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AROMATICS AND THE SOUL

DISEASES OF
THE THROAT, NOSE,
AND EAR

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AROMATICS AND THE SOUL

A STUDY OF SMELLS

BY

DAN MCKENZIE, M.D. (GLASG.)

FELLOW OF THE ROYAL COLLEGE OF SURGEONS, EDINBURGH

“Natura rerum quae sit odoribus
intenta sunt . . .

Q. Horatii Flacci Carminum, Lib. V.”

“There are whose study is of smells”

R. Kipling's version of the same



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PREFACE

HAVING, as I thought, completed this book—bar the Preface, which is, of course, always the last chapter—I sent it in manuscript to an old friend of mine for his opinion.

He let me have it.

“Your brochure,” he wrote, “is remarkable more perhaps for what it omits than for what it contains. For example, there is no mention whatever made of the *vomero-nasal organ, or organ of Jacobson.*”

Then, after drastically sweeping away the much that seems to him redundant in the body of the work, he closes his general criticism (which I omit) with “I should like to have heard your views on the vomero-nasal organ. Parker devotes a whole chapter to it.”

A carpenter, according to the adage, is known by his chips. And it was by the simple removal of some superfluous marble, as every one knows, that the Venus of Milo was revealed to the world—which is only another way of saying the same thing.

But what sort of a carpenter is he who leaves

among his chips the mouldings of his door? And what should we say of the sculptor, even in these days, who would treat as a superfluity his lady's chin?

No mention of the vomero-nasal or Jacobson's organ! A serious, nay! a damning, defect.

So here am I trying to atone for the sin of omission by giving the neglected item place of honour in my Preface. "The stone which the builders rejected . . ."

But my motive for erecting it here, in the gateway to my little pagoda of the perfumes, is not quite so simple as I am pretending. The fact is that in my capacity as creator I predetermined, I actually foredained, the omission from my text of the structure to which "Parker devotes a whole chapter."

I am sorry in some ways. But as the Aberdeen minister so consolingly said: "There are many things the Creator does in His official capacity that He would scorn to do as a private individual."

You see, I had a feeling about it. One of those feelings artists are subject to. (But a scientific writer an artist?—Certainly! Why not?)

I felt, to be quite frank, that if I were to interpolate a description and a discussion of this *minutia* my book would . . . would . . . Quite so. The artist will understand.

I came, in short, to look upon this "organ,"

this nose within a nose, as a touchstone, so to speak. The thing became a Symbol.

But here we plunge head over heels into the Subjective, on the other side of which stream lie the misty shades of the Occult. For that is what happens to you when you begin talking about Symbols.

However, we shall not be crossing to the other side on this occasion, my symbolism being after all but a humdrum affair.—Merely this, that to me this organ of Jacobson is the symbol of the Exhaustive—of the minute, punctilious, unwearying, laboured comprehensiveness, Teutonic in its over and under and through, that characterises the genuine, the reliable, scientific treatise and renders it so desperately full of interest—to examinees.

Imagine, if you can, the indignation of kindly Sir Walter were the news ever to reach him in Valhalla that urchins now at school are not only forced to study his light-hearted romances as holiday tasks, but are actually examined upon them!

So, comparing small things with great, let me say: “*Absit omen.*”

My faith in the spoken charm of that phrase is, however, none too robust. Heaven helps the man who helps himself. And so, by way of rein-

forcing the Powers in their efforts to divert professorial attention from this essay of mine, I am leaving it, by a careful act of carelessness, incomplete.

Here, then, you have the real reason for my exclusion of the organ of Jacobson (and the like). It is merely a dodge to prevent the book ever becoming a task in any way, for any one, at any time.

He who runs may read herein, then, without slackening pace—or he may refrain from reading, just as he pleases, seeing that he can never be under the compulsion of remembering a single word I have written.

This, if I may say so, is, in my opinion, the only kind of book worth reading. At all events, it is the only kind I ever enjoy reading, and I say if a book is not enjoyable it is already placed upon the only Index Expurgatorius that is worth a . . . an anathema.

D. M.

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AROMATICS AND THE SOUL

CHAPTER I

OLFACTION AND PUBLIC HEALTH

I SING of smells, of scents, perfumes, odours, whiffs and niffs; of aromas, bouquets and fragrances; and also, though temperately and restrainedly I promise you, of effluvia, reeks, fœtors, stenches, and—stinks.

A few years ago I stood before the public singing another song. By no means a service of praise it was, but something of the order of a denunciatory psalm, wherein I invoked the wrath of the high gods upon such miscreants as make life hideous with din.

You must not think that imprecations cannot be sung. All emotional utterance is song, said Carlyle; only he said it not quite so briefly. And, leaving on one side the vituperations of his enemies by King David (if he it was who wrote the Psalms) which we still chant upon certain days of the

Christian year, it may be remembered that in bygone times when the medical practitioner was a wizard (or a witch) and uttered his (or her) spell to stay the arrows of Apollo, it not infrequently contained a denunciation of some brother (or sister) practitioner of the art (how times are changed !), and it was known, in Rome at all events, as a *carmen*, a song. Hence, say the etymologists, the English word "charm," which still, of course, characterises the modern witch, if not the modern wizard—neither of whom, we may add, is nowadays a medical practitioner.

Besides, denunciations are, of course, grunted and growled with more or less of a semblance of singing in modern opera. To substantiate my words I need only mention that interminable scene—or is it an act?—of gloom and evil plottings by Telramund and Ortrud in *Lohengrin*.

But if I am again singing, this time, I trust, my voice will sound in the ears of my hearers less shrill, less strident, less of a shriek. For, in sooth, the present theme is one upon which we are justly entitled, in so far as England and Scotland at all events are concerned, to raise what would be a *Nunc Dimittis* of praise and thanksgiving, were it not that the price of cleanly air like that of liberty is eternal vigilance, seeing that our nostrils are no longer offended by the stench our forefathers had to put up with. That they endured such

offences philosophically, cheerfully even, laughing at the unpleasantness as men do at a bad smell, is true. Nevertheless most people in those days probably felt as much objection to a vile odour as Queen Elizabeth, for example, did, the sharpness of whose nose, her biographers tell us, was only equalled by the sharpness of her tongue.

Irishmen who do me the honour of tasting this light omelette of scientific literature will have noticed, I am sure, that I have not included the sister isle in my olfactory paradise. And indeed, I hesitated long before passing it over, because I am a man of peace—at any price where the Land of Ire is concerned. But alas! I am by nature truthful and only by art mendacious. And there sticks horrible to my memory the fumous and steamy stench of parboiled cabbage that filled the restaurant-car of the train for Belfast—yes! Belfast, not Dublin—one evening as I landed at Kingstown. The sea had been—well! it was the Irish Sea, and I stepped on to the train straight from the mail-boat, so that . . . in a word, I remember that luscious but washy odour too vividly to bestow upon Ireland the white flower of a stenchless life.

In these remarks I have been careful to observe that the train was not the Dublin train, but if any one feels moved to defend the capital city, let him

first of all take a stroll down by the Liffey as it flows fermenting and bubbling under its bridges, and then . . . if he can . . .

Let me, however, in justice to that grief-stricken country, spray a little perfume over my too pungent observations. I can also recall after many years a warm and balmy evening in the town of Killarney, the peaceful close to a day of torrential rain. The setting sun, glowing love through its tears, was reddening the sky and the dark green hills around, those hills of Ireland where surely, if anywhere on this earth, heaven is foreshadowed. And linked in memory with that evening's glory there comes, like the gentle strain of a long-forgotten song, the rich, pungent smell of turf-smoke eddying blue from low chimneys into the soft air of the twilight. Ireland! Ireland! What an atmosphere of love and grief that name calls up! Surely the surf that beats upon the strands of Innisfail far away is more salt, more bitter, and perhaps for that very reason more sweet, than the waters of any of the other beaches that ocean bathes!

Thence also comes a memory of heliotrope. It grew by a cottage just beyond a grey granite fishing-harbour in Dublin Bay, and brings also, with its faint, ineffable fragrance, the same inseparable blending of emotions that clings, itself a never-dying odour, to the memory of holidays

in Ireland. There is a phrase in a song, simple, sentimental, even silly if you like, that prays for "the peace of mind dearer than all."

"But what," I remember asking the mother of our party—"what is meant by 'peace of mind'?" Her wistful smile seemed to me to be a very inadequate reply to my question—which, by the way, I am still asking.

It is an historical fact that the movement which rendered England the pioneer country in the matter of Public Health received its first impulse from, and even now owes its continued existence to, the simple accident that the English public has grown intolerant of over-obtrusive odours. Stenches have attained to the dignity of a legal topic of interest, and are now by Act of Parliament become "nuisances" in law as well as in nature, with the result that they have been, for the most part, banished from the face of the land and the noses of its inhabitants.

The reason assigned by the man in the street for this reform was, and indeed still is, that stenches breed epidemic diseases. In a noisome smell people imagine a deadly pestilence, probably because patients affected with such epidemic diseases as smallpox, typhus, and diphtheria, give off nauseating odours. Now, bad smells from drains and cesspools do not of themselves induce

epidemic disease. Nevertheless, there is this much of truth in the superstition, that where you have bad smells you have also surface accumulations of filth, and these, soaking through soil and subsoil, contaminate surface wells, until it only requires the advent of a typhoid or other "carrier" to set a widespread epidemic a-going. Further, as recent investigators have shown us, the loathsome and deadly typhus fever, known for years to be a "filth-disease," is carried by lice, which pests breed and flourish where bodily cleanliness is neglected and personal odours are strong.

So that in this, as in most superstitions, there is a substratum of truth.

But the point is, that the objection to bad smells preceded all those scientific discoveries and had, in the beginning, but a slender support from rationalism. Our forebears builded better than they knew. Their objection was in reality intuitive. It may be true that all nations occupying a corresponding level of civilisation will manifest the same instinctive abhorrences, but it has been left to the practical genius of the English race to give effect to the natural repugnance and to translate its urgings into practice.

The interesting question now arises : How and when did this intuition or instinct, this blind feeling, arise, and what transformed it from a mere individual objection, voiced here and there, to a

mass-movement leading to a general popular reformation?

The first explanation that is likely to occur to us is, that it was due to the refinement of feeling that accompanies high civilisation operating in a community quick to respond and to react when a public benefit is anticipated. One of the results of culture is an increase in the delicacy of the senses. When men and women strive after refinement, they achieve it, becoming refined, in spite of what pessimists and so-called realists preach, not only in their outward behaviour, but also in their innermost thoughts and feelings, and this internal refinement implies among other things a quickening of the sense of disgust. There is naturally a close and intimate connection between the sense of smell and the nerve-centres which, when stimulated, evoke the feeling of nausea in the mind—and the bodily acts that follow it. We are here dealing, in fact, with a primitive protective impulse to ensure that evil-smelling things shall not be swallowed, and the means adopted by Nature to prevent that ingestion, or, if it has accidentally occurred, to reverse it, are prompt. And successful. There is no compromise with the evil thing.

Like all other nerve-reactions, this particular reflex can be educated: either up or down. It can be blunted and degraded, or it can be rendered

more acute, more prompt to react. Now, one of the effects of civilised life, of town life, is to abbreviate the period of all reflex action. And if this applies to knee-jerks and to seeing jokes, it is even more noticeable in the particular reflex we are here considering.

A citizen of Cologne in Coleridge's days, for example, must have been anosmic to most of the seven-and-twenty stenches that offended the Englishman, and in my own time I have counted as many as ten objectionable public perfumes, yea ! even in Lucerne, the " Lovely Lucerne " of the railway posters. Several of these, perhaps, did not amount to more than a mere whiff, just the suspicion of a something unpleasant, no more (but no less) disturbing than, say, one note a semi-tone flat in a major chord ; two or three of them, however, to the sensitive, thin-winged organ of an English school-ma'am, would have attained to the rank of a " smell," a word on her lips as emphatic as an oath on yours or mine ; four of them, at the least, were plain stenches, and so beyond *her* vocabulary altogether ; and one was—well ! beyond even mine, but only too eloquent itself of something ugly and bloated, some mess becoming aerial just round the corner. I did not turn that corner.

Now, the people of Lucerne could never have smelled them, or at all events they could never

have appreciated those perfumes as I did, or the town would have been evacuated. Their olfactory sense compared with mine must have been a stupid thing, dense to begin with, and cudgelled by use and went into blank insensibility. Because, it is obvious, delicacy in this, as in all the senses, can only be acquired by avoiding habitual overstimulation. And that avoidance is only possible in a country where odours are fine, etherealised, rare.

Even in France, France the enlightened, the sensitive, the refined, primitive odours pervade the country, as our Army knows very well. Not only is the farm dunghill given place of honour in the farm courtyard, close to doors and windows, but even in the mansions of the wealthy the cess-pool still remains—not outside, but inside, the house, the water-carriage system, even the pail-system (if that can be called a system), being unknown. So that our Army authorities had to send round a peculiar petrol-engine, known to the Tommies as “Stinking Willie,” to empty those pools of corruption. Some of the monasteries used by us as hospitals were, at the beginning of the war, even worse.

From this we may surmise that the olfactory sense of our neighbours is not yet so sensitive as is ours.

But in this matter Western Europe, at its worst—say, in one of the corridor-trains to Marseilles—is a mountain-top to a pigstye compared with the old and gorgeous East. “The East,” ejaculated an old Scotsman once—“the East is just a smell! It begins at Port Said and disna stop till ye come to San Francisco, . . . if there!” he added after a pause. From his sweeping condemnation we must, however, exempt Japan.

Who can ever forget the bazaar smells of India, the mingled must and fust with its background of garlic and strange vices, or the still more mysterious atmospheres of China with their deep suggestion of musk?

Naturally the air of a cold country is clearer of obnoxious vapours than that of tropical and subtropical climes, but in spite of that, the first whiff of a Tibetan monastery, like that of an Eskimo hut, grips the throat, they say, like the air over a brewing vat.

So that, after making every allowance for the favour of Nature, we are still entitled to claim that the relative purity of England, and of English cities, towns and even villages, is an artificial achievement.

I may therefore, with justice, raise a song of praise to our fathers who have had our country thus swept and garnished, swept of noxious vapours and emanations, and garnished with the

perfume of pure and fresh air, to the delight and invigoration of our souls.

And yet the change has only recently been brought about. Up to the beginning of the nineteenth century the city of London

“was certainly as foul as could be. The streets were unpaved or paved only with rough cobble stones. There were no side walks. The houses projected over the roadway, and were unprovided with rain-water gutters, and during a shower rain fell from the roofs into the middle of the street. These streets were filthy from constant contributions of slops and ordure from animals and human beings. There were no underground drains, and the soil of the town was soaked with the filth of centuries. This sodden condition of the soil must have affected the wells to a greater or less extent.” (“London, Sanitary and Medical,” by G. V. Poore. 1889.)

Moreover, the nineteenth century was well on its way before the last of the private cesspools disappeared from the dwelling-houses of London.

Edinburgh during the Middle Ages was, we are told, fresher and cleaner upon its wind-swept ridge than London, but with the erection of lofty houses in the High Street and Haymarket of the northern capital its atmosphere became much worse than that of London. The reason for this was that while the London houses remained low, and the population therefore, for a city, widely distributed, in those of Edinburgh, on the other hand, a large community of all classes of society was concentrated, from the noble lord and lady

to the beggarly caddie and quean. And the whole stew was quite innocent of what we call drainage. Quite. Yet the waste-products of life, the lees and offscourings of humanity, all that housemaids call "slops," had to be got rid of. Very simple problem this to our worthy Edinburgh forefathers. After dark the windows up in these "lands" were thrust open, and with a shrill cry of "Gardy-loo" (*Gardez l'eau*) the cascade of swipes and worse fell into the street below with a splash and an od—. "Ha! ha!" laughed Dr. Johnson to little Boswell; "I can smell you there in the dark!"

The hygienic reformation of Britain, although adumbrated by sundry laws made at intervals from the fifteenth century onwards, was not seriously taken in hand until as late as the sixties of last century, and Disraeli's famous Act defining a bad smell as a "nuisance" became law in 1875.

But although we may justly congratulate ourselves upon the hygienic achievements of England, one result of which has been the minimising of unpleasant odours, nevertheless, as a wider consideration of the facts will show us, the task of cleansing the air of England is not yet entirely completed. It is doubtless true that what we may term domestic stench has for the most part been dispelled, but as regards public fœtors there are

still, I regret to say, a few that abide with us, seemingly as nasty as ever they were.

One deplorable instance you will encounter at the Paddington terminus of the Great Western Railway no less, at a certain platform of which station, lying in wait for our fresh country cousins on their arrival in London, there lurks a livid concoction of ancient milk, horse-manure, live stock, dead stock, and, in the month of July, fermenting strawberries, as aggressive and unashamed as the worst Lucerne has to offer. I commend it to the attention of the Medical Officer of Health for Paddington.

Nay more! This West London efflorescence does not lie blooming alone. It is by no means the last rose of summer. On the east side of the great city, another, a rival upas-tree, spreads its nauseating blight. This is a mess that, oozing from a soap factory near Stratford-att-Bow, envelops in its oleaginous cloud several hundred yards of the main line of the Great Eastern Railway. And the world we live in is so arranged that the trains, particularly in summer, are held up by signal for several minutes in this neighbourhood, so that, as the greasy slabs of decomposing fats slump in at the open carriage windows, an early opportunity is afforded to our Continental visitors of becoming acquainted with the purifying properties of English soap.

I am blushing now for what I have been saying about Ireland, Cologne, Lucerne, France, and even the East.

This last instance, however, opens up a large subject, that, namely, of malodorous industries. Of these there is a great number, too great indeed for me to do more than make a passing allusion to them. The proximity of evil-smelling works and factories to human habitations is, as a matter of fact, prohibited by the Public Health Acts, but it is naturally impossible to remove them entirely from the knowledge of mankind inasmuch as the workers frequently carry the atmosphere about with them. Fortunately for them, but unfortunately for us, by reason of the rapid exhaustion of the olfactory sense (which we are about to deal with in the following section), they are, for the most part, not incommoded by the objectionable airs they work in.

Perhaps the worst of all are the bone-manure factories, malodorous mills which are almost invariably situated at a distance of several miles from any dwelling-house, as it would be impossible for any one but the workers themselves to live in their neighbourhood. These unfortunate people, many of whom are women, carry, as I have already remarked, the stench about with them on their clothing and persons, and I have observed that, being themselves insensitive to the odour, they

cannot rid themselves of it even on Sundays and holidays.

In this class also we must place tanneries, glue-works, and size factories, a visit to which is a severe trial for any one unaccustomed to them. Dye-works, likewise, by reason of the organic sulphur compounds they disseminate through the spongy air, are unpleasant neighbours. In cotton mills, also, the sizing-rooms are objectionable, and here, curiously enough, the operatives do not seem to become accustomed to the smell, as it is insinuatingly rather than bluntly offensive, and grows worse with use. So much so, indeed, that but few of the girls, I am told, are able to remain in that particular occupation for more than a few weeks at a time.

At this stage, albeit early in our disquisition, we may appropriately turn to consider the curious fact that of all our senses that of smell is perhaps the most easily exhausted. The olfactory organ, under the continued stimulation of one particular odour, quite quickly becomes insensitive to it. Perhaps this is the reason, or one of the reasons, why reform was so long delayed.

There are, however, in this respect great differences between odours. With some the smell is lost in a few seconds, while with others we continue to be aware of it for a much longer time.

Curiously enough, odours seem, in this matter, to follow the general law of the feelings in that the pleasant are lost sooner than the unpleasant. It is the first breath of the rose that makes the fullest appeal, when the whole being becomes for a moment suffused with the loveliest of all perfumes. But only for a moment. All too soon the door of heaven closes and the richness thins away into the common airs of this our lower world.

On the other hand, the aversion we all feel from substances like iodoform, or, what is worse, scatol, owes not the least part of its strength to the fact that both of those vile smells are very persistent. As was once said to a surgeon applying iodoform to a wound in a patient's nose : " This patient will certainly visit you again, sir, but—it will not be to consult you ! "

To this more or less rapid exhaustion of the sense is due the merciful dispensation that no one is aware of his own particular aura. We are only cognisant of odours that are strange to us. The Chinese and Japanese find the neighbourhood of Europeans highly objectionable, and we return the compliment. It is the stranger to the Island who remarks the " very ancient and fish-like smell."

Fatigue and then exhaustion of a sense-organ, rendering it finally irresponsive to a particular stimulus, is, of course, familiar to us also in the

case of vision, as the soap advertisement of our boyhood with its complementary colours taught us. Taste manifests the same phenomenon, for which reason (so he says) the cheese-taster in Scotland swallows a little whisky after each of the different samples he tries. But, curiously enough, the healthy ear is not thus dulled save by a very loud, persistent noise, and then there is the risk of permanent damage to the hearing organ. Some forms of tactile sensation, also, would seem to remain ever sensitive, for, although it may be possible to become so inured to pain as to ignore it, yet that is probably a mental act, and it is said, moreover, that men have been tortured to death by the tickling of the soles of their feet.

But, as we have already seen, of all the senses none so quickly becomes inert under stimulation as olfaction. Why it would be hard to say, unless, like the exhaustion of colour-vision, it is due to the using up of some chemical reagent in the sense-organ. At all events, if you wish to appreciate the full intensity of a smell, you should arrange to come upon it from the open air.

I wonder if this, or something like it, is the reason why England was the first country in the world to wage war against its stench. For the English are of all races the most addicted to fresh air. Consequently, they are the most likely to keep habitually their olfactory sense unspoiled and

virgin. This, I admit, is only pushing the matter a step further back, and we are still left with the question : Why is it that the English are so fond of the open ? Largely, I imagine, because their climate is so damp that an indoor atmosphere is always a little oppressive to them.

Whatever may be the reason, however, there is no doubt that the keen, clean chill of an English April day, especially when the wind is in the east (*pace* Mr. Jarndyce), brings to us an exaltation of spirit that surpasses the exhilaration of wine, and at the same time renders us impatient with mustiness and fustiness, intolerant of domestic stuffiness, and frankly disgusted with the pungent, prickly vapours of intimate humanity in the mass. The wind on the hilltop is our aspiration, our ideal. Hence, maybe, the Public Health Acts, and also the national tub.

The use of the domestic bath is, we must not forget, a social revolution of our own day and generation. Our grandfathers ventured upon a bath only when it seemed to be called for—by others. Our grandmothers, with their clean, white cotton or linen undergarments, had, or thought they had, even less need for it. Besides, in their prim and bashful eyes the necessary denudation antecedent to total immersion would have amounted, even when they were alone, to something like gross indecency. Before their

time, again, in the eighteenth century, matters were even worse, for the society ladies of that day painted their faces *instead* of washing them, and mitigated the effects of seldom-changed underclothing by copiously drenching themselves with musk and other reliable perfumes. (I am told, however, that even to-day fashionable ladies refrain from washing their faces !)

The domestic bathroom is the direct offspring of the gravitation water-supply and the modern system of drainage. Buy an old house, and you will have to convert one of the bedrooms into your bathroom, and, to this day, you must carry your bath with you if you go to reside in certain of the Oxford colleges.

I can myself remember in my younger days in Scotland an old doctor having his first bath in the palatial surroundings of a modern bathroom. Not in his own house, needless to say ! After a patient and particular inspection of all the glittering taps of " shower," " spray," " plunge," and what not, he commended his spirit to the Higher Powers—or rather, I fear, according to his wont, for he was not of the Holy Willie persuasion, to the keeping of those of the Nether Regions. Then he proceeded gingerly to insert into the steaming water first of all his toes, then his feet, next his ankles, and so bit by bit, until, greatly daring, he had

committed his entire body to the deep—to emerge as soon as possible ! He was no coward, let me tell you, in the ordinary run of life. But this was his first bath in the altogether since his primal post-natal plunge. His first bath ! And his last ! It nearly killed him, he said ; never in all his life had he felt so bad, and not for a thousand pounds would he repeat the experiment !

One more tale. Cockney this time. A gentleman of my acquaintance was one day discussing with an old-fashioned baker the modern making of bread by machinery. Both agreed that the older method made the better bread. The new was not so good. “ It seems,” said my friend, “ as if nowadays bread lacks something, but what that something is I cannot tell.”

“ You are puffickly right, sir,” returned the baker. “ It does lack something, and wot that something is I can tell you—it lacks the aromer of the ’uman ’and ! ”

CHAPTER II

THE SENSE OF OLFACTION IN LOWER ANIMALS

OLFACTION is generally felt to be the lowest, the most animal, of the senses, so much so that in polite society it is scarcely good manners to mention smells, and I am well aware of the risks I run in writing a book on the subject. And yet this feeling is by no means false modesty, because it is, first and foremost, to the animal in us that smell makes its appeal. None of the other senses brings so frankly to notice our kinship with the brute.

Olfaction is, indeed, one of the primitive senses of animal life. And in man, as it happens, while vision has constructed for itself a highly complicated camera-like end-organ, and hearing has produced an apparatus even more elaborate, the olfactory organ, on the other hand, remains primitive, its essential structure having undergone no apparent evolutionary change from the simplest and earliest type.

This, perhaps, is scarcely the proper way of expressing the situation. Evolutionary change has, as a matter of fact, occurred, but it reaches

its highest development not in man, but in terrestrial mammals otherwise inferior to him—in the dog, for example.

For once, man does not occupy the apex of the evolutionary pyramid.

Olfactory development, high or low, is linked up with the natural habits of the different species. Thus, mammals which go about on all fours, whose visual outlook is restricted and whose muzzle is near the ground, are the most highly gifted; those, again, like the seals, porpoises, whales, and walruses, which have reverted from a terrestrial to an aqueous environment, where smell is of less value to them, show poorly developed olfactory organs; and finally, the apes and man, living habitually above the ground, the former in trees, the latter on his hind legs, and relying chiefly upon vision, also show a decline from the high point reached by four-footed mammalians.

The animals of this kingdom are thus divided into macrosmatic and microsomatic groups. To the latter man belongs, but we must add that his olfactory sense has not yet degenerated so completely as that of certain other species (porpoises, etc.).

It is, of course, common knowledge that in most of the animals we are closely acquainted with the sense of smell is infinitely more delicate and

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acute than ours, so much so, indeed, that the imagination can on occasion scarcely conceive theirs to be of the same nature. As a matter of fact, many authorities incline to the belief that not only mammals and other vertebrates, but also insects, must be guided to their food and to their love-mates by some kind of perception, by some mysterious sense, of which we are totally devoid.

As this is a division of our subject of the highest interest, and one to which we shall have occasion to recur at intervals throughout this treatise, we shall discuss the matter as fully as the space at our disposal will permit.

The unit of the olfactory sense-organ is the olfactory cell. This, which does not vary in structure from one end of the animal kingdom to the other, is microscopically seen to consist of an elongated body like a tiny rod, bearing on its free end a small enlargement or prominence, on the surface of which is a cluster of extremely fine protoplasmic filaments, the olfactory hairs. These hairs project into and are immersed in a thin layer of mucus, at all events in air-breathing animals, an environment which is necessary for their functional activity, because, if the nose becomes desiccated, as it does in some diseases, the sense of smell is lost (anosmia). The hairs

are, without doubt, the true receptive elements of the olfactory cells. It is these which come into contact with and are stimulated by odours—whatever the nature of Odour may be.

The deep (proximal) end of the rod-like olfactory cell tapers into a nerve-fibre, which passes by way of the olfactory nerve to a special lobe of the brain—the olfactory lobe—in the vertebrates, or to a nerve-ganglion in the invertebrates.

Olfactory cells in man are only found in the upper—the olfactory—region of the nose, spread over a surface of about one square inch, the olfactory area—part lying on the outer (lateral) wall of each nasal passage and part on the septum, or partition between the nasal passages. In macrosmatic animals the olfactory area is relatively greater than in man, but there is apparently no other difference between them.

Olfactory cells are held in place by ordinary epithelial cells—the sustentacular cells—which contain pigment. Olfactory cells are found in animals as low in the scale as the sea-anemone. They occur in the integument of the animal, and their structure is the same as in man, the only difference evolution has brought about being that in the higher animals they are protected by lodgment in a *cul-de-sac*. Their function in the sea-anemone is probably limited to the sensing of

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food, but we do not yet know much about this particular organism.

It is otherwise with the olfaction of insects. Here the work of painstaking observers like Lubbock, Fabre, and Forel, has supplied us with a mass of information of the utmost interest, which we shall now proceed to discuss in some detail, commencing with the work of that remarkable French naturalist, Fabre, whose interest in the subject was aroused by an accident—the accident of which the genius of observation knows so well how to take advantage.

Having by chance a living female Great Peacock moth captive in his house, Fabre was surprised one night by the advent of some forty others of the same species—males in search of a mate. At once the question arose in his mind: How was it that they had been attracted?

Sight could not have guided them, because, apart from the comparative rarity of this moth in that particular district, the night of their arrival was dark and stormy, his house was screened by trees and shrubs, and the female was ensconced under a gauze cover. He observed, besides, that the males did not make straight for their objective, as is characteristic of movement when directed by sight. They blundered and went astray, some

of them wandering into rooms other than that in which the female was lying. They behaved, that is to say, as we ourselves do when we are trying to locate the source of a sound or a smell. But sound was ruled out by the fact that they must have been summoned from distances of a mile or a mile and a half.

Olfaction remains, and with this in his mind Fabre undertook several experiments, some of which, as it happens, support, while others oppose, the theory of an olfactory cause.

When the female was sequestered under the gauze cover, and in drawers or in boxes with loosely-fitting lids, the males always succeeded in discovering her. But when she was placed under a glass cover, or in a sealed receptacle, no male at all appeared. Further, Fabre found that cotton-wool stuffed into the openings and cracks of her receptacle was also sufficient to prevent the summons reaching the males. This last observation should be borne in mind in view of further discussion later on regarding the nature of the lure.

Similar observations and experiments were made on the Lesser Peacock, with very much the same kind of result. But in dealing with this moth Fabre made an observation which, if it was accurate, tells against the theory of olfaction, or at least against such olfaction as we ourselves experience. At the time when he was carrying

out his experiments the mistral was blowing hard from the north, and as nevertheless males arrived, they must all have come with the wind ; no moth ever hatched could beat up against the mistral. But then, if the guide is an odour, the wind, blowing it to the south, would have prevented it ever reaching the males ! Here, then, we have a circumstance which leaves us groping for an explanation.

In watching the behaviour of the third moth on his list, the Banded Monk, on the other hand, Fabre discerned a circumstance very strongly suggestive of the operation of an odorous lure. He found that, if the female was left for a time in contact with some absorbent material and was afterwards shifted, the males were attracted, not to her new situation, but to the place where she had originally been lying. Subsequent experiment showed that a period of about half an hour was necessary to lead to the impregnation of the neighbourhood with the effluvium she elaborated.

The obvious test was employed of trying to drown the supposed odour of the female by filling the room she was in with powerful aromas, like naphthaline, paraffin, the alkaline sulphides, and the like. But in spite of the presence of these stenches, in our experience overwhelming to fainter exhalations, the males still continued to arrive in droves. This result led Fabre to doubt

whether it could really have been an odour that attracted them. But surely this negative conclusion ignores the possibility of the moths being anosmic to these gross scents while highly specialised for one particular olfactory stimulus to which, as a matter of fact, we ourselves are wholly insensitive.

Apart from this particular problem, however, to which we return below, biologists agree that insects undoubtedly possess an olfactory sense capable of appreciating the same kind of odours as ours does. Lubbock, for example, demonstrated that ants give signs of perceiving the presence of musk and other perfumes. There is no doubt, indeed, that the olfactory sense plays a great, it may be a preponderating part in their life-activity.

The olfactory organ of insects is situated at the bottom of little crypts in the antennæ and in the palpi of the mouth apparatus, more particularly in the antennæ. And those insects, like bees, wasps, butterflies and moths, that frequent flowers, are attracted to them by their perfumes as well as by their colours. It has been found, for example, that covering up flowers from view does not put a stop to the visits of insects. Some naturalists go so far, indeed, as to say that odour is their principal guide. At all events, the

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sarcophagic and stercophagic insects are attracted to their food chiefly, if not entirely, by odour. Fabre has recorded how such insects are lured to their death by certain insectivorous plants which exhale a smell like that of putrid beef.

In this connection I may interpolate here an experience which shows that this class of insect may be attracted solely by odour. Incidentally, it also manifests how the olfactory sense of insects can be utilised in the matter of hygiene.

A clever plumber of my acquaintance was once called to a large drapery establishment in the West End of London, because the dressmakers at work in one of the rooms were making complaints of an evil smell that haunted the place. So much had they been troubled, indeed, that several of them had been made ill by it. On examining the workroom my friend found everything apparently faultless. It was a large, well-lighted and airy apartment, and he himself was unable to detect anything amiss in the atmosphere. Plans were consulted, but no evidence could be found of any possible source of unpleasant odour. His opinion therefore was, that the ladies were—ladies, that is to say, fanciful, and the matter was dropped. But the ladies were not consenting parties to this opinion, and the complaints continued. More of the assistants fell ill as a consequence, they said, of the smell, so that he was again sent for. On this occasion, it being the height of summer, he called, on his way to the draper's emporium, at a butcher's shop, and much to that man's surprise, asked permission to capture a few of his bluebottle flies. These he took with him to the draper's, and, the suspected room having been emptied of furniture and occupants, he closed all the windows and doors and released his flies. After waiting patiently for some time, he observed that these amateur detectives of his had all made for one part of the room, where they were settling on

the wall. Here he had an opening made, and found hidden behind the plaster an open drain-pipe, old and foul, which had formerly been connected with a lavatory, and had been enclosed and forgotten during some alterations made on the building several years before.

The olfactory sense of insects has been credited with perhaps even more wonderful powers than those we have just been writing about. For instance, both Lubbock and Forel have shown that the extraordinary aptitude ants possess for finding their way back to their nest after their peregrinations in the mazy labyrinth of their world depends upon the sense of smell. On their return to the nest they follow the scent left by their own footsteps.

This "homing" instinct, or "orientation," which is found in many species of insects and animals, has long been a matter of interest to scientific naturalists. The subject is, however, much too large for us to enter fully into on the present occasion.

Winged insects like bees and wasps manifest also the homing instinct. In their case the return to the nest or hive is effected probably altogether under the guidance of vision. This is what we should expect, as elevation in the air secures for these creatures a wide and unimpeded view of their world. Circumstances are obviously different in the case of ants and other creeping things, whose immediate outlook, like that of four-footed

mammals, is circumscribed to an area of but a few inches or feet at the most.

Investigating the orientation of ants, Forel found, first of all, that while the covering of their eyes with an opaque varnish "embarrassed" them to some extent, they went hopelessly astray when their antennæ were removed.

He also repeated Lubbock's well-known experiments of supplying the ants with bridges over obstacles in the neighbourhood of their nests, noting their behaviour when the bridges were changed, removed, or reversed, with the result that he came to credit the olfactory system of ants with much greater powers than the more cautious Lubbock would have believed.

These insects, says Forel, exploring with their mobile antennæ the fields of odour they encounter, form in their memory a kind of "chemical topography."

Thus when an ant sets out from her nest she distinguishes the various odours and varying strengths of odours she comes upon, noting and memorising them as in two main fields, one on her left side, the other on her right. In order to find her way back again all she has to do is to unwind, so to speak, the roll in her memory, transposing right and left, and this successfully accomplished will bring her back to the point she started from.

If, he concludes, we ourselves were endowed

with such a perfect olfactory mechanism situated in long, flexible whip-lashes, which we could move and tap with each step, the world for us would be transformed. Odour would become a sense of forms. Thus the orientation of ants can be explained without assuming the existence of an unknown sense. (It has recently been suggested, by the way, that bats owe the exquisite power they manifest of steering their flight among obstacles to the use of their squeaks, the echoes from which enable them to form "sound-pictures" of their environment. In the same way a blind man in the street tapping the pavement with his stick forms a more or less well-defined sound-picture of the walls, doorways, and alleys about him.)

In the immediately foregoing paragraphs we have been dealing with the ability of insects to smell the smells that we smell. But Fabre's experiments have familiarised us also with the notion that there are insects which can smell smells we cannot smell.

We shall see in the following section that the same may also be true of some of the higher animals.

In fish olfaction is, unlike that of air-breathing animals, effected by odorous material in solution. Whether or not their olfactory sense is as acute it

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is impossible in the present state of our knowledge to say. Anatomically the end-organ of fishes is simpler, but there are some species, the dog-fishes for example, which possess a large olfactory lobe in the brain ; and this certainly suggests that they, at all events, are gifted with an olfactory sense of relatively high development.

Experiment on fish is difficult, nevertheless it has been definitely proved that they do smell, and it seems probable that the sense is used by them for food-perception. Moreover, that it may be highly sensitive seems likely from the fact that sharks (which belong to the same order as dog-fish) can be attracted from great distances to putrid meat thrown into the water as bait, the high dilution of which resembles the behaviour of odour in an air medium.

The belief that life in water, however, is less favourable than life on land to the fullest development of the sense is supported by the fact we have already mentioned that mammals living in water are extremely microsmatic.

In the macrosmatic terrestrial animals not only is the olfactory sense relatively highly organised, but it is absolutely the predominant sense. Vision is subsidiary to it. In their brains the olfactory region constitutes by far the largest component. (The same, by the way, is true of the Reptilia.)

In other words, it is upon the olfactory sense that these animals chiefly depend for their knowledge of the world. By it they are directed to their food, warned of their enemies, and attracted to their mates. Their universe is a universe of odour.

In order to become more intimate with the details of this part of our subject, we shall pass in review some of the olfactory habits and characteristics of the macrosmatic animal most familiar to us, namely, the dog.

There can be no doubt of the all-important part that smell plays in the life of the dog. Every one is familiar with it, and yet we do not often stop to think what its meaning is for the canine brain and understanding. One of the mysteries that must, one would suppose, for ever remain hidden from us, is what aspect the world we both share in company bears to this our closest animal friend. Who can tell what is passing through his mind as he sniffs at us? He can recognise his master by sight, no doubt, yet, as we know, he is never perfectly satisfied until he has taken stock also of the scent, the more precisely to do so bringing his snout into actual contact with the person he is examining. It is as if his eyes might deceive him, but never his nose.

The greyhound courses by sight, but all other dogs hunt by scent, and the speed and certainty of foxhounds in full cry bear a new significance

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when we recollect that it is scent that is directing them. Could vision be any more swift and sure ?

We may heartily wish, as a child once remarked to a friend of mine, that Rover had a prettier way of saying " How d'ye do ? " to his canine friends. But that and other even more objectionable habits do not prevent his *entrée* into the most exclusive circles of human society. He is taken at his own valuation, and that, to be sure, is considerable. But the minute, the meticulous, olfactory scrutiny he makes of other dogs is but one more example of the predominance of this sense in his brain. (See also later.)

When you take him for a walk also, how busy his nose makes him ! Burrowing here and there among the grass and undergrowth, picking up an interesting trail that leads him a little way, until it crosses another, fresher, perhaps, or more interesting, that has to be taken up—here a cat's, there a rat's, further on a rabbit's, and then, with short squeals, scrapings in the ground, and burryings of his muzzle, a weasel's !—the whole intermixed and intermingled with whiffs of something like old decayed bones, or of another and an unfriendly dog, or of some ardent lady-love who has passed this way but shortly since !—is not this a richer, a fuller, a more attractive, world than ours, with its fickle sunlight, its pallid greys, its mournful

purples, its unattainable horizon-blue? For our life is primarily one of vision.

I am sure his dreams, also, are compounded of the gorgeous odours of some other world, such odours as even our woods in autumn know nothing of.

But we must return again to science and Fabre. This time we shall accompany him on an excursion with the wonderful dog who is trained to discover for the *gourmet* the truffles that are growing deep in the soil.

Left to his own devices, we learn, the truffle-hunting dog indicates the position not only of truffles, but also of all manner of hypogean (underground) fungi, "the large and the small, the fresh and the putrid, the scented and the unscented, the fragrant and the stinking." Only, he never at any time indicates the presence of the ordinary mushroom, not even while it is still underground, before it sprouts up as the fungus we know. And yet to our nostrils the mushroom has the same smell as many of the hypogean fungi he does indicate. Consequently, therefore, the dog is not guided to the deep fungi by what may be called the general odour common to all fungi. He must be able, that is to say, to distinguish the hypogean varieties by some quality which is not odour, or, at least, not odour as we understand it.

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There is, as it happens, something like a truffle-hunter among the insects also, what is known as the Bolboceros beetle. This little creature feeds on the *hydnocystis arenaria*, a hypogean fungus. Fabre, having captured some of these insects, placed them on earth in which he had buried the fungus at depths of six or seven inches. It was found that the beetles, without making any trial bores, sank vertical shafts through the soil direct to their food.

We may insert here also, as bearing upon the problem which is now emerging into clearness, an observation and a suggestion similar, as we shall see, to that of Fabre, on the badger by Mr. Douglas Gordon (*Spectator*, August 6th, 1921):

“ The real damage wrought by the badger is microscopic. His diet mainly consists of roots, green herbs, mice, frogs, and insects. Like the fox, he has a great partiality for whorts and blackberries when in season, and he is particularly fond of grubs. For the sake of these he will dig out every wasp's nest he can find. A considerable number of rabbit 'stops' also fall to his share, and in unearthing the latter he practises a somewhat remarkable piece of woodcraft. The hole which contains the nest may run to the depth of several feet, and the nest itself be situated ten feet from any entrance, but this does not trouble the badger. He makes no attempt to follow the tortuous passage, as a man when digging would be obliged to do. His unerring nose locates the exact spot where the young rabbits lie, and from the most convenient point he bores for them. Should it be a 'ground-burrow,' he sinks a vertical shaft. In the case of a steep bank he drives a horizontal tunnel, and, shallow or deep, with unvarying accuracy.

“ Not long ago I saw a striking case of this on Haldon Hill, near Exeter. The burrow opened on to a little gully, and ran back some distance under the heath. At least five paces from the nearest hole was the badger’s freshly cut shaft, about three feet deep, and around it were littered the ruins of the nest—the little tale of bloodstained fur so eloquent of tragedy. There on the earth drawn from the shaft the raider’s spoor was plain enough, but no imprint of his pads could I find upon the impressionable mould anywhere near the holes. This meant that he must have found the nest while traversing the heather—sensed it beneath him, in fact. And here an interesting point arises. What sense did he employ? Could he possibly ‘smell’ the rabbits through three feet of packed mould? Earth is a potent deodoriser. Do certain animals possess a sixth sense—a sympathy something akin to that of the divining rod? If so, this goes farther to explain the much-discussed principle of scent than anything yet suggested.”

Is this sense, then, as we see it in operation in the badger, in the truffle-hunting dog, in the Bolboceros beetle, and still more wonderfully in the Peacock and Banded Monk moths, drawn to their mates “ from the edge of the horizon,” and, it may be, against the wind—is this sense the same as our own sense of olfaction, only much more acute? Fabre finds some difficulty in believing that it can really be the same. “ Odour,” he argues, “ is molecular diffusion.” But nothing material, nothing our senses can perceive, is emitted by these moths, and yet they can summon their mates from relatively enormous distances. However fine may be the divisibility of matter, Fabre’s mind refuses to entertain the suggestion

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that this far-flung summons is addressed to a sense of smell of the same nature as ours. It would be tantamount, he says, "to reddening a lake with an atom of carmine, to filling immensity with nothing."

It is impossible not to sympathise with this opinion, but caution compels us to say that for the most striking of these observations, that of the calling of the males against a high wind, we should like to have confirmation by some independent observer.

Besides, I think perhaps Fabre would have hesitated to express his scepticism regarding the power of insect olfaction had he known more of the marvels of the human sense.

Vanillin, for example, is perceptible by us as a smell when it amounts to no more than 0.00000005 gram in a litre of air; and we can perceive mercaptan, a substance with a garlicky odour, in a dilution of 1/460,000,000 of a milligram in fifty cubic centimetres of air (approximately 0.000000026 of a grain in a little over three cubic inches of air!) (See also p. 108.)

What is this but immensity filled with nothing? And yet we, even we, microsmatic though we are, can perceive that "nothing."

But we must pick up again the thread of Fabre's argument. Baffled as he feels himself to be when he regards olfaction in the light of these observa-

tions of his, he goes on : " For emission substitute undulation, and the problem of the Great Peacock is explained. Without losing any of its substance a luminous point shakes the ether with its vibrations and fills a circle ¹ of indefinite width with light. . . .

" It does not emit molecules ; it vibrates ; it sets in motion waves capable of spreading to distances incompatible with a real diffusion of matter.

" In its entirety smell would thus seem to have two domains : that of particles dissolved in the air and that of ethereal waves. The first alone is known to us. . . .

" The second, which is far superior in its range through space, escapes us altogether, because we lack the necessary sensory equipment. The Great Peacock and the Banded Monk know it at the time of the nuptial rejoicings. And many others must share it in various degrees according to the exigencies of their mode of life."

In criticism of this conclusion of Fabre, however, we must again draw attention to the fact that in the case of the Greater Peacock he found that a plug of cotton-wool was sufficient to prevent the emanation leaving the immediate neighbourhood of the female, a circumstance strongly in favour of some material exhalation which was

¹ A sphere rather.

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caught and held by the cotton-wool filter. Again, in the case of the Banded Monk, the suggestion of odour is unmistakable in the tainting, as it were, of substances in her vicinity with her emanation. Further, if the guide to the males were something like a luminous undulation we should expect that, like the *Bolboceros* beetle and the badger, there would have been no blundering and going astray; they would have precipitated themselves straight on to the female, or as near to her as they could get.

Moreover, although we are ourselves unable to detect any odorous emanation, may not our inability be due simply to the fact that our olfactory hairs are not susceptible to this particular stimulus? It may be of the same nature as odour, and yet we may be unable to perceive it, just as the moths themselves seemed anosmic to what we would call the stench Fabre filled his room with.

These critical questions seem to me to be difficult to answer. Nevertheless, our imagination is certainly staggered by the fact of a tiny creature like a moth being able to disseminate in the immensity of atmospheric space an odour capable of perception at such great distances as a mile or a mile and a half. Hero, with the Great Peacock's power, could have summoned Leander from a hundred miles away.

Apart, however, from such considerations for and against his opinions, one of the modern theories of odour, and of odour belonging to Fabre's first, or material, order, is, as we shall see later on, that even it is a vibratory and not a material quality.

But leaving that development aside, and admitting for the moment the validity of Fabre's contentions, I am bold enough to ask: Are we human beings so ignorant of the second domain of olfaction as he supposes? Is it true that we are, as he says, lacking in the equipment necessary for the exploration of that mysterious region? To answering these questions we shall presently address ourselves. In the meantime, I may forestall what I shall then say by remarking that I count it a very remarkable circumstance, if not, indeed, a significant coincidence, that, before I had become acquainted with Fabre's writings, I had, considering the phenomena of human olfaction and psychology alone, actually asked myself the same question as he asks, and had come to very much the same conclusion.

CHAPTER III

OLFACTORY MEMORY

THE predominant special senses in man are vision and hearing, olfaction occupying a quite unimportant position in the scale.

Smell and taste, by the way, are usually regarded not only as allied senses, but also as if they were akin in their nature and function. Allied they are, undoubtedly, seeing that both subserve the function of food-perception. But the resemblance ends there. For, of the two, smell is at once the more delicate and the more extensive in capacity, and, as they differ widely in their anatomical structure, there can be no doubt but that in physiological action also they are dissimilar.

The taste-bulbs are capable of appreciating four sensations only, and these quite simple, while the capacity of the olfactory organ, as we shall see more fully later on, is practically unlimited. All the subtlety of "taste," all that we call "flavour," is an olfactory sensation. Thus, people devoid of the sense of smell cannot discern the finer savours. They would be unable to distinguish, say, a vanilla from a strawberry ice.

All they could tell would be that both were cold and sweet.

The popular phrase which refers the appreciation of the finer shades of taste to the "palate" we may therefore look upon as an attempt to express the feeling that delicate flavours are sensed somewhere higher up than in the mouth. So that a "man of taste" is really a man of smell, and all the literary eloquence in praise of wine and dainty food, to say nothing of the more prosy cookery books, is, in reality, a general hymn of adulation offered unwittingly to the nose!

Compared with sight and hearing, however, smell in man is only one of the minor senses. But, as if to make up for a position so inferior, it is remarkable as being the most subtle of all our senses, possibly, as some hold, because of the ancestral appeal to our (more or less repressed) animal nature. So subtle is it, indeed, that I am persuaded its stimuli may not, on occasion, emerge into consciousness at all. They remain below the threshold. So that, although subjected to their influence, we may remain ignorant of the cause of that influence. For smell often operates powerfully, not only in surreptitiously enriching and invigorating the mental impression of an event, but also in directing at times the flow of ideas into some particular channel independent

of the will. The influence of the perfume of a woman's hair in unexpectedly arousing a feeling of intimacy will appeal to the male reader as a good example of this upsurging interference with the placid flow of normal ideation.

Perhaps, also, this is the explanation of a strange and rather unpleasant ghost-story I once heard. I dare not vouch for the truth of it, but as it bears upon the subject we are considering, I give it here, not without misgiving, for what it is worth. For the sake of verisimilitude I shall relate it pretty much in the narrator's own words :

"The evening he came back I was sitting in my room alone. I had just got back from the play, the subject of which had been, it so happened, the influence of people recently dead upon those left behind. I suppose that's what turned my mind to my sorrow of the previous year when I lost him. It is my husband I am talking about.

"I was sitting gazing at the fire, and I expect you will say I had fallen asleep. Perhaps I had. It doesn't matter really.

"We had been happy enough together, he and I. Just an ordinary married couple, you might say. But now and then a terrible longing would come over me just to see him once more, . . . to hear him speak, . . . to touch him. . . . I know it is selfish, and maybe unwise, to give way to those feelings, . . . but never mind that! Well, on the night I am telling you about, there came to my recollection some of the silly cantrips those Spiritualist people used to carry on. Oh, yes, it is quite true: I had gone once or twice to see them, and had even taken part in their services—séances, I should say—in James's lifetime, I mean, before he died. Indeed I went with him. . . . I never went after. . . . I

don't know. . . . It seemed to me like trifling somehow. Anyhow I have never gone since.

"All the same there came into my head a curious jingling rhyme I had heard them repeat once or twice, because they said somebody called Plato or Plautus or something had used it. It would bring back the dead, so they used to say, if you recited it alone at midnight, and accompanied it with certain gestures. The words are nothing but gibberish, a jumbled sort of . . . No, I'm not going to repeat them. . . . Let me go on.

"Before I had realised what I was doing, without stopping to think, I uttered the words aloud, moving my arms so as to follow the ritual. Scarcely were the syllables out of my mouth—it closes with the name and the clock was striking twelve as I spoke it—scarcely, I say, were the words out of my mouth when—God! the pang comes yet when I think of it!—I heard the latch-key going into the hall door, and the door slowly opening—I was alone in the flat, and—oh! I can never tell you! I felt dreadful!—I didn't know how to undo the thing, and yet I knew it was wrong—wicked—I never for a moment thought.—Perhaps it had been my longing so much.—The hall door opened.—The chain wasn't up.—I heard a step,—a cough—oh! the usual sounds he used to make when he came in.—What would he be like?—What . . . ? what . . . ?

"Then the door of the room opened, and there he stood, swinging himself backwards and forwards, half toes, half heels, in a way he had, and replacing his jingling keys in his trouser-pocket—I could only stare at him speechless, and gasp—till suddenly he stretched out his hand and pointed at me with a . . . a sort of snarl.

"'Good heavens, Jane!'—the words sounded so commonplace that every trace of the unearthly was dissipated at the first syllable.—'Good heavens, Jane! Go and change that frock!—How often have I told you what a fright you look in mauve.—A mill-girl on a holiday!—Come! Get along and change it!'

"It seems silly, I daresay, and all that, but, do you know, no sooner did I hear him growling and grumbling and finding fault with colours he had a dozen times at least admired

and praised than—I couldn't help it!—I forgot everything—everything. And all I could say was :

“ ‘ James ! You've been eating onions again ! ’

“ ‘ Not my fault, I assure you, my dear, ’ he snapped back ; ‘ that damned cook always will put garlic in the nectar ! You must get rid of her. ’

“ . . . I suppose I must have fainted then, for I remember no more till I found myself lying on the floor with my head on the fender. I picked myself up very puzzled as to what had happened. Then I remembered my . . . dream, with a shock rather of amusement than fear, when suddenly—suddenly I smelled the nauseating stench of strong garlic ! That finished me entirely. How I got out of the place I cannot tell. Out I did get. And I have never gone back. ”

This lady evidently would not have subscribed to the old teaching of Salerno :

“ Six things that heere in order shall issue
 Against all poisons have a secret poure.
 Peares, Garlick, reddish-roots, Nuts, Rape and Rew,
 But Garlick cheese, for they that it devoure
 May walk in ways infected every houre ;
 Sith Garlick then hath poure to save from death
 Bear with it though it make unsavoury breath :
 And scorne not Garlick, like to some that think
 It only makes men wink, and drinke, and stink. ”

(It may be remembered, by the way, that Wilkie Collins's " Haunted Hotel " was haunted by a smell.)

Although we may agree with Shelley that

“ Odours when sweet violets sicken
 Live within the sense they quicken, ”

yet we must admit that the memory of an odour cannot be reproduced in our mind with

the same clearness as a vanished scene or an old tune.

It may be found on trial that by concentrating the attention strongly upon some familiar smell, particularly if at the same time we stimulate the memory by picturing in our mind's eye a scene in which that odour figured as a feature in the sensory landscape, we are sometimes able to recall its actual sensation. But the recollection lacks the intimate reality of visual and auditory images. Without doubt the mind's eye and mind's ear, when consciously aroused, are consistently more acute and their representations are more vivid than those of the mind's olfactory organ.

When, for instance, I call to memory the drawing-room of my boyhood days, I can once more catch a faint reminiscence of the acid-sweet rose-leaves that filled it with perennial fragrance, but not until I have first of all recalled its pale greys and blues and its over-bright windows, not until I have listened once more to "The March of the Troubadours" my mother is playing on the old rosewood piano, like a call to some life greater, grander, and, above all, more simple than this bewildering affair!

People, Ribot has ascertained, vary considerably in their power of resuscitating dead perfumes. According to his statistics, 40 per cent. could not revive any image at all; 48 per cent. could recall

some, but not all ; and only 12 per cent. could recall all or nearly all at pleasure. The odours most easy to bring back were pinks, musk, violet, heliotrope, carbolic acid, the smell of the country, grass, and so on. Many, as in my own case, have to evoke the visual image first.

But if the recollection of a scene can only with difficulty, or not at all, revive the sensation of an odour, the converse is most startlingly true. For odours have an extraordinary, an inexplicable, power of spontaneously and suddenly presenting a forgotten scene to the mind, and with such nearness to reality that we are translated bodily, being caught up by the spirit, as it were, like St. Philip, to be placed once more in the midst of the old past life, where we live the moment over again with the full chord of its emotions vibrating our soul and startling our consciousness. There are, it is true, certain sounds which wield the same miraculous power over our being—

“ . . . the chime familiar of a bell
Last heard at sea, but now on homely ground,
Can, with the sprites that deep in memory dwell,
Create the world anew with stroke of sound,
Transforming daisied fields to foaming seas,
And changing vales from summer calm serene
To warring tides round wintry Hebrides
That fling and toss in wat'ry hillocks green ”—

but I do not think they operate in this way so frequently as do smells.

This strange revival of bygone days by olfaction is, as I have said, automatic. It is most clearly and completely to be realised when the inciting odour comes upon us unawares, and then as in a dream the whole of the long-forgotten incident is displayed, even although it may have been an incident in which the odour itself was not specially obtrusive. Yet the display is not only a spectacle, for we become, as I have already laboured to point out, once more actors in the old life-drama.

Now memory can nearly always be recognised as memory. There is about its representations a dulling in colour, a haziness in outline, a vagueness in detail, that serves to distinguish it from the harder, clearer pictures of the imagination. Its figures and their doings are like ghosts; through them you can see the solid furniture of to-day. But from the olfactory miracle we are now considering the effect of time, the fraying effect of time and superimposed incident, is absent. That is still fresh, still, as we might say, in process of elaboration, the manifold and complicated experiences we have undergone since its occurrence being blotted for the moment out of the mind.

Curiously enough, although Ribot finds that about 60 per cent. of people experience the "spontaneous" revival of odour in memory, and so presumably are subject to this arresting phenomenon, it does not seem to have been mentioned

by writers in general until about our own time. At all events, the earliest allusion I can find to it is in "Les Fleurs du Mal" of Baudelaire :

" Lecteur, as-tu quelquefois respiré
Avec ivresse et lente gourmandise
Ce grain d'encens qui remplit une église
Ou d'un sachet le musc inveteré ?

" Charme profond, magique, dont nous grise
Dans le présent le passé restauré " . . .

Shortly after Baudelaire's time Bret Harte, on the other side of the Atlantic, imported it into "The Newport Romance" :

" But the smell of that subtle, sad perfume,
As the spiced embalmings, they say, outlast
The mummy laid in his rocky tomb,
Awakes my buried past.

" And I think of the passion that shook my youth,
Of its aimless loves and its idle pains,
And am thankful now of the certain truth
That only the sweet remains."

But the most precise and definite allusion to this curious power of odours seems to have first been made by Oliver Wendell Holmes in "The Autocrat of the Breakfast Table." Here is what he says, and it will be noted that he makes as high a claim for the power of olfaction as I have done :

" Memory, imagination, old sentiments and associations, are more readily reached through the sense of SMELL than by almost any other channel."

“ Phosphorus fires this train of associations in an instant ; its luminous vapours with their penetrating odour throw me into a trance ; it comes to me in a double sense, ‘ trailing clouds of glory.’ ”

“ Perhaps the herb *everlasting*, the fragrant *immortelle* of our autumn fields, has the most suggestive odour to me of all those that set me dreaming. I can hardly describe the strange thoughts and emotions that come to me as I inhale the aroma of the pale, dry, rustling flowers. A something it has of sepulchral spicery, as if it had been brought from the core of some great pyramid, where it had lain on the breast of a mummied Pharaoh. Something, too, of immortality in the sad, faint sweetness lingering so long in its lifeless petals. Yet this does not tell why it fills my eyes with tears and carries me in blissful thought to the banks of asphodel that border the River of Life.”

In introducing the subject, Holmes states that he has “ occasionally met with something like it in books, somewhere in Bulwer’s novels, . . . and in one of the works of Mr. Olmstead.”

When one considers the obvious poetic appeal of this psychic phenomenon as exemplified in the touching expressions we have just quoted, it seems strange that the older writers made no use of it.

Even omniscient Shakespeare, although odorous images and allusions are not uncommon in his works, seems to have overlooked this sportive trick of the sense. Otherwise we might have had Lady Macbeth sleep-walking because her night-posset exhaled the vapour of the draught she had drugged Duncan’s guards with.

Several seventeenth century writers make a

general reference to odours as “strengthening the memory.” Here is one for which I am indebted to my friend F. W. Watkyn-Thomas‡:

“OLFACTUS (*log.*)—

Hence do I likewise minister perfume
 Unto the neighbour brain, perfume of force,
 To cleanse your head, and make your fancy bright
 To refine wit and sharp invention,
And strengthen memory: from whence it came
 That old devotion incense did ordain
 To make man’s spirit more apt for things divine. . . .’
 (“Lingua, or the Combat of the Tongue and the
 Five Senses,” Act IV., Sc. 5, Anthony Brewer
 (*circa* 1600): Dodsley’s “Old Plays,” Vol. V.,
 p. 179, 1825.)

And Montaigne may be alluding to it when he says :

“Physicians might (in my opinion) draw more use and good from odours than they do. For myself have often perceived, that according unto their strength and qualitie, *they change and alter, and move my spirit, and worke strange effects in me*: Which makes me approve the common saying, that invention of incense and perfumes in Churches, so ancient and so far-dispersed throughout all nations and religions, had an especiall regard to rejoyce, to comfort, to quicken and to rowze and to purifie our senses, . . .”

The Jacobean herbalists and therapeutists in general, as we shall see later on, frequently credit aromatics with the power of strengthening the memory. But, so far as my reading goes, I have failed to find a clear and unmistakable description of this peculiar phenomenon

in any writer prior to the nineteenth century. It is, of course, difficult to prove a negative, and so it would not be surprising if some such allusion were to be dug up. But even then the wonder would remain that it had attracted little, if any, attention from others. As a matter of fact, mental happenings of this order did not interest our forebears much. Shakespeare is the exception to this statement, and that is one of his claims to greatness.

Moreover, quite apart from this particular, the writings of the old English poets and of such French and German authors as I am acquainted with, seem curiously deficient in references to all but the more gross and obvious phenomena of olfaction, and these are most frequently of the farcical order, a little too gross and obvious for modern readers.

Since Dickens's time, however, we have had almost too much literary odour.

I do not agree with the purists who deny to Dickens the glory of a great writer of English prose. Dickens was an impressionist, perhaps the first and certainly the greatest of this school, and as such he was a master. Few equal and none surpass him in the rare vigour of scene, and portrait-painting. And it is significant to find him using the aroma of the place and also of

the person to impart life and reality to his description.

Take for example, to cite but one out of many olfactory references in his books, the humorous analysis of the smells in various London churches in "The Uncommercial Traveller." One congregation furnishes "an agreeable odour of pomatum," while in the others "rat and mildew and dead citizens" seemed to be the fundamentals, to which in some localities was added "in a dreamy way not at all displeasing" the staple character of the neighbourhood. "A dry whiff of wheat" circulated about Mark Lane, and he "accidentally struck an airy sample of barley out of an aged hassock" in another. The reader's throat begins at once to feel dry.

Then note how Mr. E. W. B. Childers starts from the page the moment his creator breathes into our nostrils a breath of his life :—"a smell of lamp oil, straw, orange-peel, horses' provender, and sawdust."

I could fill this book with olfactory citations from Dickens alone. But to come to contemporary writers, those of Rudyard Kipling are almost as plentiful, the smell that brings places to the mind being a favourite with him. But I have always wondered how it came about that the highly sensitive nose of Mr. Kipling permitted Imray's corpse on the rafters above the ceiling-cloth to

remain undiscovered for as long as three months. This in India. The bungalow, we gather, was haunted. It would be.

Nevertheless, in spite of the keen olfaction of both of those writers, neither of them, as far as I can remember, weaves the memory-reviving power of olfaction into a plot. We come across it, however, in foreign literature, as in the suggestive play made with the smell of lamp-oil in Dostoevsky's "Crime and Punishment."

The more recent English and foreign writers, however, give us a surfeit of odours—as if to prove their superiority in this as in all else.

It seems strange, moreover, that the theatre should have overlooked this avenue to the memory and imagination of its audiences. The ancient Romans, to be sure, during the gladiatorial games, used to perfume the atmosphere of the Colosseum, whether to counteract the raw smell of dust, blood, and sweat, it were hard to say, as these rank odours play their part, again subtly, in stimulating the slaughterous passions of mankind.

But our modern theatre, which a prominent Scots ecclesiastic of the nineteenth century characterised as redolent only of "orange-peel, sawdust, and vice," has not yet risen to anything higher than a continuous discharge of incense

during spectacular dramas depicting the (theatrical) East.

Why not go further? Think how the appeal of a love-scene would be strengthened by an invisible cloud of roses blown into the house through the ventilating shafts! The villain would be heralded by an olfactory *motif* of a brimstony flavour mingled, if he was of the usual swarthy countenance, with a *soupeçon* of garlic. The hero, well groomed and clean-limbed, would waft a delicate suggestion of Brown Windsor to the love-sick maidens in the dress-circle. The heavy father would radiate snuff with his red pocket-handkerchief. The large-eyed foreign adventuress would permeate the auditorium on wings of patchouli. The dear broken-hearted old mother would disseminate that most respectable of perfumes (for there is a caste-system among smells) eau de Cologne—a scent that always evokes in my mind a darkened room, tiptoes, hushed voices, raised forefingers, and Somebody in bed with a—headache.

And so on. Here is a new way of “putting it over.”

Critics will object that, as the influence of eau de Cologne on my own mind shows, the particular odours so supplied would defeat their purpose by calling up a thousand different and incongruous images in the thousand minds of the audience.

But such mischances could easily be avoided by conventionalising the odours after the manner already familiar in the stock gesticulations of our players, all of whom enter, sit down, pull off their gloves, blow their noses, utter defiance, shed tears, launch curses, make love, live, die, and are buried, according to an inveterate, cast-iron ritual.

CHAPTER IV

SMELL AND SPEECH

THAT the effect of odour upon the mind is largely concealed is further illustrated by the curious fact that our native language does not possess a terminology descriptive of smells. We never name an odour ; we only say it has a " smell like " something or another. As a matter of fact, the same remark was made regarding French by P. P. Poncelet as long ago as 1755.

In this defect smell is unique among the senses. Even the sense that governs equilibration, of which the consciousness in normal conditions is never aware, has furnished us with " giddy " and " dizzy."

Vision is represented by hundreds of words. We have, for instance, names not only for the primary colours red, yellow, and blue, but also for many of their combinations. (In these remarks we are not including the modern names given to the many shades of the synthetic colours.)

If we take red as an example, we find scarlet, crimson, vermilion, and pink. This colour, indeed, is ranked above all others in the vulgar

tongue as having shades, doubtless because red, being the colour of blood and so of danger, always makes a strong appeal to the mind, an appeal which, among the responses, has led to special names being given to four of its tones.

The sense of hearing again, upon which speech is wholly dependent, has given rise to a multitude of words, many of them closely imitative of the sound, or onomatopoeic, with which words English, like the related German, is richly adorned.

Touch also has produced a number of descriptive epithets—"hot," "cold," "wet," "dry," "moist," "clammy," "rough," "smooth," as well as those like "heavy" and "light," from the deep tactile sensibility.

Even taste has its vocabulary, a complete one, as it happens, since each of the four varieties of taste has its own appropriate name—"sweet," "sour," "bitter," and "salt."

But smell is speechless. We can truthfully say that in our native English language there is not a single word characterising any one of all the myriad odours in the world.

No doubt there are many words that we do apply to smells. But they are either borrowed from the vocabulary of one of the other senses, in order to describe a state of mind induced by the smell, or else they originate from some known odoriferous object.

Thus in the opening paragraph of this book we encountered a large number of olfactory words. But they are all vague ; some applying to pleasant, some to unpleasant, odours. Many of them are very expressive, for disgust begets strong language. But although our olfactory vocabulary may be forceful, it is not discriminative. In other words, it is an emotional, not an intellectual, vocabulary.

These considerations will become more obvious as we deal with olfactory epithets in detail.

Thus smells may be " faint " or " strong," but so may any other sensation. And to call a smell " sweet " leaves it but vague, while at the same time the epithet is borrowed from the vocabulary of taste, where its meaning is quite precise. " Pungent " is also a transposition, this time from touch, as it is a Latin word signifying " prickly."

In addition to such terms as these we have a small number of words which we are in the habit of applying to certain classes of odours. " Musty " is one of these. This adjective certainly has the look of a pure English word about it, but, as it indicates a smell like that of mould, it is probably derived from the Latin *mucidus*, mouldy ; we cannot, therefore, claim it to be English any more than we can claim it to be definite. Perhaps the puff-balls of our autumn woods supply the best example of a musty smell.

" Mawkish," however, is certainly English, as

it is derived from an old word, still used, by the way, in Scotland—"mauk," a maggot. "Dank," again, means moist, and is the smell of damp, cold places. "Stuffy" also, which is a modern application to a smell, is the odour of a close, badly ventilated room, where we feel oppressed, as if half stifled.

But these words—and there are not many more of them—are only applied vaguely and to general classes of odours. We never say of any one in particular that, *e.g.*, "This is the smell called 'dank,'" in the precise way we can say: "That colour is green," or "That sound is a whistle."

We may even go further. We know that the flavour of things tasted is an olfactory sensation. Now while language attains to precision in characterising the sensations of pure taste, as we have just seen, it is significant that flavours are left unnamed, except in the manner we have just explained for olfactory epithets.

The scanty number of odorous terms in English has of late been copiously added to by words borrowed from other languages, chiefly, it is said, from the Persian.

"Musk," for instance, is Persian. "Aroma" is pure Greek, and if Liddell and Scott's suggested derivation of *ἄρωμα* (a spice) from the Sanscrit *ghrâ* (a smell) is correct, then the original meaning

of "aromatic" is merely "smelly." "Mephitic," not a popular word even now, comes from the Latin *mephitis*, "a foul, pestilential exhalation from the ground, often sulphury in character, as from volcanic regions." The brimstone odour of the devil—of which more anon—is mephitic.

Now we must here discriminate. Etymologists, delving down among the roots of our spoken language, come, so they say, to a point at which even the simplest epithet, even the plainest description of a sensation, is seen to derive from some object. Obviously this must be so in the beginning, whether or not etymologists are always correct in their particular ascriptions. An adjective describing, and later denoting, a quality, is generalised from some object bearing that quality. A "stony" countenance is a countenance rigid as stone. So in like manner, we are told, even the names of colours, deeply embedded in the language though they be, are ultimately referable to objects bearing that colour. "Brown," to take the least dubitable instance, is the colour of burnt—"brunt"—things, while "blue," according to authority, like the Scots "blae," means "livid" really, and is connected with "blow," being the colour left after a blow. (But we say "a black eye" !)

Thus the descriptive epithets not only of smell, but also of sight, are ultimately derived from

objects. But there is this great difference between them : the names of colours take us back to near the original trunk from which the Aryan languages branch off, whereas the names of odours, to this day still vague and indeterminate (at least in popular phraseology), are derived from the spoken tongue of to-day, or, in some cases, from foreign languages, and are, therefore, but recent additions.

This delay in the naming of classes of odours justifies the statement made at the outset of this section that smell is speechless. It shows, in other words, that although, as we have seen, its influence upon the mind may be profound, yet that influence does not extend as far as the speech-centres. It remains largely in the subconsciousness.

We should be guilty of error, however, were we to conclude that the scantiness of olfactory names is due to the lack of recognition by the consciousness of early man of smell in general, or to a failure to distinguish between different odours, because savages, in general less discriminating and analytical than cultured races, have, there is every reason to believe, a more acute and highly perfected olfactory sense. It has been reported that the North American Indian was able to track his enemy or his game by the scent alone, and Humboldt has recorded a similar acuteness on the part

of the Indians of Peru. While admitting the marvellous skill of the American Indians in following up their quarry, most of us will, I imagine, be inclined to doubt whether its dependence upon smell is a true inference from the facts observed. Skill in woodcraft can be brought to such marvellous perfection that it may seem like magic to the onlooker—like magic, or like scent !

Further, although we are able to distinguish clearly enough between different odours, the identification and the naming of odours does not come easy to us. *Parfumeurs* and druggists, no doubt, by the daily education of the sense, attain to a high degree of skill in this art, but those who have not cultivated their powers will find it very difficult, as the amusing parlour-game of guessing the names of concealed foodstuffs and spices shows. The difficulty is, like the paucity of olfactory terms, probably due to an absence of ready communication between the olfactory and speech centres in the brain.

CHAPTER V

SMELL IN FOLK-LORE, RELIGION, AND HISTORY

EVIDENCE of olfactory influences is encountered in folk-lore not infrequently, particularly in connection with primitive medicine, and survivals of old olfactory methods of treatment are still extant, not only in the doings of the wise women of our remoter country villages, but also, as we shall see, in modern scientific medicine.

Treatment by fumigation is perhaps the most widely prevalent of these.

Probably the earliest motive for "smoking" a patient was merely the replacing of an offensive by a pleasant odour, as we find it frequently employed in malodorous conditions. Here the practice links up with ancient ideas on epidemic diseases.

Behind this rationale, however, there lies perhaps the idea of association of death with the fœtor of decomposition and the expectation that a pleasant aromatic odour will naturally "obviate the tendency to death." This view of the matter must have become strengthened among nations like the ancient Egyptians, who had discovered that

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aromatic substances might be relied upon to preserve the body after death. Even in recent times and countries similar customs have prevailed. Scott in "The Bride of Lammermoor" tells us that rosemary, southernwood, rue and other plants were in Scotland strewn on the body after death, and were "burned by way of fumigation in the chimney."

Be that as it may, we find fumigation employed all over the world as a rite of purification, particularly during the menstrual and puerperal periods, women being at those times regarded as unclean or taboo.

Later, in the natural course of evolution, fumigation comes under the category of anti-demoniac remedies.

When disease was ascribed to the operation of demons in residence in the patient's body, a belief at one time world-wide in its distribution, the treatment mostly relied upon to cure the disease, and, granting the premises, a perfectly rational therapeutic method, was by various devices to render the patient's body too uncomfortable for the demon. And among many other modes of securing this desirable end was the smoking of the demon out by strong odours, fumes being generated around the patient by burning horns, hair, and certain odoriferous woods and plants. Among the Chippeway Indians, we are told, a species of

cypress was set on fire for this purpose, and the efficacy of the remedy was heightened by the needle-shaped leaves of the tree flying off and sticking in the spirit.

Sometimes a medical man may feel disposed to smile when he sees the priest in church "censing" the Bible in order to drive away the evil one before he begins to read it. Yet fumigation has lingered on long in medicine as well as in religion. During the severe epidemics of cholera in Egypt not so many years ago, hundreds of pounds weekly were spent upon bonfires of sulphur in the streets of Cairo, a method of disinfection more likely to drive off demons than to destroy the comma bacillus in the drinking-water!

In mediæval, Jacobean, and Georgian medicine, fumigation was a favourite remedy. Every one, for example, is familiar with the old-fashioned treatment of fainting by burning feathers under the nose. And perfumes and aromatics in general were widely used in the medicine of those days, as the following extract from Salmon's "Dispensatory" (1696) shows:

"*Balsamum Apoplecticum Horstii*, Apoplectick Balsam of Horstius.

"Take of the Oils of Nutmegs ℥i., of white Amber rectified ℥ss, Roses (commonly called *Adeps Rosarum*) of Cinnamon A. ℥i., of Lavender, of Marjoram A. grs. xv. of Benjamin, of Rue A. ℥ss of Cloves, of Citrons A. grs. iv. Mix all well together, then add Ambergrise ℥ss, Oriental Civet ℥iv., Choice

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Musk Zi. Mix all according to Art, to the just consistence of a Balsam.

“*Salmon.* The Oil of Nutmegs is that made by expression, all the rest are Chymical. *Horstius* saith, that in the whole Republick of Medicine, there is scarcely found an Apoplectick Balsam more illustrious for Fame, more noble for Virtue, more worthy for Honour, more ready for Help, and more fragrant for smell, than this. It chears and comforts all the spirits, natural, vital, and animal, by anointing the extremities of the Nostrils and the Pulses. It cures Convulsions, Palsies, Numbness, and other Diseases proceeding of cold.”

The modern physician may think this Balsam “apoplectick” in a sense never dreamt of by its author; nevertheless he must also sigh for the faith that believed all those wonders.

Here is another from the same source for “the strengthening of memory”:

“*Balsamum Maemonicus* (sic) *Sennerti.* Balsam for the loss of Memory.

“*R* of the juices of *Bawm*, *Basil*, flowers of *Sage*, *Lillies*, *Primroses*, *Rosemary*, *Lavender*, *Borrag*, *Broom*, A. ζ ii.; *Aqua Vitae*, *Water-lillies*, *Roses*, *Violets*, A. ζ i.; *Cubebs*, *Cardamoms*, *Grains of Paradise*, *yellow Sanders*, *Corpo balsamum*, *Orrice*, *Saffron*, *Savory*, *Peony*, *Tyme*, A. ζ f; *Storax liquid* and *Calamita*, *Opopanax*, *Bdellium*, *Galbanum*, *Gum of Ivy*, *Labdanum*, A. ζ vi.; *Roots of Peony*, *long Birthwort*, *Oils of Turpentine*, *Spike*, *Costus*, *Juniper*, *Bays*, *Mastick*, *Baben*, *Lavender*, A. ζ v. Powder them that are to be powdered, then mix and distil in an Alembick, with a gradual fire; separate the Balsam from the Water.

“*Salmon.* In this we have put flowers of Sage instead of *Mynica* or *Tamarisk*: otherwise it is *verbatim*. It is a truly noble Cephalick, and it is reported to cause a perpetual memory, both Water and Balsom are excellent good against all cold Diseases: you may anoint the hinder part of the

Head, the Nostrils and Ears therewith. Dose gut. iii. ad vi. This is that Balsam which *Charles*, Duke of *Burgundy* bought of an English Doctor for 10000 Florentines."

It is to be noted, by the way, the odours do not "strengthen the memory" as a whole; what they do is to revive special memories.

The use of perfumes like camphor to ward off infection has long been in vogue. The pompous doctors of Hogarth's time—just 200 years ago—carried walking-sticks the hollow handle of which formed a receptacle for camphor, musk, or other pungent substances, which they held to their noses when visiting patients, to guard against the smells that to them spelt infection. And the air of the Old Bailey used to be, and indeed still is, sweetened with herbs strewn on the Bench, lest the prisoner about to be condemned to death by the rope might return the compliment and sentence his judge to death by gaol-fever. To this day, also, herbs are strewn about the Guildhall on state and ceremonial occasions, an interesting survival.

Demoniac possession was also largely responsible for the nauseous and disgusting remedies of which early medicine, both among the folk and among the more educated medical men, was very fond.

Paracelsus was a great believer in such con-

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coctions, one of which, *zebethum occidentale*, was his own invention. Fortunately I am not compelled to divulge the constitution of this remarkable remedy. All I need say is that it was by no means the "cassia, sandal-buds, and stripes of labdanum" of Browning's "Paracelsus"!

Those unspeakable medicaments were (and are still) sometimes applied externally, sometimes administered internally. One of the most absurd variants of this class was the holding of divers foul-smelling mixtures under the patient's nose for the cure of hysteria, the idea being that the stench would repel the "mother" from the patient's throat, whither it had wandered through sheer boredom and lack of interest elsewhere.

Nevertheless, out of these most absurd and to us meaningless methods of treatment modern medicine has here and there selected remedies which experiment and experience have proved to be of value; valerian, for example, which is still largely employed for hysterical conditions, and asafœtida (popularly named "devil's dung").

As a matter of fact, many pungent, strong-smelling substances are powerful cardiac and muscular stimulants.

Nor must we overlook the carminatives, the pleasantly smelling dill, aniseed, rue and peppermint, the very names of which bring to our minds

the sweetness of old country places and the efforts, not always vain, to quiet screaming country babies ! Well are they named the *carminatives*, acting as they do “ like a charm.”

In the *Æneid* we are told how once upon a time his divine mother was revealed to pious *Æneas* by a heavenly odour. And although Lucian intimates that the gods themselves enjoyed the smell of incense, yet, according to Elliot Smith, the real object of incense-burning was to impart the body-odour of the god to his worshippers. Something of the kind, whatever the primary motive may have been, must have been needed, one would imagine, to drown the unpleasant smells from the abattoirs in the temples where the sacrificial animals were slaughtered.

The wrath of the Lord God of the Hebrews after the Flood, it will be remembered, was appeased when he smelled the sweet savour of the burnt offerings of Noah on his emergence from the Ark. The sacrifice was, of course, the meal of the god, the flesh of bullocks, rams, doves, and what not, being spiritualised by the flames and so transformed into food a spirit could absorb. The Greek gods, it is true, refreshed themselves with such ethereal delicacies as nectar and ambrosia, but they were by no means indifferent to the square meal of roast beef so punctiliously provided for

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them by human purveyors. Homer is always careful to mention that, as often as a feast was toward, neither the gods nor the bards were forgotten, the former being fed before and the latter after the heroes themselves had been satisfied.

When, following the Persian division of the unseen world of spirits into good and bad, the idea of an evil-minded and consistently hostile god became popular, his odour was naturally enough the opposite of that of the kindly gods. And as in time he came to assume some of the attributes of the Roman *di inferni*, he, like the dragons of an even greater antiquity, sported the sulphury odour of his underground dwelling.

The Northern nations of ancient Europe, Grimm tells us, believed that hell was a place of burning pitch, whence arose an intolerable stench. Our English word "smell" is obviously related to a German dialect word for hell—*smela*—which in turn is itself akin to the Bohemian *smola*, resin or pitch.

The Christian "hell" was thus the lineal descendant of the subterranean "Hades" of the pagans, and what its stench was like may be gathered from that of the noxious fumes that rise out of clefts in volcanic rocks, such fumes, we may suppose, as in earlier days threw the Oracle at Delphi into her prophetic trances.

(Some authorities, however, say that it was the smoke of burning bay-leaves that the Oracle inhaled.)

The offensive odour of hell adheres to all the devils right down to modern times. In the Middle Ages you could always tell the Evil One by his sulphurous stink, but, unfortunately for the tempted, it was not usually observed until after his departure.

But evil odours not only attended the devil himself: they were also generated by the sins. For St. Joseph of Copertino, "seeing beneath the envelope of the body," was able to recognise the sins of the flesh by their odour. And St. Paconi, so it was said, could even smell out heretics in his day, presumably in the same way as witches are now discovered in Africa.

Moreover, as the devil and his minions are attended with a vile smell, the odour of their infernal home, so naturally they detest what we call sweet and aromatic perfumes and are repelled by them, as the following tale from Sinistrari of Ameno shows. I give it *verbatim* as it appears in Sax Rohmer's "Romance of Sorcery":

"In a certain monastery of holy nuns there lived as a boarder a young maiden of noble birth who was tempted by an Incubus, that appeared to her by day and by night, and with the most earnest entreaties, the manners of a most passionate lover, incessantly incited her to sin; but she,

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supported by the grace of God and the frequent use of the Sacraments, stoutly resisted the temptation. But all her devotions, fasts, and vows notwithstanding, despite the exorcisms, the blessings, the injunctions showered by exorcists on the Incubus that he should desist from molesting her, in spite of the crowd of relics and other holy objects collected in the maiden's room, of the lighted candles kept burning there all night, the Incubus none the less persisted in appearing to her as usual in the shape of a very handsome young man.

“ At last among other learned men whose advice had been taken on the subject was a very erudite Theologian, who, observing that the maiden was of a thoroughly phlegmatic temperament, surmised that the Incubus was an aqueous demon (there are in fact, as is testified by Guaccius, igneous, aerial, phlegmatic, earthly, subterranean demons, who avoid the light of day) and prescribed an uninterrupted fumigation of the room.

“ A new vessel, made of glass like earth, was accordingly brought in, and filled with sweet cane, cubeb seed, roots of both aristolochies, great and small cardamom, ginger, long-pepper, caryophylleae, cinnamon, cloves, mace, nutmegs, calamite, storax, benzoin, aloes wood and roots, one ounce of triapandalis, and three pounds of half brandy and water ; the vessel was then set on hot ashes in order to distil the fumigating vapour, and the cell was kept closed.

“ As soon as the fumigation was done, the Incubus came, but never dared enter the cell ; only, if the maiden left it for a walk in the garden or the cloister, he appeared to her, though invisible to others, and, throwing his arms around her neck, stole or rather snatched kisses from her, to her intense disgust.

“ At last, after a new consultation, the Theologian prescribed that she should carry about her person pills made of the most exquisite perfumes, such as musk, amber, chive, Peruvian balsam, etc. Thus provided, she went for a walk in the garden, where the Incubus suddenly appeared to her with a threatening face, and in a rage. He did not approach her, however, but, after biting his finger as if meditating revenge, disappeared, and was nevermore seen by her.”

On the other hand, the odour of sanctity in mediæval times was a much more real perfume than that in which the Jackdaw of Reims died. It does not seem, so far as I can make out from my reading, that the sweet smell of the Saints was ever remarked in the early centuries of the Christian era. The odour diffused around his pillar by St. Simeon Stylites, for example, was by no means pleasant. But by A.D. 1000 the sweetness of the Saints' persons was beginning to pervade the religious atmosphere. Writing about that time, Odericus Vitalis tells us that "from the sepulchre of St. Andrew" (at Patras, Asia Minor) "manna like flour and oil of an exquisite odour flow, which indicate to the inhabitants of that country" what the crops will be like that year. And the example thus set by this apostle is followed by all other saintly personages for many centuries.

In England, we read that when the Blessed Martyr Alban's burial place on the hill above Verulamium was opened, in obedience to a sign from heaven in the shape of a flash of lightning, the good people were enraptured by the delicious fragrance of the Saint's remains, and the same characteristic attended those of the later martyr Thomas à Becket.

St. Thomas à Kempis is credited with the statement that the chamber of the blessed Leduine was so charmingly odorous that people who were

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privileged to enter it were delighted, and wishing to enjoy her perfume to the full, were wont to approach their faces close to the bosom of the Saint, "who seemed to have become a casket in which the Lord had deposited His most precious perfumes." After the death of St. Theresa a salt-cellar which had been placed in her bed preserved for a long time a most delicious odour. And so on indefinitely, some of the stories being, as might be expected, a little too plain-spoken and artless for modern readers.

It is difficult to account for the pleasant odour of Saints whose pride it was to live without change of raiment, to harbour parasites, and to abstain from washing. Nevertheless that certain persons exhale a naturally pleasant aroma from their bodies is true. Alexander the Great is noted by Plutarch as having so sweet an odour that his tunics were soaked with aromatic perfume, and taking a flying leap through the pages of history, we come to Walt Whitman, who had the same characteristic. Indeed, a piny aromatic odour, of considerable strength, is occasionally noticeable in certain people, and I can myself testify that it becomes stronger on the approach of their death.

We are not often told when historical heroes were unpleasant in this respect, but in the case of Louis XIV. we have the authoritative evidence of

Madame Montespan, who after their "divorce, when having a public set-to with her sun-god in the glittering *salles* of Versailles, discomfited that little, red-heeled, bewigged, and pompous mannikin with the following broadside :

"With all my imperfections, at least I do not smell as badly as you do !"

His ancestor, "Lewis the Eleventh," says Burton in "The Anatomy of Melancholy," "had a conceit everything did stink about him. All the odoriferous perfumes they could get would not ease him, but still he smelled a filthy stink."

A modern rhinologist would suspect this monarch of having been afflicted with maxillary antrum suppuration. It will be noted, however, that there is no record that the odour he himself perceived was perceptible to others. The fœtor, as we say, was subjective, not objective, in which respect it differed from that of another historical personage, Benjamin Disraeli to wit, who was the subject probably of the disease known as *ozæna*. (See later.)

CHAPTER VI

THE ULTIMATE

IN a former chapter we dwelt upon the curious fact that memories aroused by olfactory stimuli are independent of the will. Now there is yet another way in which smell ignores the head of the cerebral hierarchy.

Although on occasion confining its operations to the subconsciousness, and exercising, so to speak, only a backstairs influence upon the mind, olfaction much more frequently insists upon recognition, breaking in upon our privacy, like a disreputable acquaintance, at most inopportune moments.

If you do not wish to see you can look the other way. When you would rather not hear you can be inattentive. A proffered handshake you can ignore. A dish you dislike you may decline. But you can't help smelling—no, not even if you turn up your nose.

Olfaction is thus the great leveller among the senses, equality having here a reality but rarely found elsewhere. For odour makes its way into the nose of king and cadger, duke and dray-

man, lady and lout, indifferently. Nay, by an ironical law of olfaction the fœtors are more powerful than the fragrances, and vervain the feeble turns tail before the onslaught of scatol (as well it might, indeed !), in which case there is nothing to be done but to bear it (without the grin mostly) ; or to follow the wise example of vervain ; or to remove the offence, as we have done in England these latter days, only to render ourselves, as I have carefully pointed out in Chapter I., all the more sensitive to it when it does come.

To many of us it comes on the dog.

This animal has a regrettable fondness for wallowing, diligently and with forethought, in the Abominable, until his coat is thoroughly well impregnated. For no other reason, I do verily believe, than, as he thinks, to give his human friends for once some of the olfactory pleasure he himself enjoys. A treat he thinks it, without any doubt. Just look at the smirk of pride and satisfaction on his face as he trots in and resumes his place on the drawing-room hearthrug and the amazement with which he receives the sudden toe of your boot !

And yet he rolls himself over on the odoriferous for the same reason that a fashionable lady has orris-root put in her bath ; namely, for the pleasure and gratification of society at large. There are who say that my lady's perfume seems

as vile to her Pekinese as his then does to her ! If so, he is the more tolerant animal of the two.

Anyhow, he certainly has the knack of thrusting the Unmentionable upon the attention of the most fastidious, and smell is no longer speechless.

Now, if we are to treat fully of things olfactory, we must at least take cognisance of the Unmentionable. But to extend our notice would take us across the garden to the muckrake and the dunghill. And such nearer investigation and description I must decline, even although in these days of outspokenness I may have to apologise for Victorian squeamishness. To attain merit as a writer the advice now given you is : Be frank ! And if you disgust, why, so much the better !

That may be so. I do not question the value of the advice, not for a moment. All I say is that I prefer not to take it. And if somebody else desires this particular laurel-crown, this crown of tainted laurel, he shall wear it without arousing any envy upon my part, albeit, as I know full well, this is a branch of the subject which illuminates many obscurities and seeming eccentricities in human conduct. I know all about that, but, as Herodotus so often says, I am not going to tell all I know, although, I fear, an allusion or two may be necessary.

We may take it as on the whole true that a repulsive odour is a dangerous odour. Not invariably, however. Otherwise grouse in their season would not be esteemed a dainty and Gorgonzola would everywhere be buried. Nevertheless in these high realms palatability is limited to quite a narrow streak. There is a level beyond which the boldest gastronomic adventurer dare not climb.

It is remarkable that the liking for half-decomposed food, although an acquired taste, is found everywhere in the world, among savage and civilised, rich and poor, high and low—but not among young and old. For young people do not usually approve of such *recherché* flavours. It would be a mistake, however, to argue from that fact that these savoury meats act as fillips to a sense jaded with age, because it is generally agreed that neither smell nor taste declines in acuteness as we grow old. On the contrary, they become more instructed, more particular, more delicate. Appetite declines if you like, but taste and smell abide increasingly unto the end.

Nevertheless we can only look upon this particular liking as acquired, since the high relish of one country but fills its neighbours with disgust.

It is worthy of remark, perhaps, that the last whiff, the final sublimated breath of ripe Gorgonzola as it passes over, is a faint suggestion of

ammonia. Curiously enough, this always fills my imagination with the sack of cities and the end of all things in smoke and thunder. It may be because the penultimate phase of life itself is ammonia. Fire, slaughter, and much more besides come quite promptly to this gas for the City of Destruction, what there is left of the remainder in dust and ashes being but a handful for the wind.

To the keen-sensed medical man certain morbid states can be recognised by their exhalations. I have even heard of an enthusiast on the subject who alluded to them as "both visible and tangible"; but that, I think, must be exceptional.

Physicians of the last generation used to speak of typhus fever as having a close, mawkish odour, and the smell of smallpox is horrible. But these, as well as the appalling stench of the hospitals in olden days, are among the smells which have, for the most part, fled our country.

There are others, however, less powerful and repugnant, which are still with us, and which we recognise as among the prominent characteristics of certain maladies, the acid smell of acute rheumatism for one, and I have sometimes thought I could detect a characteristic odour also in acute nephritis, a smell resembling that of chaff. The odour of a big hæmorrhage is unmistakable and, to obstetricians particularly, ominous.

Then there is the smell of mice which attends upon the skin disease known as favus.

The breath of a chronic drunkard is familiar enough to everybody, and the more delicate aroma in the circumambient atmosphere of the careful tippler, ethereal and by no means unpleasant, will often reveal to the physician the hidden cause of obscure symptoms. It is particularly valuable when your patient is, as so many of these secret drinkers are, a woman, it may be a woman of good social standing.

A disease-odour of great value and significance is the sweet-smelling breath caused by acetone poisoning in the later stages of diabetes.

A sweet smell is also said by Bacon to attend plague :

“The plague is many times taken without a manifest sense, as hath been said. And they report that, where it is found, it hath the scent of a smell of a mellow apple ; and (as some say) of May-flowers ; and it is also received that smells of flowers that are mellow and luscious are ill for the plague, as white lilies, cowslips and hyacinth.” (Quoted by Creighton, “A History of British Epidemics,” p. 685, f.n.)

Death sometimes heralds his approach by means of an odour, said in some parts of the country to bring ravens about the house, which may well be true, as it is apparently a summons of the same nature that calls the Indian vulture in flocks from apparently untenanted skies. Birds in general,

however, seem to belong to the microsmatic group of animals, relying chiefly upon their vision, which is often highly perfected, particularly for distance.

Much has been made, too much perhaps, of the part played by olfaction in the sex-life, and its undoubted prominence in the coupling of four-footed animals is pointed to as an indication of its potency in mankind also. But the reasoning is fallacious. Olfactory influences predominate in these animals simply because olfaction is their principal sense.

Among birds, now, courtship and marriage are conducted without any apparent aid from olfaction, and in no group of beings, not even in mankind, is the poetic side of courtship, both before and after marriage, so highly developed and so beautifully displayed. In their love-making the birds appeal to each other through the ear in their songs, and through the eye in the nuptial splendours of the male, splendours which he parades with glorious pomp before what often seems to be, indeed, but a lackadaisical and indifferent spouse.

As we have already seen, this independence of olfactory stimuli is, so far as obvious indications go, also the case with human lovers. True, we have numerous references by poets to the sweet-

ness of their ladies' breath, only one, as far as I know, being blunt enough to say :

“ And in some perfumes there is more delight
Than in the breath that from my mistress reeks.”

But the sum and substance of Havelock Ellis's exhaustive inquiry on this point is undoubtedly this, that if a lover loves the aroma of his lady, that is because of his love, not because of her inherent sweetness. In other words, the attraction, subtle though it be, at least in the early or romantic stage, is seldom or never obviously olfactory. It is the suggestion of closer intimacy that constitutes the attraction of her nearer environment, and this suggestion is the offspring of the lover's imagination.

As to the influence of her personal emanation in the second, the realistic, stage, there also, it would seem, its power is subsidiary, certainly to that of touch, although more active than that of sight and hearing, seeing that the holy of holies is only unveiled in darkness and in silence.

As for our opinion in everyday life, I think most people will subscribe to the old adage “ *Mulier bene olet dum nihil olet.*”

CHAPTER VII

SMELL AND THE PERSONALITY

WHATEVER of myth there may be in the quaint stories we related in Chapter V., there is no doubt about this, that there is great variety among different individuals in respect to their personal atmosphere. I mean the natural atmosphere of the person, of course, not the artificial airs that surround and envelop the beperfumed modern lady.

There is no need to enlarge upon this branch of our subject. Those who are curious about it may apply themselves to Havelock Ellis for more detailed information. What I am concerned with here is something much less commonplace and obvious, the question, namely, whether we disseminate and receive, each of us, anything less material than the odours we are conscious of.

In addition to his other olfactory accomplishments, our friend the dog seems to be able to distinguish by smell when a strange dog is to be cultivated as a friend or wrangled with as a foe, and nothing is more amusing to watch than the careful and even suspicious olfactory investigation

two dogs meeting for the first time make of each other's odours, during which exchange of credentials a state of armed neutrality exists, to pass, apparently as a result of some mysterious olfactory decision, either into frank, open, and unchangeable hostility, or into friendship equally frank, open, and unchangeable.

But what it is that makes one dog smell to another of enmity or of friendship is as mysterious as—the mutual attraction or repulsion felt for each other by two human beings, shall we say? For, of course, this suspense of judgment on encountering a new-comer is a human no less than a canine trait. There were physiognomists before Lavater, since we are naturally influenced by what our senses, and especially our eyes and our ears, tell us about a person we are meeting for the first time. We like the look of the man, his expression, his smile, the character of his movements, bodily as well as facial; we find the intonation of his voice, his accent, his laugh, agreeable. Or we don't. And our decision is curiously independent of his moral character, even after we have got to know that side of him. Now, this act of judgment seems to us to be quite independent of any olfactory evidence. We rely upon our predominant senses just as the dog relies upon his. Yet I sometimes catch myself wondering whether olfaction, olfaction rarefied and refined beyond

imagining, does not without our knowledge play some part in our estimate of the pros and cons in character.

What is conveyed to us by the "personality" of a man? Here we have apparently a complex of sense-impressions, for the most part vague, which we are seldom able to analyse, even to ourselves. Still less can we put it into words capable of conveying our impression to other people. "There is *something* about him that I like" is about the sum-total of our attempts at description.

And if this be true as between man and man, it is even more often remarked as between man and woman. Meredith it is, I think, who says that the surest way to a woman's heart is through her eye. Fortunately for most of us, his dictum is open to question. Otherwise the human race would soon come to an end. Now, although, unlike Meredith, I cannot claim the rank of a high-priest in the temple of Venus, yet so far as I may dare to express an opinion upon a matter so recondite, not to say mysterious, I should rather be inclined to say that the surest route is by way of her ear, and I am fortified in my belief by an authority as erudite in these matters as Meredith himself, Shakespeare to wit :

"That man that hath a tongue, I say, is no man
If with his tongue he cannot win a woman."

John Wilkes, they say, to all appearance a "most uninteresting-looking man," asked for only half an hour of a start to beat the handsomest gentleman in England at the game of games. Women forgot what he was like as soon as he began to talk.

Who has not seen women turning sidelong glances, with that surreptitious intentness we all know so well, towards some very ordinary man in whose voice they, but not we, detect the indefinable something that has the power of luring these shy creatures from their inaccessible retreats? What man has not seen this play and puzzled over it? The quality—is it perhaps something caressing, or something brutal and ultra-masculine, or both at once? Who knows what it is that their intuition perceives?

So we ask, we less favoured mortals, as we turn and look at him also, hard and long, only to give it up with a shrug!

When I am one of a crowd under the spell of an orator—a rare bird, by the way, in England—I feel his power less in what he says than in how he says it. Gladstone, for example, swayed his audience by the fervour of his personality, not by any beauty of word or thought in his rhetoric. How meaningless his speeches seem to us nowadays as we vainly try to read them, how involved, discursive, ambiguous, turgid. How dull! And yet we

know that these same involved, discursive, ambiguous, turgid and dull speeches could and did rouse hard-bitten Scotsmen to a wildness of enthusiasm that seems to us incredible.

Thus the personality is something that travels on the wings of sound. But is that all? Is there not something more, something imperceptible which yet exercises a secret power over our emotions and passions? Is there an olfactory aura?

“Why does the elevation of the Host in a Roman Catholic church bring such an assurance of peace to the congregation?” writes a friend of mine. “This remarkable sensation I have myself frequently experienced and wondered at. Yet I am, as you know, a Scots Presbyterian, and do not credit for a single moment the miraculous change of bread and wine. And yet to this gracious and comforting influence I have been subject on more than one occasion. It is for all the world as if the constant pin-pricks of our normal life were suspended for a moment or two.

“It is present only during service, and then only at the culmination of the rite.

“As I do not believe in the miracle, the influence must come to me from without, not from within myself. Indeed, I have actually come to the conclusion that it is borne in upon me not by the church atmosphere with its incense, nor by the solemn intonation of the priest, nor by the whisper of the muted organ, nor yet by the distant murmur of the choir, but—by the congregation itself!

“It is from the kneeling worshippers that the mysterious influence emanates, invisibly, inaudibly, intangibly, to suffuse with the peace of some other world the spirit even of an unbeliever. . . .”

Is it possible that influences such as these may enter by the olfactory door?

This perhaps may seem to be rather a fanciful suggestion for a scientifically trained writer to offer. But it is not wholly fanciful, since it has some support at least from theory (whatever that may be worth), and even from some considerations based upon solid fact.

As to theory, we have already seen how Fabre arrived at the conclusion that the olfactory sense of certain insects is capable of receiving stimuli to which we are insensitive, stimuli which he surmised to be of the nature of an ethereal vibration. Consider too the following facts.

It is well known that there are people who have an instinctive dislike of cats. The late Lord Roberts was one, and it is said of him that he was aware of the presence of his *bête noire* before he caught sight of it. How was he made aware?

The same instinctive aversion is felt by some people towards spiders. I myself know of one, a young girl, who cannot sleep if her bedroom contains one of these creatures. She, like Lord Roberts feels without knowing how when a spider is near her.

Here also is a letter to a newspaper from a correspondent telling the same tale :

“ SIR,

“ I notice with interest that the official photographer who is to accompany Sir Ernest Shackleton's *Quest* expedition has an intense dislike of spiders. Can any of your readers

explain this uncanny horror, which I believe is shared by a large number of people ?

"I myself loathe and fear spiders—so much so that I have been known on more than one occasion to go into a darkened room and to declare the presence of one of these creatures, my pet abomination being subsequently discovered. . . .

"F. E."

What sense-organ—because there must be one—enables F. E. and others like him (or her) to detect the presence of a small creepy-crawly ?

We turn now to a series of medical cases which may throw some light upon this peculiarity.

There are people who suffer from asthma when they go near horses. To enter a stable or to sit behind a horse is to them a certain means of bringing on an attack.

This susceptibility and the peculiar form taken by the reaction remind us of hay fever. In sufferers from this troublesome complaint the pollen of certain plants has an irritating effect upon the mucous surfaces of the eyes, nose, and bronchial tubes. So in like manner recent investigation has shown that there is in the blood of the horse a proteid substance which acts as an irritant poison to those susceptible people. Their asthma, therefore, is merely a manifestation of the irritation produced by the poisonous body or its emanation when it is borne to them through the air. Similarly we are justified in arguing that cats

and spiders may throw off an effluvium which is irritating to those susceptible to it.

But it is to be noted that the antipathy in these last instances manifests itself, not in a tissue change, but in a feeling of the mind, an emotion. Nay more, these people do not smell the cat or the spider, except in the way that James I. "smelled" gunpowder. Nevertheless, the irritant must travel through the air as an odour does, and it probably enters the organism by the mucous membrane of the nose.

But does it act upon the olfactory cells? Here we encounter, I must confess, a serious obstacle to an acceptance of this theory.

The interior of the nose is sensitive not only to odours, but also to certain chemical irritants. Any one who has peeled a raw onion or has taken a good sniff at a bottle of strong smelling-salts knows what I mean. Now, the chemical irritant, in the latter case ammonia gas, affects not the olfactory nerve, but certain naked nerve fibrils in the mucous membrane belonging to what is known as the fifth cranial nerve, a nerve of simple sensation.¹ And the simultaneous irritation of the eyelids, and in the case of the pollen and horse effluvia the bronchial tubes, shows that these

¹ The difference between those two sensations becomes clearly evident when an anosmic person is peeling an onion. The usual irritation of the eyes and nose is felt and manifested, but the patient is unaware of any odour.

resemble in their action the simple chemical irritants, and not the odours.

It must be remembered, however, that, as we have said, the cat and the spider effluvia induce an emotional effect simply, without local irritation. And emotional change not only follows, it may also precede, the perception of an odour.

The following anecdote of Goethe, for example, shows how smell may affect the personality before it is recognised as an odour by the consciousness :

“ An air that was beneficial to Schiller acted on me like poison,” Goethe said to Eckermann. “ I called on him one day, and as I did not find him at home, I seated myself at his writing-table to note down various matters. I had not been seated long before I felt a strange indisposition steal over me, which gradually increased, until at last I nearly fainted. At first I did not know to what cause I should ascribe this wretched, and to me unusual, state, until I discovered that a dreadful odour issued from a drawer near me. When I opened it I found, to my astonishment, that it was full of rotten apples. I immediately went to the window, and inhaled the fresh air, by which I was instantly restored. Meanwhile his wife came in, and told me that the drawer was always filled with rotten apples, because the scent was beneficial to Schiller, and he could not live without it.”

I wish to emphasise, for the sake of my argument, that Goethe underwent a profound constitutional disturbance, with its attendant discomfort, before he realised that its cause was an odour.

If, then, an odour can induce such emotional

changes without attracting attention to itself, the suggestion is not, after all, so very far-fetched that an emanation proceeding from the worshippers at the moment of the elevation of the Host in a Roman Catholic church may be transmitted to the bystanders through the olfactory door to induce in them an emotion similar to that felt by the initiated.

It may be objected that Goethe's experience and that of my friend are not alike, since Goethe plainly, though tardily, became aware of a real odour. It must be remembered, however, that Goethe was a scientist and naturally gifted, besides, with an unusual power of introspective analysis. He found the cause of his disturbance because he sought for it.

Moreover, we learn from Havelock Ellis that during religious excitement a real (and pleasant) odour is sometimes perceptible in the atmosphere around the faithful.

May it not also be the same kind of influence, transmitted in the same way, that dominates the mind, in company with impressions received by sight and hearing, when we are in the vicinity of other people ?

Our study of smells has brought us, to be sure, into a strange region of psychology, for it is possible that we have here one explanation of the

mysteries of crowd-psychology, of those unreasonable waves of passion that sometimes sweep through masses of people and lead to all manner of strange happenings, like crusades and holy wars ; *autos-da-fé* ; witch-burnings ; lynch-murders ; State-prohibition ; spiritualistic manifestations ; and other miracles.

(The somewhat uncanny "sense" we have when some one else is present in what we suppose to be an empty room may be olfactory in origin, but it has generally seemed to me that it is due rather to an alteration in the echo of the room, a change in its normal sound-picture. If the room is a strange one to us, I do not think we so readily become suspicious of the presence of an unseen and unexpected visitor.)

CHAPTER VIII

THEORIES OF OLFACTION

(The Pièce de Résistance)

THE anatomical structure of the olfactory end-organ in the nose is, as we saw in Chapter II., simple.

Contrast it with the eye. Here we have what is obviously an optical instrument, with lens, iris diaphragm, dark walls, and sensitive plate complete—a photographic camera, in a word.

Contrast it also with the ear, which is an acoustic apparatus reminding us in its detail of a recording gramophone leading to a closed box in which are what look like a series of resonators, like the wires of a piano.

In the antechamber of each of those organs the physical vibrations to which they respond undergo considerable modification before they reach the sensory cells.

In the antechamber of the olfactory organ, on the other hand, the amount of modification necessary is evidently but slight, as the olfactory region of the nasal chamber is merely a narrow, open

passage. As far as we know, all that takes place is that the incoming stimulus, the odorous molecule, is warmed and received by the nasal mucus.

Thus the very complexity of the structure both of the eye and of the ear helps us to comprehend their function.

But what can we deduce from a flat surface in which all we can see is a collection of cells with minute protoplasmic hairs projecting from their distal ends? Obviously, little or nothing. We are, in fact, confounded by simplicity. It may be that we are here dealing with one of the essential properties of all living matter, little, if at all, altered from its primitive condition.

To the physiologist, then, olfaction is the most mysterious of all the senses. It still retains its secrets, and therein lies the fascination of its study.

Of late years, the exploration of this dark region of physiology has been, and is still being, vigorously pushed, and we shall now proceed to give what, however, can only be a brief and superficial account of the progress made and of the opinions held. Even so we shall be compelled to make an incursion into the high and dry realms of modern chemical and physical theory. That may not be good hearing, but what is still worse is that almost every single point we shall be discussing is a matter of controversy.

Let us commence with a few of the details, mostly unimportant, upon which there is general agreement.

Consider, first of all, the variety, the almost infinite variety, of odours. We have, for example, all the odours of the world of Nature, the emanations of inorganic matter, of the earth itself, its soil and its minerals ; to these we must add the multitudinous perfumes of the vegetable kingdom, of barks, roots, leaves, flowers and fruits, including those of growing herbaceous plants, which differ so widely from one another that it is said of Rousseau, whose myopia was compensated for by an unusually acute sense of smell, and who was, moreover, no mean botanist, that he could have classified the plants according to their smell had there been a sufficiency of olfactory terms for the purpose ; then we have the thousand effluvia, some pleasant and others not so pleasant, of living animals, including the various races of mankind ; next come the—mostly repulsive—odours of decaying vegetable and putrefying animal matter ; and finally the products of man's own proud ingenuity and skill, such as the artificial perfumes and flavours on the one hand and on the other coal-gas, acetylene, carbon disulphide, and the like.

Parker notes it as worthy of remark that man has created, both accidentally and intentionally,

many new odours—smells, that is to say, which have no fellow in the world of Nature—and he emphasises the fact that the nose is nevertheless capable of appreciating such novel sensations.

In this connection we may mention that the art of modern perfumery can imitate closely many of the natural perfumes, and more particularly the natural flavours, by mixing together essences, or components, which in no way resemble the final product.

Thus the flavour of peaches can be compounded artificially of aldehyde, acetate, formate, butyrate, valerianate, œnanthylate, and sebate of ethyl, and salicylate of methyl, with glycerine, glycerine being added to the fruit essences, as it is to wines, in order to restrain the evaporation of the volatile bodies. (The fruit essences are used only in the making of flavours. They cannot be employed as perfumes, as they are too irritating to the nose.)

The union of components to form a product different from any one of them is found also in vision. When the colours of the spectrum, for example, are commingled, the resultant white light is devoid of any colour.

Thus the potential responsiveness of the olfactory organ seems to be practically inexhaustible. So far, at all events, it has not yet reached the limits of its capacity.

The number and variety of recognised smells being so great, then, one can readily understand how difficult it is to construct a classification of odours. Many attempts have, in fact, been made, but, depending as they do more or less upon subjective sensation, no two classifiers give us the same classification. Indeed, a division of all smells into "nice," "neutral," and "nasty" would be about as good as many much more ambitious efforts.

Zwaardemaker's is the classification most usually followed at present, and as it is to him we owe most of our knowledge of scientific olfaction, we shall detail it here :

(1) Ethereal or fruity odours ; (2) aromatic, including as sub-classes camphrous, herbaceous, anisic and thymic, citronous, and the bitter almond group ; (3) balsamic, with sub-groups floral, liliaceous, and vanillar ; (4) ambrosial or muscous ; (5) garlicky (including garlic), oniony, fishy, and the bromine type of odour ; (6) empyreumatic (guaiaicol) ; (7) caprylic (valerianic acid) ; (8) disgusting ; and (9) nauseating.

The subjective character of these classes is obvious, especially in the last two groups, but, apart from that objection, most people will be inclined to protest when they learn that chloroform and iodoform are put into the first, the ethereal or fruity, group, while it is suggested, though to be

sure with a query, that coffee, bread, and burnt sugar may belong to the "repulsive" (pyridine) group!

The fact is that Zwaardemaker's classification is based upon a chemical foundation, that is to say, upon properties which, as we shall see later on, do not necessarily correspond with the odours as we smell them. That, no doubt, explains his inclusion of iodoform among the "fruity" odours.—Iodoform fruity!—Shades of George Saintsbury and his "Cellar Book"!

A shorter classification is that of Heyninx, who, aiming at objectivity, bases his arrangement, to some extent at all events, upon the spectrum analysis of odorous molecules in the atmospheric medium, of which more anon. His list is: acrid, rotten, fœtid, burning, spicy, vanillar or ethereal, and garlicky. But here, also, the coupling of vanillar with ethereal odours seems a little inappropriate.

We stand, perhaps, on rather firmer ground when we turn to the manufacturer's classification, founded as it is frankly upon subjective sensation, and therefore devoid of any surprises to the logical faculty. Here is Rimmel's arrangement: rose, jasmine, orange, tuberose, violet, balsam, spice, clove, camphor, sandal-wood, lemon, lavender, mint, anise, almond, musk, ambergris, fruit (pear).

It may be objected, perhaps, that this is a

catalogue merely, not a scientific classification. That is quite true. But what is also true is that the others we have quoted are little, if any, better. The fact is that we do not yet possess the knowledge necessary to enable us to arrange odours in classes.

The manufacturers, of course, concern themselves with agreeable and attractive odours only. To the great and growing company of the stinks they pay no attention whatever. For that reason their contribution to our knowledge is necessarily but partial and limited.

In their own proper domain, however, they can point to several great successes. They recognise, for practical purposes, about eighty primitive scents. Many natural (to say nothing of many unnatural) perfumes can now be prepared artificially, and some so prepared are said to be even more powerful than the natural productions. Artificial musk, for example, is one thousand times stronger than natural musk, Parker tells us. Deite, on the other hand, says that the smell of artificial musk is not equal to that of the natural ! Indeed, according to this authority, although synthetic perfumes play an important part in the concocting of scents, there are only a few of them which can be used instead of the natural product. What happens is that the artificial and the natural are generally used in combination. Thus the

“ mignonette ” of the shops is prepared by passing geraniol, an artificial odorivector made from citronella oil, over the natural mignonette flowers, the resulting product being an essence smelling strongly of mignonette, and not at all of geraniol.

One or two, as we said, are purely artificial imitations ; coumarin, for example, the “ new-mown hay ” of sentimental memory, which used to be obtained from the tonka bean, is now entirely made up by the synthetic chemist. But for all the more subtle essences we have still to rely upon Nature’s laboratory. The manufacturer steps in and distils the precious essential oil certainly, but it is from flowers that he obtains it. Attar of roses, for instance, contains, in addition to natural geraniol, a number of other ingredients which have so far escaped analysis, a hundred thousand roses supplying only an ounce of it. In like manner a ton of orange blossom yields but thirty to forty ounces of the odorous essential oil.

Many of the costly plant perfumes come from tropical or semi-tropical countries, such as Ceylon, Mexico, and Peru. But tropical perfumes, though strong, lack the delicacy of those found in temperate climates. Cannes, on the Riviera, gives us roses, acacias, jasmine and neroli ; from Nimes come thyme, rosemary, and lavender oil ; from Nizza, on the Italian Riviera, we get violets ; from Sicily, oranges and lemons ; from Italy, iris and

bergamot. English lavender, until quite recently the most highly esteemed, came from the towns of Hitchin and Mitcham. But I am informed that the growing of lavender in England is no longer pursued with the same success as formerly, and we have to regret the disappearance of this old and truly English industry.

The natural musk, curiously enough, which comes from the musk-deer of Tibet, is not used in making musk perfume. It is, however, widely employed in the perfumer's art, as it has the curious property of enhancing the strength of other perfumes and of rendering them permanent. Civet, also an animal product, being "the very uncleanly flux" of the civet cat, has similar properties. It is added to other perfumes to strengthen them ("to set them off," as it were) and to render them more stable.

But the most curious, and also one of the most ancient of perfumes is ambergris, which is a fatty, wax-like substance found floating in the sea or washed ashore. It comes from places as far apart as the west coast of Ireland, China, and South America. The origin of this substance was for long a mystery. But we know now that it consists of the undigested remnants of cephalopods (squids and octopuses) swallowed by the sperm-ceti whale. Ambergris is used, like musk and civet, to render other scents durable.

But while the victory of the chemist is by no means so complete as it is in the matter of the dye-stuffs, research is steadily going on, and the next few years will almost certainly witness an ever-growing conquest over this department of natural chemistry.

In the meantime chemists are applying themselves to the creation of new varieties of perfume, and, if we may judge from those disseminated by certain ladies in public places, with a success that startles and even irritates us. Compared with them, the love-philtres of olden days must have been but feeble things.

“How d’you know you’re in the right ’bus?” asked the ’bus conductor of the blind man who was confidently boarding his vehicle.

“This is the Maida Vale ’bus,” was the contemptuous reply. “I knows it by the smell o’ musk.”

The inexhaustible capacity of the olfactory organ, to which we alluded above, is by no means its only marvel. It is also of the most wonderful delicacy, equalling, even if it does not surpass, in this respect, the sensitiveness of the eye to light.

This property of the smell-organ has been scientifically estimated. There are many ways of doing so, that by means of Zwaardemaker’s olfactometer being perhaps the most popular :

“ This consists of two tubes that slide one within the other, and so shaped that one end of the inner tube may be applied to the nostril. The odorous material is carried on the inner surface of the outer tube. When the inner tube, which is graduated, is slipped into the outer one so as to cover completely its inner face, and air is drawn into the nostril through the tube, the odorous surface, being covered, gives out no particles, and no odour is perceived. By adjusting the inner tube in relation to the outer one, whereby more or less of the odorous surface is exposed, a point can be found where minimum stimulation occurs. The amount of odorous substance delivered under these circumstances to the air current has been designated by Zwaardemaker as an olfactie, the unit of olfactory stimulation. Having determined for a given substance the area necessary for the delivery of one olfactie, doubling that surface by an appropriate movement of the inner tube will produce a stimulus of two olfacties, and so forth. Thus a graded series of measured olfactory stimuli can easily be obtained. Further, by using outer tubes carrying different odorous substances various comparisons can be instituted as measured in olfacties ” (Parker).

Instruments more elaborate and of greater accuracy have, as a matter of fact, been devised and used, but they need not detain us.

The results obtained by these and other methods of determining the minimum stimulus of olfaction are certainly astonishing, and reveal as nothing else can the delicate acuteness of the sense.

Fischer and Penzoldt found that they could plainly smell one milligram of chlorphenol evaporated in a room of 230 cubic metres capacity. This is equivalent to $1/230,000,000$ of a milligram to

each cubic centimetre of air, or, assuming 50 cubic centimetres of air as the minimum needed for olfaction, the amount of chlorphenol capable of exciting sensation is $1/4,600,000$ of the thousandth part of a gram—approximately $1/276,000,000$ of a grain!

Many other odours have been similarly tested, and although there is much numerical discrepancy in the records made by different observers, all agree as to the extreme delicacy of the sense. (For vanillin and mercaptan, see p. 39.)

Those experiments and estimations explain how it comes about that many odours (musk, for example) may go on giving off their scent until they part with the whole of it *without undergoing any appreciable loss of weight*.

Thus there is no chemical test known to us so delicate as olfaction.

It has been found, for example, that over-assiduous efforts at filtering and purifying the air used for ventilation so as to remove all noxious chemical and bacterial ingredients defeat their own end. Such air, although to our artificial tests absolutely clean and pure, seems to the sense of smell to lack freshness. And the nose is right. The tests are wrong. For sojourn in such an atmosphere induces lassitude and torpor of mind, as members of the Houses of Parliament, where this method has been tried, know to their cost—and ours.

But albeit so highly sensitive to minute traces, the sense occasionally fails to perceive a highly concentrated odour.

For example, every one is aware that a bunch of violets which is filling a room with its fragrance seems when held to the nose to have no smell at all, or at the most to have but a vague, indefinable sort of odour.

The effect, as a matter of fact, varies with the perfume employed. Some, like violets, have no smell at all. Others give a different smell when concentrated from what they give when dilute. Muskone, for one, the essential constituent of musk, has an odour of pines when concentrated ; and storax, a delightful perfume when dilute, is disagreeable when too powerful, and so on.

It is to be noted that the disagreeable character of these last is not due to the mental " cloying " or " sickening " of excessive sweetness ; it is a definite odour. Nor is the anosmia for concentrated violets due to the exhaustion of the sense.

Heyninx, comparing, as we shall see, olfaction with vision, believes the indefinite odour of concentrated violets to be akin to the absence of colour in white light. But this explanation seems to me to be improbable, since the effect is due not to the combination of a number of odours, as white light is the combination of all the colours of the

spectrum, but to the overpowering influence of a single odour.

Indeed, none of the other senses shows the same phenomenon. If we happen to catch a momentary glimpse of the noonday sun, we plainly see a disc of intense light (it is pale blue in colour to my eye), surrounded by a fiery halo, before it blinds us. In the same way, when a gun is fired close to the ear, we hear the sound before we are deafened by it.

It is for such reasons that perfumers never sniff at a bottle of scent ; they take a little, rub it on the back of the hand, and then wait until the spirit has evaporated before they proceed to smell it.

The exquisite delicacy of the sense might lead us to suppose that the olfactory organ must be quick at responding to its proper stimulus. But such is not the case. It is, on the other hand, relatively "slow in the uptake."

Gleg has estimated that the reaction time for auditory sensation is from 0·12 to 0·15 of a second, whereas the reaction time for smell is as much as 0·5 of a second, only one sensory stimulus being slower, that of pain, namely, which occupies 0·9 of a second.

Odours are conveyed to the olfactory end-organ in the air we breathe. Before they can rise into

the air from the odorivector (the odorous body) and be transported they must, it is clear, pass into the vaporous or gaseous state. (In the case of fish, of course, the odour must undergo solution, that is pass into the liquid state.) Many of the natural properties manifested by smells have been related to this transformation into vapour.

Everybody knows how rich garden scents become after a shower. It has been claimed that this results from the lightening of the atmosphere by the storm, in consequence of which the diffusion of odorous vapours, following the law that governs the diffusibility of gases, is facilitated. But some of the effect must be due, one would think, partly to the impact of the raindrops breaking up and dispersing the halo of perfumed air that surrounds each flower, and partly also to the evaporation of the rain-water that has absorbed these floral emanations.

We are told also that during the night and in the chill of early morning the air is less charged with odours because cold checks the diffusion of gases. This may be true enough for some odours, but I am inclined to think that the fact is not stated with perfect accuracy, as there are certain perfumes, that of the tobacco-plant for one and that of the night-scented stock for another, which are most prevalent after nightfall. And it has always seemed to me that Mother Earth is never so nicely

perfumed as on a cool September morning, although I should never be inclined to call any morning "incense-breathing," like Gray, for anything less like incense could scarcely be imagined.

There is no doubt, however, that frost seals up all odorivectors and renders the air quite odourless.

A physical law appertaining to gases is also invoked to explain the "clinging" of odours. Many, if not all, solids and liquids when exposed to air and other gases adsorb (cause to adhere) to their surfaces a thin, dense layer or film of the gas. If now that gas happens to contain an odour, or is itself odorous, the odour must also be adsorbed, and so in the case of porous materials, such as fabrics, permeated by the odour, it lingers tenaciously in their depths.

Odoriferous bodies in the solid or powdered form are known to retain their perfume for prolonged periods. Look how long a sandal-wood box remains aromatic. This property is supposed to depend upon the lowered vapour tension of the odorous molecules in the depths of the solid or powder, in virtue of which they rise into the air, or evaporate, but slowly.

It would seem to be natural to suppose that, as vaporisation plays such an important part in the dissemination of odours, the volatile bodies and liquids would be more odorous than the non-

volatile. But, as Zwaardemaker has pointed out, this is by no means always the case. Many substances of low volatility are nevertheless highly odorous, and *vice versâ*.

We turn now for a moment to consider the behaviour of the odorous vapour in the nose.

As it passes through the nose the current of inspired air sweeps along the lower and middle regions only ; the upper or olfactory region is not directly traversed. But almost certainly some of the air is diverted up into the olfactory region in light eddies, and the act of sniffing, which is a short inspiration abruptly begun and ended, and which we instinctively resort to when trying to detect a faint odour, is obviously of a nature to propel side-streams or eddies up into the olfactory zone. One is reminded of the production of smoke rings from a box.

We smell not only during inspiration, however, but also during expiration, the latter conveying to the olfactory region the flavours of food and drink.

Flavours, that is to say the olfactory elements of so-called "taste," are not appreciated to the full until after deglutition. To most of us, although experts and connoisseurs can determine it by smelling the wine in the glass, the bouquet of port has really no meaning until after it is drunk, simply because the expiratory current of air as it

ascends through the throat into the nose receives the concentrated vapours of the warmed volatile higher alcohols which are clinging about the fauces.

We may here remark that although we are usually able to perceive that the odour and the flavour of a sapid food or drink are akin to each other, the sensation of the odour anticipating that of the flavour, yet they are by no means always identical. They may strike us as do a plain and a coloured version of the same print. Sometimes the flavour seems to be the more powerful, sometimes the odour. Nearly all bouillons, for example, possess a flavour more rich and full than the odour they give off with their steam. On the other hand, valerian has a strong, objectionable smell, which, strange to say, becomes subdued and relatively tolerable when that medicine is being swallowed.

It is a curious fact, well known to expert "tasters," that if the eyes are kept closed during the test, the delicacy of appreciation of flavours, and also of the smell of the wine in the glass, is entirely lost. I cannot suggest any explanation for this curious phenomenon.

Anosmia, absence of smell, which is the next topic for our consideration, is a not uncommon defect. It is generally the result of some form of

nasal obstruction, such as a bad "cold in the head," as Æsop's fox was clever enough to remember. This type is temporary and remediable. But there are other forms that are due to nerve-disease, and for these nothing can be done.

A congenital anosmia is occasionally met with, and a curious partial anosmia, reminding us of colour-blindness or tone-deafness. I myself know people who cannot smell coal-gas unless it is very strong, and I once knew a cook,—a cook who couldn't smell a bad egg!

Albinos are said to be congenitally anosmic, and there was recorded many years ago by Hutchison the case of a negro who, gradually losing all his pigment, became anosmic in consequence (cited by Ogle). As the sustentacular cells of the olfactory area contain granules of pigment (see Chapter II.), we are forced to conclude that it must exercise a highly important function in the perception of odours. We shall see later on that its presence is supposed by some to support the theory that odour is a specific ethereal vibration similar to light.

¶ We turn now to discuss the real nature of odour, a section of our subject which is still theoretical and highly problematical.

¶ Having accomplished so much in the art of perfumery, the chemist ought, one would think, to be

able to tell us whether or not there is any relationship or correspondence between odour and chemical constitution.

When investigation of this point was begun, a hopeful fact came to light, as it was pointed out that certain bodies of similar chemical composition had all the same kind of smell. These were the compounds of arsenic, bismuth, and phosphorus, all of which smell of garlic. But it was soon realised that this fact was of little or no significance, as the oxides of many of the metals, although quite different from the former group, also smell of garlic. To these we may add the instance of water and sulphuretted hydrogen, two substances which are related chemically, as their formulæ show (H_2O and H_2S), and yet one of them is odourless, while the other has a strong, unpleasant smell. Finally, according to Deite, natural and artificial musk have nothing in common but their smell. Chemically they are quite different.

The property of odour, then, does not depend upon the chemical constitution of bodies.

The next question that arises is : Do bodies exhaling the same kind of odour resemble each other in the structure of their molecules? In other words, can odour be related to molecular structure?

To the chemist all matter is made up of atoms and molecules. The elements, bodies which can-

not be broken up by chemical action into any simpler form, are composed of atoms. On the other hand, when elements combine to form a compound, the unit of the new body, composed as it is of two or more atoms of different elements linked together, is known as a molecule. (Probably the elements also exist in the molecular state, the atoms of which they are composed being linked together in groups.) Both atoms and molecules are, of course, very minute in size.

For reasons we need not enter into here, the molecule is held to have a certain structural form, which form is indicated by what is known as a graphic formula. The graphic formula of water, one of the simplest, may be written as H—O—H , and we may regard it as having a linear form. (Modern views indicate that it is not a simple line, but in two planes.)

Many molecules, however, particularly those of the organic compounds, are highly complex, and their structural form must be very different from that of water.

The question, then, now before us is: Does odour bear any relationship to the molecular structure of bodies? And again it has been maintained that a clue to the problem of the real nature of odour lies here.

There is a well-known series of chemical bodies

known as the "aromatics," by reason of the fact that they possess strong smells more or less similar in quality. With regard to this series, which is made up of groups of what are known as radicles which occupy definite positions on a molecule shaped like a ring—the benzene ring, as it is called—Henning, a German observer, has expressed the opinion that the odour depends, not upon the radicles as such, but upon the position they occupy on the ring.

Transferring his argument to odorous bodies in general, and taking six groups as embracing all (spicy, flowery, fruity, resinous, burnt, and foul), he associates each of these types with some feature in the constitution of the molecule which is common to all the members of each group.

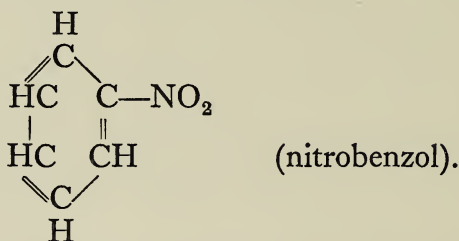
To enter more fully into this branch of the subject would carry us too deeply into chemistry. I shall content myself therefore with saying that Henning's views have received considerable support from scientific chemists and have led to several interesting and suggestive developments.

Heyninx, however, criticising this theory, points out that hydrocyanic (or prussic) acid and nitrobenzol, two substances with the same smell, have each a molecular structure in no way resembling the other.

The graphic formulæ of these bodies, which I

give here, plainly show the difference between them :

H—C≡N (hydrocyanic acid) and



(T. H. Fairbrother, to whom I am indebted for much information on the chemistry of olfaction, would dispose of this criticism of Heyninx's by denying that the odours of those two substances are identical. See later, p. 132.)

Chemistry, then, having, according to the critics, failed us, we turn to the allied science of physics. Physics deals with matter in its ultimate state, beginning, so to speak, where chemistry, with its work of changes and combinations, ceases, and taking us deep into the heart of matter independent of its chemical properties and behaviour.

We have seen that, chemically speaking, elements and their compounds exist as molecules made up of atoms. Now molecules may be minute, and atoms even more minute, but in "electrons," the name given to the last divisible

particle of matter known to the physicist, we are dealing with minuteness inconceivable. Sir Oliver Lodge has said that if an atom could be expanded to fill a space equal to that of the entire solar system, the electrons composing it would each be the size of an orange ! There is supposed, indeed, to be an atomic " system " composed of a central nucleus like the sun, with electrons revolving round it, the nucleus having a positive, and the revolving particles a negative, electric charge. Further (whether in virtue of these moving electrons or otherwise is not quite clear), the molecule is supposed to be in a state of constant vibration.

The physical theory of odour, then, refers that quality to the vibration of the molecule. It suggests that the molecules of an odorous body passing in the gaseous or, in fishes, the liquid state into the olfactory region of the nose, are there received by the film of mucus in which the olfactory hairs lie, and stimulate these hairs by their molecular vibration. No chemical change is supposed to take place, only, as it were, a mechanical stimulation, comparable to the mechanical stimulation of the retina by the waves of light.

A recent development of the theory which we owe to Heyninx, a Belgian scientist, brings the process very closely into harmony with what

occurs in the eye. According to this authority, olfaction is in reality a perception of ethereal undulations of the same character as the undulations of light, these undulations being provoked by the intra-molecular vibrations of the odorous vapour in the nasal mucus and transmitted to the olfactory hairs not by immediate contact, but through the medium of the ether.

We owe this last suggestion to the curious fact, but recently discovered, that many odorous substances (in their gaseous form in the air) absorb the rays of ultra-violet light.

In order to make clear what this means, we must say a preliminary word regarding the spectrum and spectrum analysis.

The passage of a beam of white light through a glass prism breaks it up into its component parts, beginning with red, then orange, yellow, green, blue, and ending with violet. Beyond the violet end of the spectrum we know there are rays invisible to us, but capable of acting on a photographic plate. These are called the ultra-violet rays.

In like manner, beyond the red end of the spectrum we know there are also rays, likewise invisible to us, but perceptible by our tactile sense as heat. These are called the infra-red rays.

Now, the rate of vibration of all these different rays, visible and invisible, has been estimated, and

they increase in frequency from the infra-red, which are the slowest, to the ultra-violet, which are the most rapid.

As we have already said, it has recently been shown that the odorous vapours absorb certain ultra-violet rays. That is to say, when the beam of light is directed through a chamber containing the odorous vapour before entering the prism, what are known as absorption-bands—vertical black lines in the white—appear in the photograph of the spectrum.

Similar lines are seen, as a matter of fact, in the visible spectrum of sunlight, and as these correspond in position with the spectrum given by chemical elements in an incandescent gaseous state, it is supposed that they are produced by the absorption of the corresponding light-rays by these gases in the solar atmosphere.

The physical explanation given of this phenomenon is that the molecules of the gas in the sun absorb such light-rays as are equal in rate of vibration to the rate of their own vibrating molecule.

In the same way, Heyninx and others argue that the odorous vapour is composed of molecules which are vibrating with a period equal to that of the light-rays they absorb.

Moreover, since the position of the absorption-band in the photograph varies, lying in some cases

nearer to the visible violet and in others further away from it, and since this position varies with the particular fundamental odour employed, it is suggested that not only do the molecules vibrate with a period equal to that of the ultra-violet rays they absorb, but as this vibration varies in rate, so it is to this variation that we must ascribe the differences in odours. This is analogous, of course, to the appreciation of colour by the eye. One odorous molecule, that is to say, like the colour red, having a slower rate of vibration, will give rise to one kind of smell ; another, like the colour yellow, with a more rapid rate, will give rise to another kind of smell, and so on for all the fundamental odours. Heyninx, indeed, goes so far as to fix the position in the olfactory gamut of all fundamental odours, and to base upon it the classification we have already considered.

It is supposed, that is to say, that the vibrations of the odorous molecule set up undulations in the ether, and that it is those ethereal undulations that stimulate the olfactory hairs, just as ethereal undulations emanating from a luminous source stimulate the retina.

There is one great difference, however, between light and odour, a difference admitted, we may mention, by the supporters of the undulatory theory, but not emphasised by them. The difference is this : in the case of visible light the

ethereal undulations emanate from a source at a distance (it may be like starlight at an enormous distance) from the sensory end-organ, whereas in the case of odour the undulation is supposed to be generated by the odorous molecule in close proximity to the end-organ.

The theory makes no attempt to explain how the olfactory hairs respond to these hypothetical ethereal waves.

Finally, we have the question of the olfactory pigment to consider, and in this matter we cannot do better than follow the exposition of William Ogle, an English physician who wrote as long ago as 1870. As will be seen, he forestalls the modern undulatory theory of olfaction in a remarkable manner.

Ogle contends that the presence of pigment must be of great importance in the function for the following reasons :

First, the epithelium of the olfactory region is pigmented, while that of the rest of the nasal chamber and sinuses is devoid of colouring matter.

Secondly, there seems to be some correspondence between the degree of pigmentation and the acuteness of smell, as the following facts suggest :—

In macrosmatic animals, such as the dog, cat, fox, sheep, and rabbit, pigmentation extends over a larger space and is darker in tint than in man.

In these animals also the mucus covering the olfactory area of the nose is itself pigmented.

We have seen that human albinos are anosmic, and the same is probably true of animal albinos. But care is necessary in making observations on suspected albinos in animals, as even when they are altogether white a certain amount of black pigment remains about the face and nose.

The following reports, however, would lead us to conclude that as with man, so with the animals, a relative deficiency of pigment is associated with a dull olfactory sense.

It is by smell that the herbivora detect and avoid plants which are poisonous, and when poisoning does occur, it is usually a white animal that suffers. In some parts of Virginia the farmers will only rear black pigs, because, they say, the white ones eat and are poisoned by the roots of *Lactanthus tinctoria*. For the same reason in the Tarentino only black sheep are reared.

Thirdly, the dark-skinned human races have a keener sense of smell than the lighter races.

Fourthly, the sense grows more acute as we get older, as we have already seen, and nasal pigmentation, it is said, also increases with age.

As to the function of the olfactory pigment, Ogle remarks first of all that odours are absorbed more readily by dark than by light materials.

Pigment is also present in the labyrinth of the

ear as well as in the eye, and its presence in these organs seems to be essential to their activity.

It is to be noted that the pigment does not occur on the nerve structure in any of those end-organs, but external, though contiguous to it. In the eye, it lies in contact with the rods and cones of the retina ; in the nose, with the olfactory hairs ; in the ear, with the terminal bodies of the auditory nerve.

Hence the pigment, he supposes, must be associated with the reception of the sensory impressions.

In the eye and the ear those impressions are undulatory in character. That being so, he holds that the undulatory theory of olfaction also is probably the correct one.

Ogle finishes with the remark that the theory would be strengthened if it could be shown that pigment was specially suited for the absorption and modification of undulations.

It is interesting to us to learn that claims are now being made that pigment does possess the power necessitated by Ogle's theory. At all events, there is a theory of vision (Castelli's) which claims for the ocular pigment the power of absorbing and modifying light waves, and Heyninx holds that the olfactory pigment possesses a similar property.

Summing the whole matter up, then, we may

say that the undulatory theory of olfaction is, that an odorivector gives off in the form of vapour (in the aerial medium) extremely attenuated portions of its substance, too minute to be weighed, and that this vapour, disseminated through the air, enters the nose in respiration, and, being wafted up into the olfactory region, is received by the mucus bathing the olfactory hairs, where, in virtue of the ultra-violet radiations which proceed from its molecules and are modified by the olfactory pigment, it acts on the hairs, setting up changes (it may be also undulatory in nature) in them and in their cells, which changes are transmitted thence by the olfactory nerves to the neurones or nerve-cells of the olfactory bulb (or lobe) of the brain.

The undulatory theory of olfaction, then, as will be evident to the reader, has a good deal in its favour. And in addition to what we have already said of it as accounting for the absorption by odorous vapours of ultra-violet rays, and as giving a hint regarding the function of pigment in the olfactory area, there are also a number of other phenomena which it seems to explain. We have seen, for example, how one odorivector, such as musk or civet, may have the property of enhancing the power of another, and this is a property which is characteristic also of certain luminous conditions (fluorescence, lumino-luminescence).

Again, there is a harmony existing between certain of the manufacturers' primitive odours ; " they go well together," and are employed for that reason in the art of perfumery. This resembles the harmony existing in another class of undulations, the sound waves.

On the other hand, just as one sound may silence another by the clashing of their waves, so one odour may " kill " or neutralise another odour (iodoform and coffee, *e.g.*).

There are several other minor phenomena which are in agreement with this theory. They need not detain us.

We turn now to the criticism of the undulatory theory of odour.

First of all, we shall dispose of an objection which, at first sight, has a very serious aspect.

It may seem difficult to understand how vibrations which appear to us when of a certain rate to be light should when they are of another rate become to us smell. How can one and the same physical condition produce sensations so different ?

The same difference, however, is encountered when we pass to the rays at the other end of the spectrum, the reds and infra-reds. On one side of the dividing line we only perceive these as heat ; on the other side they also become light.

Obviously, the difference can only be due to the

different character of the sensory end-organ, the receptor of these vibrations. As Head says: "Each peripheral end-organ is a specific resonator attuned to some particular kind of physical vibration"—reminding us not only of sound-resonators, but also of wireless receivers, which are "tuned" or accommodated to particular wave-lengths.

Thus, if red rays encounter certain tactile end-organs in the skin, they are perceived by the mind as heat, and if they pass into the eye and stimulate the retina, they are perceived as red light. In other words, in whatsoever manner an end-organ is stimulated, it only induces its own particular sensation.

How it comes about that the various end-organs induce such different sensations is not yet known.

The ultra-violet theory of olfaction, however, has to run the gauntlet of much more serious criticism than the difficulty we have just disposed of.

One great objection to it (to my mind) is that it fails to account for another absorption phenomenon of which I have not yet made any mention. It was first observed by Tyndall nearly fifty years ago.

On submitting odorous vapours to examination

Tyndall found, not that they absorbed ultra-violet rays, as this method is of quite recent usage, but that they *absorbed heat-rays*, or the *infra-red rays* of the spectrum. So that, if it be correct to say that odours set up ultra-violet rays in the ether, we must be equally ready to credit them with setting up infra-red rays also !

But there is another, and perhaps a stronger, objection to the ultra-violet theory.

In the interesting and highly instructive schema drawn up by Heyninx of the wave-lengths of ultra-violet absorbed by odours, we find one or two discrepancies of a serious character.

For example, iodoform and cinnamic aldehyde show absorption-bands occupying nearly the same position on the spectrum ; and presumably, therefore, these substances have the same molecular vibration-rate. Yet their odours are not at all alike !

Again, acetone-methylsuccinic and butyric acids have *precisely* the same absorption bands, and yet they also exhale totally different odours.

But the most serious discrepancy remains. The absorption bands of hydrocyanic acid and watery vapour (steam) have precisely the same position in the spectrum, yet one of these has a highly characteristic odour, and the other has none at all !

It is rather difficult, in view of these findings, to

believe that this absorption phenomenon can have anything to do with the quality of odour.

My friend Mr. T. H. Fairbrother writes regarding this controversy :—

“ Whilst I do not for one moment suggest that the whole phenomena of smell can be explained entirely in terms of chemical constitution, I do maintain that it has much to do with it, and I certainly think that more valuable information about the cause of various odours has been obtained from considerations of chemical constitution than from the many extravagant physical theories which do not lead us very far. In my view the physicists are begging the question, because they usually postulate something which we cannot prove, and whilst it is possible that the vibration of electrons causes smell, how much wiser does that statement make us? One might easily say that it was possible that the bombardment of electrons caused smell, etc. On the chemical side, however, we are bound down to experimental facts, and we do know that esterification of carboxylic acids does bring about a fruity odour invariably, etc. Chemical constitution cannot explain fully all these phenomena, because chemical formulæ themselves are only approximations, but the effect of groups in a nucleus has done much to help synthetic production of odorous bodies. When the physicist can control the vibrations of his electrons and make them rotate in accordance with his will, then he may be able to synthesise new odours—till then we have no means of testing his theories.”

The older view of olfaction—and many modern scientists, as we see, still adhere to it—is that the odorous molecule acts as a chemical reagent upon the olfactory hairs. And there is something to be said for this opinion.

To begin with, no one doubts nowadays that

odours are material. They pass through the air as vapours, and they are known to travel miles on the wind. That is to say, apart from those hypothetical varieties of odour (if we can call them odour at all) discussed by Fabre earlier in this book, odours do not emanate from a point and disperse in all directions as light and sound do. Why then drag in the ether? Is it not more probable that the odorous molecule acts on the olfactory hairs by direct material contact, and that it sets up chemical changes in them?

We are asked to believe that the ultra-violet rays of odour stimulate the olfactory hairs as visible light-rays stimulate the retina. But it must not be forgotten that in the eye those rays may induce first of all chemical changes in the retina, just as they would act on the silver salt of a photographic plate, and that it may be by these changes that the retina is stimulated.

In the phenomenon of olfactory exhaustion, as we said in our first chapter, we have a circumstance which suggests the presence of some chemical reagent in the olfactory area.

It may be, of course, that in the nose as well as in the eye the process is a combination of chemical and physical changes. And in any case we are here dealing with that obscure region where chemistry and physics meet and mingle.

We have now come to the end of our discourse upon the theories of odour, and it must be confessed that we are still very much in the dark as to the nature of the odorous, and as to the manner in which it excites the olfactory organ to activity.

Still more mysterious, however, is the process by which the physical quality of odour becomes the sensation of the mind we call smell.

The transmutation of a physical quality into a sensation is indeed the great mystery of all our senses. Olfaction is not the only one before which we throw up our hands, and this in spite of the detailed and voluminous information which modern physiology, neurology, and psychology place at our disposal, perhaps less in spite of this information than because of it, seeing that the further our knowledge extends the wider seems the unknown realm beyond. Our science is an ever-expanding sphere, no doubt, but it is expanding into the infinite.

How is it that the rhythmic vibration of matter becomes what we call "sound," or the rhythmic vibration of the ether "light" ?

How does the physical pass into and become part of the psychic ?

According to recent teaching, the physical can be followed as such from the sensory end-organ itself as far as the first synapse, or junction with

the neurone. But there something happens ; . . . then it reappears in a new guise, vibration becomes sensation, the physical psychic, the objective subjective, the real ideal, the dead alive ! In that brief tumble of time what a miraculous transformation !

Modern science has cleared up much of the mystery of the objective world, and although it may be far from the end of its search, although, indeed, the search, one must think, can never entirely elucidate the dense obscurity that envelops us on every side, dark as a starless night around a candle, yet we already know this much, that the real world is very different from the world depicted for us by our senses.

Only a little imagination is needed to convey us out of the magic circle into which we have been born, and what a strange universe do we then find ourselves in ! Entangled in a meshwork of space-time and permeated by whirling maelstroms of varied and innumerable oscillations, we lose all hold on reality in the very act of grasping it.

But although we do possess some sort of vague notion as to the constitution of the outer universe, before the inner we stand ignorant and speechless.

Regarded as a machine, the brain, it is true, like the world without, is reluctantly yielding up its secrets one by one. We are learning how it works as a chemical factory, as a physical power-house,

so that already we can surmise that here also we have probably to deal with a multiplicity of vibrations, of exquisitely minute transformations of energy, of involved intercommunications, of deft though intricate associations, of rapid yet permanent recordings and registrations.

We are now able to follow the undulations we term light, not only into the eye, but into the brain itself, locating their central station in the occipital lobe, whence their effects radiate all over the organism. And in the case of olfaction Pawlow has taught us that its chief vegetative function, the result of radiations from the olfactory central station in the brain, is the arousing of the digestive glands to activity. The first act of digestion is olfaction. But the routes which the olfactory stimuli follow in the central nervous system and their communications with other sensory paths are not yet known.

The secrets of the brain which have been disclosed to us, however wonderful they may be, concern only, we must remember, the machinery of the nervous system, that part, namely, which is of the same nature and order as the objective world, of which indeed it is a member. Hitherto have we come, but no further :

“ The traveller hails. The echoing walls respond.
And there the matter ends. The wilds beyond
Are broken rock and desert where no foot
Can venture on to trace a further route,

For none hath trodden or shall ever tread
This hither limbus of the outer dread.
Cloven abrupt, the absolute abyss
Falls sheer beneath us, fathoms fathomless,
And still high o'er us heaves the unclimbed hill,
And the unanswered questions front us still."

The "thought" escapes us. Somewhere beyond the boundary of the physical flits this elusive, this tantalising ghost. How it is acted upon and how it reacts we know to some extent. But what the nature of its action may be is more than we can determine.

Nay! A moment ago we lightly spoke of passing out of the magic circle into which we have been born, and we forthwith proceeded to talk as if we had in reality escaped from this our prison. But there is no escape for us, of course. No man can jump out of his skin. There undoubtedly are such things as "waves," or "undulations," or "oscillations," or "vibrations," or whatever we like to call them. But they are not what we imagine them to be. There is, we may suppose, a four-dimensioned universe of "space-time." But it is beyond our conception. There is "objective reality," in a word. But it is no reality to us. Those very expressions, glibly used though they be, are but metaphors—"pretendings" a child would call them—attempts to bring the remote a little nearer to us, to clothe the uncouth in the garments we ourselves wear; all

of which is nothing but Maya—illusion—shadow-play.

Let us not deceive ourselves. Along with the recent revelations of physical science there comes, say certain modern philosophers, the suspicion that the universe is irrational. At every point we are brought up short by the unknowable.

For example, Einstein tells us that what we call the “ether” has no existence. It is merely a “void.”—But how can we call that void which contains something—undulations, to wit?

“Nay!” you argue; “the undulations traverse the ether, but they are not it. The ether is a non-entity. It has no existence. It is nothing.”

To which I reply: “But ‘nothing’ is an absolute term. It means ‘no thing.’ How, then, can undulations, or anything else for that matter, pass through nothing?”

“What nonsense!” you cry; “this kind of verbal poser is just the silly old metaphysicians’ parlour game of playing with words.”

I know it is. But the word-play has its uses. It demonstrates to us that words, language, logic, all alike, fail our thought, not so much because those instruments are limited in power as because the thought itself is lacking in precision and comprehensiveness.

It is when our word-play probes the expression

that the vagueness of the idea is made manifest. Our foil, even with the button on, goes clean through the phantom.

The mind, in short, has not absorbed, nor can it absorb, the *fact*. We seize a glass of water to drain it, and presently, like Alice, we find ourselves swimming about in an ocean! Obviously the universe *is* beyond our comprehension, a conclusion desperate if you like, yet undeniable.

But how very annoying it is, after all our heavy labour, to hear the ancient scoff of Zophar the Naamathite still ringing triumphant :

“ Canst thou by searching find out God ?
Canst thou find out the Almighty unto perfection ? ”

(Still we mean to go on trying !)

Yet of all the senses none surely is so mysterious as that of smell. For, as we have shown, the nature of the emanations that stir it to activity is still unknown ; the simple structure of its end-organ confronts us, like a sphinx, with silence ; and after the reception of the stimulus in the olfactory lobe of the brain its further connections and communications still remain unsurveyed, albeit, as I have already so amply displayed, its effects upon the *psyche* are both wide and deep, at once obvious and subtle.

CHAPTER IX

DUST OF THE ROSE PETAL

BY way of relief from the exacting mental strain of the last chapter, I have thought that the reader who has got this length might be grateful for something more simple, and so it is not altogether egotism that leads me to finish up with a few of the olfactory pictures I cherish.

Before proceeding with the subject-matter proper of the chapter, however, let me put in a plea for the conscious cultivation of the sense of smell. But little more, I take it, is needed in this way than to pay attention to the olfactory sensations that reach us, for the very fact of taking note of them is sufficient probably to increase the power and delicacy of olfaction, this being always the effect of the mental process known as attention.

Smell may thus be easily cultivated and improved, and with the increase in its appreciation of the world comes an enriching of the other sense-impressions that is quite surprising.

It is possible that there is no substance in the natural world entirely devoid of odour. At all

events, after a time the amateur in smell may find himself able, like Rousseau, to perceive perfumes when other people do not notice any, and as a mark at which he can aim let it be said that when he finds himself able to distinguish streets from each other by their smell alone he has made some little progress in the art.

The innate acuteness of the sense varies widely in different people. Some go through life blunt to all but the coarser smells, while others are gifted with a sensitiveness as delicate almost as that of a macrosmatic animal. This is scarcely an exaggeration. I am acquainted with people—English people—who are able to recognise by olfaction not only different races and the two sexes, but even different persons. One of those sensitives informs me that to her the personal olfactory atmosphere is every whit as characteristic and unmistakable as the play of features or the carriage of the figure.

Another remarkable feat within the capacity of human macrosmatics, and one that seems almost incredible to the ordinary individual, is that of being able to distinguish the clothing of different persons by its aroma. Some can even recognise their own, a remarkable circumstance in view of the almost universal rule that each is anosmic to his own particular atmosphere.

It is true that we can get on quite well without smelling. Probably congenital anosmia is the least crippling of all sense-deprivations. But how much it enters into our enjoyment of life when we have once possessed it is shown by the blankness that attends its loss ; we feel then as if a tint had been bleached out of the world.

At this juncture we may stay a moment to allude to the action of tobacco on olfaction. There are few people nowadays who would uphold King Jamie's "Counterblaste," wherein he denounces smoking as—

"a custome loathsome to the Eye, hatefull to the Nose, harmefull to the Braine, dangerous to the Lungs, and in the black stinking fume thereof, neerest resembling the horrible Stigian smoke of the pit that is bottomlesse."

But, in fact, regarding the influence of the tobacco-habit on the sense there is a conflict of opinion. Some say it dulls olfaction ; others, it has no deleterious effect. My own experience would lead me to agree with the former opinion.

We now proceed with our memories.

Who does not become a boy again when the fragrance of a gardener's bonfire fills the air ? In my own case when I smell it my eyes begin to smart and to water, and I hear the laughter and shouts of my brothers as, daring the wrath of

Olympus, we leap over the blaze and land on the white powdery ash that rises in clouds around us to the ruination of boots and clothing. It is always evening, " 'twixt the gloamin' and the mirk." The moon, still golden, is hung low in the sky; the wind is sharp with a touch of frost, but the glare and the glow of the embers reddens and warms us—at least that part of us we turn to the fire. (Have you ever felt the fierce pleasure of being at once scorched and frozen ?)

In those few country places in Scotland where the old Beltane fires of midsummer or midwinter are still kindled, children are encouraged to pass through the smoke, that being good for their health. The custom, frankly pagan, is probably the maimed rite of a sacrifice of children to the old gods. That may be quite true, and yet I concur in believing the practice to be beneficial. At all events, the bonfires of so many years ago have left with me a memory that has often recurred since, and always with healing on its wings.

Again, the fainter, keener odour of burning pine-wood combined with the fanning sensation on the face of the cold wind of the dawn always brings back to me a summer morning at the Swiss frontier station of Pontarlier after an evening when *vin ordinaire* had induced effects *extra-ordinaire* upon a youth unaccustomed to that fiery

beverage. Those, no doubt, were the days when nothing mattered much. Nevertheless the fragrant coolness of that morning after touches my aching brow to this day with the soothing gentleness of a hand fraught with understanding and forgiveness.

Then what sea-lover is there but responds to the salt pungency of seaweed on an empty beach ?

It is an interesting fact that the smell of the sea may travel inland for miles on a favouring breeze. With the south-west wind blowing moist, I have in the heart of Lanarkshire repeatedly been stirred out of everyday hebetude by the smell of the sea on the Ayrshire coast, some thirty miles away. And René Bazin (in " Les Oberlé ") says you can even smell it sometimes in Alsace, 250 miles from the Mediterranean.

Once, indeed, at King's Cross, London, I beheld monstrous railway-stations and muddy streets, with their motor-'buses, dingy wayfarers, yelling newsboys and all, melting away into the glimmer and space of the sea in a sort of magical transformation, just as mist low-lying in Russell Square will turn at times those garish hotels into sea-girt palaces. . . . Only this time there was no mist. There was, indeed, no need of mist. For the spell of power was a sudden whiff of the sea from far across the bricks, slates, and sooty chimneys.

But there is another sea-smell, equally powerful and much less romantic. Can you endure the breath of hot oil and metal from the engines of a steamer without a qualm ?

If ever a boy has watched and helped the fishermen clean and tan their nets, he will always after, as often as chance brings the smell to his nostrils, revive again the pit in the ground and the gruff voices of the heavy-booted men pulling the twisted net up and down, in and out.

Or the bean-flowers' boon ?

This, as it happens, concerns also somebody else, but as she has long since been lost in the crowd, I am not breaking any confidences in recalling the scene.

We are standing together beside the gate of a hill plantation, and I see a tall lady's delicately cut profile against the sombre green and brown of the fir-trees. Although the flush of the sunset has almost entirely faded from the sky, it seems to be lingering yet a while on her cheek as if reluctant to leave her. As for me, I am as keen to every breath of emotion as the little loch below is to the slightest stir of air. The time is past for talk, and I am watching her in silence. So I see the thin curved nostril dilate a little, at once to be quietly restrained, as if even this little display of feeling on her part

were out of place,—and then I also turn to look at the butterfly bean-flowers in the field at our feet.

Now as often as the bean blooms, so does her memory.

How powerfully associations affect our olfactory likes and dislikes we hinted on a former page, and in this matter of smell-memories we can observe the same effect. Smells which to others seem offensive may, if they arouse a pleasant memory, borrow from it a tinge that turns their offence into a joy for ever. In my own case iodine and the rather irritating odour of bleaching powder are always welcome and always sweet. Yet they recall nothing more interesting than the days of childhood to me! On the other hand, perfumes generally considered to be pleasant will be objectionable to us if they arouse unhappy memories.

The most beautiful, however, are those which have been young with us, and yet have never forsaken us, by continual refreshment keeping an eternal youth. And of all the odours in life none surely is so rich both in retrospect and in prospect as the smell of books to him who loves them. The cosy invitation of a library! Not a public library, needless to say, where the intimate appeal is lost

in a jumble of smells—dust, paste, ink and clammy overcoats. Such public mixtures the bookworm, that solitary self-centred individual, must, by reason of his shyness, ever consistently shun. But usher him into the private room of a private house where books, many books, have reposed for many years. Then go away and leave him to it.

The smell of a room full of books is slow to form. Like the bouquet of wine, it must ripen. You have to wait. But if you are able to wait, then one fine day you will be welcomed there by the snuggest smell in all the world, which, when once it comes, will for ever remain, like rooks in a clump of elms. I know a few houses where this most seductive of all perfumes has resided for untold years, and whence it will never depart as long as our immemorial England endures. But alas! like most people, I have only been a fleeting visitor to those nooks of enchantment, and have had to wait myself not once, but many times, as often indeed as I have shifted my roof-tree, for that ancient fusty atmosphere. There is, I fear, no way of hastening the appearance of this beckoning finger to oblivion. We need not linger over the analysis of this particular odour. Book-lovers know it. Others don't care.

“You are a reader, I see,” said an observant doctor to me once.

“ How d’you know that ? ” I asked in surprise, as we had just met for the first time.

“ I know it,” was his reply, “ by the caressing way you took up that book ! ”

Your real bookworm loves all books. Like the modern genius, he is amoral. But unlike the genius, his amorality, simple soul, is confined within the four walls of a library. He could never, I am sure, bring himself to agree with André Theuriet, who in “ *La Chanoinesse* ” depicts

“ *les Bijoux indiscrets* auprès des œuvres de Duclos ; *Candide*, *Jacques la Fataliste* et *le Sophia* voisinant de *Restif de la Brétonne* à deux pas de *l’Emile*, et *les Aventures du Chevalier de Faublas*—une nouveauté—non loin de *l’Histoire philosophique des Indes*,”

all of which books, by a kind of moral exercise of his imagination we cannot sufficiently deplore, he found exhaling “ une odeur de volupté perverse, quelque chose comme le parfum aphrodisiac des seringues et des tubereuses dans une chambre close.”

Every dwelling-house has its own peculiar atmosphere, sometimes agreeable, sometimes not. But, whatever its quality, so characteristic and persistent are some of them that I am sure a blind man would always be able to tell them by the smell alone. Few of us may be gifted with the analytical nose of a Charles Dickens to detect the ingredients

that make up a complex domiciliary atmosphere, but everybody must have noticed that basement houses smell differently from bungalows, the former greeting you with a harmonious blend of earthiness, soapsuds, and sinks.

Nay! The house you live in has a separate odour for each room: the drawing-room with its chintzes; the snuggerly with its stale tobacco, and, perhaps, like an insinuating nudge, with a whiff of the stronger alcohols; the bedrooms, if your housekeeper knows her business, with the freshness of well-aired linen.

The very days of the week have each its own particular olfactory mark, dating from our childhood: Sundays (in Scotland), peppermint followed by roast beef and richness; Mondays, pickles and soapsuds; Tuesday, the damp airs from the washing hung up to dry; Wednesdays, warmth and beeswax from the laundry, with ever and anon the thump of the flat iron; Thursdays, bread new from the baker and the washing of floors with soft soap—"Mind yer feet, now!"—Fridays, jam-boiling and the never-to-be-forgotten aroma of oat-cakes on the girdle; Saturdays—but Saturday is a day of wind and banging doors, of tops and dust; all its smells are out of doors.

Shops, too! What of the coffee-shop?—Who does not pause a moment at that door when the

beans are roasting? One of the richest of all odours that; curious how you lose it in the beverage! Then there is the ironmonger's, where the sharp smell of steel strikes, by some strange reflex, the upper incisor teeth and gums; the oil and colour shop, with its putty, turpentine, and general clamminess; and, last and best of all, the druggist's!

What about the fried fish-shop? Faugh! I once for a reason connected with my calling had cause to spend a whole night in a room above a fish-shop—once only. The next time (there never will be a next time, she swears, but there always is)—the next time I happened, curiously enough, to arrive late!

But although houses and rooms and, as we hinted, streets also, all smell differently, each town and city has its own peculiar fundamental odour. There is a town in Yorkshire that smells of "mungo." I know another that smells of mineral oil, and many that exhale the dank smell of the coal-mine.

London has a smell of its own, a fundamental familiar odour, which, by the way, has changed of late. Twenty years ago it was faintly acid with a background of horses and harness. To-day it is a mixture of tar and burned lubricating oil, by no means so pleasant. In addition to these, however, there is another and less prominent odour charac-

teristic of the London atmosphere, which I confess I cannot describe.

“ Once upon a time, some forty years ago, there lived at Highgate, which then still retained some of the characters of a village, a lady who declared that when a yellow fog drifted up from London she could detect the smell of tobacco smoke in it. To most people the odour is flatly that of coal smoke, which is perhaps always more or less to be perceived in London air. This at any rate would seem to have been the opinion of Edward Jenner, if we may trust a note made by Farington in his diary for 1809, which is being printed in the *Morning Post*. Farington’s note is as follows :

“ ‘ Dr. Jenner observed to Lawrence that He could by smelling at His Handkerchief on going out of London ascertain when he came into an atmosphere untainted by the London air. His method was to smell at His Handkerchief occasionally, and while He continued within the London atmosphere He could never be sensible of any taint upon it ; but, for instance, when He approached Blackheath and took His Handkerchief out of His pocket where it had not been exposed to the better air of that situation—His sense of smelling having become more pure he could perceive the taint. His calculation was that the air of London affected that in the vicinity to the distance of three miles ’ ” (*The Lancet*).

Paris, in like manner, has its own peculiar aroma. Lord Frederick Hamilton analyses it correctly into “ one-half wood-smoke, one-quarter roasting coffee, and one-quarter drains.” But for myself the Paris air always brings a curious half-suppressed feeling of excitement, part of it pleasure, part apprehension, as if something tremendous were about to happen. But here perhaps

we cross the border-line between conscious sensation and subconscious stimulation.

Rome is a city of candles and incense mingled with the dry mustiness of crumbling skeletons.

In Edinburgh you encounter here and there the smell of old Scotland. Thatch enters into its make-up, why I cannot tell you. But the cold grey metropolis still preserves the soul of the thatch, a cosy sensation that is prone to bring tears to the eyes of the returning exile.

In Glasgow damp soot struggles with the smell of the Bromielaw for the mastery.

Dublin mingles the warm, rich aroma of Guinness's Brewery with the cold smell of a corpse from the Liffey.

Those are the cities I know best myself. But I have often been told, and can quite believe it, that every city has its own particular atmosphere.

Some days, both in a city and in the country, are as rich and full of odours as a Turner picture is rich and various in colour. Other days bring us but a grey Whistlerian monotone, in which, nevertheless, the trained sense delights to distinguish an infinity of tender shades, unobserved by the casual.

I used to think that country smells were particularly dear to the country-born only, and that

their charm lay in their evocation of childish memories. But that is not the whole of the story. They attract us by their own inherent beauty. I have known town-bred lads linger about a stable because the smell, I was told, was "so sweet." And most of us are, to be sure, sufficiently horsey to enjoy that smell of straw and ammonia. We linger near it as bees haunt clover or cats valerian. And we are all horse-lovers sitting behind a smart cob on a hot day when the smell of the harness is mingling with the horse-odour. But these now old-world odours are being every day more and more ousted by the less pleasant smells of the motor-car, petrol, lubricating oil, and acetylene—a pure stink this last.

But the farm is an olfactory museum, a library, a symphony! How warm and comforting is the smell of a byre full of cows! Plunge into it from the cool of the evening and listen again to the sudden swish of the warm milk into the pail, the uncompleted low of the sober cattle and the rattle of the chain as they turn to look at the new-comer. A gentle relaxation of the spirit attends the visit like the relief of the limbs from a cramped position, and we readily fall into that mood, so rare these latter days, when attention disperses and the reins drop on the neck of the mind so that it wanders on at its will up and down the lanes and by-ways of

fancy. These paths are dangerous, to be sure, leading as they do to the Castle of Indolence, where you may dream your life away and be none the wiser.

Yet there must be many who have so wandered regardless, and have wakened up too late to recapture the days they have lost in dreaming, if they ever do want to recapture them, which is doubtful. If we really intended happiness in life—as we do not ; what we intend, and ensure, too, for that matter, is excitement—but if we really intended happiness, here is where we should find it, in and about a farmyard as hangers-on. Not as the farmer, needless to say, to whose mind these olfactory stimuli are stimulant, not anodyne. So that there can be no greater contrast than that between him and us. Every one knows how the idler idling irritates the worker working. And so we are brought back to reality all too soon by the slap of fate, waking up from a bank of thyme and dreams to the pavement of worry and hard work.

But it is sweet while it lasts, and if you can acquire, or are lucky enough to have been born with, pachydermia of the soul, then it may last for a lifetime—unless, that is to say, fate, as aforesaid, in the shape of the farmer, brings you back a-bump to earth with a clout on the side of the head and an order to take the hook and cut down thistles.

Stevenson has told us that idling is no loss of

time. Perhaps not, if we happen to be geniuses. But the mischief is that the rest of your family deny (with oaths) the major premiss, and the prophet - without - honour consolation prize is but a poor substitute for the loss of comfortable eternities dozed away beside the lazy kine.

Some time in the 'eighties of last century a French professor (Jaccoud) recommended the air of a byre as beneficial in phthisis.

I have known worse cures.

Why do not the perfume-makers present us with more of these gateways to Paradise, short cuts beside which De Quincey's laudanum in the waistcoat-pocket is but a by-path to hell? We might be given odours of peace and contentment—think of them in the hands of a clever wife! We might make libraries of them as people make libraries of gramophone records. So far all we have are flower scents, like roses, lilies, violets, and outlandish Eastern aromata, redolent rather of vice and its excitements than of virtue and its placidity.

Then there is the scent of thyme and roses in the farm garden. This brings to me old Sundays and ladies passing the open garden-gate on their way to church, with their Bible carefully wrapped up in a clean pocket-handkerchief, bearing with

them also what somebody in Scotland calls "the odour of sanctity"—peppermints, to wit—and all the time the bees are humming in the warm air a deep note to the trills and runs of the skylark lost in the blue.

But I could wander on for an eternity with these smell memories and pictures. One more, and I have done with the farm, and that is the cool smell of the milk-house. It is dark there after the blaze outside, and the stone flags strike cold to a boy's bare feet wandering in from the burning cobbles of the courtyard. As your eyes become accustomed to the dimness you can see on the floor the wide, shallow milk coolers, silvery as full moons in that twilight, the only light that enters coming through the long slit of a narrow unglazed window where blistery leaves of green docken, springing rank from the unkempt garden without, show a splash of sunlight. The smell is sourish and cold, if we may speak, as I think we may, of the temperature of a smell. This is forbidden land to boys for obvious reasons, but so strong is the impression that I have never forgotten my one and only visit to that secluded chamber.

What is it that gives to a dungeon its characteristic smell? Emphatic as a blow. Obviously, we have here a combination of several sense impressions, tactile, visual, olfactory: tactile, for

the air is damp and chilly ; visual, for it is a blank, a negative, and yet a powerful influence ; olfactory, smelling ominous and of death. Old dried bones emit precisely the same exhalation. In a subtle way, too, the presence of mould is perceptible, all blending into the horrible and grisly atmosphere of despair ; the Valse Triste and the Dance of Death.

Smell can bring as certainly and as irresistibly as music emotions of all sorts to the mind.

In this same category we may place the dusty smell of a dry hay-loft, which is curiously like that of bitter almonds and hydrocyanic acid. It has a sensation like ghostly fingers fumbling about your neck with a threat, half playful, half serious, of suffocation. And, curiously enough, the mental feeling of throttling fingers is not amiss. Prussic acid kills by paralysing the respiratory centres.

Let us get out into fresh air again ! The sun is shining. A gentle breeze from the west is snowing the lawn with fragrant hawthorn blossoms. I catch a whiff of delicate lilac, and see coming towards me over the grass a slender figure in white. . . .

And so we close with the perfumes of the spring, sunshine, and beauty.

ACKNOWLEDGMENTS

THE impulse of which this study of olfaction is the outcome emanated from Sir St. Clair Thomson, who three years ago handed me for my edification and growth in knowledge the *Essai d'Olfactique Physiologique*, a *Thèse de Bruxelles*, by A. Heyninx, dated 1919.

In addition to that work the following have been utilised, for the scientific side of the subject at all events :—

Poncelet, P. P. Chimie du Gout et de l'Odorat, etc. Paris. 1755.

Parker, G. H. Smell, Taste, and Allied Senses in the Vertebrates. n.d.

Deite, C. Manual of Toilet Soap-Making. Eng. Trans., 2nd ed. London. 1921.

Ogle, Wm. Medico-Chir. Trans., Vol. LIII., p. 263.

Bonvier, E. L. The Psychic Life of Insects. Eng. Trans. London. 1922.

In Heyninx's book there is a good bibliography, but the English reader will find an excellent *résumé* of recent scientific literature in *Osmics*, by Mr. J. H. Kenneth, published by Oliver & Boyd, Edinburgh.

It is impossible in the space at my disposal to print a bibliography dealing with the historical aspect of olfaction.

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