AMOUNT AND COST OF MATERIAL REQUIRED.

Quotations here given were received by me July 24, 1884.

Deodorized alcohol.	.5 gal. @ \$ 2.40	\$12.00
Ambergris, best gray.	1/8 oz. @ 27.00	3.38
Oil of Bitter Almond.	1/2 " @ .50	.25
Oil of Bergamot.	4 " @ .10	.40
Gum Benzoin.	4 " @ .03	.12
Cassie Pomade.	1 lb. 2.25	2.25
Civet.	1/4 oz. @ 2.25	.56
Oil of Cloves.	1 " .07	.07
" Citronella.	1 " .06	.06
Jasmine Pomade.	1 lb. 2.25	2.25
Oil of Lemon.	4 oz. @ 1.40 per lb.	.35
" Grass.	1 " .10	.10
" Lavender (Mitcham).	1/4 " @ 30.00	2.50
Musk (best grain).	1/4 " @ 30.00	7.50
Oil of Neroli petale.	1 " .50	.50
" " petit grain.	1 " .44	.44
" Orange.	4 " @ .11	.44
Orange Flower Pomade.	1 lb. 2.25	2.25
Oil of Pimento.	1/2 oz. @ .24	.12
" Patchouly.	1/4 " @ 1.00	.25
" Rose.	1 " 9.00	9.00
" Geranium.	1 " .50	.50
Rose Pomade.	1 lb. 2.25	2.25
Oil of Rosemary.	2 oz. @ .10	.20
" Santal.	1 " .50	.50
Tuberose Pomade.	1 lb. 2.25	2.25
Tonka Beans.	8 oz. 2.00 per lb.	1.00
Vanilla.	4 " 10.00	2.50
Violet Pomade.	1 lb. 3.00	3.00
Oil of Vitivert.	1/2 dr. @ 1.50	.75
" Ylang.	1/2 oz. @ 8.00	4.00
Total.		\$64.90

1. AMBERGRIS EXTRACT.

Spirit of rose.	oz. 3
Tincture of ambergris.	" 8
" " musk.	" 4
" " vanilla.	" 1

Cost \$6.07 per pint. Where permanence is desired, this can be recommended.

2. ESS. BOUQUET.

Spirit of rose.	oz. 8
Tincture of ambergris.	" 1
" " orris.	" 1
Essence of cassie.	" 1
Oil of bergamot.	drops 30
" lemon.	" 60
" neroli petale.	" 15
Deodorized alcohol.	oz. 5

Cost \$2.18.

3. FRANGIPANNI.

Tincture of musk.	oz. 5
" " civet.	drachms 4
" " orris root.	oz. 3
Essence of orange flowers.	" 3
" " tuberose.	" 3
Spirit of vitivert.	" 1
Oil of santal.	drops 60
" neroli petale.	" 60
" rose.	" 120
" geranium.	" 60

Cost \$6.50 per pint. Where there is a demand for something lasting, regardless of price, this will prove satisfactory.

4. ROSE GERANIUM EXTRACT.

Oil of rose geranium.	oz. 1
Deodorized alcohol.	" 15

Cost 80 cents per pint.

5. HELIOTROPE.

Tincture of vanilla.	oz. 8
" " ambergris.	" 1
" " civet.	" 1
Spirit of rose.	" 3
Essence of rose.	" 3
Oil of bitter almond.	drops 5

Cost \$2.10 per pint.

6. HONEYSUCKLE.

Essence of rose.	oz. 4
" " violet.	" 4
" " tuberose.	" 4
Tincture of vanilla.	" 1
" " tolu.	" 1
" " musk.	" 1
Oil of neroli petale.	drops 3
" bitter almond.	" 2
Deodorized alcohol.	oz. 1

Cost \$2.80 per pint.

7. JOCKEY CLUB.

Spirit of rose.	oz. 4
Essence of rose.	" 1
" " tuberose.	" 4
" " cassie.	" 2
" " jasmine.	" 1
" " orange flowers.	" 1
Tincture of civet.	" 2
" " musk.	" 1

Cost \$2.50 per pint.

8. LAVENDER EXTRACT.

Oil of lavender (Mitcham).	drachms 4
Essence of rose.	oz. 2
Deodorized alcohol.	" 14

Cost \$2.30 per pint. By using the common oil of lavender flowers the cost will be about \$1.20.

9. LILY OF THE VALLEY OR WHITE POND LILY.

Essence of tuberose.	oz. 8
" " jasmine.	" 1
" " orange flowers.	" 1
" " cassie.	" 2
" " rose.	" 2
Spirit of rose.	" 1
Tincture of vanilla.	" 1
Oil bitter almonds.	drops 2

Cost \$2.50 per pint.

10. MILLEFLEURS (THOUSAND FLOWERS).

Spirit of rose.	oz. 3
Essence of rose.	" 1
" " jasmine.	" 4
" " orange flowers.	" 2
" " of cassie.	" 2
Tincture of orris.	" 2
" " tonka.	drachms 4
" " ambergris.	" 4
" " musk.	" 4
Oil bitter almonds.	drops 3
" " of neroli petale.	" 3
" " cloves.	" 3
" " bergamot.	" 120

Cost \$2.55 per pint.

11. MUSK.

Tincture of musk.	oz. 11
Spirit of rose.	" 4
Tincture of civet.	" 1

Cost \$5.90 per pint. This is rather a high priced article, but the tincture of musk can be reduced one-half with alcohol and still yield a satisfactory result. The cost will then be \$3.25.

12. NEW MOWN HAY.

Tincture of tonka.	oz. 6
Spirit of rose.	" 2
Essence of rose.	" 2
" " jasmine.	" 2
Oil of neroli petale.	drops 10
" rose geranium.	" 60
Deodorized alcohol.	oz. 4

Cost \$1.65 per pint.

13. NIGHT-BLOOMING CEREUS.

Spirit of rose.	oz. 4
Essence of jasmine.	" 4
Tincture of tonka.	" 2
" " civet.	" 2
" " benzoin.	" 4

Cost \$1.65 per pint.

14. ORANGE FLOWER EXTRACT.

Essence of orange flowers.	oz. 12
" " cassie.	" 2
Tincture of musk.	" 2

Cost \$3.20 per pint.

15. PATCHOULY.

Oil of patchouly.	drops 75
" rose.	" 15
Deodorized alcohol.	oz. 16

Cost 75 cents per pint.

16. SWEET PEA.

Essence of tuberose.	oz. 5
" " orange flower.	" 5
" " rose.	" 5
Tincture of tonka.	" 1

Cost \$2.50 per pint.

17. CLOVE PINK.

Essence of rose.	oz. 6
" " cassie.	" 4
Spirit orange flower.	" 4
Tincture of vanilla.	" 2
Oil of cloves.	drops 10

Cost \$2.40 per pint.

18. RONDOLETTA.

Tincture of musk.	drachms 4
" " ambergris.	" 4
" " vanilla.	" 4
Oil of bergamot.	" 1
" lavender (Mitcham).	" 2
" cloves.	" 1
" rose.	drops 30
Deodorized alcohol.	oz. 14

Cost \$2 per pint. With common oil of lavender flowers it will cost \$1.60.

19. ROSE.

White Rose (No. 1).

Spirit of rose.	oz. 8
Essence of rose.	" 3
" " jasmine.	" 4
Extract of patchouly.	" 1

Cost \$2.50 per pint.

20. White Rose (No. 2).

Oil of rose.	drachms 2
" " geranium.	drops 30
Essence of rose.	oz. 4
Deodorized alcohol.	" 16
Essence of jasmine.	" 2
Tincture of musk.	" 1
" " ambergris.	" 1

Cost \$3 per pint. Extract of white rose is a general favorite, and cannot be recommended too highly.

21. MOSS ROSE.

Spirit of rose.	oz. 9
Essence of orange flowers.	" 3
" " rose.	" 2
Tincture of civet.	" 1
" " musk.	" 1

Cost \$2.85 per pint.

22. TEA ROSE.

Essence of rose.	oz. 4
Spirit " santal.	" 8
" " santal.	" 2
Essence of orange flowers.	" 1
Tincture of orris.	" 1
Oil of rose geranium.	drops 20

Cost \$2.20 per pint.

23. SPRING FLOWERS.

Essence of rose.	oz. 7
" " violet.	" 6
Oil of bergamot.	drachm 1
Spirit of rose.	oz. 1
Tincture of ambergris.	" 1
Essence of cassie.	" 1

Cost \$2.95 per pint.

24. TUBEROSE EXTRACT.

Essence of tuberose.	oz. 15
Tincture of ambergris.	" 1

Cost \$2.85 per pint.

25. UPPER TEN.

Tincture of vanilla.	oz. 4
" " ambergris.	" 3
" " orris.	" 3
Spirit of rose.	" 3
Essence of orange flowers.	" 3
Oil of bergamot.	drops 90
" lemon.	" 15

Cost \$2.75 per pint.

26. VERBENA.

Oil of lemon grass.	drops 50
" lemon.	" 320
" neroli petale.	" 20
" orange.	" 160
Essence of orange flowers.	oz. 3
" " tuberose.	" 3
Spirit of rose.	" 3
Deodorized alcohol.	" 6

Cost \$1.90 per pint.

27. VERBENA (NO. 2).

Oil of lemon grass.	drachms 3
" lemon.	" 4
" orange.	drops 30
Deodorized alcohol.	oz. 15

Cost 60 cents per pint.

28. VIOLET.

Essence of violets.	oz. 11
" " cassie.	" 2
Tincture of musk.	" 1
" " orris.	" 2

Cost \$3 per pint.

29. VIOLET (NO. 2).

Essence of cassie.	oz. 6
" " rose.	" 3
" " tuberose.	" 3
Tincture of orris.	" 3
Spirit of bitter almonds.	" 1

Cost \$2.05 per pint.

30. WOOD VIOLET.

Extract of violets, No. 2.	oz. 16
Oil of bitter almonds.	drops 15

Cost \$2.10 per pint.

31. YLANG YLANG.

Spirit of ylang.	oz. 8
" rose.	" 4
Essence of jasmine.	" 2
Tincture of civet.	" 2

Cost \$2.70 per pint. This is my favorite; it combines fragrance and lasting qualities at a moderate price.

32. WHITE LILAC.

Essence of tuberose.	oz. 12
" " orange flowers.	" 3
Tincture of civet.	drachms 4
Spirit of ylang.	" 4
Oil of bitter almonds.	drops 3

Cost \$2.50 per pint.

To those who may wish to carry their study in perfumes and kindred arts further, I can recommend the works of G. W. S. Piesse, D. I. Cristiani, John H. Snively, and W. Saunders' article on perfumes read at the session of the twenty-fourth annual meeting of the American Pharmaceutical Association.

ON THE BOILING-POINT OF HYDROGEN.

By EDMUND J. MILLS, D.Sc., F.R.S.

In a recent memoir (*Phil. Mag.*, [5] xvii., 173) I showed that the boiling-point y of any member of a homologous series is related as follows to the coefficient x of C in its formula—

$$y = \frac{\beta(x-c)}{1+\gamma(x-c)}$$

c being the value of x to which zero Centigrade corresponds, and β γ constants depending on pressure and other conditions. Thus, the equation to the series of olefines in which x is even is—

$$y = \frac{40.709(x-4.228)}{1+0.060123(x-4.228)}$$

Putting $x = 2$, $y = -104.7^\circ$, the calculated boiling-point, at the ordinary pressure, of common olefant gas. Olzewski (*Comptes Rendus*, xcix., 133) has since found that olefant gas boils at -103° under a pressure of 750 mm.

The satisfactory character of this result has induced me to calculate the boiling-point of hydrogen. It is perfectly clear, and has been long since supposed, that hydrogen (H_2) is, or may be, the "origin" of the series of paraffins, $C H_{2n+2}$. In the memoir referred to, the boiling-points of the normal paraffins were discussed, and equations found for them. There are in all four series to deal with, viz., the even and odd series under ordinary pressure, and the same series under a pressure of 15 mm., the latter having been worked out by Krafts.

The equation for the even series is—

$$y = \frac{39.315(x-3.94)}{1+0.070753(x-3.94)}$$

and for the odd series—

$$y = \frac{38.992(x-3.92)}{1+0.070564(x-3.92)}$$

Under 15 mm., the equation to the even series is—

$$y = \frac{23.154(x-7.1)}{1+0.035484(x-7.1)}$$

and to the odd series—

$$y = \frac{21.685(x-6.77)}{1+0.030437(x-6.77)}$$

When in each of these four equations we put $x = 0$, the results are:

Even.....	y.
Even.....	—214.77
Odd.....	211.29
Even (15 mm.).....	219.76
Odd (15 mm.).....	184.91

The discordance between the results for the odd series, as compared with those of the even series, shows that hydrogen is certainly not the origin of the odd series of paraffins. The two results, however, for the even series amply support each other, and show the boiling-point of hydrogen to be about -215°C .

Messrs. Wroblewski and Olzewski are understood to be separately engaged in the investigation of this subject. According to the former (*Comptes Rendus*, xcvi., 982, oxygen and nitrogen boil respectively at -184° and -193° under the ordinary pressure, and the temperature at which hydrogen liquefies is not greatly distant from -184° . These temperatures were measured thermoelectrically. Olzewski, who uses a hydrogen thermometer, has also liquefied hydrogen, and alleges that he has measured a temperature of -213°C . (*Ibid.*, xcix., 134.)

The question will probably be settled at an early date; but it is clear that the experimental number is not likely to differ greatly from -215°C .—*Chemical News*.

NEUMAYER'S TELEPHONE.

In the central telephone office at Munich the Ader transmitter is employed, and the receivers are those of Mr. A. Neumayer. One of the latter apparatus is shown in the annexed figure. The magnet consists of five small bars, *m*, made of the best quality of English steel. In order to obtain as great a magnetic mobility as possible in the pole facing the vibrating disk, Mr. Neumayer employs a bundle of extremely fine wire, *e*. Toward its center this latter is soldered to a brass socket, and the lower half is intimately connected with magnetized rods, *m*. The other half serves as a support for the bobbin, whose wire is 0.11 mm. in diameter and has a resistance in general of 100 ohms.

NEUMAYER'S TELEPHONE.

In order to prevent those variations in distance between the diaphragm and pole which are a consequence of variations in temperature, the brass plate soldered to the bundle, *e*, is screwed to the box, *a*, that carries the vibrating disk. This box is of brass, and the diaphragm, which is 0.3 mm. in thickness, rests upon the top of it. The magnetized bars, *m*, are held in a brass ring, *f*, which is provided with a corresponding number of recesses.—*La Lumiere Electrique*.

ELECTRICITY'S DEADLY WORK.

A SHOCKING tragedy occurred on Sunday night in the Zocalo, where the beautiful concert pavilion has been erected for the festival of All Saints' and All Souls' Days. It was a case of peculiar interest. A man known as Pantaleon Estrada, a worker in guitars, tying a stone to the end of an ordinary wire, threw it over the electric wire. Estrada immediately fell dead in his tracks. The contact of the two wires killed him. A policeman standing by and a street car conductor had much of their clothing burned off, and were themselves so seriously injured that their lives tremble in the balance. The electric current affected others also more or less. The scene succeeding the tragedy was demoralizing. For a moment the dumb terror of seeing strong men totter and fall, as if struck by some invisible hand, held the crowd spellbound. Succeeding the terrorized apathy came a wild rush for life. Fortunately, exits were plentiful, and to that was due the fact that many were not stamped to death.

John Herbert of the electric light company mounted a ladder, with a silk handkerchief in hand, to remove the wire thrown by the unfortunate Estrada. The rain was falling heavily at the time, but he did not notice that the handkerchief was becoming damp. He applied it to the wire to remove it, and received himself a severe shock that threw him from the ladder. Falling to the stone pavement his head was cut open. He will recover, however. The police believe that Estrada represents a gang of pickpockets and thieves; that his object in throwing the wire was to extinguish the electric lights and give his pals a chance to operate. Whether that was so or not is not known, for he who could have told has had his lips burned to silence.

ELECTRICITY AS A MOTOR.

PROF. MOSES G. FARMER, in a recent letter to Mr. C. W. Field, gives the following interesting historical information:

Now that the application of electricity to the elevated roads is agitated, it occurs to me that it may be interesting to glance at some of the steps in the progress of discovery and invention which made electro-locomotion possible in 1850, and practicable in 1883-4. It was not until 1819-20 that Oersted, of Copenhagen, discovered that, if a wire carried a current of electricity from south to north over a magnetic needle, it caused the north end of the needle to be deflected toward the west, and also, if the current passed from north to south under the needle, the deflection of the north end of the needle was still toward the west.

It was not long before Schweiger carried the wire and current several times over and under the needle, and thus invented the galvanometer. Before 1826 Sturgeon had wound a wire several times around a bar of soft iron, and, when a current of electricity was sent through the coiled wire spiral, it made a temporary magnet of the iron bar, which magnetism remained as long as the current was flowing. Soon after, as early as 1831, Faraday discovered the principal facts of magneto-electric induction, and thus made the magneto-electric machine possible in the hands of Pixii in 1832. The Daniell's and the Grove's batteries soon after appeared, and in 1839 Jacobi, at St. Petersburg, constructed a boat, which he propelled upon the River Neva with a two horse-power electro-magnetic engine, actuated by a Grove battery, which had in it twenty square feet of platinum surface.

In 1840 Davenport and Cook, of Vermont, constructed a walking-beam engine, with which they drove a printing press, using a zinc and copper battery, with a solution of blue vitriol as the exciting liquid.

In 1842 Davidson, of Scotland, constructed a five-ton electric locomotive, which he propelled at the rate of four miles per hour with seventy-eight pairs of zinc and iron in sulphuric acid solution, the plates being thirteen inches square.

In 1844 Channing conceived the idea of substituting an electro-magnet in place of the permanent steel magnet in the magneto-electric machine of Pixii, and the further idea of using this electro-magneto electric machine to excite the field magnets of a still larger electro-magneto electric machine.

(This idea was subsequently, in 1863-6, further elaborated by Henry Wilde, of Manchester, England.)

In 1847 I constructed and exhibited in public an electro-magnetic locomotive, and with forty-eight pint-cup cells of Grove nitric acid battery drew a little car carrying two passengers on a track a foot and a half wide.

In 1850 Page, of Washington, constructed an electro-magnetic engine of sixteen horse-power, and with a hundred cells of Grove nitric acid battery, each having platinum plates eleven inches square, he propelled a car carrying a dozen or more passengers on the Washington and Baltimore Railroad at the rate of nineteen miles per hour.

In 1851 Thomas Hall, of Boston (then at work for Daniel Davis), constructed, and later exhibited at the Charitable Mechanics' Fair in Boston, a small electric locomotive which took its current from a stationary battery by means of the rails and wheel, as the following extract from a letter written to me by him, November 25, will show: "In the year 1851, when I was at work for Daniel Davis, I made a small electric locomotive, which ran on a straight track about twenty feet long. The wheels were insulated, and the electricity was conveyed to the engine by means of the rails from two Grove batteries. The cut-off was in the engine, and worked automatically or by hand, so that when the engine reached the end of the track the switch reversed the engine, and it went back to the starting point. In 1860 I exhibited in the Mechanics' Fair a small locomotive called the Volta, very finely made and finished, which ran on a circular track about eight feet in diameter. The current was conducted to the insulated wheels from two Grove batteries by means of the rails. I have a part of one of these engines on hand now, and photographs of the Volta; also woodcuts of the first ones, which were published in a catalogue between 1851 and 1860."

I asked Mr. Hall's permission to publish his letter, and in reply he says: "Shall be glad to have you publish the facts as I have stated them to you, and shall be obliged to you for doing it. You know they are facts as well as I do."

These four engines, therefore, of Davidson, Farmer, Page, and Hall could be started and stopped, sent forward or backward, at the pleasure of the engineer.

In 1859 I conceived of the self-exciting dynamo, which I constructed in 1866, and which was also conceived of by Wheatstone, Siemens, and Ladd in 1867 and by Gramme in 1871, so that by 1871 cheap electricity became possible, and nothing more was needed except to substitute the dynamo machine for the galvanic battery to make electro-locomotion both possible and cheap, and yet the invention slumbers on for a decade or more.

Now, in 1884, a host of inventors, by simply substituting the now well-known dynamo for the more expensive and troublesome acid battery, appear to be just on the eve of bringing to blossom and fruition those buds of promise after their long forty years of germination, because there was then no demand, no elevated roads, and so they came not forth.

There are two principal methods of propelling an electric locomotive: 1st. The engine carries its source of electricity, such as a galvanic battery, as did Davidson's, Farmer's, and Page's. 2d. It is picked up from a stationary source by means of the wheels and rails, as did Hall's.

In the later days, since the advent of the storage battery, the supply of electricity can be economically carried on a tender, and it is worthy of very patient and long experimental inquiry, which method is the cheaper—to lay a third rail to carry the current to the locomotive, or to charge the storage battery, place it on a tender, and attach it to the locomotive.

By the addition of ten parts of collodion to fifteen of creosote (says the *Revue de Therap.*) a sort of jelly is obtained which is more convenient to apply to decayed teeth than is creosote in its liquid form.

ELECTRICAL SPEED INDICATORS.

OUR illustrations represent Messrs. Farquharson and Lane's patent electrical speed indicator, specially designed for use on board ship for indicating the number of revolutions per minute at which an engine is running. Of course there are a number of other uses to which this instrument may be applied, such as checking the speed of dynamos, etc., which are self-evident.

The design of the instrument is certainly novel, and, from its simplicity, compactness, and reliability, should commend itself for these purposes.

A small commutator is fixed upon the shaft of the engine or other piece of machinery, the speed of which it is required to note, and upon this a contact brush is made to bear. The commutator is so arranged that at each revolution of the shaft one contact only for an

instant is made; the shaft is in connection with one pole of a battery, the other pole being connected to earth. The contact brush is joined by means of an insulated wire to the indicator, and from thence to earth.

It is evident that with a shaft traveling a given number of revolutions per minute, the interval of time between each completion of the circuit by the revolution of the commutator against the brush would be a constant interval, its length being in accordance with the speeds.

The indicator is so constructed that by pressing a button on the side of the instrument the circuit is complete the instant the commutator on the shaft has come in contact with the rubbing brush. By means of an electro-magnet placed within the indicator, at the instant the circuit is completed the pointer is released and continues to move around the dial until the commutator on the shaft has again come in contact with the

brush and completed the circuit a second time; at this moment the pointer will be instantaneously stopped.

The rate at which the hand travels being constant, it follows that the interval of time taken for the hand to move would be the same as that taken for one revolution of the shaft, and if, therefore, instead of marking the number of seconds or parts of seconds upon the dial of the instrument, the speed is marked corresponding to that interval of time, it follows that the speed of the shaft may be indicated. For instance, supposing a shaft to be traveling at the rate of 60 revolutions per minute, it would take one second to each revolution. Now the pointer in this space of time would have traveled a certain distance around the dial; if at this point the figure 60 is marked, it will represent the number of revolutions of the shaft per