THE ALCHEMICAL ESSENCE AND THE CHEMICAL ELEMENT: AN EPISODE IN THE QUEST OF THE UNCHANGING

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BY

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'Nature moves not by the theorie of men, but by their practice, and surely wit and reason can perform no miracles unlesse the hands supplie them' THOMAS VAUGHAN

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THIS ESSAY is written in the hope that some of the men who exercise their 'wit and reason' in examining the problems of life may help to answer the questions that nature propounds to those of her students who follow the quest of the unchanging.

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AMID the rush of changing appearances, and the shifting scenes wherein they move, men have always dreamt of the unchangeable, and have sought for some sure resting-place. Their conceptions of human life, and duty, and suffering, have assumed different forms at different times; and as they have represented their various ideals as shadowings forth of an immutable reality, so they have pictured the movements of matter as superficial manifestations of an underlying unity.

To write the history of the endeavours that men have made to give definiteness to the conception of the unity of material phenomena, and to represent these phenomena as the harmonious outcome of a pervading and definable principle, would be to write the history of natural science.

The results of the changes that material things undergo are so manifold and perplexing that students of natural events have been compelled to divide into bands, and each band of searchers has been forced to tread its own path; but all the bands hope to meet at the goal, that is yet far off.

The chemists form one of the bands. The path that they have trodden, and which still they tread, is a pleasant way; no one complains of lack of variety; at every turn new vistas are opened, and the prospect of new delights beckons the travellers on. But there are side paths that lead backwards, or lead nowhere, and it is easy to stray down one of these; many a man who began the journey with high hope and good promise has found himself in the forest at the end of a blind alley, unable to go on because the trees are many and grow close, and unable to go back because weeds have sprung up and choked the way. There are short cuts also, to be discovered by the keen-eyed and the men of quick wit; sometimes a traveller who started with shambling steps finds a shorter way, and soon is far ahead of those who refuse to leave the beaten path.

It is along this path, worn by the feet of many who have joined the quest of the unchanging, that I ask you to walk for a little while.

'There abides in nature a certain form of matter which, being discovered and brought by art to perfection, converts to itself, proportionally, all imperfect bodies that it touches.' Belief in this proposition, that I have quoted from one of the alchemists, was the root whence sprang many searchings into nature's ways of working in the olden days before chemistry had become a science.

'In chemistry we recognise how changes take place in combinations of the unchanging;' these are the words of one of the greatest of living chemists.

The two forms of words are somewhat alike; it is not, however, as verbal statements, but as science-producing doctrines, that they demand our attention. We must ask,—

What fruit did the alchemical proposition concerning the one perfect form of matter bring forth? And we must inquire what have been the results of examining the 'changes that take place in combinations of the unchanging.'

The changes of the seasons, the waxing and waning moon, the ebb and flow of tides, the gradual wearing away of the land by the sea and by rivers, the melting and disappearance of ice and snow, the growth and the decay of trees and plants; these changes, and changes like these, have always forced themselves on men's notice. Men, too, have long

been used to manufacture clothing from wool, or cotton, or silk; they have obtained dyes from plants; from plants also they have distilled oils, and essences, and perfumes; they have extracted metals from minerals found in the rocks, and they have melted these metals together to obtain harder, or softer, or differently coloured, or more workable, materials wherewith to make weapons, or domestic utensils, or on which the craftsman might fitly exert his skill.

All these handicrafts rest on the possibility of effecting changes in the properties of material things.

On the readiness with which the properties of substances can be changed depend also many processes that have long been in common use.

When Odysseus had made an end of slaying the suitors, he called to the nurse:

> Quickly, O Nurse, bring fire that I may burn
> Sulphur, the cure of ills.

Eurycleia wished to bring

> a rich robe and tunic clean,

but

> Wary-wise Odysseus quick replied;
> First of all now bring sulphur and the fire provide.
> (*The Odyssey*, Worsley's translation.)

The production of a deodorising substance by burning sulphur was evidently well known to the early Greeks.

Ages ago the discovery was made that the juices of many fruits by exposure to the air acquired the property of 'making glad the heart of man.' Noah's preservation of this process has helped us to realise our kinship with the unconscious chemists who practised it before the flood.

Pliny tells us that some Phœnician merchants, returning by sea from Egypt, put ashore on the sandy bank of a river, and, for lack of better supports, rested their cooking vessels on lumps of the *natron* (soda) wherewith their ship was laden. The fire melted the supports; and where the molten soda mingled with the sand, the rough dull sand disappeared, and a clear and transparent substance came in its place. After this discovery the production of glass by melting together sand and soda became a common handicraft.

Those who in bygone times examined the changes brought about in the properties of things by changing the conditions to which things were subjected, made many curious discoveries. They noticed that a yellowish-red powder was produced when lead was heated for some time in the air, and that lead was reproduced by heating this yellow powder with charcoal or wheat. They saw that lead gradually disappeared when it was melted in a dish made by kneading burnt bones and was burnt there