tion to the subject, the most interesting at the present day in the whole field of pathology, and as an aid to the practitioner in making up his mind whether he may or may not, with some hope of success, attempt to give his patient one more chance for life, in that fearful disease, diphtheritic croup.

Before ending, we must express the wish that Dr. Robinson would present his work, to the profession in this country, in an English dress. W. F. A.

ART. XXVI.—*Zymotic Diseases: their Correlation and Causation.* By A. WOLFF, F.R.C.S. 12mo. pp. 177. London: J. & A. Churchill, 1872.
The Graft Theory of Disease: being an Application of Mr. Darwin's Hypothesis of Pangenesis to the Explanation of the Phenomena of the Zymotic Diseases. By JAMES ROSS, M.D. 8vo. pp. 292. London: J. & A. Churchill, 1872.

PROF. TYNDALL has written well upon the "scientific use of the imagination." There is, however, a certain use of the same faculty upon matters of knowledge, which constitutes rather the romance of science than its positive advancement. We suppose it to have been this that was intended to be ascribed to Charles Darwin, by some of the French Academicians, in their use of the phrase "*science mousseuse*." But it ought to be apprehended that some effervescence may do no harm, either to wine or to science, if it have a body of its own. Nor are we willing to deny that this is true of both of the books whose titles are above stated.

It is certainly an interesting fact that from the same publishers, in the same year, have issued two works upon the subject of the theory of zymotic diseases, which, almost identically, many of the same facts, to establish opposite conclusions. Mr. Wolff propounds and ably defends the opinion, that all zymotic disease is a process of *inflammatory disintegration*; that the maladies included under this head are closely correlated, not specific in nature or causation, sometimes convertible into each other; that the one great cause common to them all is the contact of *decaying organic matter* from various sources; and that the differences among them result almost solely from the diversity of the organs or tissues upon which this cause takes effect. Thus we have, in typhus, the blood primarily affected; in enteric fever, the bowels; in cholera, the whole alimentary canal; in smallpox, the skin; in measles, the respiratory tract; and so on.

Dr. Ross, on the other hand, endeavours with much elaboration to prove that "contagium particles" whose action upon the body gives rise to the disorders called zymotic, are *living*, in the sense of being portions detached from a living being; "anatomical units modified and individualized by a diseased process, and impressing upon the healthy organism with which they come into collision a succession of changes similar to that which preceded their own modification in the body from which they were detached." Thus, according to one of these authors, "zymosis" is an extension from one body to another of the process of death; in the view of the other, it is the morbid transfer of an anomalous life.

In recalling what has been done in similar lines of thought, in regard to these great problems of biology and pathology, we find that, whatever vague ideas may have previously existed,¹ Liebig first gave definiteness to the theory

¹ As with Stahl and Lavoisier.

of *zymosis*, about thirty years ago. It was, with him, a molecular, and essentially a chemical theory; the extension or "instigation" of modes of atomic change in one substance by contact with another already undergoing the same or a similar change. This he applied to the germinative changes in the sap of plants; to yeast action in fermentable vegetable juices; to putrefaction, and to the agency of "virus" in producing smallpox and other (now called) euthetic diseases. Not many years later, Pasteur asserted, and defended with elaborate experimentation, the opinion that the vitality of the yeast-plant (first discovered by Fabroni¹ in 1787) had to do with the causation of fermentation; a purely chemical theory not sufficing for the facts. Many observers have wrought, out of analogous investigations, the now familiar doctrine of "disease germs." Pasteur continues to be altogether indefatigable. So recently as October 21, 1872, he read before the French Academy² a paper communicating new observations, by which he claims to prove that the cause of the vinous fermentation of grape-juice is a minute fungoid vegetation coming from the husk of the grape.

We do not need here to review the many different opinions and practical suggestions connected with this topic; either the earlier ones, as of Thénard, or the later, of Lister, Hallier, Beale, and others. One important contribution to the scientific analysis of the facts, however, must be mentioned. Dr. John Snow, President of the Medical Society of London, delivered before that body, in 1853, an admirably written oration on "*Continuous Molecular Changes; more particularly in their relation to Epidemic Diseases.*" In this discourse, Dr. Snow wrote as follows:—

"The material cause of every communicable disease resembles a species of living being in this, that both the one and the other depend on, and in fact consist of, a series of continuous molecular changes, occurring in suitable materials." "But the specific animal poisons, as they are called, are very rarely, if ever, introduced in such quantity as to produce sensible effects; the disturbance in the system, which constitutes the diseases they induce, being due to the crop or progeny of the matter first introduced."³

While Dr. Snow was undoubtedly too exclusive in his mode of applying this view to the explanation of the extension of many diseases, and especially of cholera, by the contamination of drinking water, it appears to us that, as a theory, it is the most comprehensive, and yet the most safe, of all, as involving the least conjectural expression beyond the ascertained facts. Both of the works now under notice, that of Mr. Wolff and of Dr. Ross, might, recent as they are, have nearly all their actual facts included under the wide, yet definite, category of "continuous molecular changes;" leaving the question open for more exact analysis hereafter, how far *both* life and death may, or may not, take part in causing those multiform processes called zymotic diseases.

Looking more particularly at the characteristics of the volume before us by Mr. Wolff, we find it asserting, in the first place, too broadly and absolutely, that "inflammation is a process of structural disintegration tending to structural death." This is taking a part for the whole. Inflammation *includes*, but does not consist solely of, a process of degeneration. Accepting Virchow's statement of it, we would have to regard the latter process as its consequence, or at least its termination, rather than its essence. The most important

¹ More fully described afterwards, by Cagnard de la Tour, Turpin, and Schwann. See Huxley, on Yeast, *Contemporary Review*, Dec. 1871.

² *Nature*, Nov. 7, 1872.

³ Oration (*ut supra*), pp 14, 15. J. Churchill, London, 1853.

thesis, however, of this book is, that the asserted "*specificity*" of zymotic, if not of all diseases, is a false doctrine. Most of the argumentation given upon this point refers to the interpretation of well-known facts. But a portion of it embraces evidence on subjects open to, and requiring, further exact observation. Mr. Wolff believes that instances have occurred of smallpox, scarlatina, and measles originating *de novo*, without contagion from like cases (pp. 129-137); and also, that under some circumstances, the "correlation" of zymotic affections is proven by the etiological transformation of one into another of the group. This is asserted (or conjectured) of intermittent and enteric fever; of oriental plague and cholera, etc. There is a great deal of interest in some of the facts given, which are by him understood as showing the origin, in certain cases, of scarlet fever from emanations of organic decay. But all these things require more extended investigation. The specific non-identity of smallpox with scarlet fever, measles, typhus, and cholera, to make the list no longer, is affirmed by facts whose number and constancy are familiar to every one. Mr. Wolff's book does not compel us to give them up.

Dr. Ross's rather startling title appears to have been suggested by an expression as old as the introduction of inoculation by Lady Mary Wortley Montagu. In one of her letters, dated at Adrianople, 1717, she wrote thus: "The smallpox, so fatal and so general amongst us, is here entirely harmless, by the invention of *grafting*, which is the term they give it." Without disrespect, we may ascribe the first thought of *pangeneses* as applied to etiology, to an ingenious nation yet further east, and of a still earlier date. The Chinese have long taught¹ that, when any one is bitten by a mad dog, a little dog (*microcyon*?) is introduced from the saliva of the animal into the fluids of his victim.

There is a great deal of information and very pleasant reading in Dr. Ross's book. It reminds one of the writings of Darwin and Wallace, in the facility with which the mind is made to behold, as in a grand thaumatrope, a seemingly harmonious union of facts which have really no necessary connection. Yet there is, as with those able and brilliant authors, much sound reasoning also; so much, that it requires constant effort not to be carried away by the adroit blending of the true and certain with that which is uncertain, if not false. The leading idea conveyed in the argument of Dr. Ross has its parallel (as shown by him) in an expression of Darwin's;² in which the influence of grafting upon the foliage or fruit of a stock is compared to "inoculated disease." But the boldest conception of all appears to be, that of a resemblance between the action of "contagium particles" upon living epithelial cells, and the reproductive union of the sperm-cells and germ-cells of animals or plants. The difference between the two processes is asserted to be simply this: that the epithelial cell is an integral part of the organism affected, while "the germ-cell is either detached or semi-detached, and therefore enabled after fertilization to enter upon changes more or less independent of the parent organism." The nearest previous approach to this author's views has been made in some of the works of Dr. L. Beale.

We have not space to follow Dr. Ross through the eight animated chapters in which he endeavours to apply "*pangeneses*," and the struggle for existence, with natural selection and survival of the fittest, to the origin, perpetuation, and variation "from one form or a few," of all the enthetic diseases. Almost any reader, with leisure, will enjoy the whole book. Like ourselves, some, at all

¹ Porter Smith. See Da Costa; Address on Modern Medicine, Philadelphia, 1872, p. 24.

² Animals and Plants under Domestication, vol. iii. p. 365.

events, will fail to be convinced. To us, after reading the work just noticed, of Mr. Wolff, one of the best fruits of the perusal of that of Dr. Ross is, the refutation, by his facts and reasoning, of the denial by Mr. Wolff of the specific differences commonly supposed to exist among zymotic diseases. Not as "entitics," but as *processes*, we believe them to be as fully differentiated from each other as are any species in nature; and this specificity or differentiation would still remain, as a matter of observed and demonstrated truth, even though we should have to accept, in regard to their origin, so improbable an explanation as that of "the graft theory of disease."

H. H.

ART. XXVII.—*Contributions to Mental Pathology.* By I. RAY, M.D., author of *Medical Jurisprudence of Insanity and Mental Hygiene*. 8vo. pp. 551. Boston: Little, Brown & Co., 1873.

THE elaborate work of Dr. Ray on the Medical Jurisprudence of Insanity, and the more unpretending one on Mental Hygiene, are so well known, and are so universally regarded as among the highest authorities on the subjects of which they treat, that anything from the pen of their distinguished author is sure to have a cordial welcome from the medical profession.

The volume under notice is mainly composed of articles which have already appeared in print, and they are, without exception, so admirably written, so clear in the views expressed, and so sound in their conclusions, that, even if they were—which they are not—somewhat "deficient in that unity of doctrine and purpose which is expected in a systematic treatise," their collection in a single volume places the public under new obligations to their author. As is well said in the modest preface to these contributions: "Since their first appearance the subjects they discuss have lost none of their original interest; many of the questions they present are far from being settled; and the public are still seeking for information respecting a disease that has most important relations to private happiness and social order."

These "Contributions to Mental Pathology" are twenty-two in number. The address on the occasion of laying the corner stone of the new Hospital for the Insane, at Danville, Pa., besides giving an admirable *résumé* of the progress of public sentiment in regard to provision for the insane, presents the only sound views which should influence the public authorities when legislating on the subject. The papers on the causes of insanity, on the statistics of insanity, on the objections to moral insanity, that on doubtful recoveries, on delusions and hallucinations, on the insanity of seduced or deserted women, on the management of hospitals for the insane, on medical experts, on the insanity of King George the Third, on Shakspeare's illustrations of insanity, and on those by other distinguished English writers, are all admirably written and full of interest. It would be difficult anywhere to find in so small a compass, so complete a discussion of the important subjects alluded to.

Hardly less valuable than the articles already mentioned, are the papers that are more strictly medico-legal in their character, and in which are masterly analyses of cases in which the plea of insanity was urged in extenuation of criminal charges, and which are familiar to most students of this subject. It is only necessary to refer to the trials of Rogers, who murdered the warden of the Massachusetts State Prison; of Baker of Kentucky, who killed his brother-in-law; of C. A., a young man in New England, who, apparently without mo-