

The Fungi

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The realm of the fungi is a strange and paradoxical one within the plant kingdom. What are we to make of plants which have no chlorophyll, live therefore as saprophytes or parasites; have no leaves, those most essential and characteristic organs of the plant; and have a metabolism which is catabolic, in some respects more like an animal's than anabolic like a plant's. They are composed of mycelial networks which are made of fine hyphae, thread like columns of simple cells which in the yeasts even fall apart into these separate cells. These mycelial threads may become matted together as in the mold on jam which cannot really be called a tissue, as the mycelial threads grow only lengthwise in one dimension. From these mycelial networks arise, in some forms, the fruiting bodies, amongst which the toadstools and mushrooms are familiar to everyone. Nowhere do they produce the two-dimensional planar organs, the leaf, and nowhere do they produce the green chlorophyll of the typical plant. They do produce some brightly colored pigments, familiar to us in the variegated toadstools. There is something rather garish, even ghoulish about many of these and mostly they emit stench rather than the perfumes of true flowers. They are visited mostly by flies and beetles and slugs rather than the bees and butterflies attendant on the blossoms of higher plants. What are these fungi? What element of the fully developed plant do they represent or manifest in such a one-sided specialized mode?

These fungi play a great part in our social economic life. Under their influence organic matter is decomposed into the inorganic. They can destroy the timbers of buildings as anyone unfortunate enough to have had dry rot in his house can tell. In the forests and woodlands they bring about the decay and rotting of fallen trees and vegetation to prepare new soil. Their existence around and even within the roots of many trees and plants is necessary for their growth. Invasion of the tissues of plants by fungi on the other hand is one of the major causes of diseases in plants and calls for constant surveillance and use of fungicides in horticulture and farming. They can cause disease in animals and humans. The occurrence of the fungus, *Claviceps purpurea*, on rye and other grains has been responsible over centuries for many terrible epidemics of St. Anthony's Fire, arising from the consumption of bread made from contaminated flour. Only regular public health inspection has brought this danger under control. On the other hand yeasts play a valuable part in the production of bread and beer.

During and since the last war fungi have been a main source of the new drugs, the antibiotics, which have transformed much of medical and veterinary practice. Hundreds of thousands of different fungi have been screened as possible sources of new antibiotics and the array of rival antibiotic drugs now available for the physicians and surgeons has become bewildering. They are clearly important in the economy of nature and in the economics of man. Can we approach the riddle of their real nature?

In normal flowering plants we do find processes which are essentially parasitic on the rest of the plant. The flowering and fruiting processes are dependent on the anabolic processes in the rest of the plant. In the blossom chlorophyll disappears and although the petal retains the planar two-dimensional form of the leaf, this almost gives way to linear form in the stamens. The fungus has no stem, its fruiting body arises straight out of the earth or earth equivalent. It can grow in the dark. So if we are to compare the

parasitism of the fungus with the parasitic flowering fruiting process in the higher plants we must add that here this process has been transposed downwards to the earth and makes no relationship to the light. The normal plant develops between the dark and damp earth and the light and airy realm. We can watch this polarity of influences in the plant. The plant unfolds its true form and nature within the play of this polarity. In the fungi, the influence of light is missing so that the fungi develop one-sidedly as earth beings. They show no influence from the realm of light, the wide spaces of the universe. Their linear growth by cell budding at the mycelial tips is entirely an example of Euclidean geometry, knowing nothing of the planar forces and forms of negative Euclidean space. The cell principle, atomic principle, dominates and there is a constant tendency to disintegration into spores. Their influence is towards disintegration to dead mineral substances. Chains of fungi work together to accomplish chains of chemical breakdown. Those forms and forces which lift up the dead mineral substances into the realm of life in normal plants are foreign to them. They themselves turn to dust in spore formation and turn everything to dust. They are the expression of earthly and sub-earthly forces and show us that the life and living forms of the true plant world must be looked for elsewhere than in the earth. It was indeed a clear message, indicating the true nature of the forces involved, when the atomic explosions gave rise to the mushroom clouds. Disintegration, mineralization, destruction of life forms, production of dust, these are key notes of the "life" of fungi.

We may however get another view of the world of the fungi from the phenomena of plant galls. These abnormal growths on trees and plants are produced by fungal infestation or by the larvae of mites, gnats, wasps or sometimes by nematodes. We are struck on the one hand by the similarity in the influence upon the host plant of the fungus and larvae. On the other hand, we are faced with the gall itself which often resembles a fruit or nut from some other tree. The parasite, whether fungus or larva, instigates the host to a fruiting or pseudo-fruiting process, displaced from its normal position in time and space. This may result in damage to the further development of the host. But the host may isolate the abnormal process and appear otherwise unaffected. Some of these galls really imitate fruits, such as plums or cherries, to a remarkable degree and some, developing on leaves, bring about a transformation of the leaf into a pseudo-carpel, a pod. A fungus or larva therefore in touching the plant initiates a fruiting process. The fungus in this gesture, again betrays its "animal" aspect. When a plant blossoms and fruits it is, as it were, touched by the animal world of insects hovering over it; it attains to the status of animal in its fertilization and fruiting, as Oken long ago pointed out. The particular forms of the gall are very specific to the particular larva or fungus involved, typical for that parasite rather than for the host. They may show the same characters when the same parasite invades a different host. The form of the gall comes more from the parasite than from the host.

Something similar is observed in those fungus infections known as rusts. In these the fungus invades the under-surface of the leaves of grasses and other plants. They produce spores reminiscent of those produced normally on the under surface of the leaves of ferns. Through their action the higher plant reverts to a more primitive fern-like condition and a premature "spore" formation replaces the normal "fruiting" process.

We get yet a clearer indication of the nature of the fungus when we see it replacing the stamens and anthers of some plants. Then it sheds its spores instead of the plant shedding its pollen. The plant itself remains unaffected. We can see the fungi as a fructifying process which has been pushed downstairs

into the darkness of the earth. Or, as in these infestations, we have to understand that the telluric, earthly forces have themselves risen up in the plant, affording a second dynamic earth level for the fungus to grow in.

If we now turn our attention to the realm of the lichens, we discover a fungus living in happy symbiosis with an alga. These two one-sided primitive plants come together to establish a new rank of plants, the lichens. But they are really a symbiosis. The alga which contains chlorophyll contributes photosynthesis while the hyphae of the fungus form a protective covering and make minerals accessible to the partnership. These primitive plants, the lichens, can survive and flourish under conditions impossible for other types of living creatures, but on the other hand they are peculiarly sensitive to atmospheric pollution, they are found under Arctic conditions of extreme rigor. Commonly we know them on rocks and the bark of trees, contributing their multi-colored covering.

We have been struck so far by the predominantly catabolic metabolism of fungi. Their activity is largely a breaking down of organic substance to inorganic matter. Enormously complicated processes come about through the cooperation of different fungi together with bacteria. They tend together towards disintegration, they are in the main death processes.

Does this not lead us to question the relation between this realm of fungi and the system which in the human organization carries preeminently the forces of death — the brain and nervous system? The nerve fibers run as threads throughout the organism. The brain and nerves live fundamentally as parasites upon the organism. Only in the embryo do the nerve cells multiply; probably after birth or early childhood they lose the possibility of reproduction. The fungi of course retain this capacity and the hyphae are composed of long chains of cells, unlike the nerve fibre arising from a single cell. In the embryonic stage of life, and even to a great extent in babyhood, we are almost all head with a small appendage of trunk and limbs. Gradually we grow down from this head, as a plant grows up from the root. It has often been noted that plant and man stand in inverted relationship to each other. A man would have to be turned upside down and planted with his head in the earth, trunk, limbs and genitals pointing upwards, for the correspondences between man and plant to become clear.

So if there is a possible relationship to be discovered between brain and nerves and the realm of fungi, it would point again to the earth as the home of these strange forms of life. In the embryo and baby, the head is still concerned with growth, and consciousness is obviously not yet imprisoned within the witches cottage of our head. But as the death processes gradually take over in our brains, we wake up in our heads. Historically, it was only in Greek times that thinking began to be experienced as related to the brain.

Can we get any further by looking at the drug pictures and medical experiences in relation to fungi? The very nature of fungus activity leading to fragmentation and disintegration, even to atomization, is echoed in the intellectual activity based on the brain. This too in its one-sided analytical and abstracting activity leads to information of ever increasing complexity and chaos, the information explosion. So it is understandable that synthetic grasp of the phenomena is particularly difficult in this study of fungi.

In the homoeopathic *Materia Medica* we find the following representatives of the fungi:

Agaricus Emeticus
Agaricus Muscarius
Agaricus Phalloides
Boletus Satanas
Bovista Nigrescens
Secale Cornutum
Ustilago Maydis

to use the names still used in the Materia Medica.

To these should perhaps be added *Thlaspi Bursa Pastoris* (The Shepherds Purse) a plant belonging to the Cruciferae, the family which contains *Cochlearia*, *Iberis*, *Raphanus* and *Sinapis* in the Materia Medica. *Thlaspi* is almost always heavily invaded by a fungus and O. Leeser suggested that its drug picture, divergent from the other members of the family was in fact due to the fungus parasite, not to the host plant.

The lichens, a symbiosis of an alga and fungus, in the Materia Medica are:

Cetraria Islandica (Iceland Moss)
Chladonia Rangiferina (Reindeer Moss)
Sticta Pulmonaria
Usnea Barbata

We must also consider, in broadest outline, the antibiotics. But the huge range of diseases arising from fungus invasion is outside the scope of this essay. It is worth noting, however, that poisonings and provings have been due either to eating the mushrooms or fruiting bodies or in the case of provings, taking tinctures of these. In the case of fungus diseases, mycelial invasion of tissues takes place. The first are usually called mycotoxicoses, the second mycoses. There are also allergic reactions, such as "farmers lung."

Agaricus (Amanita) Muscarius — Fly Agaric

This toadstool or mushroom is in appearance known to everyone as it is the one usually depicted in fairy-story books with its brilliant scarlet or orange-red cap with white patches. It has been used to prepare decoctions for use as a fly poison. It has also been used to prepare an intoxicating drink by many peoples including the Lapps and some tribes in Siberia. Among some of these it is said to have been used by the Shamans to help induce the trance-like state in which they utter their prophecies.

The main active principle is *muscarine* which produces most of the symptoms and is antidoted by *atropine*. Some books claim that this toadstool also contains *atropine*.

In non-lethal doses it induces intoxication, sweating, salivation, lachrymation, vomiting and diarrhea. The pulse is slow and irregular, vomiting and diarrhea, double vision and hallucinations may occur. Symptoms occur rapidly after ingestion and in non-lethal cases pass off again equally quickly in a few hours.

The homeopathic drug picture which includes results of provings and clinical experiences, characterizes the emotional state under such terms as loss of emotional control, laughter, loquacity, and

tendency to versification. Senses are intensified and appearances become very beautiful. A teaspoon may appear as a lake and other objects appear enlarged. The disturbances may intensify to maniacal dimensions.

Irregular movements, tics, blepharospasm and choreiform jerks have all been caused and cured. In earlier times when chorea was common it was a most useful remedy for this condition.

Many older accounts refer to "spinal irritation" as a well recognized condition, even diagnosis. Was this a variant on the "railway spine" which was supposed, about a hundred years ago, to manifest in extreme sensitivity along the spine, with spasms in the muscles? Frequently the patients were reduced to wrecks. Theories of meningeal irritation, of ascending or descending spinal degeneration, of meningomyelitis and so on abounded. Some of the descriptions equal those of Charcot with his "hysterics". The terminology gradually changed to "traumatic neurasthenia" and later such phenomena became transferred to the categories of psychoneurosis.

To return to *Agaricus Muscarius*, we find prominent in its drug picture, chilblains with discolorations, burning and irritation. These symptoms are worse for cold and better for heat, distinguishing them from the *Pulsatilla* chilblains and from the burnings of ergot poisonings which are worse for heat. Bunions are reported as within its sphere of action. There are pains as of ice cold needles also relieved by warmth and headaches with these icy needles, or as if a nail were driven into the temple. Also described are intense vertigo, worse walking in open air and in sunshine. These patients are cold and very sensitive to cold; they are also exhausted by mental work and by coitus. They tend to be owls rather than larks.

The acute symptoms are rather naturally marked by severe diarrhea and vomiting.

So the main actions are to be found in the changes of consciousness and the nervous irritability showing itself in hypersensitivity along the spine, together with tics, spasms, and choreiform movements. In addition, we find the chilblains and bunions with the marked modalities, relieved by warmth and aggravated by cold, mental work and coitus.

The questions arise as to how far the changes in consciousness are brought about by changes in the nervous system itself. And how far the nervous symptoms such as spinal sensitivity are hysterical.

The brain and nervous system normally function in adult life in an inhibitory manner. The expression "to keep a cool head" is highly indicative. Bergson, at the beginning of this century, showed that our senses screen from us, as it were, the multitudinous incoming impressions so that we become conscious only of a tiny selection, those needed for our action. It would seem then that the fungus represents the brain and nervous system at an earlier, more embryonic stage of development before it has been overwhelmed by the death or dying processes characteristic of the adult stages. Sense impressions in our drug picture are therefore described as more vivid, more full of life, beauty and springtime. When we look back even as far as the Greek civilization we are enchanted by the freshness of their thoughts which are still full of life and perception. They have not yet been killed off into the abstractions of modern thought life. So under the influence of *Agaricus* the Lapps and Siberian Shamans find it easier to re-enter states of consciousness of a dreamlike clairvoyance. They become mediums for inspiration

by other influences. Wordsworth's "*Ode to Immortality*" represents a similar idea in respect to childhood.

We may further question whether the movements of uncoordinated character also reflect in some degree the uncoordinated movements of the baby before it has learnt to still the unnecessary, useless movements and permit only the useful ones to occur.

In agreement with such an interpretation of the Agaricus picture would be the use of this remedy in mental retardation where there is a failure of the child to wake up in its mental functions and a persistence in a consciousness of babyhood.

Older generations of homeopathic physicians found this remedy of use in organic diseases of the nervous system such as Parkinsonism, General Paralysis, Multiple Sclerosis and Epilepsy, in addition to Chorea.

Agaricus Emeticus has a brief mention in the Materia Medica for vomiting and severe vertigo relieved by copious cold water.

Agaricus (Amanita) Phalloides is the cause of 90% of deaths due to mushroom poisoning. Some have suggested that it was a favorite poison used by the Borgias because the symptoms do not develop for 6-24 hours after ingestion. By this time the guest could have been conveniently speeded on his way. In spite of its toxic qualities it has been little used as a remedy, its homoeopathic indications having been focused on violent diarrhea with cramping pains and collapse, leading to its suggested use in Cholera. The toxic properties are due to a group of substances known as the Amanita toxins; they include 5-cyclopolypeptides, phalloidin, phalloin, and alphabeta-gamma amanitine. They give rise to the violent vomiting, diarrhea and pain in the abdomen with intense thirst and scant urine. The symptoms abate only to return with increased violence and this periodic remission and return of the symptoms is characteristic. After some days coma and jaundice develop and lead to death.

The symptoms are mainly or even exclusively abdominal and in the liver and kidneys. The coma is probably secondary to these effects.

Boletus Satanas together with Boletus Laricis and Boletus Luridus appear in the Materia Medica with severe symptoms of gastroenteritis. Little else is mentioned.

Bovista Nigrescens the puff-ball is characterized by sensations as if the head were enlarging and by distensive headaches. Also there are reports of clumsiness, drops things, mixes words up, weakness of limbs. Skin symptoms are marked, urticarial and eczematous in type. Hemorrhagic tendencies mainly related to the uterus are also reported.

The next member of the Fungi for consideration is one of the most important. Still known in the Homoeopathic literature as Secale Cornutum it is in fact the ergot fungus, *claviceps purpurea*, which infects rye and other cereal crops. Poisonings by this fungus, inadvertently included in the bread, have been known from the Middle Ages at least. Thus it was known as St. Anthony's fire on account of the intense burning pains in the extremities from which the Saint was reputed to have suffered.

The gangrene associated with these pains is dry and due to constriction of small blood vessels. In more acute and severe poisonings, hallucinations and convulsions may occur. For centuries ergot has been

known to have effects on the uterus in labor but it does not cause premature abortion. A variety of alkaloids and active substances have been separated out, each with varying emphasis of action. This has been made use of by the pharmacological industry in preparing remedies for specific uses, ergotoxin, ergometric, ergotamine are examples. It was in the course of studying this range of substances that Lysergic acid (L.S.D) was discovered.

In orthodox medicine ergot and its derivatives have found their main spheres of use in obstetric practice on the one hand and migraine on the other. This relationship between migraine and the uterine pains of labour or dysmenorrhea we have come upon before in several drug pictures.

In Homeopathy Ergot, or Secale, – to use the wrong name under which it is still found in the *Materia Medica* – has found its main use in peripheral arterial disease. Raynaud's Syndrome, Scleroderma, and arteriosclerosis leading to severe circulatory obstruction, intermittent claudication, and gangrene have all on occasion been greatly ameliorated. The modality of pain worsened by heat runs through the symptoms. Paralysis of indeterminate type are mentioned with cramps and the notable symptom of the fingers being spread out wide. In the last century Secale found a use, as did others of the fungi, in the treatment of Cholera. This builds a bridge towards *Cuprum* which proved the main homeopathic remedy in cholera and is also a main remedy for cramps and convulsions. A certain common spectrum of conditions amenable to these two remedies can be traced. From cramps of the peripheral vessels and limbs to cramps of the uterus and intestine to cramps of the head in migraine and "brain storms" showing themselves in temper tantrums with *cuprum* and full blown hallucinatory storms with L.S.D. *Cuprum* also plays into the respiratory system with asthma and paroxysmal coughs. Secale seems to avoid the respiratory system and its slight action on the heart seems secondary to its peripheral actions. Paterson placed both these remedies in the bowel nosode group of Proteus which he characterized under the keynote of "Brain Storms". The *Materia Medica* also refers to hemorrhages, mainly uterine but purpura is also mentioned. In veterinary practice early symptoms include the shedding of hoofs and gangrene of the tail, ears and tongue. Recently Bromocriptine and several allied substances from Ergot have found a use in the treatment of Parkinsonism.

Ustilago Maydis, the corn-smut seems to have some similarity in its spheres of action to the ergot. It has, according to the provings, a strong relationship to the genital organs and functions. In women, it produced hemorrhages and has found a main use here in menstrual, climacteric and post-partum bleeding. Animals have shed their hoofs and hair and shedding of nails and hair in humans is recorded. Headaches with vertigo and double vision and scotoma point to migrainous phenomena. So in this little known or used remedy the same directions of action as in ergot have been noted.

We have mentioned Thlaspi Bursa Pastoris the Shepherds Purse on account of its almost normal symbiotic invasion by a fungus. The main use of this remedy has certainly been in relation to uterine hemorrhages, profuse menstruation. It remains a most valuable remedy in these conditions.

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Throughout these different pictures of the fungi used, to some extent, in homeopathic medicine, we have found certain common features, spheres of action. Like most severe poisons they produce gastroenteritis. This symptom might be dismissed as merely typical of acute poisoning in general but for the phenomena resulting from eating *Amanita Phalloides*. In this case the patient or victim feels

perfectly well for hours after eating the mushroom. It may be up to 24 hours before the symptoms commence with severe abdominal pain and diarrhea and vomiting. The poison must have been absorbed, perhaps metabolized, before manifesting specifically in the abdominal and alimentary symptoms.

Then there is a tendency to varying skin manifestations. In *Agaricus Muscarius* this is a chilblain-like itching, burning, red-purplish discoloration relieved by warmth. In *Secale* the discoloration and burning progress to gangrene, the pains being relieved by cold. With *Bovista* there are varied skin eruptions, eczema, urticaria the most common. With *Ustilago* loss of hair with associated eruptions of the scalp, scald-head, are typical.

Headaches run through the pictures, there are in any case few drug pictures without headache. But migraine comes to the fore with *Ergot* and its use in orthodox medicine for this condition. In *Agaricus* various headaches are described and the ice-cold needles is a feature. In *Bovista* there is headache and sensation of enlargement of the head. Vertigo also is a marked feature in these drug pictures.

Hemorrhages are another common characteristic, notably in *Secale*, *Bovista*, *Thlaspi*, *Boletus* and *Ustilago*. In *Agaricus* it occurs but is not so marked a feature.

We come to the actions on the nervous system which have been most studied in *Agaricus*. "Spinal irritation", twitchings and tics, chorea and spasms all point to actions on the nervous system. Then there are disturbances of the sense, everything becomes very beautiful, small things appear large and the sense of balance is disturbed. The mental faculties are retarded, the emotional balance labile. The symptoms may intensify to mania. In *Ergot* the mental symptoms have come under scrutiny of recent years owing to the use or abuse of L.S.D. Intensification of sensory impressions and dissociation come about leading to schizophrenic-like experiences. Another group of fungi have also come to notice, the *Psilocybe* species which have hallucinogenic effects, used by Mexican Indians in religious rituals.

To summarize, we may point to the main spheres of action in the metabolic and sexual organs on the one hand and the nervous system on the other. The lungs seem unaffected (if we consider the Mycosis caused by *Aspergilla* separately). However in lichen *Sticta Pulmonaria*, lung and respiratory and rheumatic symptoms dominate the picture.

This is indeed suggestive. The fungi, as we have noted, have no leaves or proper stems, no chlorophyll. They lack the middle realm of the plant between root and flowering process. This middle realm of leaf is related to the lung in inverted fashion. The leaf takes in carbon dioxide, photosynthesizes it into carbohydrates and gives off oxygen. The lung gives off the carbon dioxide and takes in oxygen. They both belong to the rhythmic middle realm between the polarities of head and abdomen, or root and blossom. In the fungi this polarity is not established, flowering fruiting have, as it were, collapsed into the root or perhaps better stated, have not yet emancipated themselves. In the lichen *Sticta Pulmonaria*, the lungwort, this middle realm is provided by the algal part of the symbiosis. What is more, we know that lichens which are particularly hardy in respect of climatic extremes, are particularly sensitive to atmospheric pollution. They are indeed used as indicators of this pollution. The lichens therefore seem to be particularly sensitive to the realm which the fungi alone do not care about, the realm of air and light.

We have still to consider the application in modern medicine of substances derived from this fungal underworld, the antibiotics. Starting with Penicillin, an ever increasing variety of these substances are available. They are used in controlling bacterial infections, inflammations. Their antipathy to certain bacteria is based on similarities in their metabolic processes, competition between them resulting in blocking the bacterial growth. This is of course a homeopathic action on a very selective narrow front. Looking at the problems more broadly, from the periphery towards the center rather than from the center outwards, more holistically that is to say, what can we see? On and around the roots, in the soil, flourish the vast multitude of fungi, devoid of chlorophyll. In the upper pole of trees grows another parasite or semi-parasite, the mistletoe. This plant is full of chlorophyll even into its sinker which penetrates the parent tree. It is not subject to gravity in its growth, nor to the usual earthly rhythms. It has not come to earth. In some ways we can therefore see it as a polarity to the realm of fungi and it has an influence on carcinomata, themselves the polarity to inflammation. From mistletoe, substances can be prepared with the unique combination of cytotoxic and immuno-stimulating properties. We have a polarity in disease processes between inflammations and tumors and a polarity in the sources of remedies working on these diseases.

With this the present essay is concluded. It has not attempted to review the vast realms of fungi and the almost infinite complexity of their chemical processes and actions. It has been concerned to explore whether a more holistic approach taking its start from the simplest phenomena of fungal existence and the meager homeopathic drug pictures could lead to any significant viewpoints and insights, fresh perspectives. In these fungal regions which are particularly liable to disintegrate in the information explosion can we begin to grasp the phenomena together, meaningfully? Can we begin to make any sense of the chaos of facts? In all regions of activity today this is the challenge to our humanity, to confer sense on the meaninglessness of mere facts.

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