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CONTENTS

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THE EDUCATIONAL VALUE OF THE STUDY OF QUANTITATIVE ANALYSIS[1]

How often it has been said that the most important and fundamental instinct of man is the creative instinct, and how many morals have been pointed from this conclusion! This, it may be said, is one of the principal causes for the high degree of development of science and for the advanced state of our civilization. But if this is the orthodox scheme for looking at the matter, I am going to venture a heterodoxy by saying that, quite the contrary, the most primal, fundamental instinct of man is that which prompts him to take things to pieces. If you can remember when you were at the tender age of, say, four to ten years, you will probably recall no greater delight than was given by the opportunity to tear down an old watch, a bicycle or a piece of domestic machinery, to see how it was made and what made it "go." Unfortunately it was not always easy to reverse the process, and the thing would not always go when it was put together again. We are all familiar with the ancient story of the boy who took apart the family clock and who somehow could not get it together again without having a quart or so (I mean a liter or so) of wheels and screws left over. And the small boy often "analyzes" the logic of theory and rules of his elders with the same disconcerting thoroughness, neither he nor his elders being able to piece the thing together again into anything that will "go." Many embarrassing and uncomfortable moments in the family life have resulted from this.

All of which merely gives us a chance again to state that we are, by nature and inheritance, analytical and not synthetical. We want to know of what the universe is constructed and what forces keep it operating. Our greatest minds are devoted to the search for the answers to these questions. It is only a logical consequence and a secondary outgrowth of this passion to know the how and why of things that we utilize the results of scientific search for causes and ultimate forms in the construction or "synthesis" of things having a different outward form and inner nature, and having a wider field of usefulness.

In the analytical laboratory of the college and the university we attempt to direct this useful and un-

[1] Read before the Section on Chemical Education of the American Chemical Society, at the New Haven meeting, April, 1923.