ADDITIONAL ARTICLES,

BY THE TRANSLATOR.

CREOSOTE.

The name of this new remedy is derived from the Greek κρέας, flesh, and σώζω, to preserve. It was discovered last year by M. Reichenbach de Blansko in pyroligneous acid, in the first instance, and subsequently in the different kinds of tar.

In the process which led to the discovery of creosote, M. Reichenbach found that his fingers were deprived of their epidermis, and he conjectured from this vehement action on organic matter that this substance might be the mummifying principle of pyroligneous acid, and might also serve an important therapeutical purpose in the living body. This expectation has since been realized.

Physical Properties of Creosote.

Creosote is an oily, colourless, transparent liquid, of a penetrating odour, resembling that of smoke, or smoked meat, and of a burning and exceedingly caustic taste. It has a specific gravity of 1,037.

Chemical Properties.

It boils at 203°, Centigrade, and is not congealed by a cold of—27° C.; it burns with a strongly fuliginous

flame. With water at 20°, it forms two combinations, one a solution of one part in 80, and the other of 10 parts in 100. This aqueous solution does not change turnsol, nor is it neutralized by acids or alkalis. Nitric acid causes red vapours. A small portion of concentrated sulphuric acid turns it red, but a larger quantity blackens it, the acid itself being also decomposed. Acetic acid seems to be its specific solvent, for it holds any quantity of it. All the acids, even the carbonic, separate creosote from its combinations with potass and soda, without otherwise affecting it. It dissolves a great number of salts, some with, and some without heat. Alcohol, ether, carburetted sulphur, and acetic ether combine with it in any proportion. It decomposes or dissolves resins, resinous colouring matters, and other similar substances.

Shaken with white of egg, coagulation immediately takes place. Fresh meat, soaked for an hour in a solution of creosote, and then dried, may be exposed to the sun, without fear of putrefaction; in a week it becomes hard, has the smell of smoked meat, and becomes reddish brown. Fish may be preserved in the same manner. Birds poisoned with creosote, remain nearly two months without emitting any putrid odour.

These effects on animal matter closely resemble those of pyroligneous acid and tar water, and demonstrate almost to a certainty that creosote is the preservative principle of those fluids. This, however, has been further shown by the extraction of creosote from both of them. I shall confine myself to the preparation of creosote from tar, as it is procured more abundantly, and by an easier process from that substance.

Preparation of Creosote.

In the dry distillation of tar from wood the fluid collected in the receivers contains an empyreumatic acid water, which is rejected, and oil of tar, which is placed in glass retorts and rectified. In these two distillations the oil of tar is at first light, but as the heat

is increased, its gravity augments. At one period of the process the oil sinks to the bottom, and a fluid which is poor in creosote, and consists mostly of *eupione*, and other substances that interfere with the purity of the creosote, floats above it: this is poured off, and the pale yellow tar-oil is heated. Carbonate of potass is added, until the carbonic acid is no longer disengaged on shaking: the mixture is decanted, in order to separate the acetate of potass, and the oil is again distilled in a glass retort, and all the first products that float on the water are rejected. The oil is then dissolved in a solution of caustic potass of the specific gravity 1,12; heat is thereby developed, and a portion of the materials composed of eupione, &c. not being dissolved, floats on the surface, and is removed. The alkaline solution is poured into an open capsule, and regularly heated to boiling. It rapidly absorbs the oxygen of the atmosphere, whereby a peculiar oxidizable principle in it is decomposed, and the mixture then turns brown. After cooling in the open air, diluted sulphuric acid is added until the oil is set at liberty. It is then distilled with water, holding a little caustic potass, and the whole is kept boiling until the quantity of oil which passes from the retort becomes diminished; at this point the distillation should cease. The oil and water in the receiver are again distilled with potass, and the same treatment with sulphuric acid repeated, as in the former instance. A third distillation is then made, and a little phosphoric instead of sulphuric acid is added, in order to take up some ammonia retained in the oil.

The oil is then for the third time dissolved in caustic potass, and if the preceding processes have been carefully managed, they combine, without leaving any residue of eupione, and the mixture, on exposure to the air, does not turn brown, but takes on a slightly reddish tint. As long, however, as any eupione remains, and the mixture turns brown, the solution in potass should be repeated. In this state the creosote

is not entirely pure, but it may be used for medicinal purposes.

It may be obtained perfectly pure by distilling it with water alone, then rectifying the product of the distillation repeatedly until no water passes over when the heat is raised to 203° C. The last product is creosote unalloyed by eupione, picamare, water, or other matters.

M. Reichenbach endeavoured to simplify this tedious process; but he found that the product was always unfit for internal use, while its action on the surface was much impaired. So procured, its emetic effects were most violent; a single drop applied to the tongue caused in the space of a minute, excessive nausea with tremors, succeeded by vomiting, and great prostration of the powers. These effects he attributes to the presence of eupione, and he therefore recommends the process above-described to be followed on all occasions.

Physiological Action of Creosote.

Applied on the tongue in a concentrated form creosote causes violent pain, though no redness or tumefaction is present: a strong taste of smoke extends to the throat. Poured on the skin, it produces a burning sensation with rubefaction and erosion.

Flies, spiders, and small fishes die in the course of two minutes, when immersed in a solution of twelve drops of creosote, in two ounces of water.

Two drachms given in half an ounce of water to a puppy-dog induced the following symptoms; complete prostration of muscular power, drooping of the head, fixation of the eyes, vertigo, apparent stupefaction of all the senses; the respiration, from being laboured, was at the end of three minutes almost entirely stopped by an abundant secretion of viscid, filamentous mucus; to which was added vomiting of whitish milky fluid, with spasmodic contraction of the abdominal muscles. These

symptoms got gradually worse for two hours, the respiration becoming more laborious, and at longer intervals, the limbs being seized with tremors, then with convulsive contractions, and the whole ending in death.

On opening the body of the animal all the tissues of the body, except the liver, exhaled a strong odour of creosote. The mucous digestive membrane gave signs of inflammation throughout its whole extent; the matters contained in the stomach coagulated white of egg, and heated, gave out the powerful tar smell of creosote. In the heart and the immediate great vessels the blood appeared to be much more firmly coagulated than usual. The lungs were gorged over the greater part of their extent with reddish-brown blood; the more ruddy parts of them floated in water readily: the darker portions scarcely swam at all. No sign of congestion about the brain appeared.

On injecting equal parts of creosote and water into the carotid artery of a dog, the same symptoms were produced, but death ensued more speedily.

If concentrated or diluted creosote be added to blood, the latter thickens and becomes reddish-brown, with small spots of white, probably coagulated albumen: on further exposure to the air the blood passes to a yellowish-red colour.

The signs of poisoning with creosote therefore are the redness of the gastro-intestinal mucous membrane, the peculiar thickness and colour of the blood, the property possessed by the matters in the stomach of coagulating albumen, and more especially the peculiar odour exhaled by all the tissues of the body.

Plants watered with a solution of creosote, fade and die in the course of a few days.

Medicinal Employment.

Bishop Berkeley's enthusiasm in favour of tar-water is well known to all readers. His assertion that it is an antidote to the contagion of small-pox, that all who drink it escape epidemic diseases, that it clears the

voice, restores broken constitutions, rouses the spirits, and effects a thousand other wonderful consequences, will, however, be taken with the requisite quantity of salt by all those who have observed the power of new remedies in other hands than those of the inventor.

The Bishop of Cloyne is not, however, the first who recommended tar-water for its therapeutical properties. Aretæus, Cælius Aurelianus and Galen, severally mention it in some of its medicinal applications; the latter says of it, "Astmaticos et purulentes adjuvat, abstergendi vim habet, glutinendis vulneribus aptior."

Not less vaunted have been the virtues of the Neapolitan remedy, the *Acqua Balsamica Arteriale* or *Acqua Binelli*, the latter name being taken from that of its promulgator. Binelli attributes to it the property of stopping internal and external hemorrhages, even of large arteries when cut transversely, the cleansing and healing of all kinds of wounds, the renewal of uterine evacuations when suppressed, the moderating of them when excessive, &c.

I have recalled these remedies to the reader's mind, because in passing through the cases for the application of creosote, it will appear that any extraordinary effect produced by those remedies is attributable to the presence in them of the substance forming the subject of this article. In fact, though the Acqua Binelli is to this day sold in Italy at a high price (2*s.* 8*d.* an ounce,) and as a mysterious compound, its chemical and physical properties disclose it to be merely water containing a little volatile oil or naphtha, and probably prepared by the distillation of water from some kind of tar.

M. Reichenbach's first essays of his newly discovered remedy were made on slight burns, infantile excoriations and wounds. Subsequently he was induced to try it in extensive burns by hot iron and boiling fluids: in itch and various kinds of tetters: in gangrene consequent on extensive compound fracture of the leg: in caries of the phalanges of the fingers and toes: in tooth-ache, though it fails to put a stop to the caries of the tooth: in open, fungous whitlow; in scrofulous

ulcers of the throat, leg, and joints of the fingers: in ulcerated white-swelling of the knee of two years standing: in chancres and other syphilitic ulcers: in wounds from cutting and piercing instruments, caustic alkalis, &c., in which cases the wounds did not cure by suppuration, but by actual desiccation caused by the creosote. In all these instances he has found the remedy most effectual and astonishingly rapid in its operation. Thus in a case of old standing and scrofulous ulceration of the throat, with purulent discharge from the ears, the ointment of creosote to the former, and the injection of creosote water into the latter, put an end to both in the course of three weeks.

Internally, M. Reichenbach has given it in several cases of hemoptysis; in two of these, the sanguineous expectoration had continued for upwards of a week, when the administration of four drops of creosote, on sugar, daily for four days, arrested the flow of blood.

Turning to the practice of the French physicians, we find that creosote has been successfully employed in burns, by Berthelot and Goupil, who observe, that in treating these with creosote, the tendency to cicatrize from the circumference to the centre, and the consequent contractions and irregularities, are avoided; in various dry and moist tetters by Goupil, Coster, Berthelot, Martin-Solon, Duchesne-Duparc and Dauvergne: in chancres and old venereal ulcers, by Künckel, Lesseré, and others: in sanious ulceration of the cervix uteri, by Colombat: in a cancerous ulcer of the nose, by Breschet: in chronic inflammation with suppuration of the edges of the eyelids, by Coster: in cancer of the womb, by Hippolyte Cloquet and Tealier: in varicose, ill-conditioned ulcers of the leg, by Goupil, &c. &c. Chilblains are also considerably benefited by frictions, with creosote ointment or water. M. Regnart, of Paris, among many other patients, had the good fortune to relieve the gifted Broussais from an excruciating toothache, by the free application of concentrated creosote to the carious tooth; we cannot wonder that the worthy professor should be an advocate of the doctrine of "irritation."

As this application of creosote may be of more extensive and familiar use than many others, it may be well to inquire how it acts as a sedative in this instance. When the teeth are painful it is almost always because the nervous pulp near to the root is exposed to the contact of the air. If in this circumstance a few drops of undiluted creosote are applied, a fierce increase of pain is the first effect, then a total cessation of it: in this, either the nervous pulp is destroyed as by some caustic: or the creosote, by coagulating the albumen of the fluids that are always flowing from the caries, forms an albuminous layer that defends the pulp from the air; or lastly it acts as a powerful stimulant, causing the inflamed vessels of the pulp to contract and expel the load of blood by which they are oppressed. In any case the pain is apt to return, and this fact is only explicable by one of the two latter suppositions; for so long as the irritating cause, carious bone, remains, so long are the vessels of the pulp liable to relapse into their former congestion.

Creosote has been employed by the French physicians in pulmonary phthisis, but from all that I have read on the subject, the alleged successful cases are strained, and should not be recorded as such. It has not been more successfully used in several cases of chronic bronchitis by inhalation.

British practitioners have not as yet essayed the effects of creosote, and indeed this is too often the case with regard to new remedies. My friend, Dr. Copland, however, is an exception to this rule; he tells me he has employed it in cachectic affections as a tonic, and also in dropsical cases, where it has proved diuretic. In two cases of diabetes he considers that he was not allowed to make a fair trial of it. The dose he gives is generally from 1 to 8 minims three or four times a day, combined with powdered liquorice root, into pills. In porrigo favosa, he has used a lotion of a saturated solution of creosote with good effect.

My own experience of the effects of creosote is as yet confined to cases of scrofulous ulcers of the leg,

tooth-ache, lumbago and aphthæ. In the first case, of ulcers, I premised a seton in the arm, and the rapid desiccation of the ulcers caused by the creosote had no ill consequence on the brain or any other viscus. In tooth-ache I have verified the reports above alluded to. In the case of rheumatism I found the remedy at first produce distressing nausea, but the warm and copious sweat that ensued soon compensated for that symptom, and effectually removed the rheumatic pain; copious diuresis was also one of its effects.

In a case of extensive aphthous ulceration of the mouth occurring in an adult, I employed the following wash with the greatest advantage; the sloughs came away after the second time of washing, and the depressions in the mucous membrane filled up with astonishing rapidity: several of the ulcerated surfaces were as large as half of a sixpence.

Creosote.....	½ a drachm	
Gum Arabic mucilage.	1½ ounce	
Camphor Mixture...	10½ ounces.	Mix.

To wash the mouth every two hours.

Mode of Administering Creosote.

M. Reichenbach says, that his observations demonstrate that in the cure of certain ulcers, tetters and wounds, creosote water was sufficient. But it should be remembered that water does not dissolve more than about 1-80th of creosote—a proportion that will be found most inefficient in the generality of obstinate cases of ulceration. In such instances the employment of pure creosote becomes necessary.

The application of concentrated creosote to ulcers, causes, in the first instance, more or less of inflammation, which, however, quickly subsides; as soon as this inflammation appears, the remedy should be discontinued for a few days, and the wounds allowed to remain quiet. The application is then renewed with similar consequences; and this is repeated until the bad condition of the ulcer is changed, that is, until the

greenish pus becomes white, the blue or white flesh becomes red, and firm granulations fill up the solution of continuity. Creosote should therefore be employed more freely at the commencement than at the close of the treatment of these cases. When the ulcer has taken on the appearance above described, it will suffice to dress it with the creosote ointment, or water, or even desist altogether from its use, and introduce other desiccating remedies.

The best mode of applying it, is by means of a camel-hair brush to paint the surface of the sore; or from five to a dozen drops may be placed on the surface of a poultice, and this applied over the diseased point.

When used to stop external hemorrhages, it may be poured by drops into the wound; but in these cases it seems to act with more certainty if imbibed by cotton or lint, and thus applied.

To form a lotion for the employment of frictions, from two to eight drops are added to each ounce of distilled water. Creosote ointment is made from ten drops of that substance and one ounce of lard: it may be used either to dress ulcers or to rub into the sound surface.

The internal administration is either in draught or pills; the former being composed of one or two drops of creosote dissolved in camphor mixture; the latter of the same quantity and some absorbent powder with mucilage. This dose may be repeated three or four times a day, and may gradually be increased to eight drops.

The inhalation of creosote is effected, first, by steeping paper in it and placing this in approximation with the nostrils; next, by heating the creosote in the immediate neighbourhood of the patient, so that he cannot fail to inhale the fumes: or, lastly, a portion of it may be poured into hot water in a Mudge's inhaler, and the creosoted vapour inspired in the usual manner.

It should not be continued internally for too long a period, for it is apt to produce irritation of the system and pains of the stomach and intestines. Demulcents

should accompany its employment, and should occasionally replace it.

From all that I have advanced concerning the therapeutical properties of creosote, the following general conclusions may be made.

1. That creosote is beneficial in the different stages of burns.

2. It cures the majority of herpetic, furfuraceous, squamous, and crustaceous skin diseases.

3. It cicatrizes obstinate syphilitic ulcers, prevents or diminishes suppuration, and destroys the fungous growth without injuring the surrounding tissues. It also corrects the condition of cancerous ulceration.

4. In phthisis and bronchitis, though it fails to cure either, it facilitates greatly the expectoration.

5. Chronic lymphatic tumours are frequently dispersed by frictions or fomentations of creosote.

6. It is almost always successful in allaying the pain of carious teeth, but does not prevent its return nor the progress of the caries.

7. It arrests capillary hemorrhage with remarkable certainty, but fails in that from the large vessels.

8. It is an effectual remedy in atonic rheumatism, and may be tried with chance of success in cachectic disorders.*

IODURET AND HYDRIODATE OF IRON.

The ioduret of iron has been known for a considerable time as a chemical substance, chiefly employed in the preparation of the iodide of potassium, or hydriodate of potass; but Dr. A. T. Thomson has recently called attention to its medicinal properties.

* I believe that Mr. Morson, of Southampton Row, is the only manufacturer of creosote in London.

Mode of Preparation.

In preparing this substance, 126 parts of iodine, and from 40 to 50 parts of clean iron filings are mixed in a flask with 1500 parts of water; heat is applied till the mixture becomes clear, after which it is filtered. The liquor is a solution of hydriodate of protoxide of iron, consisting of hydriodic acid 127 parts, or one atom, and oxide of iron 36 parts, or one atom. By evaporating the solution nearly to dryness, the acid and oxide are decomposed; water is formed by the union of the hydrogen and oxygen evolved; and a solid combination of iodine and iron remains, which contains 126 parts, or one atom, of the former, and 28 parts, or one atom, of the latter.

Physical and Chemical Properties of Ioduret and Hydriodate of Iron.

The ioduret of iron is deliquescent, and, in decomposing the water, is transformed into hydriodate of iron, with some precipitation of oxide of iron, and some free iodine. Pure ioduret of iron is of an iron-grey colour, brittle and crystalline in texture like antimony; when dry it is inodorous; moistened, it exhales the odour of iodine. It fuses at 350° Fahrenheit, and at a higher temperature is decomposed, the iodine being volatilized and leaving a peroxide of iron.

The solution in distilled water, or the hydriodate, varies in colour from a deep greenish brown to a very pale green, or to perfect transparency, according to the neutrality of the salt and the quantity of water employed. It is decomposed by chlorine, mineral acids, arsenious acid, solutions of opium, tannin, the alkalis and their carbonates, sulphate of copper, nitrates of mercury, lead, silver, quinia, and cinchonia, infusions of foxglove, henbane, nightshade, tobacco, and all vegetable infusions containing starch. It remains in solution with all bitter vegetable infusions which contain no tannin or gallic acid.

Cases for the employment of Hydriodate of Iron.

Dr. Thomson administers it in those cases "in which the capillary system requires to be stimulated, and the tone of the habit to be maintained or brought up to the healthy standard," and he mentions, as examples, atonic dyspepsia, strumous affections, chlorosis, amenorrhœa, tabes mesenterica, rickets, &c. &c.

Mode of Administration.

The dose is two, three, or four grains taken in distilled water three or four times daily. When raised above four grains, it sometimes induces pain and uneasiness of the epigastric region, and it seems to irritate too violently.

Action on the System.

The results of experiments which Dr. Thomson performed on his own person, in order to ascertain the effects of this remedy, I shall give in his own words,

"When taken in doses from 3 to 5 grains, the hydriodate of iron makes no sensible impression on the stomach, although it sharpens the appetite and improves the digestive function; it seems to stimulate moderately the intestinal canal, through its entire length, as it opens the bowels; and whilst it produces the black colour of the alvine discharges, characteristic of all the preparations of iron, it corrects their fœtor. When it does not affect the bowels, it augments the action of the kidneys, increasing the flow of urine; and, if the solution be taken two or three times a day, for several successive days, the presence of both the iodine and the iron can be readily detected in the urine. The temperature of the skin is moderately elevated, and the insensible perspiration increased. On one occasion, having taken 10 grains for a dose, it almost immediately caused an uneasy sensation at the epigastrium, accom-

panied with nausea, that continued for several hours, and a slight degree of headache. These symptoms were relieved by a copious stool, which was perfectly black. Two hours after swallowing the medicine, a large quantity of urine was discharged; and on being tested, it displayed the presence of both iodine and iron."

On the whole, this promises to be a most useful remedy. Hitherto its most conspicuous effects have been displayed in cases of amenorrhœa, in which and in leucorrhœa, M. Pierquin has recently lauded it. M. Andral has employed it in phthisis, to modify the qualities of the blood, under the idea that the hematosis in that disease is imperfect.

Comparative Table of French and English Weights and Measures.

French Weights.	English Weights. Avoirdupois. *lb.*	*oz.*	*dr.*	*gr.*
Kilogramme, or 1000 grammes	2	0	2	0
Gramme	0	0	0	20
Livre, or 500 grammes	1	0	8	0
Once, or $31\frac{1}{4}$ grammes	0	0	9	6
Gros, or $3\frac{7}{8}$ grammes	0	0	0	60
Grain	0	0	0	$0\frac{9}{16}$

French Measures.	English Measures. *oz.*	*dr.*	*min.*
Litre	35	2	0
Pinte*	32	3	0
Livre	16	2	0
Once	1	1	0
Gros	0	1	5
Gramme	0	0	16

The French chemists always calculate fluids by weight.

Though the terms "coffee spoonful," and "mouth spoonful" are not made use of in the translation as in the French text, it may be understood with safety that the former is equivalent to a *modern-sized* English tea-spoon, and the latter to a full-sized English table-spoon; the modern tea-spoon in this country is somewhat capacious. According to several French authorities, the coffee spoonful is equal to five grammes, or 80 minims of our glasses; while the mouth spoonful contains not quite five drachms and a half. Now it will be found, on measuring the English manufactured spoons alluded to, that they exactly correspond with these quantities. Still I preferred to give the French measurement of French terms; and accordingly where five grammes, or 80 minims, is stated as the dose of a fluid, a tea spoonful, and where five gros and a half are mentioned, a table spoonful, may be understood and administered.

* This is an old French measure, the weight of which is 58.110 cubic inches; that of the litre is 61.0280: yet in 1812 both were declared to be the same!