breathing difficulties. It can also give off highly inflammable hydrogen gas (used to inflate Zeppelins in WW I and boy, did they burn! The Hindenburg took just 32 seconds to complete burn out.) No bottle is worth the risk associated with using concentrated strong acids. Really stubborn rust stains can be removed with proprietary automotive rust removers such as "Jenolite" **[Figure 2]**. These products come as both

Figure 1: Strong (32%) HCL acid, not recommended.

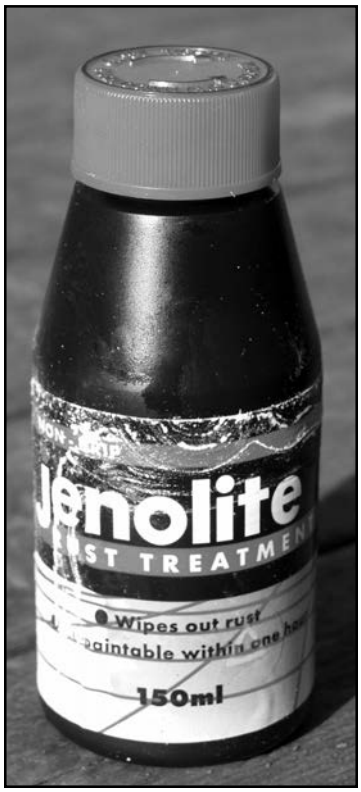

Figure 2: Jenolite rust remover.

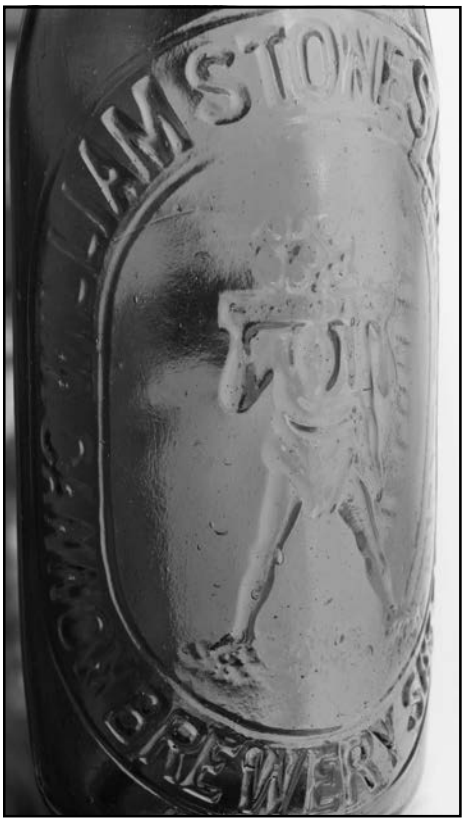

Figure 3: An acid dipped bottle: shiny finish but with a waxy "orange peel" surface complete with pits and scratches.

liquids and gels, and are readily available in car accessory shops.

Acid polishing

This is generally known in bottle collecting circles as "dipping." It relies on the use of exceptionally strong and dangerous acids to remove a thin layer of glass, leaving a polished surface. In the hands of the experienced dipper, it can produce excellent results cheaply; it can also, however, ruin a bottle in seconds, leaving a greasy/waxy appearance **[Figure 3]** and sometimes stripping away the embossing. It will also leave the scratches and pitting, unless these are removed prior to dipping by rubbing down with an abrasive material such as emery paper. The acid dipping process, which I do not recommend to anyone, involves mixing concentrated sulfuric and hydrofluoric acids. These really are the nastiest boys on the block! When mentioning sulfuric acid to most people, they immediately think of an aggressive acid often used by Victorian axe murderers to dissolve all traces of their victims - enough said on that! Hydrofluoric however, is the absolute Satan of acids. This etches and eats the glass, while the added sulfuric interacts with it to keep the surface shiny as the glass dissolves. Needless to say, without professional handling equipment, such as laboratory standard fume cabinets and respirators, you are asking for trouble if you go this route. If an accident happens, you could be severely injured or even killed! Hydrofluoric loves to munch on calcium so if you get it on your skin, its properties may not allow you to notice its spillage for up to eight hours. In the meantime, it will be happily eating its way through your flesh in search of its favorite meal, bone! If it reaches this stage, no amount of calcium gel, which is used to neutralize it, will help you, and the next steps of first aid is to amputate! My research indicates that the U.K. Government is considering banning this acid, and so it may become unavailable in the future. I have also witnessed the effects of these acids at dipper's houses. Their storage areas have opaque and frosted glass windows, rusting metals and dissolving drains. One dipper told me that he dips only in an open area of his garden on days when there is a stiff breeze so that his neighbors do not get pickled. But he still hears the local birds coughing! I am also pretty sure the Health and Safety Gestapo would take a very dim view of people using these highly pernicious chemicals in their homes, cellars, shed and gardens. I have to say that, unless you are an expert with access to approved laboratory equipment or you are a "sandwich short of a picnic," you should avoid this method at all costs.

Tumbling

Tumbling machines have become a real hot topic recently. The Internet bottle forums are alive with conversation about them and a few British collectors are now experimenting with them. The process, unlike acid dipping, is unlikely to lead to serious injury or death, although it can be a messy business and significantly more expensive than acid dipping. The basic process is straightforward. The bottle is placed in a canister and mounted in a fixed position within it. It's then bathed (inside and outside) in the tumbling medium, which is a mixture of polishing abrasive, water and a "carrier," such as copper shot **[Figure 4]** or plastic pellets. Once the canister is loaded, it is slowly rotated on a set of rollers driven by an electric motor. The process can take from 3-10 days, depending on the degree of glass sickness. The action of the copper shot and abrasive powders gently and slowly removes minuscule layers of glass, bringing the surface back to the original shine. Depending on how corroded the glass

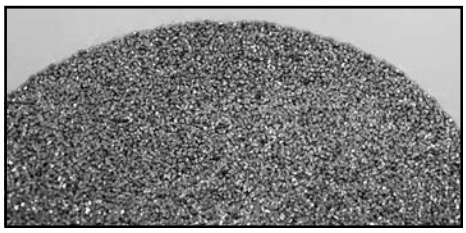

Figure 4: New copper shot.

Figure 5: Black, foamy liquid generated by the tumbling.

Figure 6: Copper shot after use.

is, it may be necessary to use different grades of polishing medium to get back to a good surface finish. Furthermore, some bottle nooks and crannies, such as Codd bottle lugs and poison bottle ribbing, can be difficult to get the tumbling medium into, so the size of the shot can be critically important. It is also important to emphasize the importance of using the correct abrasive powders of the right grade and amounts. Get this wrong and the result can be disastrous as heavily embossed bottles can soon become un-embossed!

The basic process starts with relatively coarse abrasive powders, with "cut off" the corrosion (sickness). This medium is then replaced with progressively finer powders that polish the newly exposed surface. Canisters need to be unloaded and everything thoroughly washed to avoid cross contamination before reloading with

a finer powder. Bottles also need to be turned in their mounting to remove the "touch marks" that have not been in contact with the tumbling medium. After several days of tumbling, the medium becomes a black foaming liquid **[Figure 5]** that stains everything it comes in contact with, so old clothes and rubber gloves are essential. Also, the copper turns black with use **[Figure 6]**.

Conclusion

There is not a bottle in the world that would induce me to mess with dangerous acids or to recommend it as an option for the average collector as I'm convinced that breathing in their fumes will get you in the end, but I do recognize that it is generally cheap and may be as little as £5 ($10.18 USD) for a "quick dip." Furthermore, if it is done well, it can produce good results. My preferred solution to bottle cleaning is tumbling. Use it regularly and it produces good to really excellent results **[Figure 7]**. You need a bit of experience to get it right, but it is something that can be done by anyone in their garden shed with little to no risk to health. Tumbling is relatively expensive, however, as there is the capital costs of buying or building a tumbling machine. The process also requires continuous use of an electric motor: I estimate about £18 ($36.65 USD) of electricity a month (based on 10p per hour per kW) for 1/3 HP motor running 24/7. Consumables also need to be taken into account - £10 ($20.36 USD) per pound for silicon carbide, £3 ($6.11 USD) per pound for aluminium oxide; copper shot is not cheap, but it does last a long time. There is also the time and costs of regularly cleaning down the equipment.

Figure 7: The same bottle as in Figure 3, but now tumbled to a bright, smooth re-polished finish.

Another consideration is that the process is much slower than acid dipping and the volume of bottles you can clean is limited by the time it takes and by the number of canisters your machine holds at one time. The limit with acid cleaning is when you get bored, the acid starts losing its cleaning strength or you get taken to the hospital. Before setting up a tumbler, it is worth assessing whether you will even clean enough bottles to cover the setup and running costs. Maybe it would be better to pay someone a few pounds to do it for you and let them have the problem. If you do consider it an investment, then I can recommend tumbling as a very rewarding pastime, turning pig's ears into silk purses, as the phrase goes.

A small, single canister machine will provide you with your own personal bottle restoration shop! I recommend buying a custom-built machine as apposed to designing and making your own. While self-build may appear simple, I can guarantee there is more to it than meets the eye, unless you are an accomplished engineer. Even then, there is an immense amount of trial, error and experience needed to get it right, which has already been done for you with a commercial machine.

In your pursuit of cleaning bottles, you should remember that you are dealing with antique glass, which was originally made quickly and cheaply on a huge commercial basis, and as a result, often contained flaws that can lead to cracks and breakages during *any* cleaning process. While this is rare, it is still a risk; no commercial cleaners will give you a guarantee that your bottle will not break and they will certainly not offer any insurance against breakages - it is all at your own risk.

Tumbling? Acid? Or leave it to others? Ultimately, you choose your poison, so to speak - hopefully, not literally!

Review of a Bottle Tumbling Machine

Machine: Jar Doctor large 6-canister Platinum Series 2 extended machine

When it comes to commercially produced tumbling machines, "Jar Doctor" is the world leader.

Ordering

The brains behind "Jar Doctor" is Wayne Lowry from Raymore, Mo., ably assisted by his wife, June. I placed an Internet order (www.jardoctor.com) and received very friendly and efficient service. My questions were immediately answered with all of the available options, combined with helpful suggestions. It was clear that I was not just buying a machine, I was also getting 12 years of development knowledge for free. If you have problems, then Wayne will help you solve them. I placed my order for the Platinum Series 2 extended machine **[Figures 8-10]** and awaited delivery, which due to a holiday period and U.K. Customs wanting their pound of flesh, took over three weeks to arrive.

Figure 11: Two examples of Jar Doctor cleaning powders.

Cost

The cost of the whole package, which included a European 2 speed motor, 120 pounds of short cut copper, 30 pounds of various powders **[Figure 11]**, six canisters, stopple wrench, bottle brushes and a variety of stopples, was $2555 (approx. £1300). Given the capabilities of the machine and the expert personal support supplied, I found this very reasonable, however,

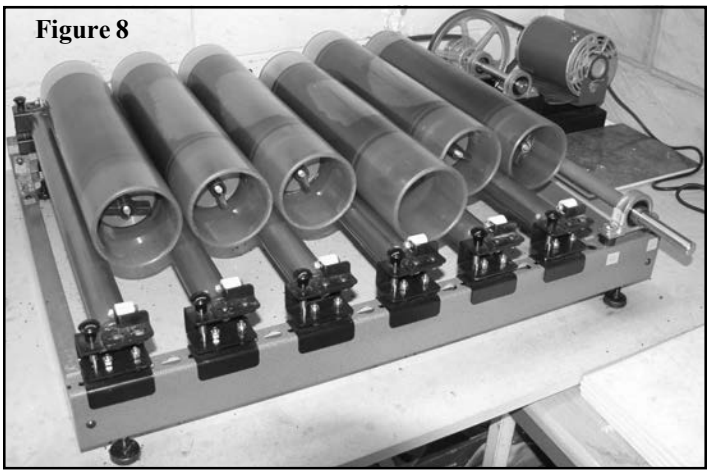
Figure 8

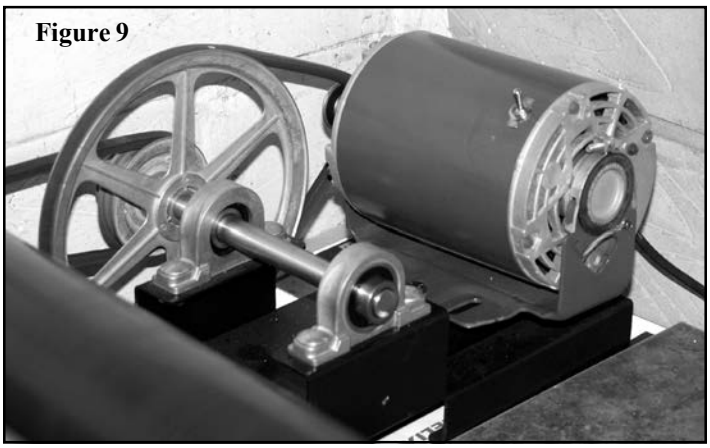
Figure 9


Figure 10

Figures 8-10: Jar Doctor large 6-canister Platinum Series 2 extended machine

beware of the transportation costs - shipping airmail, fully insured, came to a further £500 ($1018 USD). You can, of course, send it surface slightly cheaper, providing you are prepared to wait. My tumbler is one of the large machines; smaller machines are obviously cheaper. When it reached the U.K., Tony Blair's henchmen at Customs and Excise levied their taxes, which, with Parcel Force delivery fees, added another £320 ($652 USD) - ouch! If you were to insure at half price, then this fee is reduced. The total cost came to £2120 ($4316 USD). While this is quite expensive, don't forget this is the larger machine designed for commercial use; smaller machines with fewer canisters are cheaper and not as heavy and therefore the prices start to tumble - so to speak.

Delivery and assembly

My machine was very well packed and arrived intact, despite the transporting services doing everything possible to ensure otherwise. The packaging had been through the wars. Once unpacked, assembly was painless with excellent instructions and parts clearly marked. The construction needed an Allen key that was supplied with the machine and a couple of spanners. The other had to be changed from 110v to 240v, which was done in seconds by swapping over two easily accessible wires. (This is normally done in the factory, but it missed this one.) Then a U.K. 3-pin electric plug and I was ready to go.

Construction

The quality of construction is excellent with everything made to a good industrial standard - no Heath Robinson effort here! The frame is solid and well engineered with heavy duty components. It uses a stainless steel vinyl cased drive bar and maintenance-free, self-aligning ballbearing pillow blocks. The bearing unit is encased in a nonconductive oil-resistant rubber liner, which corrects misalignment and reduces noise and vibration. It has an easily adjustable roller system, which can accommodate different diameter canisters. Simply unlock a spring-loaded locking pin in the mounting and the roller can be moved to a different setting. Small nylon rollers on the mounting are set to deal with the canister's lateral movement.

The canisters and, most importantly, the amazing stopples are also of the highest quality. The stopples seat each end of the canister while holding the bottle in situ. These took years of development to get right. Don't think you can get away with a bit of drainpipe and a rubber bung! The heavy duty motor transfers its power smoothly via two adjustable and changeable belts and aluminum pulley wheels, which are used to change the speed (RPM) of the rollers.

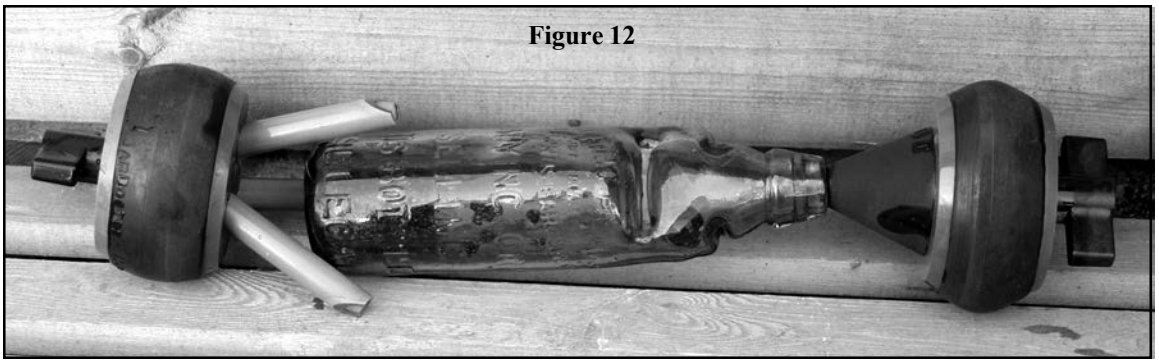
Figure 12

Use

The instructions are comprehensive without being a rocket science docket. I followed them to the letter and got instant professional results from my tumbling. The canisters are easy to load; simply put copper shot, water and powder in the bottle,

then mount it in the fingered stopple, load it into the canister and put more copper, powder and water around the outside of the bottle. Seal it in the canister with the cone stopple, which supports the mouth of the bottle **[Figure 12]** of either aluminum, tin or cerium oxide, again the correct grade is critical. Then it's straight on to the rollers and away you go. You have to turn the canisters end-to-end twice a day to ensure that each side of the embossing comes into contact with the copper. The first tumbling stage uses a silicon carbide powder **[Figure 11]** that has a 'cutting' effect that gently strips away a very thin surface layer of glass. Wayne supplies the correct one for the job. Be warned, if you try to use your own from a commercial supplier and get the wrong grade you could find yourself with an un-embossed bottle in as little as 12 hours! It's therefore well worth buying it from Wayne. After about three days of tumbling you move to stage two which is to unload, clean off the cutting powder and reload with a polishing compound. This part of the process is messy and will take about two hours for six canisters. The resultant black foamy liquid stains terribly and you will need to rinse all trace of the cutting powder to ensure no cross contamination occurs. You might need to reload again if there are marks left by the stopple fingers (where the copper doesn't come in contact with the bottle). That's about it, apart from the fact that you are learning all the time. For example, I quickly found that the hardness of bottle glass can vary a lot and as a result, polishes must also be varied. Shapes, such as squares, need to be tumbled on a slower speed, which can be done easily by moving the motor drive belt onto the different sized pulley wheels.

Conclusions

To sum everything up, I have three main conclusions:

Firstly, the results speak for themselves as shown by the before **[Figure 13]** and after **[Figure 14]** results of tumbling a very sick and corroded Codd bottle. Like everything in life, you gain experience as you go along, and the same can be said here. I get better at it as I gain experience. With a Jar Doctor machine the difference is that, even without this immediate experience, you will get great results straight away, and if you do get stuck, then Wayne is always willing to help.

Secondly, careful consideration must be given to where to site the machine. The tumbling process generates noise and it really needs an outside workshop. A back bedroom is NOT an option; the drone would drive you crazy. The rollers also like to be warm; if they are cold, I find the canisters do not turn evenly. However, if you have a small shed/workshop, the motor generates enough heat to warm the rollers.

Thirdly, this is a great bit of kit, well-constructed and likely to be working without problems a decade from now. What really is wonderful about this tumbler is that everything has been fully developed. The whole package, from the right size of copper to the correct powders and the running system, are at the end of the evolutionary scale rather than at the start. For the average person who wants to have hassle-free professional results, there is no doubt in my mind that this set up will do the job. The bottles are restored to a fresh glass shine, rather than the waxy finish you often get from acid dipping. The only downside I can see is that it is expensive to get it from the U.S. to the U.K.

The whole machine is very good value for the money, and if you want to tumble on a big scale, then the machine reviewed is the one for you.

Figure 13 >

< Figure 14

Questions or comments can be directed to Russ Parkin by E-mail: abc.editor@btinternet.com. Russ is part of the editoral team of the *Antique Bottle Collector* (U.K.) in charge of finance, subscriptions and distribution. You can find out more about the *ABC*, and see some of Russ's other articles, from the magazine's website: www.abc-ukmag.co.uk.

Editor's Note: Our appreciation to Russ, and the *Antique Bottle Collector*, for allowing us to reprint his article and the information he shares with us in it.