

C.S.I.R. MONOGRAPH

REPORT
OF
THE ESSENTIAL OIL ADVISORY
COMMITTEE
(EXPLORATORY)

By

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Council of Scientific and Industrial Research

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FOREWORD

It affords us pleasure to know that our exploratory report on the Essential Oils of India has roused considerable amount of interest and the demand for the report has necessitated its further reprint.

We have received a number of suggestions and also some criticisms on the report. We have welcomed the suggestions but the criticisms have not been entirely constructive and have tended to be frivolous. The main criticisms have been that the facts collected by us in the report were not dead accurate. This was inevitable- looking to the fact that the report was of an exploratory nature and had to be compiled at great speed from materials supplied to us and which had to be accepted at their face value. We are, however, grateful to several friends for the valuable suggestions they have made on the report and before it is reprinted, we have deemed it advisable to incorporate some of the suggestions. We have also tried to make amends for the typographical errors which had crept into the report.

We are glad to record here that the recommendations in chapter 5 of the report were accepted by the Council of Scientific and Industrial Research in many respects and an Essential Oil Advisory Committee, under the Board of Scientific and Industrial Research, has been functioning since the first publication of the report. It is attempting to implement the recommendation in the Report and we are grateful to the Council and the Board of Scientific and Industrial Research for the sympathetic attention and the systematic encouragement they have given to the work of this Committee.

We sincerely trust that the revised edition of the report will continue to evoke the interest that has already been roused and the Indian Essential Oil Industry will be established on a sound and profitable basis.

20th September, 1946.

P. A. NARIELWALA.

J. N. RAKSHIT.

APPENDIX "A".

A list of persons, Institutions and Business firms addressed, to by the Committee.

- (1) The Director General of Commercial Intelligence and Statistics, Calcutta.
- (2) The Director, Imperial Agricultural Research Institute, New Delhi.
- (3) The Director, Indian Institute of Science, Bangalore.
- (4) The President, Forest Research Institute and College, Dehra Dun.
- (5) The Principal, Harcourt Butler Technological Institute, Cawnpore.
- (6) The Superintendent, The Kerala Soap Institute, Calicut.
- (7) The Universities of Agra, Aligarh, Allahabad, Andhra, Bombay, Calcutta, Dacca, Delhi, Lucknow, Madras, Mysore, Nagpur, The Punjab, Rangoon and Travancore.
- (8) The Directors of Industries of Assam, Bengal, Bihar, Bombay, Central Provinces and Berar, Madras, North-West Frontier Province, Orissa, The Punjab, Sind and United Provinces.
- (9) The Directors of Agriculture (Same as in No. 8).
- (10) The following Indian States : Alwar, Baroda, Bharatpur, Bikaner, Cochin, Cutch, Dewas, Gwalior, Hyderabad (Deccan), Idar, Indore, Jodhpur, Kashmir, Miraj, Morvi, Mysore, Patiala, Rajkot, Rampur, Rewa, Travancore and Udaipur.
- (11) The Chambers of Commerce and Industries of Bengal, Bombay, Cawnpore, Karachi, Lahore and Madras.
- (12) The Indian Chemical Manufacturers' Association, Calcutta.
- (13) The All-India Soap Makers' Association, Calcutta.
- (14) *Business firms and others* : Messrs. Lever Bros. (India) Ltd., Bombay ; The Tata Oil Mills Co. Ltd., Bombay ; Pierce Leslie & Co. Ltd., Cochin ; Volkart Bros. Ltd., Bombay ; Godrej Soap Ltd., Bombay ; Swastik Oil Mills Co. Ltd., Bombay ; Pattanwala Ltd., Bombay ; Ashgar Ali Mohamad Ali, Lucknow ; Government Sandalwood Oil Factory, Mysore ; The Hindustan Aromatics Co., Naini, Allahabad ; The Agri-Horticultural Society, Madras ; Mr. A. M. D'Roza, Gudalur ; The Hallacarry Estate, Coonoor ; Glenand Products, Bangalore ; Mr. A. Rahm Yercaud ; Mr. Faisandier, Yercaud ; The Indian Mildura Fruit Farm, Punjab ; The Ram-bilas Thymol Factory, Rao, Indore ; Karandikar Bros. Korla (Ratnagiri).

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Research work done in Indian Laboratories.

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APPENDIX "C"

(1)

Statement showing the quantity and value of essential oils exported from British India during the two years 1937-38 and 1938-39.

Essential Oils.	1937-38.		1938-39.	
	Gals.	Rs.	Gals.	Rs.
Cinnamon	12	125	2	15
Citronella . . . . .	...	...	12	70
Ginger grass	180	7,351	265	9,249
Lemon grass	90,121	7,22,845	97,920	7,13,068
Palmarosa	10,837	4,13,413	6,642	2,34,305
Sandalwood	13,259	13,86,216	9,695	9,47,318
Turpentine	95,100	95,001	1,78,117	2,13,080
Other sorts	1,509	31,084	3,727	1,08,511
Total	2,11,018	26,56,035	2,96,380	22,25,616

(2)

Statement showing the imports of essential oils into British India during the two years 1937-38 and 1938-39.

Essential Oils.	1937-38.		1938-39	
	Gals.	Rs.	Gals.	Rs.
(a) Synthetic	23,680	8,26,486	20,981	6,84,134
(b) Natural :—				
(i) Almond	82	1,755	148	5,128
(ii) Bergamot	754	49,648	873	55,884
(iii) Cajuputi	734	9,932	1,230	15,914
(iv) Camphor	6,853	16,714	4,637	10,821
(v) Clove	1,366	41,510	1,543	40,535
(vi) Dill	3	155	1	48
(vii) Eucalyptus	1,385	26,148	1,904	25,582
(viii) Lavender	1,328	82,022	1,771	1,02,580
(ix) Lemon	1,055	49,613	1,986	93,729
(x) Otto Rose	18	2,350	15	3,399
(xi) Peppermint	1,705	70,710	1,683	67,292
(xii) Turpentine	67,125	1,10,869	31,210	44,195
(xiii) Other sorts	29,117	4,45,164	32,210	4,85,315
Total	1,35,203	17,33,076	1,00,192	16,34,556

N.B.—1 gallon=9 lbs.

"Figures taken from the Annual Statement of the Seaborne Trade of British India."

APPENDIX "D".

Export in quantity and value from India of Essential oil-bearing Raw materials for the years 1937-38 and 1938-39.

Name of material.	1937-38		1938-39.	
	Quantity in tons.	Value in Rupees.	Quantity in tons.	Value in Rupees.
(a) Wood—				
Santalwood	1,002	10,08,867	647	6,53,743
(b) Seeds—				
(i) Ajama	177	46,729	140	43,684
(ii) Ajwan	23	5,535	24	4,769
(iii) Aniseed	97	12,981	115	17,291
(iv) Cardamom	660	31,51,691	679	21,22,190
(v) Coriander	6,151	9,27,893	6,353	8,65,301
(vi) Cummin (other than black)	1,162	5,79,096	1,404	5,34,388
(vii) Cummin (black)	167	44,368	126	31,876
(viii) Fennel	808	2,17,425	974	2,26,733
(ix) Fenugreek	866	2,34,240	1,227	2,41,328
(x) Dill	237	55,097	355	73,488
(xi) Other sorts	659	4,32,001	500	2,26,868
Total	11,000	56,07,056	11,800	43,87,916
(c) Roots—				
(i) Ginger	1,049	6,45,691	1,714	7,91,597
(ii) Turmeric	3,658	10,05,720	3,627	10,17,805
Total	4,707	16,51,411	5,341	18,09,402
(d) Flowers—				
Cloves	6	9,392	3	5,429
(e) Bark—				
Cinnamon	16	16,351	25	13,896
(f) Gum—				
(i) Benjamin	3	1,603	5	2,860
(ii) Olibanum	9	4,265	11	7,075
Grand Total	16,743	82,98,945	17,832	68,80,321

APPENDIX "E"

Approximate World Production of Important Essential Oils in quantity and value and showing the countries of origin.

Name of the oil.	Country of origin.	Annual production.	References	Value per lb. (mostly taken from Chemist and Druggist December 10, 1938, p. 652).		Total value.
				s.	d.	
American Wormseed or Chenopodium oil.	United States ...	30 tons	Schimmel's Report, 1934, p. 102.	10	3	Rs. 4,82,000
Anise oil ..	Russia ..	25 tons (?)	Ditto ..	2	0	78,000
Australian Sandalwood oil	Australia ...	30 tons	Ditto ..	14	6	6,82,000
Bay oil ...	West Indies ...	10 tons	Ditto ...	4	9	74,500
Bergamot oil ...	Calabria (170 tons) U. S. and Guinea (experimental).	170 tons	Ditto ..	15	0	40,00,000
Cajuput oil ...	Dutch Indies (90 to 100 tons) Annam (5 tons).	375 tons	Schimmel's Report, 1932, page 7.	2	6	14,70,000
Champhor oil ...	Japan (300 tons). Formosa (1,200 to 1,500 tons).	4,500 tons	Schimmel's Report, 1934, page 102.	130	0	81,90,000
Cananga oil ...	Java ..	22 tons	Schimmel's Report, 1938, page 12.	4	3	1,47,000
Cassia oil ...	China (100 to 200 tons), Java (2 to 5 tons) and Ceylon (5 to 6 tons).	200 tons	Schimmel's Report, 1934, page 102.	3	4	10,46,000

Cedarwood oil	..	U. S. A. (100 tons), Morocco (4 to 5 tons) and Italy (0.1 ton).	115 tons	Schimmel's Report, 1934, page 102, also 1938, page 148.	1 9	3,15,500
Cinnamon leaf oil	...	Ceylon (50 to 60 tons) and Seychelles (40 tons).	160 tons	Chemist & Druggist, December 10, 1938, page 648	2 6	6,27,000
Citronella oil	...	Ceylon (500 to 700 tons), Java (1,000 to 1,200 tons) and India (5 to 10 tons).	2,500 tons	Schimmel's Report, 1938, pp. 18 to 25.	1 6	58,80,000
Coriandar oil	..	Russia (30 tons), Germany, U. S. A., England, Hungary, Italy, Czechoslovakia (?).	35 tons	Schimmel's Report, 1934, page 102.	14 6	7,96,000
Clove oil	..	Madagascar and European countries	250 tons	Ditto	6 0	22,85,000
Eucalyptus oil	...	Australia (400 tons), Spain (80 to 100 tons). Italy (0.25 to 0.5 ton) and India (?)	500 tons	Ditto	1 2	9,15,000
Gautheria or Wintergreen oil.	..	United States	35 tons	Ditto	7 6	3,12,000
Geranium oil	..	Reunion (80 tons), North Africa (20 to 30 tons), Grasse (2 to 3 tons), Spain (1 to 2 tons) and Russia (3 to 5 tons).	150 tons	Schimmel's Report, 1938, pages 51-52, also 1934, page 102.	21 0	49,40,000
Jasmine oil	..	S. France, North Africa and Palestine	* between 1 & 2 tons		£93 10 0	+27,92,000
Juniper berry oil	..	Czechoslovakia (5 to 10 tons), Hungary, Yugoslavia, Germany and West Indies.	10 tons	Schimmel's Report, 1934, page 102.	4 0	-55,84,000 62,700
Lavender oil	..	France (80 to 100 tons), Spain (2 to 3 tons) and Italy (10 tons).	115 tons	Ditto	10 0	18,03,000
Lemon oil	..	Sicily and Calabria (700 tons), U. S. A. (100 to 125 tons), Martinique (0.6 ton) and Madagascar (0.1 ton).	900 tons	Schimmel's Report, 1938, pages 36 and 60.	11 0	1,55,23,000

* Approximate figures calculated by us on the basis of a yield of 0.1%.

Name of the oil.	Country of origin.	Annual production	References	Value per lb. (mostly taken from Chemist and Druggist, December 10, 1938, p. 652.	Total value.
				s. d.	Rs.
Lemongrass oil ..	India (150 to 270 tons), Madagascar (40 to 50 tons) and Martinique (0.4 to 0.5 ton).	350 tons	Chemist and Druggist, January 28, 1933, page 100.	2 2	11,89,000
Lime oil	West Indies ..	40 tons	Schimmel's Report, 1934, page 102.	17 6	10,98,000
Linaloe oil ..	Brazil (100 tons) and Guiana (15 to 20 tons).	100 tons	Ditto ..	8 0	12,10,000
Neroli oil ..	France (1.5 ton), Algeria and Tunis (0.2 to 0.5 ton), Italy (0.25 to 0.4 ton) and Spain (0.1 to 0.2 ton).	2.5 tons	Ditto ..	25 0 per oz.	15,68,000
Orange oil sweet ..	Sicily and Calabria (fell from 100 to 25 tons), Guinea (100 to 120 tons) Jamaica (30 tons), California (25 tons), Spain (10 to 15 tons), S. Africa (10 to 15 tons) and Brazil (0.5 ton).	400 tons	Schimmel's Report, 1934, page 102, also 1938, page 62 and page 73, and other reports of Schimmel & Co.	5 0	31,36,000
Orange oil bitter ..	Sicily and Calabria (25 tons) and Jamaica (5 tons).	25 tons	Schimmel's Report, 1934, page 102.	5 0	1,96,000
Origanum oil ..	Spain (25 to 30 tons), Italy (5 to 10 tons) France and Palestine (?)	130 tons	Schimmel's Report, 1938, page 74.	5 0	10,19,000
Orris-root oil ..	France and Germany ..	2 tons	Schimmel's Report, 1934, page 102.	48 0	1,50,500
Palmarosa oil ..	British India, ..	40 tons	Ditto ..	7 3	4,55,000

Patchouli oil	..	Malay States and Straits Settlements (15 to 20 tons) and Seychelles (3 to 5 tons).	35 tons	Schimmel's Report, 1938, page 77. Chemist and Druggist December 10, 1938.	9 6	5,21,000
Peppermint oil	..	U. S. (350 to 400 tons), Japan (250 to 300 tons), Italy (100 to 120 tons) Russia (10 to 20 tons), France (20 to 30 tons) and England (5 to 10 tons).	850 tons	Schimmel's Report, 1934, page 102.	8 0	1,06,62,000
Petitgrain oil	..	Paraguay (80 to 90 tons), France (1 to 2 tons), Italy (0.5 to 1 ton) and Algeria (0.25 to 0.5 ton).	92 tons	Ditto ...	3 0	4,33,000
Pimento oil	..	West Indies	5 tons	Ditto ..	7 6	58,800
Rose oil	..	Bulgaria (2 to 3 tons), Turkey (0.3 to 0.6 tons) and Italy (0.1 to 0.15 tons)	3.5 tons	Ditto ...	50 0	43,90,000
Rosemary oil	..	Spain (70 to 100 tons) and Yugoslavia (10 to 15 tons). France (5 to 10 tons)	125 tons	Ditto ..	3 3	6,37,000
Sage oil	..	.....	11,000 lbs.	Schimmel's Report, 1938, page 94.	4 6	35,000
Sandalwood oil Indian.	East	India (Mysore) (70 to 80 tons) and European countries (?).	112 tons	Drug and Cosmetic Industry, May 1941, page 540.	20 0	35,12,300
Sassafras oil	..	....	50 tons	Schimmel's Report, 1934, 102.	4 0	3,13,600
Schin or Ho oil	..	Japan	100 tons	Ditto ..	3 0	5,21,000
Spike Lavender oil	..	Spain (125 to 150 tons), France (25 tons) and Italy (?).	175 tons	Schimmel's Report 1934, page 102.	7 0	18,52,000
Staranise oil	..	Hong Kong (100 tons) and China (300 to 400 tons).	600 tons	Schimmel's Report, 1932, page 5.	3 4	31,36,000
Thyme oil	..	Spain (25 tons), France (0.5 to 1 ton), Italy and Palestine (?).	30 tons	Schimmel's Report, 1934, page 102.	4 8	2,12,000
Vetivert oil	..	Reunion (8 to 15 tons) and Java (5 to 10 tons).	30 tons	Schimmel's Report, 1938, page 105.	15 0	7,05,600
Ylang Ylang oil	..	Manilla (0.7 to 0.8 ton), Madagascar 15 to 20 tons) and Reunion (2 to 3 tons).	24 tons	Schimmel's Report, 1934, page 102.	1 6	9,03,000
		Total ..	13,968 tons		Total ...	9,87,10,500

APPENDIX "F"

A few important manufacturers and shippers of Essential Oils and Attars of
India.

- | | |
|---|--------------------------|
| 1. Rambilas Thymol Factory, Rao, Indore | Ajwan Oil and Thymol. |
| 2. M. D'Roza, Gudalur, S. India | Artemesia Oil |
| 3. Ashgar Ali Mohd. Ali, Lucknow | Attars. |
| 4. Devi Prasad Sunderlal, Kanauj | Attars. |
| 5. Mathura Prasad Suraj Prasad, Kanauj | Attars. |
| 6. Sitharam Ayodhya Prasad, Kanauj | Attars. |
| 7. The Hallacarry Estate, Coonoor | Camphor and Camphor Oil. |
| 8. The Indian Mildura Fruit Farms, Punjab | Citrus Oils. |
| 9. Manakchand Kisondas, Utran, E. Khandesh | Citrus Oils |
| 10. Gordandas Khimjee Asher, Mangalore | Cinnamon Oil. |
| 11. Pandya Jivanlal Mayashankar & Co. Mangalore | Cinnamon Oil. |
| 12. P. Narayan Vajjappa Bhandari & Sons, Mangalore | Cinnamon Oil. |
| 13. South India Cash Trading Co., Ootacamund | Eucalyptus Oil. |
| 14. The Hindustan Aromatics Co., Allahabad | Flower Oils. |
| 15. A. Rahm, Yercaud, S. India | Geranium Oil. |
| 16. Fr. Faisandier, Yercaud, S. India | Geranium Oil. |
| 17. Diwanchand Kewda Supply Co., Chitrapur | Kewda Oil. |
| 18. Govindram Khasi Ram, Chitrapur | Kewda Oil. |
| 19. The Asiatic Essential Oil Works, Ellenabad | Khus Oil. |
| 20. The Manmohan Perfumery Works, Ellenabad | Khus Oil. |
| 21. Makkar Pillai, Alwaye, Travancore | Lemon Grass Oil. |
| 22. Pierce Leslie & Co. Ltd., Cochin | Lemon Grass Oil. |
| 23. Volkart Bros., Bombay and Cochin | Lemon Grass Oil. |
| 24. Glenand Products, Bangalore | Linaloe Oil. |
| 25. Sardar Ramendar Singh, Chenab Kanel, Punjab | Palmarosa Oil. |
| 26. Botosahu, Ranihat, Cuttack | Sal Resin Oil. |
| 27. Kasambhai Manji, Ranihat, Cuttack | Sal Resin Oil. |
| 28. The Government Sandalwood Oil Factory, Mysore | Sandalwood Oil. |
| 29. The Kangudi Industrial Works, Kuppam (S. India) | Sandalwood Oil. |
| 30. Rao Sahib Chandappa Iyer, Mettur Dam | Sandalwood Oil. |
| 31. The South Indian Industrial Works, Kuppam | Sandalwood Oil. |
| 32. Lakshmi Sri Niwas Oil Mill, Karkala, S. Karana | Sandalwood Oil. |
| 33. The Sandalwood Oil Factory, Kanauj | Sandalwood Oil. |
| 34. Karandikar Bros., Ratnagiri | Tirphal, etc. |
| 35. Jallo Rosin & Turpentine Factory, Lahore | Turpentine. |
| 36. Indian Turpentine & Rosin Co. Ltd., Bareilly U.P. | Turpentine. |

APPENDIX "G"

Estimated imports into India in 1938-39 of Aromatic Chemicals.

Name of product.	Quantity imported.	Rate per lb.		Value Indian	C. I. F. ports.	
		Cwts.	s. d.		£	s. d.
(1) Amyl Acetate Pure ..	80	2	0	896	0	0
* (2) Amyl Cinnamic Aldehyde Alpha	80	5	0	1,680	0	0
* (3) Benzyl Acetate ..	360	2	4	4,704	0	0
(4) Benzyl Alcohol ..	80	2	2	970	13	4
* (5) Benzaldehyde free from Chlorine	40	2	11	653	6	8
* (6) Benzyl Benzoate ..	80	3	1	1,381	6	8
* (7) Benzyl Formate ..	7	5	6	215	12	0
* (8) Benzophenone ..	20	6	4	709	6	8
* (9) Benzyl Propionate ..	15	8	0	672	0	0
* (10) Benzyl Salicylate ..	20	4	6	504	0	0
(11) Citronellol Pure ...	60	7	0	2,352	0	0
* (12) Coumarin Crystals ...	40	10	0	2,240	0	0
* (13) Diphenyl Oxide ..	160	4	0	3,584	0	0
(14) Eugenol ..	2	10	0	112	0	0
(15) Geraniol Pure ...	100	5	0	2,800	0	0
(16) Geraniol for Soap ...	40	4	0	896	0	0
(17) Geranyl Acetate ...	15	6	0	504	0	0
(18) Heliotropin ...	40	10	0	2,240	0	0
(19) Hydroxycitronellal ..	30	9	0	1,512	0	0
* (20) Indol ...	1	66	0	369	12	0
(21) Ionone 100 per cent. ...	20	11	0	1,232	0	0
(22) Ionone Alpha ...	4	15	0	336	0	0
(23) Iso-Eugenol ...	2	12	0	134	8	0
(24) Linalol Pure ..	20	15	0	1,344	0	0
(25) Linalyl Acetate ...	30	11	0	1,848	0	0
(26) Methyl Ionone ..	3	18	0	302	8	0
* (27) Musk Ambrette ...	80	16	0	7,168	0	0
* (28) Musk Ketone ..	20	16	0	1,792	0	0
* (29) Musk Xylol ..	80	6	0	2,688	0	0
* (30) Nerolin Yara Yara ..	60	4	0	1,344	0	0
* (31) Phenyl Ethyl Alcohol ...	100	7	6	4,200	0	0
(32) Rhodinol ...	2	12	0	134	8	0
* (33) Skatol ..	0.25	66	0	98	0	0
(34) Turpeneol ..	160	2	6	2,240	0	0
(35) Vanillin ..	80	14	0	6,272	0	0
Total ...	1911.25			50,129	1	4

N. B.—The products marked with an asterisk are obtained from coal-tar derivatives. At the rate of exchange of Re 1 = 1s. 6d. the value of this import comes to Rs. 6,83,000.

APPENDIX "H".

Chemical classification of aromatic constituents of Indian Essential oils.

N. B.—The numbers in brackets represent the serial reference numbers in Appendix B.

Hydrocarbons.

1. Aromadendrene (112).
2. Bisabolene (41).
3. Cadinene (15, 36, 103).
4. Camphene (16, 18, 20, 29, 112).
5. Carene (11, 14, 15, 27, 36, 62, 120).
6. Caryophyllene (15, 37, 103, 109, 112).
7. Curcumene (28).
8. Cymene (55, 97).
9. Dipentene (10, 42B, 97, 103).
10. Ishwarene (59).
11. Limonene (11, 17, 18, 20, 92).
12. Longifolene (7, 11).
13. Myrcene (44).
14. Ocimene (102, 128).
15. Phellandrene (30, 37, 42A and B, 49, 54).
16. Pinene (6, 7, 8, 9, 10, 11, 62, 92, 93, 102, 103, 112, 128).
17. Sabinene (10, 12, 36, 42C, 43).
18. Santalene (85).
19. Sylvestrene (93).
20. Terpinene (10, 42C, 55, 97).
21. Thujene 49
22. Zingiberene (30, 32, 55).

Alcohols.

23. Benzyl Alcohol (73).
24. Borneol (18, 20, 92, 94, 112).
25. Citronellol (No Indian work has been brought to our notice).
26. Geraniol (17, 18, 73, 84, 86, 89).
27. Isocyperol (81).
28. Linalool (42A & B, 73, 118, 128, 140, 141).
29. Menthol (76).
30. Perillic alcohol (17, 19).
31. Phenyl ethyl alcohol (73).
32. Santalol (73, 85, 96).
33. Terpeneol (6, 8, 12, 37, 92).

Aldehydes.

34. Citral (17, 141, 142, 145).
35. Citronellal (141).

Ketones

36. Camphor (28, 29, 38, 103).
37. Carvone (53).
38. Carvotanacetone,-d. (121).
39. Cyperone, -L (81).
40. Fenchone (52).
41. Ishwarone (58).
42. Menthone (76).
43. Methyl heptenone (17).
44. Piperitone, -d (14).
45. Tetrahydrocarvone, -1(121).
46. Turmerones.

Phenols and phenolic ethers.

47. Anethol (52).
48. Asarone (25).
49. Carvacrol (55).
50. Dill apiol (53).
51. Eugenol (34, 37, 141, 142, 143).
52. Eugenol methyl ether (25).
53. Safrol. (44, 128).
54. Thymol (63, 64).

Esters.

55. Benzyl acetate (73, 172).
56. Benzyl Benzoate (73).
57. Benzyl Salicylate (73).
58. Bornyl acetate (112).
59. Ethyl cinnamate (27).
60. Ethyl methoxycinnamate (27).
61. Geranyl acetate (4, 18).
62. Geranyl tiglate (89).
63. Linalyl acetate (50, 73, 118, 128).
64. Methyl cinnamate (42B, 140, 141).
65. Methyl salicylate (90).
66. Terpinyl nonylate, -1 (6).

Lactones

- 67. Costus lactone (58).
- 68. Dihydrocostus lactone (58).

Oxides.

- 69. Cineol (28, 29, 30, 36, 103).

Unclassified.

- 70. . Apilotaxene (58).
- 71. Asarylic aldehyde (25).
- 72. Azulene (48).
- 73. Bromstyrol (73).
- 74. Cadinol, -l (No Indian work).
- 75. Calamene (25).
- 76. Calamenenol (25).
- 77. Calameone (25).
- 78. Camphoracene, -n (27).
- 79. Clausenane, L-, B-, &-, di (80, 83).
- 80. Copaene (No Indian work).
- 81. Costene L-, B- (58).
- 82. Costol (58).
- 83. Guaiacol (73).
- 84. Ishwarol (59).
- 85. p-methoxy salicylic aldehyde (95).
- 86. p-methyl -tetrahydroacetophenone (5).
- 87. Pentadecane -n (27).
- 88. Piperitol, -d (15).
- 89. Zingiberol (31).

APPENDIX "I"

List of Essential oils incorporated in the British Pharmacopœia 1932.

- Oil of American Wormseed, see *Oleum Chenopodii*.
- Oil of Anise.
- Oil of Aniseed, see *Oleum Anisi*.
- Oil of Australian Sandalwood.
- Oil of Cade.
- Oil of Cajuput.
- Oil of Caraway.
- Oil of Chenopodium.
- Oil of Cinnamon.
- Oil of Clove.
- Oil of Coriander.
- Oil of Dill.
- Oil of Eucalyptus.
- Oil of Lavender.
- Oil of Lemon.
- Oil of Nutmeg.
- Oil of Peppermint.
- Oil of Pine, see *Oleum Abietis*.
- Oil of Rosemary.
- Oil of Sandalwood.
- Oil of Siberian Fir.
- Oil of Turpentine.