conclusion that the substance might be used as a fertiliser, and to determine the question he sent large quantities to Herr Geheimrat, Professor Wagner, of Darmstadt, to Dr. Gerlach, of Posen, and subsequently to numerous agricultural stations scattered over the country.

The result of this experimentation has established beyond all question the fact that, under certain conditions, calcium cyanamide is a better fertiliser than the sulphate of ammonia from the gasworks, and practically equal to the saltpetre from the mines, weight for weight of the nitrogen that it contains For the growth of wheat it gives its best results when buried four or five inches below the surface of the soil some eight to fourteen days before the seed is sown. The exact mechanism of its action has still to be determined. It is not unlikely that the calcium cyanamide in the soil breaks down into cyanamide itself which in turn decomposes into ammonia, which oxidises into nitric acid, and that the nitric acid so formed unites with the lime constituent of the compound to form calcium nitrate.

Under the name of "Kalkstickstoff," calcium cyanamide is now in the markets of the world. The little experimenting Cyanid-Gesellschaft, which consisted of Siemens and Halske, the Deutsche Bank, and Professor Frank, has turned over the manufacture of Kalkstickstoff to a large company formed for the purpose, the Societa Generale per la Cianamide, of Rome, and this company in its turn consists of the Cyanid-Gesellschaft, the Societa Italiana per la fabbricazione di prodotti azotati, edi altre sostange per l'agricoltura, and the Societa Italiana per il carburo di calcio acetilene ed altri gas, of Rome.

In manufacturing the substance, they employ the latest results of technical science. The atmospheric nitrogen must be separated from the oxygen with which it is mixed. They, therefore, liquefy the atmosphere and separate the two substances by fractional distillation. The oxygen passes off to be used for other purposes, but the nitrogen passes suddenly from the intense cold of liquid air into the highest heat of the electric furnace where, through contact with a mixture of coke and lime, it is caught and transformed into Kalkstickstoff The action of the, Cyanid-Gesellschaft in turning over the fertiliser phase of Kalkstickstoff to the guardianship of another company, has left their hands free to exploit its other uses. These uses are manifold. The fact that calcium cyanamide, under the action of high-pressure steam, passes over all its nitrogen into the form of ammonia leads to an elegant method of making this substance and other ammonium salts The company has at present a demonstration plant in operation for the production of 1500 tons of ammonium sulphate a year. But, mixed with carbonate of soda, or with common salt, and fused, the cyanamide passes over into the form of cyanide of sodium, and this cyanide is useful for a vast number of processes, from silver-plating to gold extraction. They have a plant for this purpose yielding 500 tons a year, and in Mexico, for mining purposes, they are beginning to manufacture the cyanamide directly at the mouth of the mine. A valuable use of cyanamide has been found in a curious function it has of causing the case-hardening of steel, and we find the great firm of Ludwig Loeve and Co., for one, continually using large quantities of it in the manufacture of tools and of arms for the government.

An interesting substance easily produced by the action of acids upon calcium cyanamide (with an apology to the reader for its hard name) is dicyandiamide, a beautiful crystalline body containing sixty-six per cent. of nitrogen. This substance, previously known only as a laboratory curiosity, is now made by the ton, and much of it is sold to the dye industries for a purpose that cannot be imagined by the manufacturers. Still other quantities are sold to manufacturers of explosives, owing to the fact that when mixed with other substances it lowers the temperature in the gun barrel. A very interesting property of cyanamide is the ease with which it may be made to unite with water to form urea—a substance occurring naturally in animal excretions. Tons of this artificial urea are now sold to manufacturers of pharmaceutical preparations, though, again, for purposes of which the manufacturers of the urea have no idea. Guanidine, another product of the animal organism, is also made from it, and, we are informed, tons of it are now being sold to America.

Still another reaction, of no practical utility to-day, but impressively significant of a thousand utilities awaiting the hand of future man to develop, is that by which sarcosin unites with this same cyanamide from atmospheric nitrogen to yield creatine—one of the actual substances of human muscle found in extract of meat.

From all these facts it is demonstrated that we may look forward with a very reasonable assurance to the creation of as many factories for the fixation of elemental nitrogen as we have smelting furnaces for the unfixing of elemental iron. Through all these processes we see the unwilling nitrogen, fixed by the genius of man into the active and useful form, working not only in the thousands of nitrogenous substances used in our civilisation, but in the soil in the plant, and causatively in the actions and thoughts and feelings of men, until, freed of its energy, it sinks back into the Nirvana of the empty air. We see, too, that the disaster of which the world actually stood in imminent deadly peril has been averted, and that if every pound of saltpetre in the mines of Chili were suddenly to dissolve into its elements, the human race would still be able to guard itself against the unhumanity of nature. Though, is there this unhumanity of nature?

Say there be;
Yet nature is made better by no mean,
But nature makes that mean; so, o'er the art
Which you say adds to nature, is an art
That nature makes.

Every atom within us moves in harmony with every atom without, and we that think we move them to suit our needs or our caprice are but the crude instruments of a Purpose unfilled and unimagined, but predestinated from the beginning of all things.

The present-day practical lesson of this whole strenuous successful work lies in the little object lesson it affords of the immense importance which technical science is assuming in our daily lives and in all our industrial operations. The substitution of real knowledge and high technical skill for the "rule of thumb" of our ancestors has created a revolution in industry. This revolution took its rise in Germany, and it is spreading rapidly to every corner. It is spreading silently, too, because it does not pay to tell. During the next five years, the small manufacturer who is swept out of existence will often wonder why. He will ascribe it to the economy of large-scale operations, or business intrigues, or what not, never knowing that his disaster was due to the application of pure science that the trust organisations and large manufacturers already are beginning to appreciate.

Copyright.

Photograph Copyright Good Consideration.—Section 2 of "The Fine Arts Copyright Act, 1877," enacts that the author of, *inter alia*, every original photograph shall have the sole right to sell, copy, engrave, reproduce and multiply it for the life of the author and seven years after his death, provided that when any negative of any photograph shall be made or executed for or on behalf of any other person for a good or valuable consideration, the person so making or executing the same shall not retain the copyright unless it be expressly reserved to him by agreement in writing, but the copyright shall belong to the person for or on whose behalf the same shall have been made or executed. Messrs Stackemann, photographers, were in the habit—as a speculation—of taking photographs of school buildings by permission of the principals it being understood that the principals need not buy any photographs unless they so desired. In 1904 Messrs. Stackemann, by permission of Rev. W G Price, the proprietor of a school at Harrow, took photographs of the school, certain rooms shown them by Mr. Price, and groups of the cricket eleven and of the boys of the school posed by Mr. Price. Subsequently Mr. Price purchased £15 worth of photographs. Mr. Paton published "Paton's list of Schools and Tutors" and the advertisers in this volume used to furnish him with photographs of their schools for insertion in the text. Accordingly, Mr. Paton published in his book one of the photographs taken by the Stackemanns which had been furnished to him by Mr. Price. The Stackemanns considered this an infringement of their copyright, and sued Mr. Paton accordingly Held, however, by Farwell, J., that the circumstances under which the photograph was taken constituted "good consideration" from the school proprietor to the photographers, and that therefore the copyright of the photographs belonged to the school proprietor and not to the photographers. *Stackemann v. Paton.* 75 L.J *Ch.* 590.

Company. Sale of Undertaking.—A provision in a Company's memorandum of association giving it power to sell its real and personal property does not confer on the Company power to sell its whole undertaking Such a transaction can only be effective if the memorandum of association reserves to the Company express power to sell its undertaking *The Rewa Co-operative Dairy Company v. Lonergan.* 25 *N.Z. L.R.* 540.

NITROGEN-INOCULATION EXPERIMENTS IN NEW ZEALAND:
BROAD BEANS, SHOWING DEVELOPMENT OF NODULES DUE TO SOIL-INOCULATION.