



FIG. 11 A 1935 Photograph of Jean Dunand demonstrating with a blow torch the fire resistance of a lacquered table, cast from a gypsum based material containing *urushi*.

JEAN DUNAND—A FRENCH ART DÉCO ARTIST WORKING WITH ASIAN LACQUER

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Jean Dunand was one of the most renowned French Art Déco artists, creating lacquer furniture and decorative objects that exemplified the sophisticated taste of his time. His innovative combination of traditional Oriental lacquer techniques with contemporary forms and abstract decorative designs established his international success.

Dunand's development as a lacquer artist is remarkable, especially considering that he was one of the first western artists to work with *urushi*, which is the Japanese word for both the tree sap that is the basis of Asian lacquer and the finished product itself. Urushi is derived from sap obtained through incisions in the bark of several species of trees in the *Anacardiaceae* family, genus *Rhus*. *Rhus vernicifera* is mainly used in China, Japan, and Korea to produce raw lacquer, while *Rhus succedanea* is the source for *urushi* in Vietnam and Taiwan. Raw *urushi* is an emulsion with the main component—approximately 60–65% by weight—being urushiol, laccol or thitsiol, depending on the species. It contains also 20–30% water, 5–7% polysaccharides, 2–3% glycoproteins, and around 1% laccase. The raw *urushi* is refined by filtering and stirring, which reduces the water content and produces a more homogeneous, brownish-black lacquer. Compared to other varnishes and paint media, *urushi* is much harder and more resistant to water and organic solvents. While natural gums and resins usually set up in dry conditions, *urushi* requires a relative humidity of 65–80% to cure. The polymerization is initiated by the enzyme laccase in the presence of water.

Born on May 20, 1877 in Lancy, Switzerland, Dunand started his artistic training at the age of 14 at the École des Arts Industriels in Geneva, completing his studies in 1896 with a degree in sculpture and design.¹ The city of Geneva granted the talented young artist a stipend to continue his training in Paris, where he studied with the Art Nouveau sculptor Jean Dampé. Under the influence of Dampé, who believed that a sculptor should also be a good craftsman, Dunand spent his summer vacations working with a Geneva coppersmith as an apprentice. There he learned the traditional metalworking techniques for making household wares of hand-beaten copper and brass, known as *dinanderie*.² Although Dunand found success as a sculptor, participating in major exhibitions, such as the Exposition Universelle 1900 in Paris, commissions for carved furniture and decorative interiors on which he collaborated demonstrated to him the economic advantages of the applied arts. Consequently, he focused his energy on decorative metalwork and established himself as a *dinandier*. It was in this context that he first experimented with coatings which would inhibit corrosion. He noticed that the Japanese metal vases sent to his workshop for restoration had coatings that were not only protective but added a decorative element to the surface. Fascinated by Oriental lacquer techniques and eager to apply lacquer to his own metal wares, Dunand invited several Parisian specialists to his studio to learn from them the secret of lacquer work. He was astonished

by their lack of knowledge and considered them mere “varnishers.”³ Pursuing his keen interest in this matter, he contacted the Japanese lacquer artist Seizo Sugawara, who himself was interested in Dunand’s metalworking techniques. They agreed to exchange their workshop secrets.

Seizo Sugawara came from the small village of Johoji in the north of Japan, which is famous for its lacquerware. In 1900, he arrived in Paris as part of the Japanese national delegation to the Exposition Universelle to oversee the lacquerware sent from Japan.⁴ Sugawara decided to settle in Paris, where he became an important figure in the art scene, teaching western artists the Oriental lacquer technique. Dunand and the Irish artist Eileen Gray were his most prominent students.

The thirteen lessons Dunand received from Sugawara in 1912 are documented in Dunand’s notebook.⁵ There he recorded descriptions for preparing the lacquer, the tools and necessary materials, working procedures, and various decorative techniques, including their Japanese names. The interpretation of Dunand’s notes, especially the Japanese terminology, is made easier through consultation of extensive documentation compiled by Johannes Justus Rein and John James Quin, who independently studied traditional lacquer techniques in Japan in the late 19th century.⁶ Working on behalf of the Prussian government, Rein presented one hundred sample boards and an accompanying report to the Königliche Kunstgewerbemuseum in Berlin in 1874.⁷ Quin was commissioned by the British government to collect specimens and tools for the new Museum of Economic Botany at the Royal Botanic Gardens in Kew. By 1882 he had assembled a study collection of 170 items, including raw materials and tools, sample boards, and objects demonstrating all stages of lacquering and various decorative techniques, as well as finished lacquerware.⁸ Both reports describe in detail the cultivation of the lacquer tree *Rhus vernicifera*, the extraction of the tree’s sap, the refining of the lacquer, the lacquering procedure, and traditional techniques of decoration.⁹

Dunand’s notes and the sample boards he made during the lessons with Seizo Sugawara reflect traditional Japanese lacquer techniques. *Sessimé*, the type of *urushi* most frequently mentioned by Dunand, is a purified, filtered, evenly flowing, raw lacquer, obtained from the tree trunk.¹⁰ Dunand describes *nashizi* as a high-grade transparent lacquer and *schuaye* as a lacquer containing oil that was used for “ordinary and colored lacquerware.”¹¹ Dunand mentions the application of heat and the addition of camphor for thinning lacquer and glycerin to thicken it.

The wooden sample boards made by Dunand while he studied with Sugawara demonstrate a thirty-step process for producing a black lacquer surface (figs. 1 & 2). First, the wooden surface is sealed with *sessimé*, and then a mixture of *urushi*, rice starch, and chopped hemp or cotton fibers, known as *kokuso* and referred to by Dunand as *kekso*, is applied to even out any irregularities.¹² Another layer of *urushi* is applied and then a piece of hemp cloth, adhered with a paste of rice starch and *urushi*, called *ita* by Dunand.¹³ Seven increasingly-fine foundation layers of *kiriko*, *dzinoko*, and *sabi*, which are mixtures in varying proportions of coarsely and finely ground clays, water, and *urushi*, are then applied.¹⁴ The black surface is produced with three layers of black *louero* finished with two coatings of transparent *sessimé*. Between each application, the layer was allowed to cure and was then ground or polished with stone, charcoal, finely ground clay, or powdered, calcined deer antler, with or without a lubricant such as water or oil.¹⁵ That Sugawara must have emphasized the importance of this procedure to Dunand is indicated by a comment in the notebook: “Lacquerers who do not know very well how to polish and smooth lacquer with charcoal are called camels, because a camel has two humps, similar to badly polished lacquer.”¹⁶

Dunand describes the *louero* lacquer, called *ro-iro urushi* in Rein’s terminology, as a black lacquer of the highest quality. It is obtained through a reaction of *urushi* with iron. A solution of iron filings in vinegar is added to *sessimé* and then

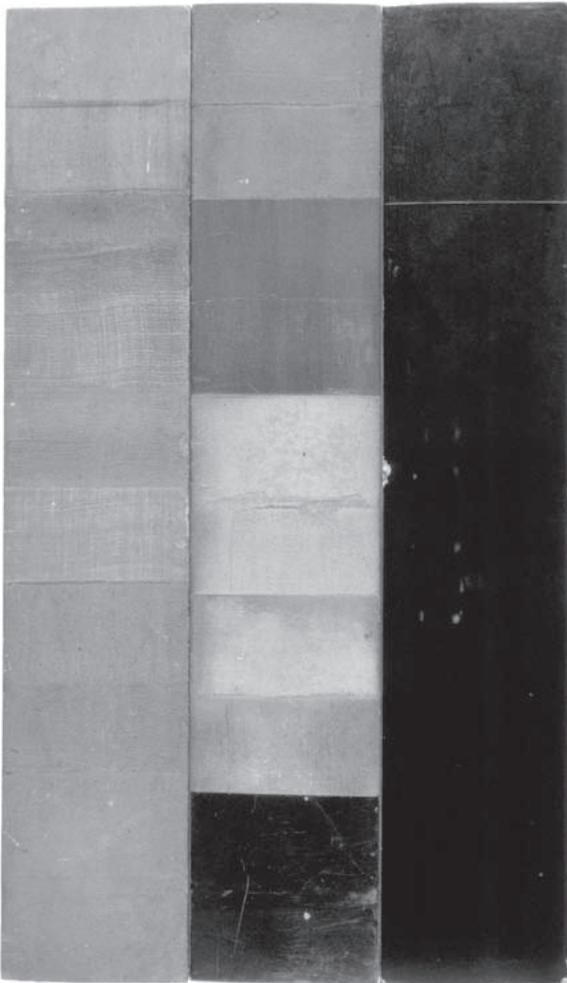


FIG. 1 Sample boards produced by Dunand during his lessons with Sugawara in 1912.

the mixture is heated and filtered.¹⁷ Additionally, Dunand mentions *yuyen*, a *nashizi* lacquer mixed with lamp black, and a lower grade *jôhana* lacquer, which contains oil and is blackened with iron powder. Dunand pointed out that lacquers containing oils, such as *schuaye* and *jôhana*, used for ordinary lacquer articles are never polished.¹⁸ For colored lacquers various pigments are added, vermilion (*schu*) and iron-oxide (*benigara*) for red lacquer, cadmium and chrome yellows for yellow lacquer, and Prussian blue for blue lacquer. Green lacquer is obtained either with a mixture of yellow and blue pigments, or with chromium oxide. Brown is achieved by mixing red *schu* and black *jôhana* lacquer. Barium sulfate, and lead and zinc whites are used as white colorants.

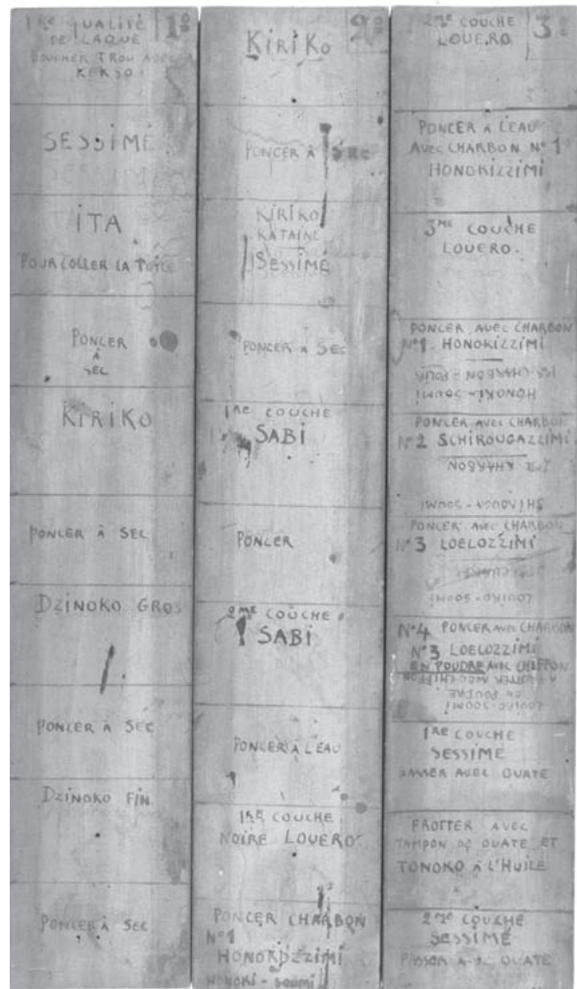


FIG. 2 Backside of sample boards listing the thirty steps for producing a black lacquer surface.

Sugawara also taught Dunand the application of gold lacquers, which incorporate metal leaf and powder, as well as other decorative techniques. Dunand noted the importance of a dust-free environment for the drying of lacquer. He also mentions that freshly lacquered objects must be placed in an “armoire,” without indicating that a high relative humidity must be maintained inside in order for the lacquer to cure. The use of *sessimé* on metal was specifically addressed and special mention was made of the fact that the lacquer applied to metal can be hardened in an oven at temperatures of 100–180°C.¹⁹

The lessons took place over a brief period of two months.²⁰ They provided Dunand with a basic

introduction to Japanese lacquer techniques, leaving this immensely talented craftsman with a new obsession. Dunand continued to experiment on his own and after World War I he installed a lacquer studio in his workshop, located in the Rue Hallé in the fourteenth *arrondissement* in Paris. He obtained *urushi* from the French colonies in Indochina, and most of the craftsmen in his studio who helped him with the lacquer work were Indochinese. In a magazine interview of the early 1920s Dunand explained that he favored Asian assistants because they were experienced in working with lacquer and not susceptible to the allergic reaction to *urushi* common among Europeans.²¹ Lacquer had become the dominant element in Dunand's artistic *oeuvre* in the 1920s and 1930s, his most successful and creative period.²² René Gimbel, a Paris-based art dealer who visited Dunand in his studio on June 8, 1920, copied into his diary Dunand's description of lacquer:

“Of course there are some art forms which are merely a matter of patience, like the lacquer which I love so much! Just look, and think how much work goes into preparing this stuff and making it. Here you have some trial attempts. On these tablets you can see the various stages of preparation. At the bottom, the first layer of lacquer, then comes the second, and at the top the twentieth. So you have to varnish or paint twenty times—or rather forty, as the job has to be repeated on the other side to keep the wood from warping; otherwise it would crack, for you wouldn't believe how easily the lacquer can twist even the hardest wood into a semicircle. Actually, not forty but as many as a hundred preparations are required, since after varnishing you have to polish and before each varnishing there have to be twenty seasonings, each lasting four days. It'll surprise you to learn that the seasonings require damp conditions, and a dark room where water flows continuously, and that success is more certain at the full moon. So you'll understand that it's positively Oriental labor!”²³

With his lacquerware, Dunand combined traditional Asian methods of manufacture with modern Art Déco designs and bold color schemes. Always searching for new applications and expanding the repertoire of his techniques, he used lacquer to embellish furniture, wall panels, paintings, metal vases, jewelry, and textiles. His extraordinary creativity and tremendous stamina led to an enormous production of lacquerware in his workshop.

Dunand participated in the important art exhibitions of his time. His work was widely shown throughout Europe and the United States, where it was acquired by major museums. In 1998, the Metropolitan Museum of Art mounted a small Jean Dunand exhibition showing works drawn mainly from its own collection.²⁴ This exhibition provided a welcome opportunity to study Dunand's lacquer techniques.

One of the most impressive interiors by Dunand was completed in 1928 for the San Francisco penthouse of Templeton Crocker, the wealthy grandson of the founder of the Union Pacific railroad company. Crocker's attention was drawn to Dunand's lacquer work by two exhibitions of contemporary French design displayed in the mid-twenties in San Francisco. He commissioned a master bedroom, a dining room, and a breakfast room, all to be decorated with lacquer.²⁵ The bedroom walls, originally decorated with lacquered panels depicting a forest landscape, are now lost, while the bedroom furniture is in the collection of the Metropolitan Museum (fig. 3).²⁶

The lacquered surfaces on the furniture mainly feature a technique favored in Dunand's workshop, *laque arrachée*, whereby the lacquer was lifted with a flat wooden spatula to create an uneven surface. In this case, the *laque arrachée* consists of a black *louero* lacquer applied to several ground layers.²⁷ After drying, the surface was lightly smoothed and a silver-gray lacquer was applied over the black layer. The color and metallic appearance of this layer were obtained by adding aluminum filings mixed with titanium-white and cadmium-yellow pigments to the lacquer.²⁸ Polishing the surface

FIG. 3 Photograph of bedroom by Dunand made for Templeton Crocker in 1928. The photograph was taken in Paris in 1928, before the room was shipped to San Francisco.



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revealed the raised areas of black lacquer within the silver-gray layer, resulting in a mottled effect (fig. 4). Black lacquer and silver leaf that juxtapose the colors of the mottled lacquer on a different scale accentuate the angular forms of the furniture. The analysis of samples from the black and silver-gray lacquers indicates the presence of laccol, the major component in *urushi* derived from *Rhus succedanea*, the lac tree native to Vietnam and Taiwan.²⁹ These results confirm documentary evidence that Dunand obtained *urushi* from the French colonies in Indochina.

Laque arrachée is the final surface decoration on a series of pictorial wall panels entitled “Les peuples d’Asie et d’Afrique,” which Dunand made for the 1931 Exposition Coloniale in Paris (figs. 5 & 6).³⁰ In this case, the uneven texture of the matte brown *laque arrachée* creates a striking contrast with the smooth, silver-leafed background. Instructions associated with a *laque arrachée* sample board made in Dunand’s workshop in 1931 describe the technique as follows: “On a cured lacquer with gold leaf apply a coat of *laque arrachée* mixed with clay and draw the design in the freshly applied lacquer. After drying sand lightly with fine sandpaper.”³¹

More elaborate is Dunand’s lacquer decoration on a pair of screens “Pianissimo” and “Fortissimo,” which were made for the music salon of Mr. and Mrs. Solomon R. Guggenheim’s residence in Port Washington, NY (fig. 7).³² Fabricated in 1925–26, the screens are signed by Dunand and his collaborator on this project, the sculptor Seraphin Soudbinine. The latter was most likely responsible for the overall design, as well as for carving the relief



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FIG. 4 Detail of the mottled lacquer from the bedroom furniture, showing black *laque arrachée* filled with a silver-gray lacquer juxtaposed with black lacquer.



FIG. 5 Wall panel from the series “Les peuples d’Asie et d’Afrique,” 1931, Musée des Arts d’Afrique et d’Océanie, Paris.

figures of the angels and the angular rocks. The angels are decorated with an unusual gilding technique; smooth and wrinkled sheets of gold leaf, all of the same composition, were applied side-by-side to a red vermilion lacquer.³³ The smooth leaf is shiny and appears lighter in color than the textured, matte surfaces of the wrinkled leaf. Further gradations in color were obtained through the selective application of a coating to areas of wrinkled leaf which were intended to appear even darker.³⁴ The marbling of the towering rocks was achieved through a complex layering which is vis-

ible in the cross section of a sample taken from an illuminated side of a rock (fig. 8). Black *louero* lacquer was used as the surface for the side of the rock in shadow, and also appears as the darkest color in the marbling. A brown, pigmented layer was applied unevenly to the black lacquer and covered with fragments of gold leaf. The irregularities were then filled with a transparent lacquer and the surface was polished until the marbled appearance desired was obtained. Eggshell fragments embedded in lacquer were used to produce a white surface, an effect difficult to achieve with pigments due to the inherently dark color of *urushi*. On the screens, crushed eggshells were applied to the gold lacquer surface of the angels’ draperies and also combined with mother-of-pearl particles to represent spiraling clouds within the dark blue-green background.³⁵

The use of crushed eggshells to cover large surfaces is a technique first introduced by Dunand that became a specialty of his workshop. Depending on the effect intended, shell fragments were crushed and placed on freshly applied lacquer with either their convex or concave side facing up. In the latter case, the cavities were subsequently filled with lacquer and after polishing only the white edges of the shells are exposed. In the former, the relationship between the materials is reversed, and white patches of eggshell are outlined by the contrast-

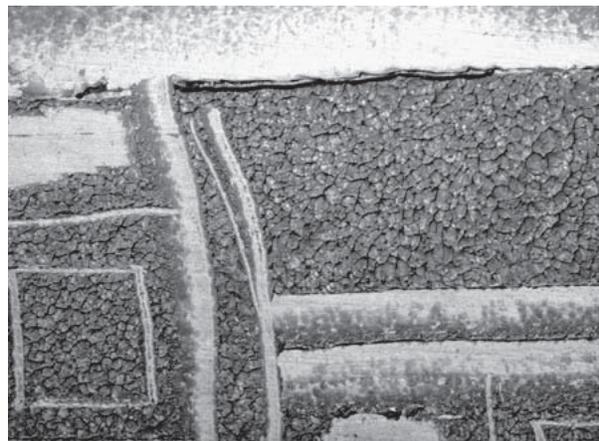


FIG. 6 Detail of wall panel from the series “Les peuples d’Asie et d’Afrique,” Musée des Arts d’Afrique et d’Océanie, Paris, showing the use of matte brown *laque arrachée* as surface decoration.

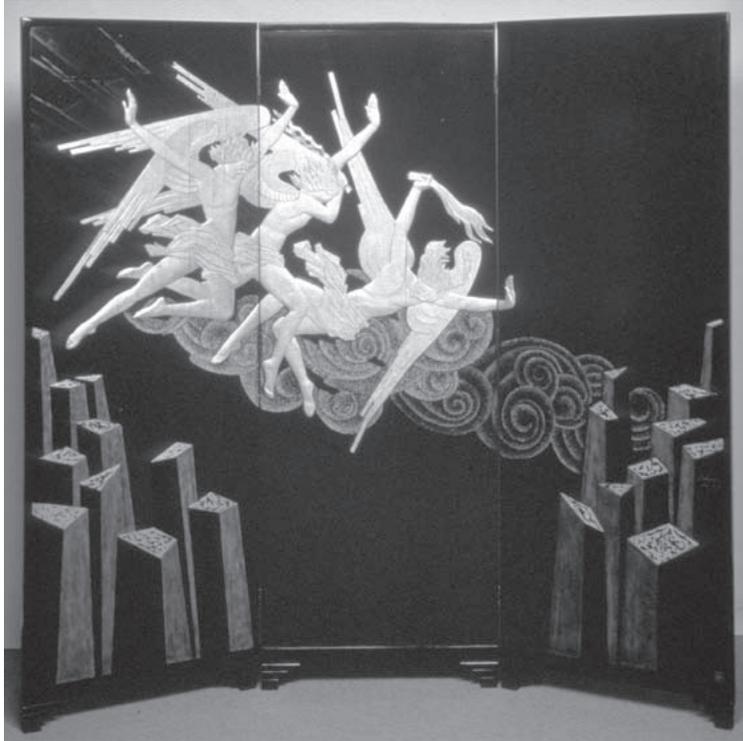


FIG. 7 “Fortissimo” screen by Jean Dunand and Seraphin Soudbinine made in 1925–26 for Mr. and Mrs. Solomon R. Guggenheim. The Metropolitan Museum of Art, Gift of Mrs. Solomon R. Guggenheim, 1950 (50.102.4).

ing lacquer. The alternating squares covering the table top, drop-leaves and shelf of a table made by Dunand around 1925, are executed with juxtaposed fields of shell fragments, with their convex or concave side facing up (figs. 9 & 10). Microscopic examination under ultraviolet light of a cross section of an eggshell particle with its concave side facing up revealed that the smoothed surface received a final coating of transparent *urushi*.³⁶ Dunand’s eggshell lacquer became so popular that he maintained a chicken coop in the courtyard of his workshop to guarantee a steady supply of eggs. In order to create different shadings and color contrasts, Dunand also incorporated into his lacquer crushed eggshells of ducks, partridges, and exotic birds.

In a similar way, Dunand experimented with embedding dried lacquer flakes in freshly applied lacquers, generally of a different color. The lacquer flakes were obtained by applying a layer of a col-

ored lacquer to a sheet of paper and heating it in an oven. After removing the paper, the dried lacquer was broken into pieces.³⁷ Sieves with different gauge meshes were used to separate different particle sizes. Dried lacquer flakes were also ground to produce a powder, which could be sprinkled onto freshly-applied lacquer surfaces.

Coromandel lacquer technique was also frequently used in the Dunand workshop. Typically the lacquered surface was engraved and the incised designs revealed ground layers, which were either left exposed or were covered with colored lacquers. This technique was mainly applied to screens and wall panels, because coromandel lacquer is a relatively simple technique which is useful for quickly decorating large surfaces.

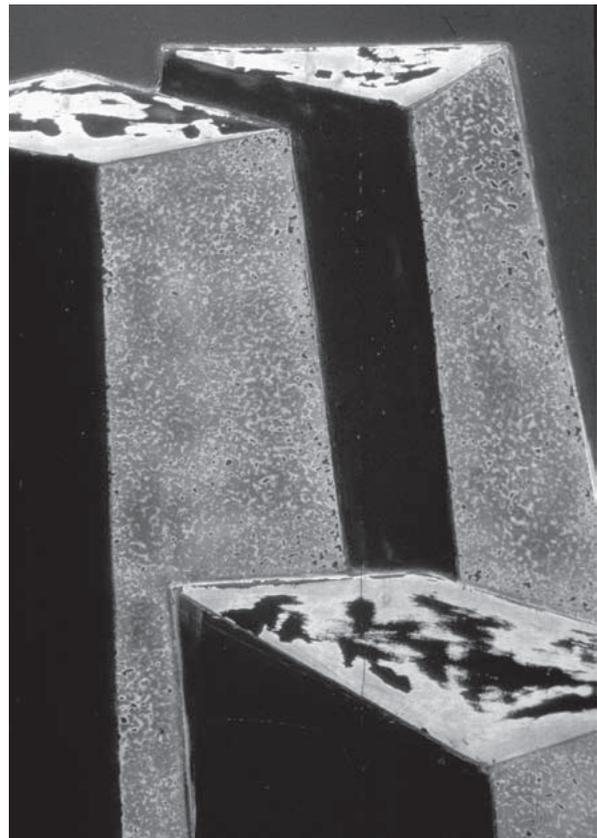


FIG. 8 Detail of “Fortissimo” screen showing the geometrically abstracted rocks.



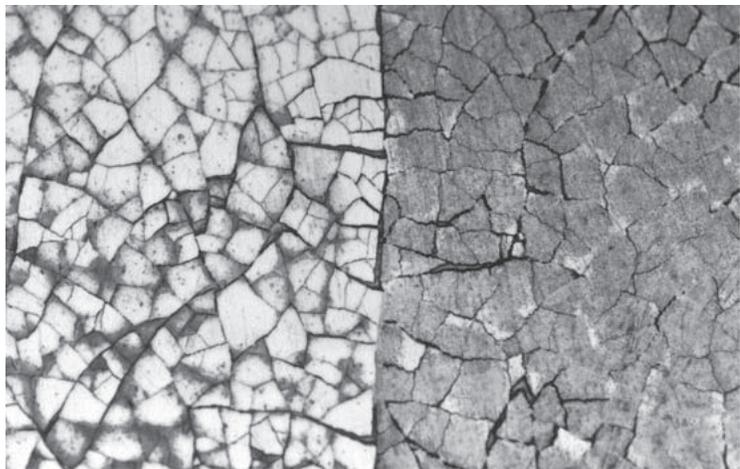
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FIG. 9 Drop-leaf table by Dunand, ca. 1925. The table top, drop-leaves and shelf are decorated with crushed eggshells, arranged in a checkered pattern. The Metropolitan Museum of Art, Gift of Mr. and Mrs. Michael Chow, 1986 (1986.400).

Dunand seems to have been more interested in the technical challenges and craftsmanship involved in the application of the lacquer than in the designs per se. This is reflected in his numerous collaborations with other artists and designers, such as Jean Goulden, Paul Jouve, Seraphin Soudbinine, Jean Lambert-Rucki, Gustave Miklos, Jacques-Émile Ruhlmann, Eugène Printz, and Pierre Legrain. Dunand executed either the pictorial sketches in lacquer or decorated the surfaces of sculptures and unfinished furniture sent to his workshop. Jacques-Émile Ruhlmann, one of the most important French Art Déco furniture designers, created the “Chinoise” vanity in about 1929. This dressing table was produced with different finishes, including plain black lacquer and black lacquer with an abstract eggshell decoration,

both executed in Dunand’s studio.³⁸ Dunand’s fascination with lacquer and his identification as a lacquer artist is also illustrated by his signature: “Jean Dunand Laqueur,” with which he often signed his work.³⁹

Dunand continued to experiment with new ways of using lacquer. Among his most unusual applications were his portraits, which he based on his own photographs and sketches.⁴⁰ One of the portraits, in the collection of the Metropolitan Museum represents Madame Juliette de Saint Cyr, painted about 1925. It features an eggshell mosaic background and a *laque arrachée* border containing a floral ornament. The fabric of Mme. de Saint Cyr’s abstractly patterned dress and her jewelry originated in Dunand’s workshop as well. Mme. Agnès, an influential Parisian milliner and member of the avant-garde had introduced Dunand to the fashion world and encouraged him to experiment with lacquered fabrics and jewelry, as well as other fashion accessories.



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FIG. 10 Detail of table top decorated with crushed eggshells, arranged in a checkered pattern. The eggshells that appear predominantly white were positioned convex-side up, while the adjacent eggshells were placed concave-side up and the subsequently applied grayish lacquer filled the cavities, thus creating the color contrast.

Dunand's most extensive commissions were the monumental decorative wall panels for the ocean liners *Île de France* (1927), *L'Atlantique* (1931), and *Normandie* (1935). Their luxurious interiors represented the best in contemporary French design. For the *Normandie* Dunand was required to use fire-resistant materials, which posed yet another new challenge. He developed a gypsum-based material, containing *urushi*, that could be cast, carved, and lacquered. A photograph shows Dunand with a blowtorch demonstrating the fire resistance of a lacquered table cast from his newly-invented material (fig. 11, page 2).

The enormous demand for Dunand's lacquerware and the production of large-scale projects required the constant expansion of his workshop on the Rue Hallé. A ground plan from 1935 outlines his premises, which included a show room, an office, several lacquer studios, including one for gilding, as well as designated areas for designing, model making, metalworking, cabinetmaking, casting, and sculpture. There were also several chambers, where water running down the walls produced a high-humidity environment for curing lacquer surfaces, and a large kiln for heat-resistant materials.⁴¹ The number of craftsmen and assistants working in Dunand's studio varied according to the scale of his commissions. In the twenties and thirties, Dunand had forty to sixty employees, nearly half of them lacquer workers from Indochina.⁴² During the production of the decorative wall panels for the *Normandie*, Dunand employed more than one hundred workers in order to complete this enormous project.

Considering that Dunand's lacquer oeuvre is based on a two month course in Japanese lacquer technique, his ingenuity in this field is remarkable. Dunand was an artist extremely receptive to new ideas and who was, above all, an outstanding, multi-talented craftsman, constantly looking for new inspiration, driven by his own high technical and aesthetic standards. *Urushi* presented to him a challenging medium which was difficult to master and provided endless opportunities to develop new techniques and applications. Dunand combined a

modern sensibility with a foreign material, thereby making Oriental lacquer highly fashionable in the Art Déco period. His reputation and mastery of *urushi* was such that lacquer experts from Tokyo regularly paid visits to his studio to study his innovative techniques and to acquire representative examples of his lacquer work.⁴³ His success was also based on a close collaboration with his oldest son Bernard, himself a lacquer artist, and on the help of his many Asian assistants, who produced most of the lacquerware under Dunand's supervision.⁴⁴

Dunand died at the age of 65 on June 7, 1942. Although faced with a shortage of materials during World War II, he had continued to work and to find new ways to express his creativity. A photograph, taken shortly before his death, shows Jean Dunand planing wood; the resulting shavings were lacquered and applied to hats created by the milliner Mme. Agnès.

ENDNOTES

1. Baptized Jules John, Dunand adopted Jean as his first name in 1909. Dunand became a French citizen on May 29, 1922. Marcilhac, F. 1991. *Jean Dunand—His Life and Works*. New York. 26, 37.
2. The term *dinanderie* is derived from Dinant, a Belgium town which specialized in hand-crafted domestic and ecclesiastical metal objects made of brass, copper, and bronze from the twelfth to fifteenth centuries.
3. Gauthier, M. ca. 1923. Vingt minutes avec M. Jean Dunand. *La Renaissance politique, littéraire, artistique*. I would like to thank M. Félix Marcilhac for providing a copy of this article.
4. Adam, P. 1978. Eileen Gray—Architect/Designer. New York. 49–50. Marcilhac 1991. 28–29, 170. Lorac-Gerbaud, A. 1973. *L'art du laque*. Paris. 100. Lorac-Gerbaud, A. 1996. *Les secrets du laque*. Paris. 160. According to Lorac-Gerbaud's 1996 publication, Sugawara came to Paris with a friend, the *ébéniste* Inagari, rather than with a Japanese delegation to the *Exposition Universelle*.

5. Dunand's notebook is preserved in an archive retained by Dunand's family.
6. The different phonetic transliterations from Japanese into French, German, and English must be considered. To complicate the matter, Dunand himself used more than one spelling to write the same Japanese term. I would like to thank Pascale Patris, Assistant Conservator, The Sherman Fairchild Center for Objects Conservation, The Metropolitan Museum of Art, for her help translating Dunand's notes.
7. The whereabouts of most sample boards (each 20cm x 13cm) and the report are still unknown. Investigations conducted by Hans-Werner Pape, Chief Conservator, Kunstgewerbemuseum Berlin, uncovered museum's inventory records for the transfer of 32 Japanese lacquer sample boards on April 9, 1934, most likely from Rein's collection, to the Völkerkunde Museum in Berlin. According to Birgit Kantzenbach, a conservator at the Museum für Völkerkunde, seven of those sample boards are preserved in the Museum's collection. The other samples might have been destroyed or lost during World War II. I am grateful to Hans-Werner Pape and Birgit Kantzenbach for this information. According to Rein, his report formed the basis of his later publication on Japanese lacquer work. Rein, J. J. 1886. *Japan nach Reisen und Studien im Auftrage der königlich preussischen Regierung dargestellt. Land- und Forstwirtschaft, Industrie und Handel*. 2 vols. Leipzig. II:400-448. This work was also published in English in 1889, under the title: *The Industries of Japan. Together with an Account of its Agriculture, Forestry, Arts, and Commerce, from Travels and Researches Undertaken at the Cost of the Prussian Government*. New York & London. 338-377.
8. Most of the 170 items from the Quin collection are preserved in the Economic Botany Collections, Royal Botanic Gardens Kew. Quin, J. J. 1882. *Report by Her Majesty's Acting Consul at Hakodate on the Lacquer Industry of Japan*. London. Quin, J. J. 1995 (reprint of the 1896 edition). *Urushi—The Technology of Japanese Lacquer*. Portland, OR.
9. Jaeschke, H. 1991. Reflections on Lacquer. *KEW* (Spring):22-25. I am grateful to Naomi Rumball, Assistant Curator, Economic Botany Collections, Royal Botanic Gardens Kew, for providing a copy of Jaeschke's article.
9. Rein and Quin both identified the Japanese lacquer tree as *Rhus vernicifera*. The botanical name currently in use for the species is *Toxicodendron vernicifluum* (Stokes) F. Barkley; *Rhus vernicifera* D.C. and *Rhus verniciflua* Stokes are synonyms. Vogl, O., M. Qin, and J. D. Mitchell. 1995. Oriental Lacquers. 7. Botany and Chemistry of Japanese Lacquer and the Beauty of the Final Art Objects. *Cellulose Chemistry and Technology* 29:273-286. I would like to thank Dr. Dennis Stevenson, Director of the Plant Research Laboratory, The New York Botanical Garden, for his help in clarifying these terms.
10. Rein 1889, 350. Dunand also refers to *sessimé* as a transparent lacquer.
11. The name *schuaye* is spelled in various ways in Dunand's notebook: *shuai*, *schay*, *shuay*, *schuay* and *schuai*. The oil component of *schuaye* is most likely perilla oil, which Rein and Quin mention in connection with oil-containing lacquer. Rein 1889, 352. Quin 1882, 8.
12. Dunand notes that *kekso* is used to fill joints and contains equal amounts of *sessimé* and rice starch mixed with hemp or cotton fibers. Sawdust is also used traditionally as a filler in this ground layer.
13. *Ita* is made of equal amounts of *sessimé* and rice starch.
14. *Kiriko* is a mixture of 1/3 *dzinoko* (coarsely ground, baked clay), and 2/3 *tonoko* (finely ground, baked clay) with water, to which *sessimé*, in the amount of 25% of the starting mixture, is added. Coarse *dzinoko* contains *sessimé*, a little rice starch diluted with a lot of water, and coarsely ground *dzinoko*, while fine *dzinoko* has a similar composition, probably with the substitution of a

more finely ground clay, which is not explicitly mentioned. Dunand writes that *sabi* contains *tonoko*, *sessimé*, and a little water.

15. In his notebook Dunand mentions two stones by name: *arato*, which according to Quin is a rough stone for wet polishing, and *nagato*, which could refer to *nagura-to-ishi*, the finest stone for wet polishing. Quin 1882, p. 10. Three different charcoals—*honokizzimi*, *schirougazzimi*, and *loelozzimi*—are utilized, and Dunand specifies that end-grain surfaces of the charcoal pieces are used, and that the growth-rings must be perpendicular to the polishing movement. Afterwards the lacquer is polished with powdered *loelozzimi*, *tonoko* (finely ground, baked clay), and *tsinoko* (powdered, calcined deer antler) applied with oil and a cloth, cotton wool, or filter paper (*yossimo gami*, also used for filtering lacquer). The best results are achieved by final polishing with the palm or finger, and women's fingers seem to be extremely suitable as Dunand noted: "le doigt de femme est très bon pour bien finir."

16. "Les laqueurs qui ne savent pas bien polir et dresser une laque avec leur charbon, sont dénommés "Chameaux", parce [sic] le chameau a 2 bosses, il est comme la laque mal dressée." Another note from his booklet addresses the same concern: "Les laques qui ne sont pas très bien polies sont appelées laques de paresseux."

17. "Louiro—1re qualité laque noire. Cette laque est faite avec la laque sessimé - prendre de la limaille de fer—y mettre un peu de vinaigre—ensuite le mélanger dans la laque et passer sur le feu (avec le filtre)." Quin and Rein both mention that in the preparation of black *ro-iro-urushi* / *ro-urushi haguro*, a solution produced by boiling iron filings in rice vinegar used by women to blacken their teeth is added to the lacquer. Quin 1882, 7, and Rein 1889, 352-353. Dunand mentions the use of *yossimo gami* paper for filtering lacquer.

18. With regard to *schuaye*, Dunand describes on one occasion the use of *honokizzimi* charcoal to smooth each of three layers of transparent *schuai*

after they have dried for 2 hours; no final polishing, however, is mentioned.

19. The temperature of the oven was noted as 100°C for the first five hours, then 150°C for thirty minutes and 180°C for the last ten minutes.

20. The lessons started on May 16, 1912 and continued until the end of June.

21. "Pour obtenir un laque réussi, vingt-deux opérations sont nécessaires. Et les matières premières ne sont pas seulement d'un maniement difficile; leur nocivité ne me permet d'employer, à ce genre de travaux, qu'une main-d'oeuvre elle-même importée, si l'on peut dire; mes ouvriers chinois, japonais, annamites, manipulent impunément des produits qui font, sur l'ouvrier européen, effet de poison." Gauthier, ca. 1923.

22. At the 1921 Salon des Artistes Décorateurs in Paris, Dunand exhibited for the first time a lacquer panel depicting fishing boats seen against a mountain landscape, which was based on a sketch by his friend, the painter Henry de Waroquier. Marcilhac 1991, 35.

23. Gimbel, R. 1966. *Diary of an Art Dealer*. New York. 137-138. The diary was first published in French in 1963 as *Journal d'un collectionneur*. Paris, 165-166.

24. The exhibition, entitled Jean Dunand: Master of Art Deco (May 23-October 25, 1998), was organized by J. Stewart Johnson, Consultant for Design and Architecture, and Jared Goss, Assistant Curator, Department of Modern Art, The Metropolitan Museum of Art.

25. A 1929 article in *Vogue* magazine devoted to Crocker's luxurious apartment, praised its modern interior, which also included rooms designed by Jean-Michel Frank, Pierre Legrain, and Mme. Lipska. Miller, M. A. 1929. A Twentieth Century Apartment. *Vogue* (August 3):30-35, 94.

26. In the above-mentioned *Vogue* article, the bedroom was described as follows: “In the adjoining bedroom, Dunand has again contrasted his own love for movement and design with Frank’s monotonous. Here again, *laque arrachée* on the walls is worked into a modern design in tones of silver and grey with overtones of tan, giving the effect of a woodland. Over the head of the bed, a life-sized deer nibbles a miraculous green bough, and on an adjacent wall, his companion sips calmly from a spring. These deer are made of thin sheets of lead, inlaid with colours. The furniture, low and square, is of black and grey lacquer, with a note of white in the ivory knobs of the commode and the goat-skin that covers the chairs. The curtains are of grey chamois in three shades.” Miller 1929, 94.

The original photograph of the completed bedroom taken by Thérèse Bonney in Paris in 1928 has the following description typed on the reverse: “Lacquered bedroom by great French lacquist [sic] Jean Dunand. Done for an American pent house [sic] in soft greys and reds, chairs upholstered in white goat skin.”

Photographs of the bedroom suite in the Dunand family archive have the following comment written on the back: “Boiseries en *laque arrachée* argent, gazelle en plomb incrusté, meuble en laque chine gris et noir.”

A maquette for the wall paneling behind the bed, recently acquired by the Metropolitan Museum, has a raised surface texture imitating *laque arrachée* covered with aluminum leaf. Different shades of gray, and pale red and yellow washes, were applied to the metal surface to depict the landscape scene.

27. Elemental analyses of cross sections of lacquer samples were carried out by Mark T. Wypyski, Associate Research Scientist, The Sherman Fairchild Center for Objects Conservation, The Metropolitan Museum of Art, using an energy-dispersive X-ray spectrometer (EDS) attached to a scanning electron microscope. EDS analysis of the black lacquer detected the presence of iron in the layer, indicating the use of *louero* lacquer. Fluores-

cence microscopy of cross sections from samples of the bedroom furniture showed a maximum of eight ground layers, including cloth, applied to wood and plywood substrates. EDS analyses of the ground layers revealed large amounts of silicon, with lesser quantities of magnesium, aluminum, sulfur, potassium, calcium, and iron, apparently a mixture of silica particles and clay. The bottom ground layers also contain bast fibers and wood, the latter most likely present in the form of saw dust. I would like to thank Mark T. Wypyski for performing all EDS analyses.

28. The metal filings and pigments were identified by EDS and X-ray diffraction analysis. Silicon, phosphorus, sulfur, calcium, and barium were also detected in the silver-gray lacquer, suggesting the presence of silica, barium sulfate and calcium phosphate particles, the latter possibly in the form of bone or ivory white.

29. The lacquer was analyzed by Prof. Dr. Tetsuo Miyakoshi, Department of Industrial Chemistry, Meiji University, using pyrolysis-gas chromatography/mass spectrometry. I am very grateful to Prof. Dr. Miyakoshi for conducting the analysis of four samples from the Dunand bedroom furniture. Kamiya, Y., and T. Miyakoshi. 2000. The Analysis of *Urushi* by Pyrolysis-Gas Chromatography and Mass Spectrometry. In *Ostasiatische und europäische Lacktechniken / East Asian and European Lacquer Techniques*, ed. M. Kühnenthal. Munich: Arbeitshefte des Bayerischen Landesamtes für Denkmalpflege 112: 107-120. *Rhus succedanea* also grows in Taiwan, but because Indochina was a French colony at the time, it is more likely that Dunand imported his lacquer from there.

30. The panels are now in the collection of the Musée des Arts d’Afrique et d’Océanie in Paris, which is housed in the Palais Permanent des Colonies, where Dunand’s panels were originally displayed. Marcilhac 1991. 119-120.

31. “Sur une laque d’or en feuilles sèche passer une couche de laque à la terre arrachée et tracer des

décors dedans pendant qu'elle est fraîche. Après séchage passer légèrement en papier de verre fin.”

32. In addition to the two screens, which are now in the collection of the Metropolitan Museum, two double doors decorated with angels sounding horns and a small panel depicting St. Michael and the Dragon were also made by Soudbinine and Dunand for the music salon. Photographs of the original interior of the music room and both screens are published by Marcilhac. Marcilhac 1991, 323, color plate 163.

33. The gilding was probably executed by a craftsman named Zuber, who was the specialist for gold lacquer in Dunand's workshop. EDS analysis was used to identify vermilion as the colorant of the red lacquer, based on the presence of mercury and sulfur. EDS analysis characterized the composition of the gold leaf as approximately 90% gold, 7% silver, and 3% copper by weight.

34. When viewed in cross section under a UV light microscope, a coating on the “darker” gold leaf displayed an orange fluorescence, which is characteristic for shellac. It is known that Dunand used shellac, and in this case he might have chosen it because of its orange coloration.

35. The examination of cross sections from the blue-green lacquer of the background revealed a mixture of coarse blue, fine blue-green, and yellow pigment particles. EDS analysis of the blue-green lacquer detected mainly chromium, aluminum, and cobalt, with traces of silicon, sulfur, calcium, and iron, which can be best correlated to the presence of cobalt blue, chromium oxide green, and an organic yellow pigment.

36. For the fluorescence microscopy the following filter set was used: excitation filter 365 nm, chromatic beam splitter 395 nm and emission filter 397 nm.

37. Records of a sample board made in Dunand's workshop in 1932 describe the technique as follows: “Sur une couche de laque noire coller des morceaux de laque à la terre rouge. Morceaux

obtenus en cassant une plaque de laque à la terre faite en passant une couche de cette laque sur du papier et en la faisant cuire au four. La laque à la terre rouge était obtenue avec de l'ocre rouge, de l'eau et moitié laque transparente, moitié laque naturelle. Après séchage passer une couche de laque noire. Après séchage poncer et polir.”

38. Camard, F. 1983. *Rublmann*. Paris. The dressing table with black lacquer and abstract eggshell decoration, and the matching chair, are illustrated on p. 60 and 275.

39. In addition to signing his work, Dunand also stamped pieces produced in his workshop. The heated metal stamp left the following imprint on unexposed lacquered and wooden surfaces of the Crocker bedroom furniture: “JEAN DUNAND - 72 RUE HALLE - PARIS - MADE IN FRANCE.”

40. In the 1927 October issue of the magazine *Arts & Decoration* a page was devoted to Jean Dunand's spectacular portraiture, reproducing portraits of four famous French women. Anonymous. 1927. In Paris You Must Have a Lacquer Portrait. *Arts & Decoration* (October):134.

41. A-Dayot, M. 1936. Art et technique—une visite à Jean Dunand. *L'Art et les Artistes* (November): 57-62. Marcilhac 1991, 172.

42. Dunand, B. 1982. Jean Dunand. *Club français de la médaille* 77:42-43, 49.

43. Garner, P. 1973. The Lacquer Work of Eileen Gray and Jean Dunand. *The Connoisseur* (May): 3-11. Dunand also participated in an exhibition of French decorative arts shown in Japan. Marcilhac 1991, 72.

44. From 1925, Bernard Dunand was Jean Dunand's closest collaborator. Thanks to his understanding and appreciation of his father's lacquer-work, as well as his own professional activities as a lacquer artist, many utensils, materials, documents, and sample boards from Jean Dunand's

workshop are preserved. I had the honor to meet Bernard Dunand three weeks before he died at the age of ninety. I am most grateful to Mme Dorothee Dunand-Dougoud and M. Christian Dougoud, Bernard Dunand's daughter and son-in-law, for their strong encouragement and support of my research on the lacquer techniques of Jean Dunand.

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