ammoniacal is soaked in water of the sapanwood tree a day and a night. On the morning it is drained with the fingers in the vessel in which it is. It is then clarified. On it are thrown three distillations of saffron to obtain a stronger color than gold. Its yellow is prettier.

Preparation of a blackish ink. One part of bee honey is taken and one part of mica and one part of galgad vitriol. The vitriol, mica, and honey are pounded and put in a crucible and alambic and distilled. Then the distillate is removed from it into a vessel and placed in the sun for twenty days. Every day there is pulverized for it a distillation of gum arabic which is put into it. It is stirred vigorously until the gum is dissolved. When one writes with it, it comes out beautifully.

Preparation of another. One part of vitriol and one part of green vitriol are pulped together. With it is a bit of gum. It is dissolved in water of boiled gallnut. Use it.

Preparation of sumac ink. One half rafl of sumac is taken. On it are poured three rafls of pure water. It is placed in the sun for two days until the red of the sumac comes out. It is squeezed, filtered through a fine cloth, and put in the sun for five days. On every rafl five ounces of gum are put—every day an ounce. It is left until the gum is dissolved. On it is thrown what is necessary of vitriol. It is checked so that it is not burned owing to an excess of vitriol. It is stirred, then left for seven days. As often as the water diminishes, there is added to it an amount that disappeared from it. It is stirred. After the days pass, the water is clarified on eight distillations of collyrium, i.e., collyrium of the pulverized distillations and three distillations of marasite, and a distillation of myrrh. If it is spoiled, it is pulverized in a mortar one day and there are added to it four distillations of vitriol and two distillations of sumac. According to a Babylonian text (Levey, 74), the oak and sumac were two of the principal sources for tannin agents. Sumac was used medicinally in Babylonia (D.B. 157, 239, 245). The 1st (1-108) considered sumac, paps, Rhum cirriPersian L., as a toning agent to dye hair black, for dyestuff, and for pain in the gums and teeth. In Arabic times, L. J. (247) explained sumac was used by al-Riḍā as an astringent, for urinary hemorrhages, and polyuria. Others used it in ophthalmology, to prevent inflammation, and for contusions. In the Twalit al-ajfal (308), the Ohrar term for sumac is shown as being (sing. tąlgul). Daurus gives the synonym of sumac as aswound at-sawwqat, mawwwaq, and mawānī. It is sold in the Egyptian bazaars as an astringent, antirheumatics, and antiseptic. Sumac still grows in the Near East. It is still used to dye silk and tan leather goods by the Arabs, Turks, Iranians, and in Europe (Hooper, 164; Nabat, 900; the Rasd, 560).

226 al-kadīd. We know it from the inscription and to Dors (V. 119). Cf. note 162. This is the most common Arabic word for woad which is an alkali from althea plants. The word "alkali" is derived from Greek Al-Riḍā, pius, implies soda and its many uses. See also Alumn on salvia alkalis (318, 818) and Main (345). Salicornia fruticosa L. was the plant most used to obtain gull in Babylonia as well as in later Arabic times (Levey, 124). For the preparation of alkali from plants in India, see Ray (63-64). For gull in Jāhār, see his book on poisons (II: 54; IV: 180a, 1120).

243 sumac. Marasite, to ancient writers, is variously a mixture of iron pyrites, bisulfur, and antimony. Later it referred to Pera. It was used in the ancient Near East for ornaments (C.A.S. 1170). Aitken’s lapidey (28) states that “there are many types—gold, silver, and copper marasites.” (Cf. Weilman 1957). It is metallic in character when it is calcined and burned until it is a fine powder. When it is mixed with gums or a grease in a crucible, it purifies gold (Aitken 34). Al-Kinḍī knew marasite and discussed it in his work (II: 54a). J. B. (214) states that al-Riḍā used marasite for the eyes and in a compound recipe for fever. Twalit al-ajfal (362) calls it “some light because of its use for the sight. Its types are the gold, silver, copper, and iron.” It is noted that the Sīk and al-Raṣūl state the same thing. Daurus (217) notes the same in present day homes in Egypt of marasite abshabāw, a pyrite, for kidney calculi.
leaving out, sometimes asking, sad, or sad. It was
1945. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194]. (India) [118: 194].
solved in water, and thrown on it, then beaten vigorously (27) Write with it.

FIFTH CHAPTER
ON THE PREPARATION OF LIQ

Description of red liqf. There is taken of distilled soda as much as is desired. To it is added washed, powdered red cinnafrar which one sebuah sufficient in weight according to the eye. It is then put into a clean vessel and on it is poured enough water of fresh unused sapanwood to cover it. The liq is made from it. Write with it.

Preparation of a beautiful red liq. One part of red lead is taken and one part of Indian Indigo. Each is powdered separately. Then they are put into a clean vessel and water of gum is poured over them. Write with it.

Preparation of a khaliq liq. One part of red lead is taken and one part of yellow arsenic. Each is powdered separately. Then one is added to the other with strong pulverization. Water of gum is added. Write with it.

Preparation of pomegranate flowers colored ink. What is desired of green gallnut is taken. It is crushed with an equal amount of strong vinegar. Then it is left to settle to become well mixed. It is mixed with a 30 sodium or arakst. This is an impure alkali from phanta-Riner, H. J. Rynke, F. Sachs, and E. Windisch, Orientalische Stoffeiberie, 6, periodische Phactretertial, Zeitschrifter Molekulare 35, note 4. See earlier note on soda. In Berber, this is called liqf (Tafihf el-adab, 38) and in Persian khatam or nasbate. I. B. (87) cited nasbate as having many medical uses. Fuller's soda is given as plauil while sodium = berd. Many types of soda were available in the ancient and medieval periods. Failing to complete the description, it is impossible to know the impurities of the various kinds and their many sources. Jadhahide (113a) mentions it for a dyestuff. Mazin. (24) gave the Greek name as alkhas and Berber as alkhadgh.

khaliq. A mixture of perfumes including saffron as an ingredient (G. Laine). It is mentioned in many works. Al-Kindî (42a) gives the erast formula in nos. 24, 25. Saffron is usually added to seize pulverized in jumiasic or severe oil. Honey and drugs are then added. The Persian is al-khalîq (Stelligma).

jalalûd. Penisn = jalâlûd and jalâlûd from jâl (a flower) and nûd (a pomegranate). Or a flower (Stelligma). Or in Ar. it is also called al-ajâlûd and marjîlûd (Mazin. 75). In India the flower was used as a vermifuge and stomachic (D.A.H, 315). Dioscor. (1: 97, 111) considered pomegranate flowers, erast, to be good for expelling internal worms, for the gums, and for loose teeth. Whatever swallows the flowers will not be troubled with eye disorders for a year, some say. There are various species of this tree. The Persians consider the blossoms as the same as the starchmu-nia (Anderson 13: 327-336). Jalâlûd comes from the male pomegranate which does not bear fruit and is sometimes called the "bead pomegranate" (al-Rakisz, 205). Al-Kindî (35) used it dried in a recipe to safely saffron (nos. 17, 18). In the ajâlûd (160b), it is used with other simples for sore. Zohafir (175) mentions rose callices for stomach bleeding. For rose oil (Zohafir 209a). I. B. (194) claimed that jalâlûd is good for an excess of humors in the stomach and ulcers. The Tafihf el-adabî (94, 237) gave a synonym as ranmaul al-arshid. Possibly, it is sold in the Egyptian bazaars (Durou, 65) also under the name of starchmu-nia employed mostly as an astringent for external and internal use. Cf. al-Ghildîn (194).

bit of saffron and then boiled with powdered gum arabic. Then it is used.

Preparation of pistachio liq. Ten dirhams are taken of colchicin (probably madder here) and water poured on it to immerse it. This is done in a small boiling pot. It is cooked until when feathers are immersed in it they will be dyed. It is then taken down from the fire. The water is decanted from it. (28) Then a dichrom of hairy saffron, complete with its hair, is put in the clean water. It is boiled until feathers can be dyed. When the goal is achieved, it is then well purified. Water of rush and water of rinses of the pomegranate are taken in amounts than can be taken up and put in. It must be the proper amount. Then two dirhams of pulverized, sieved gum are added. Write with it.

Description of a beautiful green liq. Gallnut is crushed and water poured over it, enough to cover it. It is left an hour until a little of the strength of the gallnut goes into the water. It is then purified and set aside. Then the best red cinnafrar in an amount necessary is watered in. This is done by pulverizing it, pouring much water on it, shaking it, and then transferring it to another vessel until its form has come out. It is left to settle. It is purified until there does not remain in it a bit of water. It is then set aside until it is dry, i.e., its dampness disappears. It is then purified until it becomes like paste. It is beaten with some of the water of gallnut which had been set aside and in which two dirhams of gum arabic or whatever is necessary has been dissolved. It is all mixed. Write with it.

Preparation of a strong yellow liq. Yellow arsenic platelets and saffron, from each one part, are pulverized separately. They are then mixed by pulverization with the same quantity of gum arabic and placed in a clean vessel. Water of gum is then poured on it. Write with it.

Preparation of a beautiful blue liq. Two dirhams of cedrast are taken. It is a twig found at the dyers. It is put in a pot and cooked as has been previously
Description of a beautiful green fig. Gallnut is crushed and water poured over it, enough to cover it. It is left as hour until a little of the gallnut goes into the water. It is then purified and set aside. Then the best red cinnabar in an amount necessary is washed in water. This is done by pulverizing it, pouring much water on it, shaking it, and then transferring it to another vessel until its foam has come out. It is left to settle. It is purified until there does not remain in it a bit of water. It is then set aside until it is dry, i.e. its dampness disappears. It is then purified until it becomes like paste. It is better to be washed with a little water which had been set aside and in which two dirhams of gum arabic or whatever is necessary has been dissolved. It is all mixed. Write with it.

preparation of a strong yellow fig. Yellow arsenic platelets and saffron, of each one part, are pulverized separately. They are then mixed by pulverization with the same quantity of gum arabic and placed in a clean vessel. Water of gum is then poured on to it to cover it.

Write with it.

Preparation of a beautiful blue fig. Two dirhams of indigo and a WW is a twig found at the dyers. It is put in a pot and cooked as has been previously noted until the feather is dyed. (29) It is then removed from the fire and purified. Then water of indigo is added in an amount sufficient for it and for the color desired, it is then dried. The gallnut is gradually introduced, judged according to the appearance. Then write with it.

Preparation of a yellow apricot-colored Fig. Three parts of yellow arsenic and one part of saffron are taken. These are pulverized together and moistened with water until it is reduced until it is desired. It is also mixed with the yellow of an egg. It is put into white wool. Write with it.

Preparation of a green fig. like emerald. Verdigris is pulverized with an equal amount of white gum arabic in water of gallnut. Then a little wine is poured on it. It is then used.

Preparation of a green fig. Three parts of verdigris and two parts of gum are taken. These are pulverized together with wine vinegar very well and all dirhams of verdigris. Then write with it. 108

Preparation of an apricot-colored fig. Yellow arsenic is taken as needed and pulverized with water of gallnut and water of gum until it is well done. It is then dried. Then one-sixth of its weight is taken of Iraqi indigo. These are pulverized with water of the lock or with water of rock salt or occasionally with the jet with it to mix them. It is bound in the bladder of an ox with the head tied. It is carcinogenic, and inflammations of the skin. Later, it was known to be of great use in making of “albizzia” (al-khawar al-kharr). Maimi, probably did not know this and divided all the indigo and madder (the two species are from the Abyssinian mountains) in two parts and thus it is bound in the bladder of a cow and mica is pulverized and added to it. It is vigorously stirred until the gum arabic is dissolved. It is removed after that. One can write with it as desired. It comes out the color of gold.

Preparation of another golden ink. One part of yellow vitriol is taken and also its fourth of ammonium chloride. The vitriol is pounded but it is left coarse. The rock molybdenum is put in it to mix them. It is bound in the bladder of an ox with the head tied. It is carcinogenic, and inflammations of the skin. Later, it was known to be of great use in making of “albizzia” (al-khawar al-kharr). Maimi, probably did not know this and divided all the indigo and madder (the two species are from the Abyssinian mountains) in two parts and thus it is bound in the bladder of a cow and mica is pulverized and added to it. It is vigorously stirred until the gum arabic is dissolved. It is removed after that. One can write with it as desired. It comes out the color of gold.
hung in an oven having a low fire for one night. It is covered. When morning comes, it is removed. It is then found that what is in it has become creamy, thick, and is viscous. Write with it on cloth, parchment, or what you wish.

Preparation of a silver Iq. A raf of the best mica is pulverized and put in a vessel which has been untouched by fat. In it are put ten dirhams of butol and on it shap pure vinegar is poured, enough to cover it by a finger. It is placed in the warm sun for fifteen days. It is removed from the sun and put in a thick Kordewan cloth bag. Warm water of cooked beans is used in which to press the bag. In it has been put a little saffron. It is rubbed vigorously with the palm of the hand. To what comes out from it, pulverized saffron and pulverized gum arabic are added. (31) Then write with it for the color of gold comes out. If a silver color is wanted, then it is used without the saffron but with the gum. It comes out silvery.

Preparation of Khli bil Iq. The desired amount of mica is cut with shears until it is smaller than the grain of a mustard seed. It is bound in a thick cloth.

—sahih. According to Aristotle’s legacies (51), this stone is found in mountains. “There are many types, white, yellow, and green. All are useful for inlay. In the eyes.” dadk is mentioned in Dioscorides (V: 75) as being used to remove malignant and creeping sores and to dry abscesses. There is a great deal of uncertainty as to what this is. For the washing of hurt, cf. Sahib al-ma’ (175). Main, (382) gives the synonyms as quljaq al-juf, quqloq and gulaq; thus it would appear to be sodium in a very impure state. Its color would depend on its impurities. L. B. (435) says that pumposiku is buts. According to the Tafsir al-akhdari (436), the buts is the white type. The word buts perhaps comes from but “multifarious,” thus coming from the Greek word. Cf. also al-Razi’s parton for šlikh.

—color. A measure of length.

—quljaq. The Akhisar synonym is not yet known. In Dioscorides (II: 305), quljaq “rules parvum,” it is the Vicia Faba L. called “Greek bean.” It had many medicinal uses—for eye difficulties, and in cataplasm for children. It also dyes wool. On the other hand, it causes “ugly and false dreams.” It also increases the flesh of the body, and when cooked in vinegar and water and eaten with its peel, it checks diarrhoea caused by infection in the gut (al-Ghazali, 127). Main. (47) states that it is the ajwān with the more common name being asaf. The former name is doubtfully. The Arabic title probably is in the origin of quljaq. The Tafsir al-akhdari (76) also gives al-saf as the synonym. The saf is today grown in Iran and in other parts of the Near East (Hooper, 184). The Hindu for it is baha, and in Turkish buta, in Kushtish peoples, and in Perisan bahaq. L. B. (224) cites the uses of bahaq in Gales, the Shat, and others.

—shālūd. Buta was a very common condiment and simple in ancient Mesopotamia. Cf. Levy (236) for its use in backed, beer, and in seasoning; cf. also DAB (203 f.) for the medicinal uses. The Semitic for mustard is suhur, in Arā. in Akk, Kadūpugn. It was used particularly in venereal disease, hemorrhages, for the eye, in comas, and as a sitz-bath. Some of the synonyms for Kadūpugn are Akk, bābu, bābu, and bābu, and in Semitic too. Tork, P.O.S. R.C., and Thompson (243, 307) proposes that Av. shālūd may have come from Akk, Kadūpugn (consider the Syriac kardūd). The Akkadian Ɨn-dur is shālūd.” In Dioscorides (II: 151), quljaq is good for the head, swellings, and lepros. In Apophthegmen (124, 128), it is used for burns and leprosias. Main. (409) states that the white type is (Sahil) and the wild al-Jaradā. The name and rubbed until whatever is necessary comes out. It is sieved with another thick cloth. Then one part of it is taken and one part of red aracen which has been well pulverized and one part of the mentioned mica. It is all gathered and kneaded with water of gum arabic which is described later. It is then dried to the extent desired. It is removed. If it is desired to write with it, a small amount is taken or whatever desired and dissolved in a shell container with water of gum. Write with it. However, if a golden color is desired, in place of red aracen, yellow is used. The color is then yellow.

Preparation of water of gum with which the colors are mixed and also others. A raf of clarified gum aracic is broken into pieces. On it is poured clear water. It is then boiled on a low fire until it is dissolved and has the consistency of honey. It is put in enough water to cover it. When it is cooled a little, it is used.

Preparation of a golden Iq from anemones. The black part of the petals of anemones is cut off and thrown away. The red is removed and collected in a pot. On it is poured enough water to cover it. It is put on the fire and boiled until its color comes out into the water according to what is desired. It is then taken down and purified. Two dirhams of water of myrtle are thrown on it and also a quantity of gum aracic—(32) as much as one quarter of the water. Write with it.

Preparation of a rose Iq. One part of white lead and one part of red lead are pulverized in wine vinegar and then put into a little pot hared with clay of the art. It is placed in the upper part of a glass oven and left for three days. It is then removed, powdered, and on it a little water of gallnut is poured. A bit of gum is added. Write with it.

Preparation of violet Iq. Ten dirhams of celandine are taken. On it is poured enough water to cover it in a small pan. It is cooked until it disintegrates. It is taken down and its water purified. Ten dirhams of hairy sofern are put in the water. It is now in the proper portion. It is then boiled until the feather is dyed and then well purified. Then water of myrtle or water of the root of the pomegranate in the proper amount is added; if it is more, then it turns black. Let it be in a pot. Then two dirhams of sieved gum aracic are thrown into it. Write with it.

Preparation of another Iq. One part of yellow of the entire plant is al-Jaradā and that of the seed al-Jaradā. The Tafsir al-akhdari (417) calls it liix šeem in Berber. The mastax (Bassam snip Kouch) and other species are today abundant in Egypt and Iran.

—saḥīfah. Dioscorides (IV: 123) gives it as a martyr and a help for convulsions in children. Curry shows that the Greek may have come from the Indo-Eur. root, “to turn.” Jalal cites the viet as al-Salāq who mentions the viex in as na. 35, 58, 81. He obtained the oil by distillation. Apophthegmen (108) employs it in a plaster for the quinsies or stomach. It is probably Vicia eleana L. 1, B. (355) says that it is a well-known plant employed medicinally. The Tafsir al-akhdari (note to 63) gives the Persian synonym as jum-burt. Meyer of water thatMaisalw15 excluded beneath from his list (cf. Main, 67) since it is too common and well known.
LEVEY: MEDIAEVAL ARAB BOOKMARKING

TRANSLATION OF MANUSCRIPT OF IBN BADIS

n having a low fire for one night. It is then rubbed until whatever is necessary comes out. It is sieved with another thick mic. Then one part of it is taken and one part of red arsenic which has been well pulverized and one part with the mention of the mora. It is in all gathered and kneaded with water of gum arabic which is described later. It is then dried to the extent desired. It is mixed with water according to the desire. It is in part too hot, in part too cold. A small amount is taken every day until the amount of gum tragacanth is taken. It is then pulverized. Fish glue\textsuperscript{34} is put into it. Write with it.

Preparation of a black fig. (33) Three parts of fresh walnuts\textsuperscript{35}, before they are formed, are taken and one part of vitriol. They are pounded with some gum arabic and dissolved in water of the gallnut mixture. Use it.

Preparation of gold. One part of blue vitriol is taken, one part of mica, three parts of honey and put in a vessel. Its head is coated with clay. It is buried in a dungh fire for seven days. It is then taken out and put in an alembic. It is distilled with gum arabic in it. One writes with it.

Preparation of another excellent red. Gold is filed, then placed in a clean container. On it is poured enough vinegar to cover it. When it is dissolved, the vinegar over it is filtered off little by little. Fish glue is added to the residue. Write with it. The pen is dipped in alum water.

Another \textsuperscript{1} White lead is taken and made stringy. Empyreuma is taken and mixed with it. This empyreuma is the greatest. Write with it.

Preparation of another red color. A dribble of a very good red earth, called a "red vein," is added to gum.\textsuperscript{40} Write with it.

SIXTH CHAPTER ON THE MIXTURE OF DYES, COLORS, AND THEIR PREPARATION

Know that the colors are white, black, red, green, yellow, and the color of the sky.\textsuperscript{43} The white is the baryq. The black is the kok. The green is the color of verdigris. Red is made with cinnabar and red lead. The shining yellow is from yellow arsenic, and the red is from red arsenic. When you work with the dyes, you should note that the colors vary with some others until they have been pulverized and moistened. It is better when it is so. Through the white lead, which is baryq, a multiplicity of dyes is obtained. This changes from tint to tint. It is alone used for a white and not anything else. The arsenic and the verdigris do not mix with anything else. They are not pulverized together in them anything outside of their color. (33) There is a lament\textsuperscript{35} majazi, made by taking one part of kaward and one part of baryq. They are not pulverized together in them anything outside of their color. (33) There is a lament majazi, made by taking one part of kaward and one part of baryq. They are not pulverized together in them anything outside of their color.
Then a small part of baraziq is introduced, little by little. It is changed from tint to tint. Take from it what is wanted.

Another color which is dark. One part of dry good indigo is taken and one part of baraziq, mixed, and powdered well together. Then one part of white lead is added. It changes every time a little is added until it comes to the desired color.

Section on the cinnabar colors. The color of cinnabar is the color of enriched turquoise. A desired amount of cinnabar is pulverized well with grape vinegar until it can no longer be felt. Nothing else is mixed with it.

Another color inferior to it. Two parts of cinnabar and of baraziq are taken together and pulverized. Baraziq is added little by little until the color called gozak is obtained. It is whitish.

From it the enriched pottery glass is obtained. Three parts of cinnabar are taken and one part of damar. These are pulverized together. Use it.

Section on the green color. Ten parts of yellow arsenic are taken with two parts of good indigo. They are well pulverized together so that it becomes a saturated rich green. Every time it is desired to enrich the color, particles of arsenic must be added, little by little, until the noble green is achieved. There are many tints of this.

A color like the color of blood. The best red cinnabar is taken and pulverized in water. It is then left under cover until it is still. The white which rises is decanted. Water is then added to it and then decanted until the water remains clear. The residue is the color of the blood. The cinnabar may be pulverized in water and salt. In that case, the upper layer is black. When settled, the black water is decanted from it. More water is returned to it, with pulverization, settling, and decantation. This is done until the water is pure. The cinnabar is tasted. If a salty taste is not found in the layer, then it has been attained. Use it.

Then there is a rose color. Three parts of baraziq are taken and one part of cinnabar. These are mixed together by pulverization. Each time one part of baraziq is added, it whitens further until it is returned to its original.

Another color is orange. The best red lead is pulverized well with water when needed. Write.

Another color is red ruby from the lukh. How it is made. Description of how to dissolve the lukh. Ten ounces of lukh are broken up after it has been freed of its twigs. Then two dirhams of wustha and two dirhams of baraziq are poured very finely. Enough water is poured on to cover them. It is brought to the fire with the lukh until all of the redness of the lukh is brought out. (37) It is removed from the fire. It is filtered, returned to the fire, and boiled until half of the lukh solution remains. It is then removed. Write with it. If it is desired to make the liquid from which lukh was extracted dry, it is placed in the shade protected from dust. When it is dry, it is removed and used for that which is desired. The lukh is broken into pieces and powdered like the crumbled chick pea. It is washed with water and put in a thick filter. The water is boiled vigorously. While it is in the filter, hot water is poured on it so that its color, red, will flow from the filter. The filtrate is boiled until it is decreased by two-thirds. Then dissolved gum is mixed in it. Write with it. It comes out well.

Another color is the gleaming red ruby. Three rafus of Carthamus are pulverized a day in the sun. It is then pulverized and sieved with a sieve which is larger than the flour sieve and smaller than a regular sieve. Then it is hung in a cloth above a wide filter on
Another color is red ruby\textsuperscript{42} from the lalku. How it is made. Description of how to dissolve the lalku. Ten ounces of lalku are broken up after it has been dried. Two dhrums of unripe and two dhrums of red of lalku are poured on to cover it. Then it is set aside for two nights. The next day it is dissolved, placed in the shade protected from dust. When it is dry, it is removed and used for that which is desired. The lalku is broken into pieces and powdered like the cumbined chick pea\textsuperscript{43}. It is washed with water and put in a thick filter. The water is boiled vigorously. While it is in the filter,\textsuperscript{44} hot water is poured on it so that its color, red, will flow from the filter. The filtrate is boiled until it is decreased by two-thirds. Then dissolved gum is melted in it. Write it. It comes out well.

Another color is the glowing red ruby. Three types of Carthamus\textsuperset{45} are pulverized a day in the sun. It is then pulverized and sieved\textsuperset{46} with a sieve which is larger than the flour sieve and a smaller one than regular sieve. Then it is hung in a cloth above a wide filter on which it is hung in a cloth above a wide filter on which it is hung in a cloth above a wide filter

\footnote{\textsuperscript{42} Ruby. According to Aristote's biographical (3), there are three main types, the red, yellow, and dark blue. The red is supposed to be the most noble, beautiful, and most saucy. The yellow is not found in Discorides or Galen. The ruby is mentioned in Ram- masammasambrasam as a gem. Gems were regarded as medicines which protected the castration of obsession (Ray, 1279). I. B. L. (1279) mentions that Ruby is used as an amulet for poisons. Al-Râàdâûd used it as an anticoagulant.}

\footnote{\textsuperscript{43} Ruby. According to Arzou's references (32) wrote that this was cey- dhased sugar, perhaps for what we today call rose water. He says that this sugar is equivalent to the candy type. Al-Khufi used red sugar in his perfumes (22, 21), claiming that the word "rubus" or "rubid" meant "bloody." I. B. L. (1198) states that rubarub is not an inexpensive while the colored and dried type are. Al-Râàdâûd claimed that the sugar (from) is a laxative and curative. Cf. I. B. L. (1199) for rubarub.}

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same quantity of sharp vinegar. It is left to settle. It is then purified and mixed with hairy saffron boiled with pulverized gum arabic. It is used for what is desired.

Another color is violet. A little indigo is added to the mentioned saffron until it is pleasing. It comes out violet. It is mixed with water of gum. If it is too red, a little indigo is added to it. Write with it.

Another color is **lamard**. Saffron is pulverized, then boiled with water of gum until its dye comes out in the water. Then sieved pulverized indigo is thrown into it and some red leaf. It remains overnight and is then filtered in the morning. It is put on the fire and with it its pitch of gum arabe and its tenth of fish glue. It is boiled until it is dissolved and reddened. Write with it.

It comes out beautifully like **lamard**.

Another color is yellow. Monk's arsenic is pulverized on a clean stone so well that it is not affected by the hand stone. It is put in the sweet water. Some saffron and gum arabic are thrown on it and pulverized. It is put aside in **bg**.

Another type, Shining red arsenic is pulverized well with water. If desired, saffron is dissolved in it. If desired, it is left as it is. (41) Then it is removed, in a **bg** which is in a glass vessel. Write with it after gum has been added. If desired, cinnamar is added to saffron. Use it.

Another color is green. Yellow monk's arsenic, which is better, is pulverized well with water on a stone. Good indigo is thrown on the arsenic. This is then pulverized. If pistachio is desired, then the amount of indigo is not increased. If myrtle is desired, or verdigris, or mésina, it is experimented with by increasing the indigo. It is filtered, then put into the **bg**. Write with it. It comes out beautifully.

Another color is the white of fat. **Banruq** is well pulverized with water. A small lot of dissolved **laq** is thrown on it and then it is pulverized. It comes out fat-white. If a rosy color is desired, **laq** is added. If purple is desired, indigo is added to it together with water of gum. It is removed in **bg**.

Another color is blue. **Banruq** is pulverized well. A small amount of indigo is thrown on it. It is pulverized. Use it. If a darker blue than that is desired, then indigo and gum arabic are added to it. It is removed. If various shades of color are desired, these are obtained by increasing or decreasing the indigo.

Another color is the **ribat** color. Three dhurians of indigo are pulverized on a stone until it is a paste. On it is thrown a dhurm of verdigris. It is pulverized until its color is pleasing. Write with it. 

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**SEVENTH CHAPTER**

ON THE WRITING ART WITH GOLD, SILVER, COPPER, TIN, AND THEIR SUBSTITUTES

Section on solution of the gold. (42) Pure gold is beaten to a thin leaf. It is then cut up into small pieces. On it is poured borax.288 The fire is then introduced and blown on it until melted. It is then rubbed with a stone until it becomes like butter. It is then gathered and pressed until the liquid comes out and the gold remains. It is then returned to the rubbing stone and rubbed again with water of alum289 used for wool and **Andarzí ir** salt290 table salt, and Greek varnish. If its color is pleasing, then it is completed. Write with it like ink. It is good.

Preparation for goldwriting. A sheet of gold is put on a rubbing stone and good wine vinegar poured on it. It is pulverized three days. Then it is washed finely with water. Write with it. If desired, water of tragacanth can be used in place of vinegar. Water is poured on it. It is kept wet a day and a night until it becomes like honey in appearance. Then the powdered gold is washed. On it is thrown a measure of tragacanth such that it flows. Write with it.

Preparation for gold writing. What is desired is filed with a fine file. The filings are poured in a glass pot. On it is poured black **laq** filings. It turns black. It is left in it twenty one days in a place where there is no dust, no wind, and no sun. It dissolves. If it is desired to write with it, then red alum is moistened in sweet water a day until the night. Then the pen is taken, dipped into water of alum and then into the gold. The supply comes from it. Write well with it.

For a similar writing, it is well filed. Then an equal amount of mercury291 is added. It is then pulverized on

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288 **Banruq.** In this context, the meaning is borax which acts as a flux. In most cases, however, **Banruq** indicates a type of impure arsenic. Borax is called toshka in the Táját al-qáhár (405), also lának-ál-dhahab, látál-dhahab, and wáll al-dhábi. Cf. Al-Imam’s *Ibádah* (106) for use with metals. Cf. 1, b. (431)

289 Water of alum was a well known medicant in Babylon for dyeing of wool. (Levey, 163) It was also known as a flux. (Levey, 160) and as a tanning and weaving agent. (Levey, 176. 122, 160) Although alum was mined in Egypt, there is no evidence that it was employed there in ancient times. (Lucas, 291-293)

290 **Andarzí ir** is a crystalline salt (probably a pure sodium chloride) found at Andaran in Persia. Some say it comes from Andara, a village in Syria. According to Alamos (121 f.), "the best salt is that from Andaran; then comes the table salt, then the Indian salt which is red, and then the bitter." Salt is supposed to whiten the metals and to purify them. It also dissolves them and "strengthens the aqālī." In salt lies a great secret. It is the "ways of the light." Cf. L. B. (266). 391. This reading is uncertain.

291 Red alum was probably alum with the red impurity of iron compounds. No doubt the mixture was found in many regions.

392 **Andarzí ir** one of the places mentioned in the Kerubim inscription as a source of gold. It is mentioned by the Greek geographers as a source of gold. In Arabic times, a good description of the properties of mercury is given in Alamos (90 f.). Also, this is mentioned by the jurists who hold that this is the case in this context. (See Also: The use of gold in. )
a stone three days, then put in a thick cloth until (43) there comes out what is in it of the mercury. What remaining lies away in the flame of the fire, Gum is added in the necessary amount is then added. Write with it.

Another preparation for gold. Yellow sulphur, white ash, alum, and gum are mixed, then all of it is pulverized with one part of yellow arsenic, a half part of suffan, three parts of gum, and dissolved mica until its pulverization is well done. Write with it on the fire. It is thinned out as a sheet as much as possible. It is cut into little pieces and put into an iron spoo on a fire. It is heated until it is

filtered, then its fine material of good mercury is added. It is pulverized with a clay pot handle and rubbed with it vigorously until all its blackness comes out and the water comes out clear when it is poured in. It is put in a thick cloth and gum arabic is put on it. Write with it.

Another preparation. Fillings of silver are pulverized with distilled wine vinegar three days. It is then dried and pulverized again with the distillate until it comes out like clay. It is washed from the vinegar until its sourness disappears. Gum is added. Write with it.

Another preparation. Four parts of white Indian tin are added. An equal amount of mercury is thorn bar is the first substance for which there is evidence for distilla-
tion in ancient Egypt. As mercury is a volatile metal, it is not easy to distill. Hence, the distillation of mercury is a technique that was developed in ancient India.

Preparation of ink with gold. The ink that is used for writing on papyrus is made by mixing gold with gum arabic. The ink is then used to write on the papyrus scrolls. In ancient Egypt, gold was used as a precious metal and was highly valued. It was used in the making of jewelry, making of statues, and in the writing of important documents.

Preparation of ink with silver. Silver was another precious metal that was used in ancient Egypt. Silver was used in making jewelry, making of statues, and in the writing of important documents. Silver was also used in the making of coins and currency.

In conclusion, the ancient Egyptians were skilled in the art of distillation and writing. They used sophisticated techniques to produce materials for writing and for other purposes. The use of mercury, gold, and silver in the making of ink and ink with gold or silver was a testament to their advanced knowledge in the field of alchemy. The use of these materials for writing and making of jewelry was a symbol of wealth and status in ancient Egypt.

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radish" oil is lit. (45) An iron pot is heated such that it is removed from the earth a distance so that only air can go under it. Remove the soot suspended from it; it acts as the soot of the chick pea.

Preparation of soot ink. Soot of the chick pea is sieved with a hair sieve. Two handfuls of it are used and also five dirhams of Kufic ink. It is well pulverized. Then it is put with the soot in a pot or in a porcelain vessel. Gum arabic is sealed in water a day and a night. Then the soled is made fine; its water is taken and clarified. A solution of two parts of the water of gum and two parts of water of soot is poured on the soot bit by bit. It is collected by hand. When it is collected, it is stretched on a stone or board. It is left in the shade until it is dry. On its surface, a bit of water of gum is smeared. Then it is removed. If it is the Kufic ink as was first described, then it is pulped, covered with water as has been described to you, and left a day and a night until it is settled. The water is taken from it, then fresh water is poured on it. This is done for three days until the water comes out clear. The residue remains in the lower part of the vessel. It is used with the soot and others.

Preparation of soot of the chick pea. The soot is dissolved in a flat dish. For every two ounces, there are four pounds with it two dirhams of gum Arabian and salt. The gum Arabian is pulped and the water is extracted. This is not stopped until it becomes like clay. After it is dried it is removed and used.

Preparation of soot ink for paper. Light Persian ink is taken which when broken up does not show clay or earth in it. (46) It is soaked in water a day and a night. Then the water is poured out and it is dried. For it, a dirham of gum Arabic is sealed and also five dirhams of ink. The ink is pulped and kneaded with water of the gum. It is dried and put in the inkwell. Write with it. It comes out as a pure shining good ink from the first to the last.

Preparation of another. One part each of good Persian soot ink, gum Arabic, and gallnut, and also one half part of burned paper are poured, sieved, and kneaded with white of eggs. Balls are made of it and dried. It is put into the inkwell. Write with it. It is the best ink.

Preparation of a special paper ink. One part each of good Persian ink and gum Arabic are pounded and kneaded with filtered water of gallnut. The latter is made from ten large gallnuts. They are pressed and one-half rug of water is poured on it. If it is desired to write, then it is diluted with water of gallnut every time the ink dries. Clear water is never added to it. It comes out well and cannot be erased. It does not disappear from the paper. If it is desired that flies do not fall into it, then fat of the colochoctus is added.

Preparation of ink of the seesa. The Arabic sawd is burned well, then well pulverized on a stone or a rubbing stone. Gum or the fruit of the acacia is added. It is made into flat cakes. It comes out beautifully.

Preparation of Kufic ink. (47) Rags of cloth are burned. It is covered with a tab after it has been burned. It is left a day and a night from the morning on. Then it is put in a hair sieve. It is rubbed with the hand like collyrium. Then a rug, which is the amount necessary, of gum acacia is moistened. Three-quarters of an ounce of the gum is used. When the gum is dissolved in the water, more is poured on it but not too much. It is pulped in a mortar and then made into flat cakes. It is tried and found good.

Preparation of Kufic ink. A white clean linen cloth is stuffed into a new clay vessel never touched by fat. It is well luted with good clay until air cannot enter it. If wind enters it, it spoils. Dung is heaped on it, the fire is lit for a day and a night, then left until it grows cold. What is inside is then pounded, kneaded with milk, and collected. It is then prepared in the form of flat cakes, and dried in the shade. While kneading, moistened gum Arabic is added. A very good ink results.

86 šajel. The pulp of the colochoctus was used in Babylonian (Staet. sm. KUS.LU.A.G.Z.K.I.S.R, and 3ašE.T.G.U.L.L, 1aš. šajel) as a hydropathic emetic (D.A.R., 83). In the Ebers papyri (4.9.8.1) it is used in a remedy for the teeth (Grassop, 67). It was also used for intestinal worms, for alleviating the pains of the joints, for gout, rheumatism, scrofula, and for the eyes in India (Ahmad 1:81-86). Dioscor. (IV, 176) used the colochoctus, exclusively, to assuage edema and ulcer suppuration, for the ears, and the intestines. Al Kindî (2:9) used it as an emetic substance to raise the weight of saffron, ḏqilāḏ (1212) gives "alcohol a kind of colochoctus, for the miners, pain in the back, and the perspiration of women. Malām. (188) states that it is the same as ʿamaṯ al-šajel, al-biḏī, al-buḥās, ḏajṭ al-biḏī, al-ṣarkh, 1: 118) speaks the same as stating that the oil in which the colochoctus is boiled in good for injection into the ear. Many other Arabic authors write on the colochoctus. The Tufāq al-ṣajel (177) says that radish is called ʿajdāfī (or ʿajbīfī) in Berber. It is probably the Curvicaulis colochoctus Schult. Drugas (93) lists the colochoctus in use today as a cathartic, antispasitic and purgative. The fœtus, according to Hooper (100), is grown in the Near East, India, and other regions today. In Persia, it is called šābdīraš-nāḏ, šābdīraš fardāš, and šābdīraš in Hindī.

87 šajuk. The genus is uncertain but may be Foradale. Dioscor. (IV, 11:3, 34) wrote that ʿajdāfī has a drying faculty and is good for chronic eye. In Gr. it is stated. I. R. (1178) quotes al-Ghazīlī to the effect that ʿajdāfī facilitates digestion, dilates obstructions, is good for the stomach, kidneys, vasaec, and coagulates flatulence. Malām. (255) among his words for ʿajdāfī gives al-biḏī al-šajel "Greek mustard" pediš, al-ṣarkh al-šajel, al-biḏī al-šajel, "Greek lovage."
An iron pot is heated such that there is a distance so that only air goes over the suspended from it; each chick pea.  

Kul. Soil of the chick pea is is. Two handulal6 are it used of 4 Kulc ink. It is well pulverized, e soil in a pot or in a porcelain soak in water a day and is made fine; its water is taken on of two parts of the water of water of sorrel is poured on the collected by hand. When it is cold, on a stone or board. It is left in on its surface, a bit of water in it is removed if, it is the Kule, set, then it is pulverized, covered it described to you, and left a piece of clay. The water is taken from it poured on it. This is done for the coriander, coriander. The residue xar of the vessel. It is used with of the chick pea. The soil is disp. For every two ounces, there are thrashes of gum arabic and salt, mixed and the water is extracted, until it becomes like clay. After it and used.

Light Persian en broken up does not show clay is soaked in water a day and it is poured out and it is dried. For Arabic is soaked and also five ink is pulverized and kneaded with dried dirt and put in the inkwell out as a pure shining good ink.

other. One part each of good ink; and also one part ink are poured, sieved, and of the egg. Balks are made of it into the inkwell. Write it with...}

...ink is used. One part equal a portion of ink, and equal one part ink are poured, sieved, and of the egg. Balks are made of it into the inkwell. Write it with...}
not exposed to the sun. It is then boiled vigorously. Then two dirhams of mercury are killed 42 and left for forty days. Ten dirhams of yoghurt are thrown on it. One writes with it a kind of writing which cannot be read except in the night and in darkness.

Description of another way. It is that two dirhams of goat yoghurt are taken and two dirhams of milk of the wild ass. All of it is thrown into five dirhams of grape juice where it remains ten days. It is dissolved in fifteen dirhams of camel's milk. It is that camel whose udders is infilled to redness. Then write with it. It cannot be read except in the light of the lamp. If a man has yellow jaundice and drinks one-half dirham, he recovers. It is also for those who have liver fever and similar to that.

Another type of it. The heart of the seed of the prunes 43 is removed, pulverized, and sieved. Two dirhams of this are mixed with one dirham of saffron and two dirhams of Greek gallnut. It is left for a month in the shade, then ten days in the sun. Then five dirhams of the milk of a woman are thrown on it. Write with it in a book. It cannot be read until powder of chalk is sprinkled upon it.

Another type of it. One and a half dirhams of gum arabic are mixed with cow's milk and one dirham of gum tragacanth. It is boiled but not too much. It is left for forty days. Then three dirhams of water are put on it. Write with it. It cannot be read until ashes are put on it.

or [Hyssop] (Pers.) and the Greek name of this juice is known; it is the collyrium of Khwâla (al-khâla)." The Persian name is put from the name "bele of the elephant." In Babylonian, lycurium was probably L.G.ER (in Sumer.) and adag or åâm (in Akk.). In Hebrew, it is åâmâ. Its shoots, roots, seeds, tops, and powder are used in Babylonian texts for a Murr, ta'âtâ, ex- ceptive collection, and difficulty in menstruation (D.I.4, 182f.). The Arabic name is the house, and its use are those of the pain, protection against venomous bites, and as a tonic. Lecidea (1, 660) says that ñûdat in Khâla means al-khâla (L. Alkindi 41) used it in a music recipe. The Tafhât al-qâdîf declares that Iâhîr: "as al-khâla of Jâran." The Hebrew call it åâmâ. Khâla, according to Fuytagi (1, 558), is the name of an Arabic tribe in Yemen where the collyrium was originally known. Today ñûdat al-qâdîf is still known mainly in Yemen and used in witchcraft (Docus, 189), water.

42 To do away with many properties (both physical and chemical) of mercury, Negrjuna said, "Killed mercury in that which does not show signs of fluidity, mobility, and tartar." (Ray, 134).

43 Kâhânoch and Aminutam Tantra states that mercury is rubbed with ingredients on the side and rotated in a closed crucible. The ingredients with which the mercury is rubbed may include vegetable matter, sugar, and other substances. (cf. al-Kârî, 103-104; Aristotle's chemistry, 61.).

44 [Hey]. The prusa has been well known for thousands of years in the Near East, Maim. (183) gives the synonym [Hey] as al-khâlsâq in the Mughâr, 6âbâb al-barâb in Spain, and also al-khâla and al-khâla. The latter are Persian, L. 1, 77 (1) billion fever, and as a stomachic. The Tâfkhât al-qâdîf (45) mentions ñûdat.
LEVEY: MEDIAEVAL ARAB BOOKMARKING

NINTH CHAPTER ON THE WORK IN WHICH THE WRITING IS ERADICATED FROM MANUSCRIPTS AND PARCHMENTS. THEIR WRITING AND SURE AND DEEP BOUNDS

One part each is taken of yellow Yeminite alum, false bellowul, white sulphur and white ammonias, and white sulphur. It is pounded well and well mixed with water and when it is then pulverized until it becomes like fat, it is made into the shappoon a color. Whatever may be desired is mixed with it in order and then written with or be read except in the light of the lamp. Yellow janninde and drinks one-half to recover it. It is also for those who have liver similar to that.

Of type it. The heat of the seed of the removed, pulvinated, and mixed. Two dirhams are mixed with one dirham of ispar and as of Greek galln it is left for a month in then ten days in the sun. Then five dirhams of a woman are thrown on it. Write with it. It cannot be read until powder of chalk is upon it.

Of type. One and a half dirhams of gum mixed with cow’s milk for the first dirham of canth. It is boiled but not too much. It is hot it days. Then three dirhams of water are Write with it. It cannot be read until ashes

88 magh. Bellowul was probably known in Eighteenth-Dynasty Egypt (Lenox, 553). Magh. (Maln.)

89 assuf. The onion, in Sus. SJSKEL SR, in Abk. saSkel.

90 alblab. Babylon for dryness of the eyes. It is probably the Alabum Cinae L. Dios. (1:151) wrote that onion or good for incipient cataract, for opening the orifices of blood vessels, for relieving hernias and as a purifying medicine, which is called SaSkel, is very good for catarrhal illnesses. It is used in Abk. as al-blab, “union of the pig.” Al-Schikli (134) says that onion is injurious to the stomach. When cooked, it is an aphrodisiac, and, eaten raw, it checks the hemorrhages of different kinds of warts.

91 soap. Soap is found in medical works in early Mesopotamian and Egyptian literature. The oblique letters in this word from water, mixed, alkaline, etc., is seen in Pausanias’ description of the 12th century B.C. Diodoros’ (9:15) that apple is good for the stomach and as a laxative. When mixed with it is an aphrodisiac, and, eaten raw, it checks the hemorrhages of different kinds of warts.

92 This soap is used mainly in medical works in early Mesopotamian and Egyptian literature. The oblique letters in this word from water, mixed, alkaline, etc., is seen in Pausanias’ description of the 12th century B.C. Diodoros’ (9:15) that apple is good for the stomach and as a laxative. When mixed with it is an aphrodisiac, and, eaten raw, it checks the hemorrhages of different kinds of warts.
It is used in the polish with moisture on the middle finger between the gold letters, then with khul after that.

List of the polishing agents of gold—the burnishers. For this art, there are three polishing agents of jumkhava stone: the blue rounded feathered one; that which is rectangular in form, proportionate in the face which is at the head of the feathering since the sides are not used; and the third is small, pine tree in shape, with a proportionate face. The last is for the polishing of thin lines and its complications in fine work. Its fine edge is not pointed but it has a slight width in order that its purpose may be accomplished. A little piece is shaped for it, as much as the quantity of silver. For much gold, put the stone in the middle and lower it into the hakka. A cover is made for it either of silver or copper. It is made tight so that it will not shake because of the force of the work. For little gold, there are perpendicular pieces at the head of which are the stones. One performs with it as the first. Then in the absence of jumkhava, even is used in its place.

Description of the polishing tablet. The polishing tablet for the gold is square, in the thickness of one finger. It is made from the yellow or the walnut for fineness in the work. (56) If it fails, then a tablet of another type of wood is used.

Description of the knife for gluing the gold leaf. It is an Indian knife whose length with its handle is the span of a king or two thirds. Its bored blade is wider than its handle to cut a leaf of gold or something else. The second side is indented, its middle section is wider than its extremity. It is good for softening the pega
tments after their occurrence on the leaf and after they have dried.

Description of a sponge to push gold leaf in the pressing. A piece of sea sponge is made round with scissors and put in a reed head. It is inserted with the fingers. Take some away from its head later.

Description of the quill pen for writing and so on. The part of the wings of eagles, thick with feathers, is taken. From it, the hard thick place is chosen and the quill plucked. The pen is cut off with the scissors since the knife does not do it entirely straight. A short cut is made for the pen. The fat is removed from it to make it thin. It is good for drawing and writing. The scissors used to cut off the feather pen are short at the head. The blade of the scissors should be thin.

Description of the brush pen. The hair of a woz is taken and the thin part bundled, all of it to one side. Then Indian akeswod or sandalwood or something of ivory or ebony is thinned out for the hand.
the polish with moisture on the middle of the gold letters, then with after polishing agents of gold—the burnishers. The burnisher is in the shape of a wedge; (9) the blue rounded feathered one, that angular in form, proportionate in the face, and straighter in the sides; and the third is small, pine tree in shape, sentiments like. The last is for the polishing of gold, a sort of fine silk. Its fine edge is pointed but it has a slight width in order (one) may be accomplished. A little piece is, as much as the quantity of silver. For it put in the middle and lower it is a cover. A made for it either of silver or made tight so that it will not shake off. For little gold, there are three pieces at the head of which are the stones. It is with it as with the first. Then in the emulsion, ebony is placed in use, as the polishing of the table. The polishing of gold is square, in the thickness of one made from the willow or the wattle for he work. (56) If it is then faded, at a table of wood is used.

of the knife for gluing the gold leaf. The knife is made with its handle is changing or two thirds. Its bared blade is wider else to cut a leaf of gold or something else. It is inserted, its middle section is wider tenacity. It is good for softening of the pigments later their occurrence on the leaf and after they have dried.

Description of a sponge to polish gold leaf in the pressing. A piece of sea sponge is made round with scissors and put in a medium size cup with the fingers. Take some away from its head later. Description of the quill pen for writing and so on. The part of the quills is thick in the side. The quill placed. From the hard, its thick piece is chosen and the quill plucked. The pen is cut off with the scissors since the knife does not do it entirely straight. A short cut is made for the pen. The cut is removed in order to make it thin. It is good for drawing and writing. The scissors used to cut off the feather pen are short at the head. The blade of the scissors should be thin.

Description of the brush pen. The hair of a weasel is taken and the thin part banded, all of it to one side. Then Indian aloeswood or satinwood or something of ivory or ebony is thinned out for the hand.

Isurfahi. Many types of oxen have been known from prehistoric to the present days, and India (6) claimed that oxen came from two sources. One, "It is black and white," not yet pitch black, mixed with green and yellow. Whoever uses it for a bear or a fox or the like is very black known by this name today.

burnishers for application to metallic writing on. Usually there had been a number of oxen or blocks set This was still true in nineteenth century books on t. Delaciones, F., Primer de iluminacion, 40, Loc. Burnish, A., Practical arts on the art of illumination, 1867.

willox green in the southern Babylonian maroza is by T. Ahad, a species of rafflesia was used in perfume. willow green means here is Salvia apetens, L. or some other flowers, Many, in Malaya, the small inflorescence in the f. sinuata, cherub, xeranth, and atal. The Twinkel (1:130) gives kibbi and kibbi for the xeranth.

Then it is spread on a stone. When it is dry, it is moved when need it. When it is desired to use it, a solution is prepared with water and a little vinegar. One writes with it. It comes out a pretty ruby color. It is good for tattooing on. Then the whole piece turns out, it comes out like gold. Half of the dry mass from the filtering of saffron is put in a copper pot. It is put on to a fire or a stove. It is tested with the pen on a finger nail. It becomes like honey and its color is golden; it is tested during its cooling so that it will not change in color. It is changed twice or three times, or changed since the secret of this process is in the cooling. It is removed in a glass container. (59) When it is necessary for the operation of gluing it to silver or tin, then rub it on. It comes out like gold.

ELEMENTH CHAPITRE ON THE MANUFACTURE OF PAPER, IMPARTING OF DYES BY SOAKING OF PAPER, ITS DYES, AND ITS BEAUTIFICATION

Description of the manufacturer of paper. The best white flax fiber is purified from its reed. It is moistened and combed until it softens. Then it is soaked in quicklime a night until morning. It is then rubbed with the hands and spread out in the sun until all of it dries in the daylight. It is then returned to water of quicklime, not the white flax. It is so the next night morning it is then rubbed a night as in the first rubbing and spread out in the sun. This is done three or five or seven times, and the water of the quicklime is changed twice a day, then it is better. If its whiteness is brought out, then cut it with the scissors little by little. It is then immersed in sweet water for seven days. The water is changed every day. When the quicklime has gone out from it, then it is poured in a mortor very finely while it is moist. Then, when it is dry, it is ground up. Other water is put on it in clean vessel. It is dissolved until it reaches a silky viscosity. Then it is introduced into the molds in the desired size. These are made from straw used for baskets, nails, and the walls are collapsible. Under it an empty rib. The flax is beaten round, the stems are extracted. When it is dropped in the molds it is then placed in the quicklime so that it will not be thick in one place and thin in another. (60) When it is evened, then its water dries away. It is found proper in its mold. When the desired is attained, it is adjusted on a flat tablet. Then it is bound to a wall and straightened with the hand. It is left until it is dry. It is white, pure and tall. One may take a powder, shining white, pure chalk and starch in equal parts. (61) Levey. Cf. Levey (87) for the uses of flax in Babylonia, The Hellenistic writer A., and F. B. On the other hand, the quicklime is very thin. It is well spread out in the sun. When it turns out, then its water dries away. It is found proper in its mold. When the desired is attained, it is adjusted on a flat tablet. Then it is bound to a wall and straightened with the hand. It is left until it is dry. It is white, pure and tall. One may take a powder, shining white, pure chalk and starch in equal parts. (61) On the quicklime. Cf. Levey (87) for the uses of flax in Babylonia, The Hellenistic writer A., and F. B. On the other hand, the quicklime is very thin. It is well spread out in the sun. When it turns out, then its water dries away. It is found proper in its mold. When the desired is attained, it is adjusted on a flat tablet. Then it is bound to a wall and straightened with the hand. It is left until it is dry. It is white, pure and tall. One may take a powder, shining white, pure chalk and starch in equal parts.
quantities. The powder and the starch are macerated in cold water until there is no limpidness. It is heated to the boiling point. When it boils, it is filtered on that powder. It is stirred until it settles and it becomes a sheet. Then the sheet is drawn back and glazed with the hand, then put on a reed. When all the sheet is glazed, the sheet is dry. It is glazed from the other side, then returned to a flat tablet. Water is sprinkled on it lightly. It is then gathered and stacked. It is polished as one with a cloth. Write on it.

Description of soaking the paper. A very white kind of rice is cooked vigorously in a pot or in a glazed pan. There is no fat in the pot. It is washed, then the water of the rice is filtered in a sieve or it is drawn through a clean cloth. It is then spread out on a clean cloth. It is so until it is dry. Some people cook the husks and take the water with which it was soaked. Some people wet tragacanth or soak it with starch. This is after it is bailed with water and soaked as described.

Description of beautifying the paper that has been tested. In a copper pot, ten rails of sweet water and good clean starch are cooked on the fire. It is boiled more than once until the water is diminished by two fingers or more. Then there is added a little saffron in a quantity to strengthen its color or its purity. The saffron is poured into a wide basin. The sheet is immersed in it lightly with care so that it is not torn. It is spread with a thin flax string in the shade. One must be careful that it is not reached by the sun else it will be spoiled. It is examined every hour with a turning over so that it will not stick. When dry, it is polished with glass burnishes on a board.

Another description of it. Old straw is moistened in water for three days. It is then boiled until a third of the water is lost. Starch, in the mentioned weight of the first description, is thrown into it. The operations are carried out as in the first procedure. It comes out improved for pen coloring and drawing.

Description of white writing on a black surface by pens. Sea reed growing in the meadows or the reed watered by rain or the one irrigated from time to time which is growing in free places, or the hanging vine—a large quantity of an arm's length is cut up after it is found smooth, hollow, and clear of knots. It is washed clean. Already wool alum has been dissolved in water. When its color is shown, then the pen is immersed in that water all over. It is thin and does not show too much on the body of the pen. The pen is dried in the sun. When the white dyes, it blackens. When it sticks to the pen quickly, then it is black. It is shiny and it stands out. Its whiteness is glittering and shiny—not at the same time. When it is rubbed, the second crust comes off. The black does not stick. There is no form of it as was first described. (62)

If the water of the alum on the pen dries, it is thought to be good. It is pulverized very thinly on a stone. After proper pulverization it is cooked with good vinegar. Each time, it is well pulverized until it resembles ink. Then one writes with this pen with a mastery of the art that is desired. Whatever coloring is desired is dyed in it. Writing is not made wide or thick; it is a plan of the middle of the pen. Then take two pots large enough for enough material for the length of a book that is to be written or a little more. Both are introduced into the fire which is blown on strongly. It has previously been in contact with the sulphur of the fire. It is broken up and pounded to pieces. The two pots are removed from the fire with pincers and tongs. The material is placed in the hands and a little of good quality sulphur is added. A narrow line like the pen is made. The end of the pen is taken with the hand and suspended in this soot. It is brought close to it if there is no flame on the sulphur. If there is, then raise the pen to a small height so that it does not reach the flame. When the flame has died down, then the pen is lowered closely to the pot. The green soot is followed with the pen. That makes the effort successful for that which is desired. If it is evident that the sulphur has not burned and had not produced green soot, and the pot has become cold, then it is returned to the fire. (63) The other pot in the fire is then removed. Sulphur is added to the fire. The pen is then returned to the soot. This is done until the pen turns quite black. Then it is believed that it has been well dyed. Else the pot is returned to the fire with the sulphur to be heated. The white, black, and yellow places are followed by the pen without hurry. If it is achieved, it is stopped at the end. It is left a while. One may write for a short period. If the reddish is dissolved while writing, then it is washed well or rubbed in a hair cloth. It is then taken out and wiped. It is examined to see whether certain places are not dyed with the black. The writing is repeated with the red on the place of the white. It is hung on the door. The work is begun as it was first described. It comes out beautifully. The correct and the complete then comes out. This is an art. Depend on the directions of the burning of the sulphur on the pot. It should not be burned on the fire else there is a flame to it with only a little soot and it comes out light and is not useful.

Description of black writing on a white body as desired. Rely on sulfur of which you take two parts. You also take red lead one part. It is well pul-
TRANSLATION OF MANUSCRIPT OF IBN BADIS

12TH CHAPTER

On the art of binding books in leather and the use of all its tools until it is finished

As to these, there are the slab, the whetstone, the parer, the knife, and theawl, the needles, the cutter, the press, the screw press, the rarser, and the compasses.

As to the slab, it is necessary that it be of white and black marble, the best, or some other. It is smooth on its side so that a ruler can be passed over it. It is good for scoring or binding.

As to the whetstone, it is essential that it be smooth on the surface. It should not be so soft that an iron scratches it nor so hard that it harms the iron. Hardness may dull it. Some craftsmen straighten the sharpening stone, make it exact, equalize it, according to the thickness of the blade. It remains overnight in a pot to absorb the oil which is best for it.

As to the parer, it is necessary that it be of good iron, and as hard as possible. The hardness is according to the measure of the hand of the craftsman. This is also true for the leather shears. The awl is used for the gluing process. The awl is very fine.

The shears are very straight, of the best iron, to cut leather and other things.

There are two types of needles, one that does the page sewing and one for binding the book. (66) The one used for sewing should be perfect and thin in body. The one for bookbinding should be shorter and thicker.

The cutter should have a length of twenty or less than that. The width should be good. It should not be spotted on the body and be of the best tempering. Some craftsmen do not appreciate the use of the cutter. Its handle must be adapted to the fullness of the hand.

I heard that some people of this art do not use a cutter and do not command their skill. They do not use it well since they have a long iron blade and cut with it in the way to which they have become accustomed. As to the press which has a cord, the Iraqis use it as well as the people of Egypt and Khorasan. The other press is the screw press. It is called by the bookbinders and by the carpenters'LC the press of the hiltor'. The Greeks call it klistron. All the people of Iraq use it. As to the cord press, its length should be related to the section to be tied. If it is half a cubit, it is cut to the operation that the press be longer than the book. The book should be in the middle of the press. That is easier for the craftsman and safer for him during the pressing. The cheeks should be of good width and perfect in form. This is so that when it is desired they be closed, they hold a paper sheet firmly. The cord should be of hair newly cut when it is twisted. It should be fine and fully black, with no odor except a good one.

There should be no defect in it. It is seen in the work of the tanners in deactivation. It is necessary that the cord of the best hair, as has been mentioned, be used for this press. It is fine, finer than flax, and its length is enough to go around the press on all sides—four times. If one adds to this number, then it is less tiring

60 awl. A cutting instrument.
61 tars: probably fingers, each equivalent to approximately one inch.
62 This is also the term used for the wine press and oil press.
63 Related to enab, a screw. Cf. enabak, a spiral shell, helix.
64 This is an excellent article on this subject in Oman 41:1-13, 1961, refers to Jawhar who states that Manurili is an Egyptian paper of large size having polished surfaces.
to the craftsman because as often as one adds strands the less difficult it is to pull. When the cord is in two strands on every side, it is necessary that the stick be twisted many times. But if there are four strands, it is turned less than eight times. When there are more than four strands, it is twisted less than that or four turnings. The length of the stick is according to the length of the finger in that it is light, thin, and smooth. It is necessary for this press that the two cheeks have slots in the places where the cord is to be. It is better when the cheeks of the press are shortened. This is so that when the cutter falls along the edge of the press it does not cut off a bit of the cord.

The best straightedges are made of ebony or box-wood. For drawing, inking, and lining, it is better that they be of these materials. As to the straightedge for the usual work, it is desirable that it be of the wood of the willow. The willow should be on the edge, that is, on the sides of the straightedge. This is to avoid damage which could happen to ebony; it would affect the lines by the imperfections of the straightedge. (68) As to the straightedge for drawing, it is necessary for it to be very long. It is not made thick or thin. Straightedges for marking are very thin because they are worked by two fingers. As to the straightedge for lining, it is necessary that it be like the latter in thinness and lightness. Lining will be noted in the chapter on pretty drawing. As to the folder which in the "straightedge of the air," it is the one used for work on leather and in its craft to force the air out from under the leather, to correct wrinkling and crookedness and to straighten the leather on a level surface. It must be of good thickness and a span in length. It is of wood of the best oak. It is square and thin at the edges so that if it smooths the leather when it is passed over it. The handle is made of oak since ebony and boxwood, if pounded on the press, have their edges dulled and they break.

For the divider to be good, it is necessary that the body be light. The divider maker should be thin so that it makes a fine line and the opening and closing joint of the divider should be accurate. If it is not correct, it is necessary that it be adjusted. The divider is to make the marks. These are circles in pretty drawings that are in the middle of the book. The description of it and the description of the work will be explained.

Then there are the irons for tooling. These are the grove, and the "beest" which is called "the breast of the falcon." There are also the ornament, the dot, the "encircled," and the polisher which is called a dust. Then there is a fine polisher. There are different stamps. The dots for impressing will be mentioned in their place. This is the total of instruments. It is complete. (69)

One who makes this art should have quick understanding, good observation, dexterity of the hand, and be certain without being hasty. The latter is a good manner of getting along and it has the elegance of attracting others of grace and good character.

The first thing to do to begin this art is to place the part to be sewed beside you on a slab. It is put to your left. A quire is picked up with the left hand. It is opened with the right hand. It is put down on the slab and opened. Then the folder is passed over its center where the binding thread is to be. Then it is folded and the end paper is cut squarely. This is a double sheet; one page is pasted on the leather and the other remains on the quires to protect the book from harm and dirt. Then this is done to the remainder of the quires until the last. When finished, the thread is then twisted for tying. It is in three strands according to the manner of the fineness of the thread. It is best if the thread is fine for then the twist is best. If it is coarse, this part is damaged since it turns in every sheet and produces extra bulk. If it is coarse and the book is bound, the press will fall on the end of the thread which remains and will have a mark. It is similarly so if one winds a thread on his finger to the end. Thus it causes extra thickness in the interior of the book.

There are ways of bundling (gathering in sewing). Some are used by craftsmen for ease and quickness. (70) It is that the needle penetrates two places. Others work with two needles or three. I saw the Greeks do it but I cannot approve of it. I cannot describe it. When the section is tied together with string, the place where it is bound is then pounded with the folder previously described. It is then put between the knees. The press is taken and one of the cords is put against the left knee and the other against the right. The book is in the middle between the knees. The end of the cord is put to the left hand and wrapped around the press. Both ends of the cord are tied together. Then it (the book) is taken from between the knees while it is in the press. The protruding spine is put on the slab. Then the ends of the sections are pounded with the folder where sewn.

68. meidr.
69. leer, In Main. (9) leer is equated with sinait or somaihe (1, Bl. 332, 442). There seems to be uncertainty in application in applications for extinction of the boat, and headache. The box shomshub in Akk. is used in Babylon as a stomachic, for the head, and in enemies.
70. seiler. A compass divider.
LEVEY: MEDIAEVAL ARAB BOOKMAKING
FRANK AMER, PHIL. SOC.

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TRANSLATION OF MANUSCRIPT OF HIN BEN SADDIF

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thick. It must be last in dying. Then a leaf is taken, folded, every side, in the middle. Each half will see the
width of the spine or more by it than two fingers. (71)
The glue is taken up with the middle finger, the rest of
the glue is smeared lightly, the spine is smeared lightly, getting the slime of the glue fall on the book. The

(70)

(71)

author is not in contact with it. When the gallnut leather is
washed, it is rubbed well on the surface with a potsherd
and then spread out on the slab and rubbed with the
straightedge previously mentioned. If anything separates,
the excess falls on the outer surface of it is scraped off.
The best scraping is done when it is nearly dry. Then
the knife does not pull it as it does when it is dry.
When it is scraped, it is necessary that there should
not be any scraping in the leather. It should be cut on
that place. When the scraping is finished, then comes
the washing. It is washed until the water comes out very
clear. If it is seen that the water stays in spots on the
surface of the leather, know then that there is an excess
of fat. It will not make a good job. If it is desired to
remove the oil from it, two ounces of powdered gallnut
are thrown on every layer. The piece is stretched be-


tween the hands. The gallnut is spread and all of it is


 If it is tannin, then it is the leather. It is tannin and
it is left until it cools. It is then immersed in water a
night or a day. It is then put into a copper pot, a clean
attire. On it poured ten nafs of water and the best
material to be used. This is dried in a good fire until
half of the water is lost. The essential of the process
is that a red is left in it. Drip it on your thumb. If it
remains and does not drip, then it is successful. It
taken down and purified. If desired, this may be
repeated on that type which is sold. The first is the
brown type. The second is the black type.