

and his humble negro valet to breathe the same kind of air, drink the same kind of water, and eat the same kinds of solid food year in and year out, and yet one of them go right on being a great Nordic while the other as persistently continue to be a humble negro? If there is any truth in Feuerbach's epigram, "Mann ist, was er isst," how can such a thing be?

What I wrote, essentially, in attempting to throw some light into this dark place, which has drawn the fire of these critics is this: Every elementary substance is different from every other as to its physical attributes and as to the products of its chemical reactions with other elementary substances. Likewise every human person is different to some extent from every other as to many of his physical attributes, and as to his chemical reactions with certain elementary substances, notably with atmospheric oxygen. That these two groups of facts constitute a rather striking resemblance between a chemically elementary substance and a human organism scarcely needs saying in so many words when they are presented in this bald way.

I further directed attention to the idea that the validity and perhaps the significance of this resemblance are increased by drawing consciousness into the comparison. Thus when the conscious organism is deprived of air (oxygen) its consciousness ceases as inevitably and almost as promptly as does the flame of a lump of phosphorus or sulphur under like deprivation. Furthermore, the utter differentiatedness of every person's conscious activity from every other person's, and the consequent possession by every person of a measure of genuine uniqueness, is comparable with the differentiation that characterises the chemical reaction of every elementary substance with every other such substance.

As to its conscious life especially, the definitiveness of every human person is like unto the definitiveness of a chemically elementary substance.

To show that the separate reality of each and every conscious person is comparable with the separate reality of each and every chemically elementary body is the essence of my discussion from which More quotes. What I did was to manipulate, by the methods of description and comparison, certain well-established facts concerning the nature of man and some other organisms, and other well-established facts concerning the nature of certain inanimate bodies, with the view of finding how much they have in common.

If this performance deserves to be stigmatised as "incredibly absurd" materialism, the stigma rests on the facts rather than on me.

The separate and more difficult question of whether such a way of treating the facts really connotes materialism cannot, of course, be gone into in a brief communication like this.

This much may, however, be said: My description of conscious human personality recognises its utter dependence on material substances and atoms, but it also recognises that the worth and dignity of each human person are real in the same sense that the atoms themselves are real. So far as I can learn, materialism has never recognised such a relation between a personality and the atoms of which it is composed.

WM. E. RITTER.

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PROF. RITTER'S further explanation of his meaning leaves me gasping! Apparently I did him an injustice in supposing that he meant to compare the human organism to a chemical compound. What he really intended was to compare each human individual

to a chemical element. Just as each element reacts differently with oxygen and thereby manifests its individuality, so each human being reacts differently to oxygen, and in this his personal peculiarities find their explanation.

We might remark that chemical atoms (barring radioactive transformations) persist and are indestructible, whereas the human being in so far as he consists of matter is a temporary phenomenon. Further comment, however, on this extraordinary comparison appears to be superfluous.

E. W. M.

A Surface Catalysis in Photochemical Processes.

DURING the course of an investigation on the photochemical combination of gases, our attention was directed to the marked diversity in the rate of combination of gases such as hydrogen with oxygen, ethylene and carbon monoxide, effected by irradiation in quartz tubes with the mercury vapour lamp, observed by different investigators.

It is a well-established fact that pure hydrogen and oxygen can combine when subjected to radiation of short wave-length, but owing in general both to the weak absorption coefficient of the gases, probably oxygen being the important constituent, and the feeble nature of light at wave-length shorter than the resonance line $\lambda = 2537 \text{ \AA}$ to which such photo-activity is due, the rate of combination is generally small. Indeed at low pressure Dickinson failed to note any combination. Again, if mercury vapour be admitted to the system, Franck and Cario have pointed out that the mercury atoms are activated to the $2p_2$ state by absorption of quanta of light of wave-length 2537 \AA.U. , and such activated mercury atoms on collision with hydrogen molecules produce an active modification of hydrogen which can react either with the gases mentioned above or with metallic oxides. It is uncertain at the present time whether this "active" modification so produced consists of activated hydrogen molecules, a point of view held by Mitchell, hydrogen atoms as suggested by Franck and Cario, or an unstable but active mercury hydride postulated by Compton.

When a comparison is made of the rates of these two homogeneous gas reactions obtained by observers such as Franck and Cario, Dickinson and Mitchell, with the relatively high rates obtained by Berthelot and Gaudechon, Baker, and especially Taylor, on illuminating a gas mixture *in the presence of liquid mercury*, it was evident that the discrepancy was too great to be accounted for by variations in the intensity of the line $\lambda = 2537 \text{ \AA.U.}$ from the lamps of the different observers. Taylor indeed has recently realised this discrepancy and suggested that combination is in effect a chain mechanism of the type postulated by Christiansen and Kramers. Whilst some species of chain reaction does undoubtedly occur in a few cases, such as in the combination of hydrogen and chlorine, it appears improbable that the diversity of the results between the two groups of experimentalists can be attributed to some unknown factor causing the inhibition in the former, or the propagation of chains in the latter cases.

An investigation of the catalytic effect of a mercury surface in the photochemical combination of these various gas mixtures revealed the interesting fact that combination between these gases is promoted by a mercury surface when illuminated at ordinary temperatures with radiation from a quartz mercury vapour lamp under the conditions of strong emission of the resonance line $\lambda = 2537 \text{ \AA.U.}$

We have likewise made a search for any catalytic effect of metals such as iron, copper, cadmium, and silver, when radiated with the mercury and cadmium