21. Notes from the Chemical Laboratory of the Presidency College. Note No. 1.—A new method of preparing Mercurous Iodide.

By Panchanan Neogi, M.A., *Premchand Roychand Scholar, and Government of Bengal Research Scholar.*

Yvon (Comptes rendus, 76, 1607) obtained mercurous iodide by heating mercury and iodine in a retort on a sand-bath to 250°. Stroman (Berichte, 20, 2818) also got it on a large scale by heating a strong solution of $HgNO_3$ containing a little nitric acid with excess of iodine. Rây (Journ. Asiatic Soc. Bengal, lxix. pt. ii., 1900, p. 477) has prepared it by the interaction of ethyl iodide on mercurous nitrite. In all these cases the mercurous ioide obtained was of a distinct yellow colour.

Experimental.

A sample of isopropyl iodide prepared from glycerin, iodine and phosphorus was left with a globule of mercury in order to keep it colourless. The iodide remained with the globule of mercury for nearly eight months in a dark room unobserved, at the end of which time it was taken out. I was surprised to find beautiful, yellow, shining crystals at the neck of the flask instead of isopropyl iodide in it. Another layer of red crystals of mercuric iodide was found above the layer of the yellow crystals. The isopropyl iodide being very unstable even in the dark evidently liberated iodine, which in the nascent state combined with the mercury present forming mercurous iodide, which sublimed gradually during the long interval on the neck of the flask forming large, beautiful, yellow crystals, while a portion of the mercurous iodide was oxidised to mercuric iodide forming the layer of red crystals.

The experiment was repeated with methyl, ethyl and isopropyl iodides in presence of sunlight, in order to expedite the liberation of iodine by the actinic action of sunlight. In this manner a larger yield of mercurous iodide was secured. The experiment was conducted in the following manner. The iodide was taken along with mercury in a round-bottomed flask, which was corked with a rubber-cork and exposed to strong diffused sunlight. The cork was occasionally removed in order to allow the gaseous products of decomposition to pass away and the contents of the flask were occasionally shaken. As the reaction went on, a yellow deposit was continuously formed, and when the whole of the iodide was used up, fresh iodide was poured in until the whole of the mercury was converted into the yellow compound. The yellow deposit was then transferred into a small

Erlenmeyer flask, and mercurous iodide was sublimed off in an atmosphere of carbon dioxide by partially immersing the flask in a glycerin bath. In this way beautiful, yellow crystals of mercurous ioide were obtained. Any accompanying mercuric iodide was removed by alcohol in which it is soluble.

Analysis: 0·112g. of the substance gave 0·0789g. of AgI by Carius' method, whence the percentage of iodine is 38·1, that required by theory for mercurous iodide being 38·8.

The present investigation confirms the observation of Yvon, Stroman and Rây that pure mercurous iodide is bright yellow, while the so-called green variety of mercurous iodide is evidently a mixture.

22. Notes from the Chemical Laboratory of the Presidency College. Note No. 2.—Nitro-ethane as a Solvent of Iodoform.

By Panchanan Neogi, M.A.

While preparing nitro-ethane by the action of alkali nitrites on the alkaline salts of ethyl sulphuric acid (Rây and Neogi, in Trans. Chem. Soc., Decem., 1906) the distillate obtained consisted of a mixture of alcohol and nitro-ethane. It was then found that the iodoform test of alcohol failed with the liquid obtained, though alcohol was distilled off at its usual boiling point. Known mixtures of pure nitro-ethane and alcohol were then taken and found not to respond to the iodoform test of alcohol. Two explanations seemed to account for this singular behaviour:— first, that a compound was formed by the interaction of iodoform with nitro-ethane; and second, that iodoform was soluble in nitro-ethane. In order to decide between the two, pure iodoform was repeatedly shaken up in excess with pure nitro-ethane in a test-tube, and the tube was immersed in water in the dark room in order to keep the temperature constant. After several hours the supernatant, clear liquid was drawn up by means of a pipette and weighed. It was then kept in a vacuum desiccator over caustic potash and soda lime, when nitro-ethane evaporated and yellow crystals remained which were weighed. The melting point of the substance as well as its peculiar odour proved it to be iodoform.

Exp. I.—2·0316g. of a saturated solution of iodoform in nitro-ethane at 23° gave ·1002g. of iodoform on evaporation, whence 100 vols. of nitro-ethane dissolve 5·4g. of iodoform at 23°.

Exp. II.—2·4452g. of a saturated solution at 23° gave, on evaporation, ·1217g. of iodoform; hence 100 vols. of nitro-ethane dissolve 5·5g. of iodoform at 23°.

23. Notes from the Chemical Laboratory of the Presidency College. Note No. 3.—On Silver-Mercuroso-Mercuric Nitrate.

By P. C. RÂY.

It has already been shown that mercurous nitrite when treated with water, undergoes partial dissociation. But however much the solution may be diluted, about 22 per cent of the salt dissolves without decomposition.[1] The explanation of this anomalous behaviour lies in the fact that in solution a pretty stable compound $4Hg(NO_2)_2 + 2(HgNO_2)$ is formed. If, however, an alkaline nitrite or even silver nitrite be added to the above solution, the mercurous nitrite is completely dissociated into mercury and mercuric nitrite (*vide* Journ. Asiatic Soc. Bengal, lxix., pt. ii., 1900, p. 413).

Recently I have been engaged in a systematic investigation of this subject. A large excess of mercurous nitrite was triturated in a mortar with silver nitrite, and water was added from time to time. The liquid, which looks dirty grey due to the suspension of metallic mercury in a fine state of division, on filtration gave a clear, pale-yellow solution. It was then allowed to evaporate under diminished pressure over sulphuric acid. After a few days a bright yellow, crystalline powder was obtained. The compound proved to be silver-mercuroso-mercuric nitrate. The analysis of a typical preparation is given below :—

Mercuric mercury	Hg″	...	26·23÷200 = 0·1312	
Mercurous mercury	Hg′	...	45·81÷200 = 0·2290	0·2670.
Silver	Ag	...	4·15÷108 = 0·0380	
Nitrogen	N	...	3·60÷ 14 = 0·2570	

The simplest ratio is Hg″ : (Hg′ + Ag) : N = 1 : 2 : 2. Hence the formula of the compound would be $Hg''(Hg', Ag)_2(NO_3)_2$.

It has already been shown that when the solution of mercuroso-mercuric nitrite is allowed to evaporate spontaneously, a basic mercuroso-mercuric nitrate in the shape of a yellow crystalline powder is obtained (Trans. Chem. Soc., 87, 1905, 174), the nitrite undergoing decomposition thus,

$$3HgNO_2 = Hg_2O + HgNO_3 + 2NO.$$

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[1] Journ. Asiatic Soc. Bengal, lxv. pt. ii. (1896), p. 1.

In the present instance a basic mercuroso-mercuric nitrate has been formed, in which a part of the mercurous mercury has been replaced by silver. Evidently we have here a remarkable case of isomorphism. I am not aware of any instance in which univalent mercury is isomorphously replaced by silver.

24. Some Birds and other animals that have been metamorphosed [being an extract from the *Kitābu'l-Jamharah fi 'ilmi'l-Bazyarah*,[1] an Arabic manuscript, No. 865, in the Library of the Asiatic Society of Bengal].

By Lieut.-Colonel D. C. Phillott and Mr. R. F. Azoo.

Amongst traditions handed down to us from trustworthy sources is one that the Prophet (on whom be the Peace and Blessing of God) once said: "The metamorphosed beings in this world are seven hundred, and these rebelled against the Vicars of the Prophets after the death of the latter. Four hundred of them took to the land and three hundred to the sea." He then repeated this sacred verse: "And we made them the subject of stories and we scattered them utterly."[2] Of them, too, a poet has said:—

"Those that opposed the Guides in religion were changed on the spot and were utterly scattered."

Muḥammad, son of *Abū 'Abdi 'llah*, has related to us on the authority of *Muḥammad* son of *Aḥmad*, who heard it from *Muḥammad son of Ismā'īl*, of the family of *'Alī*, who heard it from *'Ali* the son of *Al-Ḥusayn*, the son of *'Alī* the son of *'Umar*, the son of *'Alī*, the son of *Al-Ḥusayn*, the son of *'Ali*, the son of *Abū Ṭālib* (peace be on them) that he (*'Alī*) said: "The Apostle of God (blessings on Him and on his Family and on his Companions) once said, 'The metamorphosed beings that people can see and have seen are nineteen. These are, the elephant, the bear, the scorpion, the 'spiny-tailed lizard'[3] (*ẓabb*), the spider, the *du'mūṣ*[4] the eel, the swallow (*waṭwāṭ*[5]), the pig, Venus, Canopus, the ape,

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1 This work is in two volumes, of which only the second is in the Library of the Asiatic Society. The name of the author is not given, nor is the work mentioned in Brockelmann or in *Ḥājī Khalfa*. From the colophon at the end of the volume it appears that the book was written in 797 A.H. (1394 A.D.). This is followed by these words: "May God forgive the owner who helped in the composition of it," from which it appears that the MS. was the author's original copy.

2 *Quran*, Chapter XXXIV., Verse 18.

3 The spiny-tailed lizard (*Uromastix*) caught and eaten by the Arabs as well as by certain tribes of India. The flesh is white and rich, and in appearance resembles chicken's flesh. The verb حَرْشَ signifies to hunt this lizard.

4 The دعموص *du'mūṣ* is probably the mosquito larva. It is described by Arab authors as 'a worm with two heads living in stagnant water.'

5 The plural word *abābīl*, primarily meaning in Arabic, "flocks of birds," is the name of the "birds" (metaphorically small-pox) that attacked the army

the hare (according to some), the bat, the mouse,[1] the mosquito, the human louse (according to some), the gecko, the parrot, and the peacock (according to some).'

The author continues:—

The Apostle of God being questioned as to the reason for their metamorphosis replied: "The elephant was once a man of oppression, who took all, sparing neither green nor dry. The bear was a man, vicious and effeminate, who solicited men. The scorpion was a scandal-monger, from whose tongue none was safe. The spiny-tailed lizard was a Bedouin that used to steal from the pilgrims on their way to Mecca. The spider was a woman, who exercised witchcraft over her husband.[2] The *du'mūṣ* was a tale-bearer, who caused dissension amongst friends. The eel was a cuckold, a pander to his own wife. The swallow was a thief, who stole ripe dates from the tree-tops of his neighbours. Pigs were those Christians that asked Jesus for a table from Heaven, but after its descent denied Him[3] all the more. Now Venus was a woman named *Hind*, and it was she by whom *Hārūt* and *Mārūt*[4] were fascinated and so sinned.[5] Canopus was a publican[6] of Yemen. Apes were those Jews that broke the Sabbath. The hare is said to have been a filthy woman, who never bathed after her courses—or at any other time; but God knows best. The bat was a woman, who practised witchcraft on a rival-wife and so Allah changed her into a bat. The mouse was a patriarch of the Jews with whom God was wrath, and so He transformed him into a mouse. The mosquito was a man who was wont to deride the Prophets and revile them, making grimaces in their faces, and clapping his hands[7]; so God metamorphosed him into a mosquito. Now the story about the body-louse is that a certain prophet of the Children of Israel was once standing in prayer, when one of the foolish ones of the Children of Israel came to him and began to mock him, pulling faces at him and making disgusting noises with his mouth[8]; so he moved not from that spot before God Almighty metamorphosed him into a louse. As

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of *Abrahah* with clay pellets (*Qurān*, Chapter CV., verse 3); but in Persian and in Urdu the word is singular and means "swallow."

1 *Fār*, a singular and a collective noun includes mice and rats.

2 Presumably while she received the attentions of her paramour.

3 *Qurān*, Chapter V., 112.

4 *Hārūt* and *Mārūt*, two fallen angels, now suspended head downwards in a well in Babylon. They were tempted and fell, and chose present punishment to punishment hereafter. They are supposed to be teachers of magic.

5 *Iftatan* signifies "to be enamoured, to fall and to suffer punishment from the fall."

6 *'Ashshār*, a publican or tax-gatherer in the Biblical sense.

7 Arab children clap the hands in mockery or derision. There appears to be some connection between the clapping of the hands and the beating of the mosquito's wings.

8 ضرط ب colloquial and literary "*Imiter le pet par un certain mouvement des levres.*"

to the gecko, [1] there once were two tribes of the Children of Israel and these God changed into geckos. Now the parrot was metamorphosed [2] for disobedience to God."

Aḥmad ibn Idrīs has told us that he heard from *Aḥmad ibn Muḥammad*, who heard it from *Al-Ḥusayn ibn 'Abdu 'llah*, who heard it from *Sulaymān ibn Ja'far Al-Ja'farī*, who said: "I once heard *Al-Ḥasan* (Peace be on him) saying, 'The peacock is a metamorphosed bird and was formerly a handsome man who enticed the wife of a Believer, and seduced her, and then sent her away; so God on High changed him into a pair of pea-fowl, male and female"—and Praise be to God the Lord of the Universe.

ذكر المُسوخ من الطَّير وغيره

ممّا جاءت به الأخبار عن الثِّقات الّذين نقلوا عن المتقدمين انّ النبيّ صلى الله عليه وسلّم قال انّ المسوخ في الدُّنيا سبعمائة أُمّة عصوا الأوصياء بعد الرّسل فأُخذت اربعمائة منهم برًّا وثلثمائة بحرًا ثمّ تلا هذه الآية وَجَعَلْنَا هُمْ أَحَادِيثَ وَمَزَّقْنَاهُمْ كُلَّ مُمَزَّقٍ * قال الشّاعر

إِنَّ الَّذِينَ عَلَى الْأَيْمَةِ نَافَقُوا * مُسِخُوا هُنَاكَ و مُزِّقُوا تَمْزِيقَا

قال حدّثنا محمّد بن ابي عبد الله قال حدّثنا محمّد بن احمد عن محمّد ابن اسماعيل العلويّ قال حدثنا عليّ بن الحسين بن علي بن عمر بن علي ابن الحسين بن عليّ بن ابي طالب عليهم السلام انه قال قال رسول الله صلّى الله عليه وعلى آله وصحبه وسلّم المسوخ التي يراها الناس ويشاهدونها تسعة عشر وهي الفيل والدُّبّ والعقرب والضَّبّ والعنكبوت والدَّعموص والجِرِّيّ والوَطْواط والخنزير

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[1] وَزَغ the gecko house-lizard called also سام ابرص, and colloquially الوبريص

[2] Apparently from a woman. There appears to be an omission in the text.

والزُّهرة وسُهَيل والقرد - وذكر قومٌ ان الأرنب مسخٌ ايضا - والخفّاش والفار والبعوض - وقال ان القملة ايضا وهي من الجسد - قَالَ وَانّ الوزغ مسخٌ - والبَبغاء والطاووس ايضا ذكر انه مسخ - قال سئل رسول الله صلّى الله عليه وسلّم ماكان السبب في ذلك فقال صلى الله عليه وسلم امّا الفيل فكان رجلاً جبّاراً لا يدع رطبًا ولا يابسًا - و امّا الدّب فكان رجلاً مؤنّثًا يدعو الرّجال الى نفسه - وامّا العقرب فكان رجلاً همّازاً لا يسلم منه احد - واما الضبّ فكان رجلاً اعرابيًا يسرق الحجّاج بمحجّته - واما العذكبوت فكانت امراةً سحرت زوجها و اما الدّعموص فكان رجلاً نمّامًا يقطع بين الأحبّة - واما الجّريّ فكان رجلاً ديوثًا يجلب الرجال الى حلائله - واما الوطواط فكان رجلاً سارقًا يسرق الرُّطَب من رؤس النخيل واما الخنزير فالنصارى حين سألوا المائدة فكانوا بعد نزولها اشدّ ما كانوا تكذيبًا - وامّا الزهرة فكانت امراةً تسمّى هند وهي التي افْتُتِنَ بها هاروت وماروت - وامّا سُهَيل فكان رجلاً عشّاراً باليمن - واما القرد فاليهود حين اعتدوا في السبت - واما الارنب فذكر انهّا كانت امراةً قذرةً لا تغتسل من الحيض ولا من غير ذلك والله اعلم - واما الخفّاش فكانت امراةً سحرت ضرّةً لها وانّ الله مسخها خفّاشًا - واما الفار فكان سبطًا من اليهود غضب الله عليه فمسخه فارًا - واما البعوض فكان رجلا يستهزئ بالانبياء ويسبّهم ويكلح في وجوههم و يصفّق بيده فمسخه الله بعوضًا - واما القملة في الجسد فان نبيًّا من الانبياء من بني اسرائيل كان قائمًا يصلّي اذ أقبل له سفيه من سفهاء بني اسرائيل فجعل يهزأ به ويكلح في وجهه ويضرط به فما برح من مكانه حتى مسخه الله

عزّ وجلّ قملةً - وامّا الوزغ فكانوا سبطين من اسباط بني اسرائيل فمسخهم الله اوزاغًا وانّ الببّغاء قد عصت اللّٰه فمسخها - فنعوذ باللّٰه من غضب الله ونقمه -

اخبرنا احمد بن ادريس عن احمد بن محمّد عن الحسين بن عبد اللّٰه عن سليمان ابن جعفر الجعفري قال سمعت الحسن عليه السلام يقول الطاووس مسخٌ وكان رجلاً جميلاً وانه كايد امراة رجلٍ مؤمن فوقع بها ثم ارسلها بعد ذلك فمسخه الله تعالى طاووسًا ذكرًا وانثى والحمد للّٰه ربّ العالمين *

12. Note on the Constituents of the Bark of the Hymenodyctyon Excelsum.

By Charles Stanley Gibson and John Lionel Simonsen.

[Read at the 3rd Indian Science Congress.]

A large number of barks are made use of in this country for medicinal purposes, although their action is in many cases obscure, and only in a few cases has a therapeutically active principle been isolated. It has, therefore, seemed to the authors a matter of considerable interest to subject some of these barks to a more careful chemical examination in order to clear up many anomalies and contradictions.

The first bark selected for this purpose was the bark of the Hymenodyctyon excelsum, a bark which according to the Pharmacographia Indica (Vol. II, p. 193) is used as a tonic, a febrifuge, and also as an astringent.

This bark was first subjected to a chemical examination by Broughton in 1870, and subsequently Naylor (Pharm. Journ. 1893, *14*. 311, 1884, *15*. 195) investigated it much more thoroughly. Broughton showed that it contained a glucoside, aesculin, and that on keeping the bark lost its bitter flavour owing to the hydrolysis of the glucoside with formation of aesculetin (scopoletin). Naylor, on the other hand, succeeded in isolating a crystalline alkaloid to which he gave the name hymenodyctine and the formula $C_{24}H_{40}N_3$ and also an amorphous neutral substance of the formula $C_{22}H_{43}G_{10}$[1].

From the results obtained by Naylor it seemed possible to us that the alkaloid might be of therapeutic value and furthermore, since it was one of the few alkaloids which do not contain oxygen, it should be of considerable scientific interest, and we decided, therefore, to attempt its isolation.

For this purpose three different specimens of the bark were subjected to a careful examination. The first specimen was obtained from the Calcutta Museum by the kindness of Mr. I. H. Burkill, the then Reporter on Economic Products, whilst the other two specimens were obtained for us by Dr. J. R. Henderson, Superintendent of the Madras Museum, and we wish to take this opportunity of expressing our thanks to these gentlemen for their assistance.

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[1] This formula is obviously incorrect, containing as it does an odd number of hydrogen atoms.

An examination of the bark by the methods described in the experimental part of this note has confirmed the results obtained by Broughton. We have isolated aesculin and scopoletin, but we have been unable to find any traces of an alkaloid. It would, therefore, appear that Naylor cannot have examined the bark of the Hymenodyctyon excelsum, but must have been dealing with some other bark.

Experimental.

A preliminary extraction with Prollius fluid having shown the absence of any alkaloid, several methods were tried for the extraction of the bark, but as the results obtained were in each case practically identical, it will only be necessary to describe briefly one of the methods used.

The finely powdered bark (1 kilo) was thoroughly mixed with purified sand and extracted by percolation with hot alcohol, when a dark brown extract was obtained which showed a strong yellowish green fluorscence. After removing the alcohol, the residual oil was mixed with a little water and repeatedly extracted with ether. The combined ethereal extracts were washed in turn with dilute hydrochloric acid (A), sodium carbonate solution (B), and sodium hydroxide solution (C). The ethereal extract was dried and evaporated, when a viscous oil remained. This was subjected to distillation in steam, when a trace of oil passed over (0·5 gram) which possessed a distinctly camphoraceous smell. The residual oil remaining after the distillation was found to consist of a mixture of glycerides which were not subjected to a detailed examination.

The original aqueous solution which had been extracted with ether was concentrated, when a small quantity of a crystalline solid separated. This was purified by repeated crystallisation from hot water when it was obtained in fine needles which after drying at 100°, melted at 160° and evidently consisted of aesculin, since when mixed with a specimen of aesculin from another source the melting point was found to be unaltered.

The hydrochloric extract (A) was basified and extracted with ether, the ether dried and evaporated when a trace of a resinous substance remained. This substance could not be crystallized, but it showed no alkaloidal properties.

The strongly fluorescent sodium carbonate solution (B) was acidified, when a quantity of a thick brown oil was deposited. This was ground up with ether when the oil readily dissolved, leaving a colourless crystalline solid. This was collected and recrystallized from dilute alcohol, when it was obtained in colourless prismatic needles melting at 203°. The alkaline solution showed a beautiful blue fluorescence.

0·1063 gave 0·243 CO_2 and 0·043 H_2O : C = 62·4, H = 4·5.

$C_{10}H_8O_4$ requires C = 62·5, H = 4·2 per cent.

This substance was scopoletin, 4-hydroxy-5-methoxy coumarin (see Moore, Chem. Soc. Trans. 1911.99.1043). The correctness of this view was confirmed by the preparation of the *acetyl* derivative which melted, as stated by Moore, at 177°.

The ethereal solution from which the scopoletin had been separated was found to contain a mixture of fatty acids which have not so far been subjected to detailed examination.

The sodium hydroxide solution (C), on acidification, yielded a further quantity of scopoletin which had escaped extraction with sodium carbonate.

In conclusion we may mention that Capt. A. C. Ingram, M.D., I.M.S., very kindly tried the effect of the extract of the bark on two frogs (subcutaneous injection), but was unable to detect any physiological action.