

**PRECIOUS METALS AND JEWELRY ART
(EXPERIENCE OF WORK IN SMAILES COMPANY, AUSTRALIA)**

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In practice, such jewelry metals as gold, silver, platinum, etc. are generally used.

Gold is a wonderful metal in many ways. It is a yellow metal, bright and shining when it is polished – the colour of the sun. And that, in itself, is, perhaps, the answer why gold seemed to the ancient folk to be a piece of the sun found on the earth. Gold is a chemical element with the symbol of Au (from Latin: *aurum* "gold"). Pure gold has a bright yellow colour and luster traditionally considered attractive, which it maintains without oxidizing in air or water. It has been a valuable and highly precious metal for coinage, jewelry, and other arts since long before the beginning of recorded history. The native metal occurs as nuggets or grains in rocks, in veins and in alluvial deposits. Less commonly, it occurs in minerals as gold compounds, usually with tellurium. Its high malleability, ductility, resistance to corrosion and most other chemical reactions, and conductivity of electricity lead to many uses of gold, including electric wiring, coloured glass production and others. Whereas most other pure metals are grey or silvery white, gold is yellow. Common coloured gold alloys, such as rose gold, can be created by the addition of various amounts of copper and silver. Alloys containing palladium or nickel are also important in commercial jewelry as these produce white gold alloys. Less commonly, addition of manganese, aluminum, iron, indium and other elements can produce more unusual colours of gold for various applications. Because of the softness of pure (24k) gold, it is usually alloyed with base metals for using in jewelry, altering its hardness and ductility, the melting point, colour and other properties. Alloys with lower carat age, typically of 22k, 18k, 14k or 10k, contain higher percentages of copper or other base metals, or silver or palladium in the alloy. Copper is the most commonly used base metal, yielding a redder colour. Eighteen-carat gold containing 25% of copper is found in antique and Russian jewelry, and has a distinct, though not dominant, copper cast, creating rose gold. Fourteen-carat gold-copper alloy is nearly identical in colour to certain bronze alloys, and both can be used to produce police and other badges. Blue gold can be made by alloying with iron, and purple gold can be made by alloying with aluminum, although rarely done, except in special jewelry. Blue gold is more brittle and, therefore, much more difficult to work when making jewelry. Fourteen and eighteen-carat gold alloys with silver alone appear to be greenish-yellow and are referred to as green gold. White gold alloys can be made with palladium or nickel. High-carat white gold alloys are far more resistant to corrosion than either pure silver or sterling silver.

Silver, like gold, as you know, is one of precious metals. In the early days, silver was very valuable. It was priced almost as such as gold itself. It is a white and shining metal which can be beaten into sheets or drawn into threads. Silver is harder than gold and will, in time, tarnish and lose its luster. It is a metallic chemical element with the chemical symbol of Ag (Latin: *argentum*). Silver is a soft, white, lustrous transition metal, it has the highest electrical conductivity of any element and the highest thermal conductivity of any metal. The metal occurs naturally in its pure, free form (native silver), as an alloy with gold and other metals, and in minerals, such as argentite and chlorargyrite. Most silver is produced as a by-product of copper, gold, lead, and zinc refining. Silver has long been valued as a precious metal, and it is used to make ornaments, jewelry, high-value tableware, utensils (hence the term

silverware), and currency coins. Today, silver metal is also used in electrical contacts and conductors, in mirrors and in catalysis of chemical reactions.

Platinum is a dense, malleable, ductile, precious, grey-white transition metal.

As a member of the platinum group of elements, it is generally nonreactive. It exhibits a remarkable resistance to corrosion, even at high temperatures, and as such is considered a noble metal. As a result, platinum is often found chemically uncombined as native platinum.

Platinum is used in catalytic converters, laboratory equipment, electrical contacts and electrodes, platinum resistance thermometers, dentistry equipment, and jewelry. Basically, the platinum and white gold are two different metals which have different properties in them. To differentiate some properties, the white gold is delicate and the platinum is less fragile, i.e. the white gold by nature can be easily captured or get cracked, whereas, in case of platinum it bends and is more flexible. The differences in qualities are more important as in case of mounting the platinum stone, that is why there is less chance for the platinum stones to break and to fall out. White gold and platinum will easily bend and are reliable to hold the stone. The platinum is the most expensive metal, and people need to see to their budget before getting it.

It is the jeweler who decides which colour to choose and sometimes he emphasizes the natural colour of the metal, polishing it and then covering with a thin layer of lacquer that protects from oxidation. Choosing metals and their alloys for working, the artist must take into account the nature of the image. Cleverly chosen, the colour of the metal can greatly enhance the expressiveness of the work of decorative art.

The basic non-ferrous metals working processes are rolling, art casting, soldering, stamping, etc.

Rolling, as the term implies, works the metal by rolls, whereas forging works the metal by means of hammers, presses, and forging machines. The rolling mill in which the first mechanical working of the cast ingot is done is known as the 'bloomer'. The function of the bloomer is to take the ingot as received from the soaking pit and break it down or reduce it to a smaller size called a bloom or a billet. Steel is rolled into many various shapes and special passes are made in rolls, depending upon the shape of the finished product. The rolling mill is a machine designed to produce thinner gauges of sheet metal and wire. Most studio jewelers use a hand cranked mill (automated mills are used in the refining and jewelry industries). Each mill consists of two smooth, highly polished, hardened steel rolls, mounted in the housing parallel to each other. The rolling mill is used for reducing the thickness of sheet metal. The rolls for wire are cut with 'v' shaped grooves arranged in decreasing sizes, allowing for gradual reduction of wire diameter and producing a square cross section of wire.

Objects and materials that can be used to make patterns are too thick or three dimensional to be appropriate (the metal is usually not thick enough to encompass the object and give a good imprint). Hard metal objects (steel) should only be used in the two-sided ('metal sandwich') method, as they may damage the steel rolls. We can use such materials as paper, fabric, thread, screen, feathers, lace, wire, masking tape, washers, plastic, sequins, leaves, doilies, thin keys, sandpaper, netting, chain.

Art casting is an ancient method of creating statues and sculptures. It has been applied in practice in Meso-America, China, and Ancient Egypt since 2000 BC. There were the Greeks who practised it too, so did the Romans, and any civilization with a strong interest in art. The casting process is the method preferred used for this purpose. When used in commercial manufacturing or jewelry making, the casting process is called investment casting. The investment process makes it possible to produce a casting of a wide range of shapes and contours in small-size parts. A metal master pattern is used to form out of wax or synthetic resin what may be called a negative pattern, that is, a shape having exactly the form desired in the finished casting. The gating system of same material as the wax pattern is put

together separately and attached to the pattern at any desired points. The assembled pattern is then coated by dipping or spraying with a thin layer of refractory cement. After drying for the several hours, the coated pattern is placed in a flask, and with a refractory mixture. The process seems to be elaborate and expensive, but it has proved to be advantageous in a large number of cases. Art casting can be done with any metal or alloy.

When soldering silver, or any metal for that matter, there are a few variables depending on what is being soldered, but for the most part, you follow the same series of steps each time you solder metal. First, you need to set up a safe area to solder. This will normally require a large ceramic tile, a fire brick or heat resistance pad, and an overhead lamp. The fire brick is put on the top of the tile. Also make sure you work in a very well-ventilated area. Some other items you want to have nearby are a pair of copper tongs, a jar of water, small paint brush, solder and flux. It is important that whatever is being soldered is clean and free from grease and oils that has been transmitted to the metal from your hands. So, each piece that is to be soldered should be put into a pickle for a few minutes. Once the pieces to solder are cleaned and arranged on the brick, it's time to cut the solder.

The first way of soldering is using a type of flux called Battern's. It's light yellow in color. The flux is applied to the area to be soldered using a thin paint brush. Then the solder is placed on the metal. This way the flux and solder are heated at the same time.

In the second way boraxbased flux is necessary to use that is more like a paste. The flux is again applied with a thin brush. However, instead of immediately applying the solder, the metal is heated first until the fluxed area looks like the glass. Then the solder is placed on the metal. Tweezers work well for placing the tiny pieces of solder onto the metal. When placing solder on the metal, it should be positioned between the areas that will best join the metal. A little solder will go a long way if placed correctly. Using tweezers or pliers pick up the hot metal and drop into a jar of water. If you need to solder the piece again, you will need to repeat these steps.

When the jewelry is manufactured by stamping the hard metal is transformed into the softer precious metal. There are some advantages and disadvantages of stamped or die-struck jewelry. Die-struck jewelry is denser and more durable than cast jewelry, and it allows a higher polish, but stamping is more expensive than casting because of the equipment, factory space and time involved in making dies.

The concept of quality and quality of products is taken for granted for most goods, including jewelry. If the jewel is an example of truly high art, it is capable of delivering great aesthetic pleasure. In this case, its value as works of art can be tens or even hundreds of times greater than the cost of materials used, and the cost of art works has not reduced. Jewelers should be the masters of high class.

The main criterion of quality is to match the true price of goods claimed, which is basically determined by the value of precious metals and stones. In these case, consumers are more likely to acquire gold bullion. Their main interest is reduced to that amount of gold in the product coincided with the breakdown, and the real stones are not a fake, and their purity, cut, and other properties result in the value. Since jewelry production is used in ornaments, it is absolutely necessary that the things do not break, crack, dark, etc.