

## THE ACHIEVEMENTS OF SCIENCE.

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THE ancients knew nothing of the laws of chemical action, and recognized only four elements—earth, air, water, and fire; and for two thousand years after Aristotle there was little progress made toward a better knowledge, though for the latter part of that time the alchemists were engaged in an earnest search for that by which they might transmute all things into gold. The science of chemistry is well-nigh coextensive with the nineteenth century. The great pioneers and the principles already partly indicated cannot be discussed here. Before 1800 chemistry had not been of much benefit to mankind. Since then it has been a most practical science, benefiting humanity in every avenue of life. It is expected of me that I shall in this paper indicate how this has been so.

Foremost, then, allow me to mention illumination. A century ago there was not even the most inferior mineral oil-lamp. The best illumination for the inside of a house was some form of animal or vegetable fat or oil in a cup, with a small round wick, giving a light hardly better than a candle. For outside illumination there was nothing better than a torch, nor was there any way of lighting this or the morning fire save by the flint and steel, by friction of wood against wood, by firing a gun, or by sunlight focused by a lens, when the sun shone. Chemistry early in the century brought a knowledge of

illuminating gas and its method of production, but by no means was it easy to introduce gas for illuminating purposes.

Ten years since, by the action of water on calcium carbide, was produced acetylene gas, which is as much superior in brilliancy to the ordinary gas as that was to the tallow dip. Moreover, it does not leave you for its production at the mercy of a corporation. By improved apparatus its production has been made cheap, and its careful use not dangerous. Each home may have its apparatus, or the gas may be liquefied, and is destined to be furnished in that form. Petroleum is found in the earth, but its refinement is one of the achievements of chemistry. Electric lighting is a matter of physics.

Synthetic chemistry has accomplished enough in the closing century to make it conceivable at least that man might to some degree be independent of the seasons for his food and clothing. If we have not tasted olcomargarine, we all know it is here, and doubtless to stay, despite proper legislation in behalf of the cow. It is said to be a perfectly wholesome chemical product and no mean imitation of butter; cheaper by half, if honestly sold, therefore a boon to the poor. This is but one of many food products, the result of chemical experiment and processes—some, perhaps, not now so innocent, but which may become so. I can only mention some of these: Sugar, grape sugar, acetic acid (vinegar), tartaric acid, tea, coffee, oil of mustard, the fruit flavours, the various essential oils of the fruits (pear, pineapple, etc.), formed by combining in varying

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