Constance Naden:
Further Reliques

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Vivere diis libenda
Constance.

Facsimile of Miss Haden's last letter to Dr. Lewins

Nov. 22nd /89

I cannot help
writing a few lines, which will
cost me no exertion. I was
very much agitated when I
spoke to you last night, but
now I feel that we ought
both to be glad that there is
a chance of my getting rid of
this incubus, which has been
weighing on my life so much

lately. The treatment is not painful & only applied for 10 minutes at a time, just once a week. The invalid-ism is the worst part of it— but it seems to me that unless something can be done I shall be an invalid in any case — judging by my present condition. So let us welcome this chance of recovery, & above all try to be

hopeful — I shall do so
for your sake & you must
for mine. There is no
way in which you can
help me more, for when
I feel that you are
despondent about me,
then the feeling that
I am giving you such
bitter sorrow is almost
more than I can bear.
I think I am a little
better today, & I had a
good night.

Lennie.

FURTHER RELIQUES OF CONSTANCE NADEN:

BEING

Essays and Tracts for our Times.

EDITED,
WITH AN ANALYTICAL AND CRITICAL INTRODUCTION, AND NOTES, BY

GEORGE M. McCRIE.

With Portrait.

"Macrocosm and Microcosm alike are but Auto-cosm."

LONDON:
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1891.

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TO

ROBERT LEWINS M.D.

THIS VOLUME IS DEDICATED BY

THE EDITOR

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CONTENTS.

SOME PERSONAL OPINIONS.

CONSTANCE NADEN: A MEMOIR.

Mr. Hughes has received many gratifying letters in acknowledgment of presentation copies of this volume, among which the following are noteworthy.

General Sir Henry F. Ponsonby, G.C.B., writes from Osborne:—"I have had much pleasure in laying before the Queen the copy of your work, 'Constance Naden: a memoir,' of which I had already heard an interesting account."

"Her Majesty was graciously pleased to accept the volume, and commands me to thank you for your kindness in having presented her with this book."

Lord Reay writes:—"I have had the privilege of receiving your memoir of Miss Naden. I am very much obliged. Though only having had the pleasure of seeing her for a few hours, I mourn the premature death of this singularly-gifted lady as warmly as any of her friends."

The Right Hon. W. E. Gladstone, M.P., writes:—"I thank you very much for the Memoir of Miss Naden. Everything relating to her is to me matter of deep and touching interest."

The Right Hon. J. Chamberlain, M.P., writes:—"I am much obliged to you for the copy of the Life of Miss Naden, which I shall read with interest."

Sir Philip Magnus writes:—"I am indeed very much obliged to you for sending me the Memoir of Constance Naden . . . . . In common with every one else who knew her I was deeply shocked when I heard the sad news of her death, which so abruptly terminated an acquaintance which I had hoped would ripen into friendship."

In acknowledging the receipt of a copy of the Memoir sent to him by Mrs. Charles Daniell, Mr. Gladstone writes as follows:—". . . I read through the whole Memoir with undiminished interest. There can be no doubt that by the death of Miss Naden the world has lost a person of gifts both extraordinary and highly diversified. As yet I believe in her mainly for her poetry, but a mind highly scientific is shown by the wonderfully clever verses on Solomon Redivivus. I am glad to be under the impression that we have not got the last of her remains. I shall always regret my personal loss in not having known her personally."

For Press Notices see end of Volume.

PREFACE.

THE intrinsic value of the papers themselves, and, *inter alia*, the interest and attention which have been aroused by the publication of Miss Naden's posthumous volume of Essays, and by the succeeding Memoir which appeared last year, suggest the compilation of these her further literary *Reliques*.

In the arrangement of the volume the Editor has endeavoured, by introducing several reprinted papers, culled from the *Journal of Science*, etc., to add variety to the list now before the reader.

The appendices are necessarily numerous. They consist of some valuable additions and illustrative notes contributed to the already published papers by Dr. Lewins, and by the Rev. E. Cobham Brewer, LL.D. To this department the Editor has also ventured to add an article, written by Dr. R. W. Dale in the *Contemporary Review* for April, 1891, together with a reply written by himself and forwarded to that journal. This reply was made strictly in the interests of justice to Miss Naden's memory. Eleven years of her life's noontide have been overlooked by Dr. Dale.

I append, also, the *facsimile* of the last letter written by Miss Naden, to face the portrait. It is thoroughly characteristic of her habitual serene courage and self-forgetfulness.

INTRODUCTION.

IN the original "Prefatory Note" to the first two Essays, "Induction and Deduction" and "Evolutionary Ethics," published in the former volume [Induction and Deduction, by Constance C. W. Naden—*London: Bickers & Son*] of Miss Naden's Essays, I find her scientific and philosophical standpoint indicated in a few words. I quote them here in order that, after the following papers are perused by the general reader, the consistency of her views may be confirmed: "The inner bond of union between these two essays consists in the principle, implied where not explicit, that man evolves from his inner nature the world of experience, as well as the world of thought—that, in fact, these seemingly rival spheres constitute but one Cosmos. Whether I insist upon the truth that induction and deduction are involved in the simplest percept, or on the kindred truth that the germ of morality lies in the power which every man possesses to image and asself the feelings of his neighbours, I am equally enforcing this primary idea."

This may seem *prima facie* a broad and all too bold generalization. It is only, however, when we take a sample of Miss Naden's purely empirical papers, such as the Panton Prize Essay in the following pages, and unify it with the "primary truth" above mentioned, that we see how her life philosophy was based on foundations quite susceptible, in our age, of positive verification. Professor Tilden, in his interesting contribution to her "Memoir" [*Bickers & Son*, 1890], tells us that "no inducements seemed sufficient to prevail upon her [while at Mason College] to become a

mere scientific specialist." Still more definitely Professor Lapworth, in his introduction to the same volume, informs us to the like effect, "I take it," he says (xv), "that Miss Naden's study of Geology, as that of other sciences, was only as a means to an end." What this "end" was may not lie exoterically manifest upon the surface of *all* her published prose writings, yet it is, nevertheless, true that—"Without this revelation of her inner life, much, especially of her later poetry and prose, must be as enigmatical and, indeed, incomprehensible as Volapük." [*Addition to Memoir by* ROBERT LEWINS, M.D.] Such a life purpose as this, based upon the latest acquirements in modern science, and yet employing these, not in any special line of empirical study or research, but concentrating them in the elaboration of a "world scheme" or Cosmic synthesis—above all, in all and through all—constitutes, as a whole, a study so unique, that it can be but briefly dwelt upon within the limits of this introductory paper. Of the "profound simplicity" of this her life gospel, there can be no better evidence than the fact that, in its entirety at all events, so many of her earlier teachers have contrived to miss its real significance. The profoundly simple eludes observation by reason of its very nearness and closeness, and resolves into the simply profound. To say, for example, that the query, "Man, whence and whither?" was *the* question which bulked most largely with her, is disproved by the singularly able philosophical tracts now for the first time published in these pages. The question is not even mooted. To say that the bent of her mind was "Spencerian" is but inadequately to convey an idea of her mental grasp, which was more than equal to the problems of the newest philosophic schools; she was equally at home in the Synthetic Philosophy as in the speculations of MM. Renouvier and Pillon, as well as in those of the

late Prof. T. H. Green. But she identified herself with none of these. It would be quite as reasonable to state of the last-named that he was a Kantian.

If the highest art be to conceal all traces of art, the profoundest philosophic ability conceals all evidence of acquirement—is simply informed, and speaks from knowledge. Although the papers which follow have not had the benefit of her personal revision, I need scarcely point to them as characterized by an entire absence of the literary undress and scrappiness so common now-a-days. The MSS. have been written by the "vanished hand" with such mature deliberation and calmness, that one is at a loss which most to admire, the brilliant and original thoughts or the classical repose of manner and expression. Again and again while perusing these *reliques* has the present writer had, as it were, to reassure himself as to their veritable authorship. These quiet forceful words, this commanding grace of expression, this workmanship of phrase, so apt that not one word could be substituted without changing the whole meaning, all are the work, little more than the beginning of the life-work, of one of England's daughters!

Comparisons at once suggest themselves in these circumstances. But these need not be, in the least degree, invidious, since it goes without saying that, as regards scientific, up to date, training, as a basis for philosophical elaboration, she had advantages such as no woman of mark preceding her has ever enjoyed. And, as Mr. Herbert Spencer has remarked of her, "Very generally receptivity and originality are not associated, but in her mind they appear to have been equally great." In respect of solid acquirements, perhaps the nearest name to hers in this connexion is that of the late Miss Harriet Martineau,—who with unquestionable talent and ability, and under the

guidance of the late Mr. Atkinson, did endeavour, if not to construct a philosophical system, at least to impress the public at large with some very pronounced views as to Mesmerism and kindred topics. It will not be seriously contended, however, that Miss Martineau's range of acquirement, or capacity for abstract thought, at all equalled Miss Naden's, even making allowance for the difference of their respective epochs. The former's correspondence with her mentor on the "Laws of Man's Nature and Development" only marked a stage in a long series of intellectual divagations on her part, in the course of which every depth and shallow, lying between Unitarianism and Neo-Phrenology, had been attempted. At the present day it may safely be affirmed that the influence upon modern thought, whether of teacher or disciple, is practically *nil*.

Continuing the above extract from Mr. Herbert Spencer, which is quoted in the Memoir (p. 89), we find the following words, "I can think of no woman, save 'George Eliot,' in whom there has been this union of high philosophical capacity with extensive acquisition." A closer examination, however, shews this well-meant comparison inapplicable. There was all the difference between the early and thorough scientific grounding, in the case of Miss Naden, and the scientific acquirements, picked up comparatively late in life, in the case of George Eliot. It is no dispraise to allude to this in the case of the latter. It is impossible, however high a tribute may be intended, as it is doubtless due, to her imaginative powers, to credit her with having been scientifically educated, while, as a matter of fact, she did not possess any such advantage as an aid to philosophical theorisings, with all the disadvantages which, on the other hand, accompany acquirements gained after the normal period of receptivity had passed. It is evident, also, that the disparity of age

tells much in favour of the younger thinker, if only on account of the notable advances made in scientific methods during the last forty years. In many departments scientific theories have been practically revolutionized during that period. Miss Naden's teachers at Mason College, who share the symposium on the title-page of her Memoir—Professors Lapworth and Tilden—are scientists of the newest schools in their respective departments. The former has practically revolutionized Sir R. Murchison's Geology of the Scottish Highlands as well as that of the Scandinavian Peninsula: the latter, like other professors of Mason College, is, unlike Dr. Tyndall and other *established* authorities, at the high-water mark of present-day Empiricism.

Here, also, the question of mere acquirements apart, we have to contrast, as it were instinctively, the calm serenity, the just balance and equipoise, of our author's mind with not a little wavering and hesitancy on the part of the distinguished psychological novelist. Doubtless the companionship of the latter with the late Mr. G. H. Lewes had much to do with this. Where there was no approach to anything like a monistic cosmical synthesis on the part of the teacher, the disciple could not be expected to originate one. The dramatic and prudential requirements of the successful novel writer, also, did not square with the severity of a monistic persuasion. So that, in the end, although the genius was unquestionable, the aspiration high and the moral lofty, we have compromise instead of constancy, dualism for monism, and a general impression of "trimming" conveyed, which may be false or not, but which, in the case of one more single-hearted and sincere, would never have been originated.

As Miss Naden did not essay the rôle of novelist, it would seem out of place to mention any of the Brontë family in this connexion, even if there were any link of association

between the somewhat feverish genius of the daughters of Haworth Vicarage and the achromatic vision and faculty divine of Constance Naden. Pure specialists in science, like the late Mrs. Mary Somerville, cannot be classed with her, for she soared far above mere specialism—though she had the training of a specialist of the specialists, as it were, thrown in, to incline the balance of adjudication more markedly in her favour. And, at the other end of the vista, place beside her calm insight, beside "the vigour and sound sanity of her brain," the pitiful autobiography of that spoiled child of modern society, Marie Bashkirtseff—that hectic record of genius, vanity, folly and despair.

But, far more important than the petty details of literary comparison and estimate, remains the actual philosophic work performed by Miss Naden. Its quality is such as to dwarf, for the most part, the other departments of her activity. Poet she was, but her poetry suffers, not in comparison with the work of other women of letters in the same sphere, but with her own still more precious and enduring contributions to the literature of abstract thought. We have seen that, by her own statement, one "primary truth" runs like a silver thread through all her graver papers: it gleams through the Heslop Prize Essay on Induction and Deduction, and also through the shorter papers published in the same volume. In the following pages, the same conclusions are reached through an analysis of Transcendental Psychology — notably the position of the late Professor T. H. Green, of Oxford.

In order to show how firmly based on positive science were Miss Naden's theorisings, there is reprinted in the following pages a paper entitled "Hylo-Zoism *v.* Animism," from the *Journal of Science*. It was the crowning glory of her philosophical exposition, that she could try conclusions with a subtle thinker like the late Prof. Green (and I confess that

the Apostle of The Eternal Consciousness seems to me ever to have the worst of the argument), both on his own ground, and on the field of physical science, in which he was no expert. Her argument found confirmation alike in the mental and material spheres, these in the alembic of Hylo-Idealism, being but one and the same. She parts from the Oxford Professor just at the point where, embarrassed with the Relational system to which he has reduced everything, he seeks refuge in an Infinite Consciousness which is to correlate all things, and in regard to which the human organism is to serve but as a keyboard, whereon the Symphony of Being is to be performed :—

> "Now it is like all instruments,
> Now like a lonely lute—."

This view, of course, repels her. She equally rejects the abstract Relationalism of the French School of the Neo-Kantians; while, on the other hand, she also avoids the crude, undigested realism, which would make an "external world" the informing and illuminating agent, and the subjective mind a passive mirror, over which appearances change and pass. It is one of the most notable features of that all-embracing Theory of Hylo-Idealism, which was Miss Naden's life-creed, that, at a stage of argument like this, the *hiatus* is self-supplied. It was indifferent with her, as Hylo-Idealist, whether the *Relation* of the Neo-Kantians were a thing wholly in the air—a termless abstraction, or the measured relations recognized by the anatomist and evolutionist. To the ordinary spectator, as, indeed, to the ordinary scientist of to-day, these are wholly different, wholly irreconcilable; with the consistent Hylo-Idealist, they are one and the same. The *limitary* Ego—the Ego which gives birth to the chimera of Dualism—cannot be found. For, p. 152, "*if subject and object be indissolubly* ONE

the simplest unit from which we can start must be the Ego in its entirety, that is the universe as felt and known." I italicise one of the most pregnant dicta in all the literature of abstract thought.

The prime error of Dualism, as opposed to a judicial and consistent Monism, lies in the illegitimate postulate of the objective and external. The very query, "Is there an external world?" is one which ought not to be put until the true definition of "externality" be arrived at, or until it be discovered whether it be possible for the self to transcend itself. True externality, as regards consciousness, or a conscious subject, would mean a something, or somewhat indefinable, with which the conscious, not being in relation, had no concern, something beyond or above it, which would be as nothing to it. To put it in the words of Prof. Green, arguing wholly from the metaphysical side, "We are not entitled to say that anything is without, or outside consciousness; for *externality* being a relation which, like any other relation, exists only in the medium of consciousness, only between certain objects as they are for consciousness, cannot be a relation between consciousness and anything else." But the teachings of positive science, also, effectually negative any such absolute or unconnected entity. "*Nihil a me alienum puto*" is true in the realm of physics, as well as in that of ethics. Distinguish we may; separate we cannot. Each one of us is being regenerated, born again, every instant. We are not what we have been—we know not what we shall be. Never continuing for an instant in one stay, individuality, personality were a mockery could we not say that the Ego in its entirety is not the shadow on the dial, or the wavelet in the ocean, but itself the veritable "universe as felt and known."

In this light the resort of Prof. Green, and other similar

thinkers (acute enough in their way, but purblind when it comes to be a question of the last recess of knowledge), to a supreme *outside* consciousness of whom much is required, and who therefore is made Infinite, Eternal or what not, and is supposed to play upon the human organism as upon a harp, is found to be superfluous, an illegitimate complication of a problem already solved. A Cosmic Soul, or *Anima Mundi*, is as unnecessary as an *Anima Humana*. Neither are required by the conditions, for just as the human organism needs no quickening spirit to enable it to perform its functions, so the Ego in its entirety—viz., the Universe as felt and known—needs no energy save its own *vis insita*. As put in the paper on Hylo-Zoism *v.* Animism, p. 208. "The *vis insita* of matter (which etymologically means *in-dwelling*, but practically means *inalienable* energy) supplies the place of the Divine *afflatus*, and affords, in the strictest sense of the phrase, a logically sufficient 'cause'—*i.e.*, a *rationale* reducing apparently anomalous phenomena to a familiar category." The animal economy is clearly automatic and requires no external instrumentality to energize it.

These things are not hard to be understood, as some have ignorantly supposed. Should their significance be missed by the sincere enquirer, let it be pondered whether the error does not lie with himself or herself, or by reason of the unexpected nearness and plainness of the truths involved. For Cosmic Identity is a transcendent truth hidden by its own conspicuousness. To the unsophisticated mind this all-subduing solution of "the riddle of the painful earth" is clearer than to one darkened and blinded by the glare of light, which purely fractional, empirical science affords. The whole must ever be greater than the part. "The stars are well, but the self is better."

It is thus not a singular, though perhaps a noticeable

feature in the propaganda of Hylo-Idealism, that no type of intellect is so difficult of access as that of the modern specialist, who is specialist and nothing more. The plain directness of the Solipsismal verity irritates and upsets him. The intellectual focus in such cases is adjusted for the far, the remote,—for anything but the near at hand, the "simply simple." Yet it is to this erroneous perspective that so-called "modern thought" asks its votaries to trust implicitly, to the neglect of certain antiquated myths and fables. Let us have correct perspective by all means, true insight and achromatic vision, but till this be attained, fables young and old will seem fables equally—the invention of the Bathybius of much the same value as a solar myth, and the doctrine of atomicity [*Stallo's Concepts and Theories of Modern Physics*] quite as shaky as any oft-impugned Christian symbol.

Perhaps no collection of posthumous essays ever required so little of introduction or direction to be addressed to the reader. The arrangement of the present volume has been made in accordance with a plan which, upon consideration, will make itself readily understood. The student will find it to his advantage to peruse, first of all, and more especially in advance of the philosophical tracts which follow, the lesser papers connected with Hylo-Idealism, contained in the former volume of essays already alluded to—and then to follow up the papers in the order of their arrangement in the present volume. At first glance it may seem as if the viewpoint shifted abruptly, and as if the topics varied at haphazard—but this kaleidoscopic alternation, besides being characteristic of the many-sided genius of the writer, has its wider lesson and its moral in connection with the all-inclusive synthesis which inspires these papers throughout. The study of the Ego which these pages present, in accordance with the motto on the title-page, is a reflection of personality,

not in the narrow sense of a purely individual centre, a vortex constant amid the Cosmic whirl, but in that supreme one which identifies *all that is* with the I of the thinker. When think and thing are reconciled, knowing and being are found identical, and the view-point of philosophy broadens to the limit of the conceivable.

Towards the hastening of the better day of clear envisagement and sober judgment, the eminently calm and judicial writings left us by Miss Naden promise incalculable help. The times have need of it. The prosecution of the study of abstract thought has, for the most part, fallen into the hands of the inconstant and half-hearted, who confess their intellectual feebleness by resorting to an "unknowable" fount as the source of all that is, while the study of physical science has degenerated into a microscopic specialism, which utterly ignores the origin and bourne of all possible knowledge, whether empirical or metempirical, the Ego, which is itself "the Universe as felt and known," the autocosm which enfolds macrocosm and microcosm alike. Both of those extremes (a metempirical system by its own confession blind and dumb, and an empirical scientism wholly insufficient, as being without any other foundation than the concrete) both spell one word in the end, and that is dualism, and dualism is but ignorance confessed. If "to be weak is miserable," to be ignorant implies some measure of despair. Listen, in this connexion, to the confession of one who finds his philosophic model in the "common sense" conclusions of an outworn creed.*

"God, if at all, must rise above the line of the finite regress; He cannot be a cause in that; He cannot be a cause dependent on another cause; He must be somewhere, or at

* Professor Veitch, a follower of Reid and Hamilton's so-called "Common Sense" philosophy.—"*Knowing and Being*," p. 320.

some point, in the line of an otherwise endless scientific regress [!],—there above it, yet related to it, and in it—otherwise He is nothing for us." Well has Miss Naden written, "The first step towards knowledge is the exclusion from our search of all that we cannot know (Transcendental Psychology, p. 144)." Verily, then, the first thing to be excluded as unknowable would be a point *in* a line, *above* it, and, at the same time, *related to* it. But let that pass; only how clearly does her own calm pronouncement ring out by way of contrast to the foregoing medley, "Man, if pure of heart and lofty of mind, must be 'crowned with glory and honour' whatever be the first cause of his sovereignty. A material origin cannot degrade his thoughts if they be lofty; a spiritual origin cannot ennoble them if they be base. Nor does it seem more glorious to be 'a little lower than the angels' than to be the Creator and fashioner of an ideal host of heaven, even though their bright array be the offspring of a material organ ('What is Religion?' pp. 122-3)."

Dr. Dale, her latest biographer, tells us (*Contemporary Review, April*, 1891) that "she died too soon." Perhaps it were better to put it that she lived too soon, before the time had come when her pure evangel—sublimely simple, simply sublime—could meet with ready acceptance. But *manet litera scripta*, her words will yet be read (as they even now are by many who never heard her name during her life-time) by the light of a brighter dawn.

G. M. McC.

London, September, 1891.

"PIG PHILOSOPHY."

A Protest.

Declined by the Editor of *Fortnightly Review*.

THE task of the present age seems to be the identification

ERRATA.

p. 18, 3rd line, for *marks* read *marls*.

p. 26, 10th line, for *Charmwood* read *Charnwood*.

p. 32, 2nd line, *strategraphical* read *stratigraphical*.

p. 36, last line but one, for *Terebratuluhastala* read *Terebratulahastala*.

p. 38, last line but four, for *Leckey* read *Lickey*.

p. 59, 12th line, for *Rhœtic* read *Rhætic*.

is really water, and water wine. It consists in showing that the two ideas are two aspects of one philosophy; and that, while each preserves its distinctive value, there is a unity of import clearly visible in the midst of the diversity. Deny the diversity and you destroy the possibility of identification; for one or other of the ideas must be nullified. Deny the unity, and you have assumed that the whole truth lies on one side; an assumption which may be correct, but is more likely to be erroneous when it concerns the sincere thoughts of sane thinkers.

Mr. Lilly, in his treatment of the Intuitional and Utili-

some point, in the line of an otherwise endless scientific regress [!],—there above it, yet related to it, and in it—otherwise He is nothing for us." Well has Miss Naden written, "The first step towards knowledge is the exclusion from our search of all that we cannot know (Transcendental Psychology, p. 144)." Verily, then, the first thing to be excluded as unknowable would be a point *in* a line, *above* it, and, at the same time, *related to* it. But let that pass; only how clearly does her own calm pronouncement ring out by way of con-

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"PIG PHILOSOPHY."

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THE task of the present age seems to be the identification of apparently opposite modes of thought.

"Identification" is a bold word, and the cautious critic will probably suggest "harmonisation" or "reconciliation" as at once milder and more correct. But both these phrases imply something of concession, something of toning down and filling in, which, however necessary in practical life, is hardly compatible with philosophical precision. We all know how cleverly Genesis may be reconciled with Geology, Evolution harmonised with Special Creation,—we do not hanker after further specimens of this ingenious art. True identification differs *toto cœlo* from compromise. It does not consist in emptying an idea of its own proper significance, in order to charge it with the significance of a contrary idea, and triumphantly to exhibit the harmony of the two; which is very much like pouring out the contents of a water-bottle and filling it with champagne, for the sake of proving that wine is really water, and water wine. It consists in showing that the two ideas are two aspects of one philosophy; and that, while each preserves its distinctive value, there is a unity of import clearly visible in the midst of the diversity. Deny the diversity and you destroy the possibility of identification; for one or other of the ideas must be nullified. Deny the unity, and you have assumed that the whole truth lies on one side; an assumption which may be correct, but is more likely to be erroneous when it concerns the sincere thoughts of sane thinkers.

Mr. Lilly, in his treatment of the Intuitional and Utili-

tarian systems of Ethics, prefers the denial of Unity; thus choosing the latter horn of the dilemma.* He emphasises this choice by the use of extremely vigorous language. There is, indeed, a certain incongruity in the spectacle of a philosopher in a passion; a philosopher appealing to prejudice in the name of reason; a philosopher shrieking out "blasphemy," "gross outrage," "ignoble surfeit," "Pig-philosophy," so soon as his favourite theories seem to be endangered. The atmosphere of the Inquisition hangs about his pages, and we half expect to be summoned to an *auto-da-fé*, in which Mr. Herbert Spencer, Mr. Leslie Stephen and Professor Bain, are to be the principal victims, clad in black robes embroidered with the demoniac features of John Stuart Mill and Jeremy Bentham. It is perhaps significant that Mr. Lilly clenches his arguments with a dictum of the Latter-day Sage, who could write powerfully, imagine vividly, feel profoundly—could, in a word, do everything but think exactly. If questions of this nature are to be examined at all, they should surely be examined in another spirit. Mr. Lilly should have reflected that the *mot* "Justice is volitional, not abdominal," will be taken seriously by some of his readers, who will actually believe that the ethics of utilitarianism are in some way based on the digestive functions; that the brain must resign the place of honour to the splanchnic plexus, and that the motto of fully-developed Hedonism is in truth "Let us eat and drink for to-morrow we die." He himself is of course aware that this is not a true conception; but he forgets that many of his readers may not be similarly instructed; and that, in yielding to his love of antithesis, he ministers to an ignorant hatred of the systems which he attacks.

It is a relief to turn for a moment from Mr. Lilly's diatribes to the calm wisdom of Professor T. H. Green; who, it will be remembered, expressed deep regret for the solitary

* *The Ethics of Punishment*, by W. S. Lilly. *Fortnightly Review*, July 1889. I use the term "intuitional" for the sake of convenience, though its connotations are ambiguous. It seems to express fairly well the ethical theory adopted by Mr. Lilly.

occasion on which he allowed himself to adopt a tone of unseemly sarcasm, when criticising the ideas of a great thinker. He says, in his *Prolegomena to Ethics:* "On the whole, there is no doubt that the theory of an ideal good, consisting in the greatest happiness of the greatest number, as the end by reference to which the claim of all laws and powers and rules of action on our obedience is to be tested, has tended to improve human conduct and character. . . . . It has not given men a more lively sense of their duty to others—no theory can do that—but it has led those in whom that sense has already been awakened to be less partial in judging who the 'others' are, to consider all men as the 'others,' and on the ground of the claim of all men to an equal chance of 'happiness' to secure their political and promote their social equality."* This he maintains, in a work expressly designed to overthrow the Utilitarian theory; and these noble words cannot be too earnestly commended to the study of more recent critics.

"Pig-philosophy" is a term of abuse characteristically applied by Carlyle to a theory which he did not understand. Mr. Lilly curiously speaks of its "exact descriptiveness." What does he mean? One might as soon allude to the "exact descriptiveness" of the forcible phraseology commonly heard at Billingsgate. This word "exact" implies a scientific accuracy which it is difficult to associate with Carlyle's gift of picturesque vituperation. Evidently we must seek for some definite meaning in the metaphor, apart from the general opprobrium which it conveys. From the context, this definite meaning would appear to be that the utilitarian ideal of happiness or welfare includes merely the swinish joys of the trough, and excludes all those delights which are distinctively human. "Pleasure," it would seem, can mean nothing but that point of pleasure which the pig is able to enjoy. "Happiness," properly so called, depends on those conditions which suit the porcine nature. "Welfare" consists in a comfortable sty and an abundance of pig's-wash. If the phrase coined by Carlyle, and adopted by

* Prolegomena to Ethics, bk. IV, ch. iii, § 331.

Mr. Lilly, has any "exact" meaning at all, it must mean something like this. But in this case we should be forced to conclude that the conception of happiness formed by these philosophers is a very low conception, and is what in evolutional language may be called a survival from a previous stage. The Carlylean epithet implies, if taken literally, either a brutish ideal of happiness or a wilful misrepresentation of utilitarianism. Either alternative being, of course, inadmissible, we are obliged to suppose that there has been some mistake, and that the word "exact" should be "rhetorical," or perhaps "humorous." Another interpretation, however, is suggested by the context. Mr. Lilly assails the theory of Determinism with a dexterous confusion of language which I cannot sufficiently admire. He apparently believes that "the very existence of morality depends upon" the issue of a philosophical controversy, and fulminates against his opponents with a fervour truly Athanasian. If the "existence of morality" really depends on Kant's axiom that "Everything in nature acts according to laws; the destruction of a rational being is the faculty of acting according to the consciousness of laws," then morality may be considered fairly safe. For I do not know that this doctrine would be questioned on either side. Luther asserted it when he upheld the right of private judgment, however "antinomian" he may have been in other respects. John Stuart Mill, in the Essay on Utilitarianism, which Mr. Lilly has read so carelessly as completely to misapprehend its line of argument, insists again and again on the necessity of conscious action according to law or principle. "Whatever we adopt as the fundamental principle of morality, we require subordinate principles to apply it by; the impossibility of doing without them, being common to all systems, can afford no argument against any form in particular." He finds "the ultimate sanction of all morality" in "the conscientious feelings of mankind."

It is indeed difficult to understand how an acute critic, who has read even superficially the works of our Determinist thinkers, can imagine that they deny "human freedom of

action" in the sense of "action from a motive intelligible to, and chosen by, a self-conscious moral being." Yet that he does so imagine, appears certain. The resulting syllogism seems to be that the philosophy of the pig is not the philosophy of "a self-conscious moral being," and that the philosophy of Determinism is similarly defective; therefore, that Determinism is Pig-philosophy. It would not be a particularly cogent piece of reasoning, even if the premises were granted, and a trained logician like our critic should be the first to scent out the fallacy of the double negative. But, after studying Mr. Lilly's arguments with considerable attention, I have come to the conclusion that his Free-will is my Determinism. I quite agree that a man's "character is more or less of his own making," and that it "is not something imposed upon him from without, but something shaped by himself from within." True; but what is the self that shapes? Is it a self destitute of "character," or acting irrespectively of character? Then it is un-moral, its decisions are un-moral, and its deeds are un-moral, since they do not proceed from any moral quality in the agent. Is it a self possessed of character, and acting according to its character? Then, according to Mr. Lilly, the agent is not morally responsible; for we learn from him that "If a man's actions are absolutely determined by character and disposition . . . then most assuredly he is not morally responsible for those actions."

I have dwelt so long on Mr. Lilly's phraseology, not because I hold that his main principles are altogether fallacious, but rather because I believe that those principles, freed from mysticism and prejudice, constitute an important aspect of truth. A Utilitarian, in the strict sense of the term, might well regard attacks of this kind with some complacency, foreseeing that even the "general reader," though impressed at first by their vigour, will in his more reflective moments be inclined to suspect a certain weakness underlying all this violence, and may perhaps even turn to Utilitarian literature, in order to "see the folly of it" for himself. First, he may attempt to verify the accusation that "utilitarian, experi-

mental and physical moralists generally" consider an act to be made wrong by being made penal, to be "wrong because it is punished," not "punished because it is wrong." In Mill's Utilitarianism he will find a passage, which at first sight seems to lend some colour to this contention. But he will soon discover that, while the particular form taken by our conception of justice is there regarded as having sprung from the idea of conformity to the laws of the state, justice itself is held to be "a name for certain classes of moral rules, which concern the essentials of human well-being more nearly, and are of more absolute obligation, than any other rules for the guidance of life." Pursuing his studies he will search the writings of eminent living thinkers whom I need neither name nor defend; and, finally, the general reader may find his pious horror of the "*doctrina demoniorum*" sensibly diminished, and may begin to question Mr. Lilly's assumed infallibility. For when a critic cannot read aright what is plainly set before him, how shall we trust his insight in matters of high philosophy?

Yet, when we strip away from Mr. Lilly's ideal its wrappings of dogmatic theology, there remains a kernel of truth which should not be lost through our distaste for the husk. There remains a principle, which is the converse aspect of the principle of utilitarianism. I mean the principle that "*reason and right are synonymous.*"

In what sense are reason and right synonymous? Not surely in the sense which Mr. Lilly seems to imply—that the supreme reason is one with the universal will, and that right is reason, because God has made it so. This would be only a variant of the "*doctrina demoniorum*" of Hobbes, not of John Stuart Mill, that you make an act wrong by making it penal. One sees, on this hypothesis, the function of will, but one does not see so clearly the function of reason. To say that the Deity, being the supreme reason, is the source of such and such laws, and that these laws are rational, because they proceed from the Deity, is to argue in too obvious a circle. We cannot know them to be laws of reason until we are made to see in what respect they are reasonable.

No vague appeal to "that divine reason which is the nature of things" can supply the lack of a definite deduction. Reference to an unexplained supernatural source, and to an "organic instinct of conscience," does not suffice to prove rationality. A further explanation is needed. By what process does reason originate the laws of morality? (For if the process is rational, it should be intelligible). What is their rational ground, and in what way is it connected with human welfare?

I do not profess to be able to answer all or any of these questions in a satisfactory manner. But it is something to point out that they *need* an answer—a need ignored in the easy assertion that instinct is the "voice of God," which "never deceives." Before building on this oracle a fabric of ethical dogma, it would be well to define the precise meaning and limitation of the term "instinct"—that overloaded hackword, which has already borne the burden of so many thankless theories. Such an investigation might be interesting, if conducted on the Socratic method; but this would be a task alien from my present purpose. Instead, I shall try to indicate a partial solution of the problems suggested in the last paragraph.

Be it first said, that the Kantian "Critique of the Practical Reason" fails to convince, because the deductions are too large for the data from which they are drawn. Something like the categorical imperative of duty is indeed presupposed in the facts of individual and social conduct; but the speculative ideas of God, the soul and immortality, at once overweight the deduction. It is the essence of the deductive method that its categories should be implied in the very possibility of experience. The categories of cause and effect, action and reaction, substance and quality, are implied throughout man's intellectual life. Take them away and the cosmos falls into a meaningless heap of crude sensations. But it is not true that the ideas of God, the soul and immortality, are similarly implied in his moral life. Take them away and morality is still intelligible and coherent.

Man is a principle-forming, identity-recognising animal

and reason is the faculty which recognises identities and forms principles. By reason he perceives the universal in the particular, the law in the facts ; reason gives continuity to the world of perception and to practical life, distinguishing the common character which unifies different objects, the common principle running through different actions. Were it removed his whole consciousness would become atomic, a mere primæval fire-mist, without form and void, destitute of intelligence, destitute even of that synthesised sensation which we call perception. Possessing it he is compelled to find some kind of principle embodied in every part of his experience, sometimes a true and sometimes a false principle, but a principle always. His own actions form no exception to this rule ; and they, like the material objects around him, are classed according to their character, thus the isolated actions are viewed as the coherent conduct. But in the practical sphere principle always has its emotional side, and is thus naturally translatable into action. A man's doings are so intimately connected with his inner life, that his thoughts about them are already emotions, already motives. The different character of two courses of conduct cannot be distinguished without some abstract preference being felt for the one course over the other, a preference which will be translated into action if the opportunity is given.

The further question arises—" What in general will be the direction of the preference? What will be the substance of the principles ? Taking into account the nature of the individual, as related to the nature of the race, can we infer the general character of the conceptions which he must form respecting his own life, and the lives of others, and which he must feel it right—that is, rational—to embody in conduct?"

Every man is conscious—dimly perhaps, but still in some way conscious—of his own physical, emotional, and intellectual nature. He has bodily pains and pleasures ; he is susceptible of fear and hope, love and hate, anger and sympathy ; he can think, and communicate his thoughts. This self-consciousness involves a consciousness of others, different from himself and yet generically one with himself. Hunger,

no doubt, is a purely individual sensation; fear, also, may be purely individual; but love, hate, sympathy, anger, can exist only so far as the subject and object of these emotions are believed to be one in nature. It is a fellow-creature that we love, so soon as "love" means anything more than the barest appetite; a fellow-creature with whom we sympathise, towards whom we feel anger, jealousy or gratitude. Thus the emotional nature of man presupposes a more or less vague recognition of Humanity, and, without such a recognition, could not even exist.

Further, his intellectual nature, if developed beyond the merest rudiments, involves the conscious identification of his fellows with himself. The very need of communication arises from and implies this perception. The use of names, as meaning the same thing to different ears, implies that the individual difference is less important than the racial unity; that there is one intellect in all, however great may be its particular diversities. But for this conscious identity, there could have been no language and no thought, beyond the beggarly elements of sensation and memory.

In the most literal sense, the individual man is unthinkable apart from the community, just as the community is unthinkable apart from the individual man. Remove, one by one, the bonds which unite him to his species, and you have stripped away all the qualities of the human Self, leaving a mere eating and drinking brute in the semblance of a man. No doubt, man was originally evolved from an eating and drinking brute; but the precise manner of this development is a hard question for Evolutional Philosophy. But we may fully accept any theory of the Descent of Man without invalidating the fundamental truth that the individual is a social unit, and thus presupposes society, just as truly as society presupposes him as a social unit.

Every man, so far as he is really human, knows that other human beings share his own nature. He knows that their pleasures and pains are like his; for his physical feelings are clearly mirrored in their spontaneous actions, while his higher emotions concern them, and imply their possession of corre-

sponding emotional capabilities. His whole nature requires satisfaction and seeks development, and in complete satisfaction and development finds its welfare; by which I mean, its fullest and most permanent happiness. But he cannot help knowing that other men, of like nature, make a similar demand, and towards their demand he is compelled to assume a definite attitude. He feels, of course, that it does to a certain extent set bounds to this gratification and his own desires; but on the other hand he feels, more or less vaguely, that the fulfilment of these desires can never be completed unless it is shared by others. Reason, the principle-forming faculty, can alone decide upon the attitude which should be assumed; that is, which it would be *rational* to assume. It by no means follows that Reason will prevail; but it, at least, utters its protest.

The rational view, expressed, of course, far more clearly and distinctly than it usually expresses itself in the average conscience, is somewhat as follows:—

The nature of the human beings around me is fundamentally the same as mine. Their needs are the same, their demands are the same. My attitude towards this common nature and towards its welfare, ought in reason to be identical with my attitude towards my own nature and welfare. I ought to feel towards humanity in them as I feel towards humanity in myself; I ought to do to them as I would wish them to do to me. For if my desire of self-fulfilment is according to reason, so also are their desires of self-fulfilment. In those respects in which we are identical, we deserve to be treated identically. I should, as far as possible, treat my neighbour as myself, though I may not be able to love him as myself. My neighbours, of course, must treat me and each other according to the same principle. Failing in this, they have sinned against the law of reason and of our common nature.

This conception appears, under more or less comprehensive forms, in the moral teaching of all ages. What for Moses and Plato took the form of tribal and civil duty, appeared to Christ and to Confucius as duty towards the whole of

humanity. Wherever justice and mercy have been conceived in the heart of man, there the Golden rule "Do unto others as ye would that they should do unto you," has been implicitly or explicitly present as the true meaning and foundation of morality and religion.

This internal necessity is reinforced by the external necessity so clearly set forth in modern evolutional ethics. Without moral principles, society could not cohere; and as the more coherent societies tend to survive those which are less coherent, so the individuals better fitted for social cohesion tend to survive the worse fitted individuals. Upon this phase of the subject I need not dwell, as it has been treated by the hand of a master; nor need I do more than touch upon the emotional side of the rational function, upon which Mr. Leslie Stephen dwells in a fine chapter of the *Science of Ethics.**

It should now be evident that the Intuitional and Utilitarian systems are but two aspects of a single philosophy. The Utilitarian theory regards the content or subject-matter —human welfare—with which reason deals, while the intuitional theory regards, without sufficiently explaining, the dealings of reason. The differentia of the practical application of reason, as distinguished from its speculative application, is that the former directly concerns human welfare, while the latter concerns knowledge in general. From the very beginning to the very end, morality is occupied with human feelings and needs, with human joys and sorrows. Man could not be moral, unless he were a being capable of and desiring happiness. This personal craving for satisfaction lies at the very root of his morality. He understands the wants of others by his own wants, the desires of others by his own desires. His sense of justice springs from the recognition of their needs as not less imperative than his own; and becomes, in its full maturity, the recognition of the right of all men to equal chances of self-development. Human welfare is the beginning and the ending of morality. If the dictates of reason led, on the whole, to misery, then it

* Ch. vi, § 2.

were better, *in* reason, that the human race should be annihilated; so that reason cannot lead to misery without destroying its own right to exist. But to ask what would happen should reason cease to be the chief ground and instrument of human welfare, would be very much like asking what would happen should a straight line cease to be the shortest way from point to point. The true answer is "*Nothing* would happen; because, in that case, reality would cease to be real."

The Utilitarian system, at least in its later developments, prescribes a course of conduct identical with that prescribed by the rational or intuitional system. I do not wish to imply that any utilitarian thinker would agree with the views expressed in the preceding pages. I mean simply that ethical theories which regard happiness, not as an end to be directly pursued, but as an end to be attained by rational conformity to the authoritative laws of justice and benevolence, have precisely the same practical outcome as ethical theories, which regard reason as the faculty which models and rules our well-doing and well-being. Developed utilitarianism in no way countenances the mere chase of pleasure, or even the attempt to increase the happiness of others, without regard to principle. It is as remote as possible from the crude Hedonism of the Cyrenaic school, from the immoral legalism of Hobbes, from the conventionalism of Paley, and even from the fruitful but imperfectly developed ideal of Jeremy Bentham. Yet the view—if view it can be called—which Mr. Lilly attacks, appears to be a compound of all these, with a spice of swinishness peculiar to itself.

I did not set out to criticise the main point of Mr. Lilly's article—the meaning and object of punishment—and I am sorry that I can devote only a few lines to its consideration. But from what I have already said, it should be sufficiently clear that the utilitarian, as well as the intuitionalist, must regard punishment as the vindication of a principle, not merely as an isolated measure of social expediency; and that he may quite as consistently value and foster the spirit of indignation against brutal or treacherous crimes, and of

hatred towards the dark natures that give them birth. To both philosophers the offence is an offence against law, which the one will call the law of reason, and the other the law of happiness. The one may lay greater stress on the principle itself, the other on the consequences of its violation; but to both the context of the principle is the same. Opinions may differ as to the due punishment of the worst class of criminals, such as the wretch whom Mr. Lilly mentions as having barbarously mutilated a child for the sake of its silver ornaments. Personally, I agree that no punishment would be adequate but one involving "sharp and repeated" physical pain. Many would dissent from this view; but no one, whatever his philosophical creed, would wish to be able to look upon the crime except with burning indignation and heartfelt abhorrence.

We can now see where Mr. Lilly's misapprehension really lies. Understanding that the object of Utilitarianism is happiness, he has failed to understand that it is *human* happiness. Why the pig should be taken as the type of felicity, I cannot conjecture, except that it is presumably untroubled by dyspepsia. But, even supposing the pig to be the happiest of animals, it is plain that the human species cannot live down to the swinish ideal. Man must have a happiness of his own, not porcine but human. His social and intellectual faculties, as well as his appetites and passions, crave to be satisfied. There is a pleasure in ministering to the welfare of others, and in doing what we may for the advancement of the Race. There is a joy in the search for truth, and the keenest delight in every glimpse of her countenance:—

> "As when a great thought strikes along the brain,
> And flushes all the cheek."

These are distinctively *human* pleasures, which, though not attainable in their fulness by the average man as at present constituted, are yet necessarily consequent on the full development of distinctively human qualities. The perfection of this development would fulfil the aspirations of

the utilitarian philosopher, as well as of the poet or idealist who feels the truth of Wordsworth's lines :—

"Serene will be our days and bright,
And happy will our nature be,
When love is an unerring light,
And joy its own security.
And they a blissful course may hold
Even now, who, not unwisely bold
Live in the spirit of this creed,
Yet find that other strength, according to their need."

This ideal is certainly unimpeachable on the grounds adduced by Mr. Lilly. It is not one which a pig, however learned, could be brought to appreciate. It is perfectly conformable to Kant's apothegm that "Everything in nature acts according to laws; the distinction of a rational being is the faculty of acting according to the consciousness of laws." If there be, in truth, any pig who is prepared to accept and act upon developed utilitarianism, then let us welcome him at once as a rational being and a brother, deserving immediate relief from the vile Circean spell.

GEOLOGY OF THE BIRMINGHAM DISTRICT.

Panton Prize Essay at Mason College for 1885.

I.

BOTH geographically and geologically, the position of Birmingham is central. It stands nearly in the middle of the Midlands, and close to the line of junction between the highly contorted strata of the west and the more gently inclined strata of the east. On the one hand lie the older rocks, squeezed and bent and wrinkled by unnumbered ages of alternate upheaval and depression; on the other lie newer rocks, which in some cases have been so little disturbed that they retain the horizontal position in which they were originally laid down. Between the Palæozoic and Mesozoic deposits there is a great physical and biological break, and both periods are characteristically represented in the immediate neighbourhood of Birmingham.

These facts are not only interesting to the geologist; they are of the highest practical importance to the manufacturer, the tradesman, and even to the politician. Though the town is of modern growth, the origin of its present prosperity can be traced back to those ancient times, which produced the gigantic tree-ferns and club-mosses and horsetails of the Carboniferous jungles. It is chiefly to the coal and iron of South Staffordshire that the "Midland Metropolis" owes its manufactures, its dense population, and its political importance, though some thanks are also due to the inland lakes of Trias times, where those red sands were deposited which now form the agricultural plains of Warwickshire and Worcestershire.

For present purposes, the "Birmingham district" may be defined as the area included in a circle with the town at its centre, and a radius of about thirty miles. This would comprise nearly the whole of Warwickshire, North Worcestershire, South Staffordshire, a small part of Shropshire, and the western edge of Leicestershire.

The district is, as a rule, flat or gently undulating. A long broken ridge of high ground stretches from the Wrekin, through the Forest of Wyre, southwards to the Malverns. Between this and the South Staffordshire coal-field there is a stretch of rolling ground, which can be well seen from the Clent Hills. From the plain of South Staffordshire itself rise the Lickey Hills, the Clent Hills, the Rowley Hills, the ridge of high ground running from Dudley to Sedgley, the high ground about Barr, and the plateau of Cannock Chase. East of Birmingham stretches the plain of East Warwickshire, broken only by a few unimportant elevations. To the north-east are the hills of Charnwood Forest and Ashby. As the watershed of England runs through Wolverhampton, Dudley, Rowley, and the Clent Hills, there are no navigable rivers in the immediate neighbourhood of Birmingham, and the streams are few and unimportant. The Severn skirts the Forest of Wyre, and waters the Worcestershire plain, and the Tame rises near Bloxwich, and sweeps off northward to join the Trent.

The distinctive scenery of the Midlands will be better understood after a description of the geological formations which determine its contour. It must be remembered that the highest ground in a district is generally formed by the oldest rocks, which have been subjected for the longest time to the action of the forces at work in the earth's crust, and which are not only the most steeply inclined, but also the hardest and densest, and therefore best able to resist denudation by rain and rivers. High ground may also be formed by hard igneous rocks, which have forced their way upward through cracks and faults. Plains are generally mantled by the newer stratified rocks.

TABLE OF GEOLOGICAL FORMATIONS.

NEOZOIC.	ANTHROPOZOIC.	Recent—Peats, Gravels, Alluvium, &c.	
		Prehistoric—Cave remains, Kjökken-möddings, &c., not distinguishable in Birmingham district.	
		Glacial—Till, Boulder Clays, Inland Shell-beds.	
	CAINOZOIC.	Pliocene—Crag, Sub-Apennine Beds	
		Miocene—Bovey Tracey Lignite, Leaf-bed of Mull	Not found in Birmingham district.
		Oligiocene—Headon Beds, &c.	
		Eocene—London Clay, Thanet Sands, &c.	
	MESOZOIC.	Cretaceous—Chalk, Upper Greensand, Gault	Not found in Birmingham district
		Neocomian—Lower Greensand, Wealden	
		Oolitic—Portlandian, Oxfordian, Bathonian	
		Liassic and Rhaetic—not found nearer to Birmingham than Harbury and Rugby, with the exception of an isolated patch at Barston in Warwickshire.	
		Trianic or New Red Sandstone—Bunter, Keuper, &c.	
PALÆOZOIC.	DEUTEROZOIC.	Permian or Dyassic—Magnesian Limestone, Breccias, &c.	
		Carboniferous—Coal Measures, Grit, Mountain Limestone.	
		Devonian or Old Red—not found nearer to Birmingham than Bewdley.	
	PROTEROZOIC.	Silurian—Llandovery, Tarannion, Wenlock, Ludlow.	
		Ordovician—Arenig, Llandeils, Bala or Caradoc—missing in Birmingham district.	
		Cambrian—Paradoxidian, Olenidian.	

ARCHÆAN.

II.—GEOLOGICAL DISCOVERY IN THE MIDLANDS.

Modern Geology is not more than a century old. About 1790, a land-surveyor named William Smith began to make observations upon the red marks of Warwickshire and the oolites of Gloucestershire, and in the following year he found evidences of a "constancy in the order of superpositions" of strata, more extensive and regular than had before been admitted. In 1815 he published a Geological Map of the whole of England and Wales, and a work entitled *Strata Identified by the Superposition of Organic Remains*, which practically settled the controversy between the Neptunists, or followers of Werner, who held that all rocks had originally been precipitated from a universal ocean, and the Plutonists, or followers of Hutton, who recognised igneous agencies as sharing in the formation of the earth-crust. Smith, however, was weak as to the older rocks; and so also were the Geological Society of London, who did much good work in the newer formation. About 1840, Murchison surveyed and examined the older rocks of Shropshire, Herefordshire, and Wales, down to the base of the present Ordovician, while Sedgwick began with the Cambrian, and worked up to the Silurian. The Geological survey of England and Wales was soon after constituted, with Murchison at its head. The South Staffordshire coal-field was very carefully surveyed by Mr. Jukes, whose report, completed in 1859, is of great interest. Dr. Lloyd in 1849, found the cranium of a Labyrintodon in the Permian strata of East Warwickshire; a few years later Mr. Gibbs and the Rev. P. B. Brodie discovered fish remains in the Lower Keuper Sandstone of Bromsgrove and Rowington; and various important palaeontological discoveries were made by Sir P. Egerton and others. In 1869 was published the Survey Report on the Trianic and Permian rocks of the Midlands, by Mr. Hull, who, with Mr. Howell, had been engaged for some years in examining these strata under the direction of Professor Ramsay. The

chief results of this investigation were the separation of the Lower Permian of Warwick from the Trianic, with which it had previously been grouped, and the three-fold sub-division of the Bunter Sandstone, which had been regarded as only a confused mass of sand stones and conglomerates. The sinkings for coal, at Hampstead and Sandwell Park, have shown the true relation of the Permians to the underlying coal measures. Professor Bonney has investigated the origin of the pebbles in the Bunter beds of Staffordshire, Dr. Lapworth, in a paper published in 1882, gives an account of the oldest rocks in the district, which crop out at the Lower Lickey and Nuneaton, and have hitherto been described as Upper Silurian, but which he has identified as Cambrian.

III.—SO-CALLED ARCHÆAN ROCKS.

The rocks usually known as Archaean underlie the fossiliferous formations, and consist of gneisses, schists, marbles, &c. At first sight many of them seem to be regularly stratified, but on more careful observation it will be seen that the lines of lamination do not always lie parallel, as in strata deposited on the ocean floor. The crystalline character of the rocks has also puzzled the geologist. They are all extremely hard, generally steeply inclined, and of enormous thickness, occupying nearly half of the present surface of the globe. A peculiar marking in the "Laurentian" rocks of Canada has been imagined by Prof. Dawson and Dr. Carpenter to be the remains of a gigantic Protozoon, which has been named the "Eozoon Canadeuse;" but this idea is now generally discredited.

The Archaeans are typically developed in Canada, where they are overlain by the Cambrians, the basement-bed of which contains a conglomerate, formed of Archæan fragments. Sir Wm. Logan, who first worked out these rocks, named them *Laurentian*, from the St. Laurence river. They are full of crystallized minerals, as apatite, graphite, tourmaline, iron, serpentine, hornblende, and there are great veins of pegma-

tite, quartz, porphyries, gabbro, dolerite, and basalt. Here and there are enormous masses of limestone, sometimes six thousand feet thick. Other pre-Cambrian systems, as the Huronian, are found in America. This latter, named from Lake Huron, contains copper so abundantly that it is sometimes known as the *cupriferous* formation.

Theories of the origin of the Archæan rocks:—

(1) These formations are supposed by some to be the relics of the first crust of the globe. Originally of igneous character, they have re-crystallised and have been re-arranged by water, which has distributed the quartz, felspar and mica in different layers.

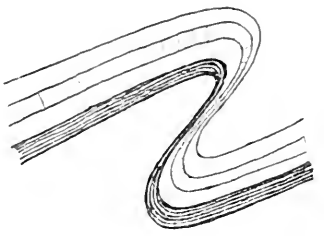
But if this theory be correct, the Archæans ought to show every gradation between the debris of the first cooled crust, and the modern sedimentary mud stones and sand stones. This, however, is not the case, as the oldest and youngest Archæan rocks appear to be of identical structure. The peculiar nature of the lamination is another difficulty.

(2) The Archæans were at first ordinary sedimentary rocks; but they have been depressed to a great depth by the weight of overlying masses, and the central heat has melted them up. In re-crystallisation, the minerals arranged themselves in layers according to their natural relationships.

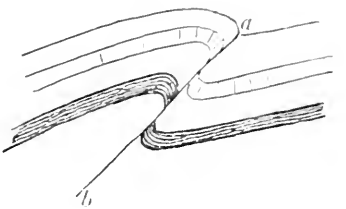
If this be true, every continuous mass of Archæan rock ought to be identical in chemical constitution with some ordinary sedimentary bed, or with several beds. There ought to be representatives of sand-stones, lime-stones, shales, and clays. In a few cases this does happen; but the great majority of the Archæans represent igneous rocks. Gneisses and some schists have the same composition as granite, and green and dark schists correspond to gabbros, green-stones, &c.

(3) In the formation of mountains, the rocks are first bent into the form of a great arch; the pressure being in the earliest stages only sufficient to crush the clays and shales into slates. As the lateral pressure increases in intensity, the arch rises, and finally gives

way at some point, one part riding forwards and upwards over the other.



1



2

Thus an *over-fault* (2) is the final stage of an *over-fold* (1). In the shearing plane (*a b*) the beds are rolled out, intermixed, and twisted, as though in a mill. Foliation is thus produced, and the more fluid constituents of the rock are in some cases squeezed out, and crystallize between the lamina of more solid materials. Thus a set of rocks of very varied composition may be transformed into an apparently homogeneous sheet of enormous thickness. This seems the most probable mode of origin of "Archæan" rocks. Some are doubtless pre-Cambrian, while others are certainly newer; but petrologically, the two classes are indistinguishable.

TYPICAL DEVELOPMENT OF ARCHAEANS IN BRITAIN.

The whole of Scotland, north of a line drawn from Glasgow to Stonehaven, is paved with gneisses and schists, and slates here and there. They contain vast dykes of pegmatite and gabbro, and veins of marble. In Caniop and Assynt the gneisses are covered by the Torridon sandstone, which underlies a system of quartzites and limestones with Ordovician fossils, and is therefore in the place of the Cambrian. In other parts, however, the metamorphic rocks are evidently of later date. Ten years ago, Dr. Hicks discovered at St. David's, in South Wales, a dome of rocks rising from beneath the Cambrian. The east side is formed of granitic rock with decomposed mica, the west side of bedded traps and ashes. These beds have nearly the same dip as the Cambrian, but the base of the latter is formed of their fragments. Dr. Hicks

at once instituted two new systems, calling the granitic rock Dimetian, and the ashy strata Pebidian. It is, however, probable that the "Pebidian" is merely a series of volcanic rocks in the lower part of the Cambrian, and that the "Dimetian" is common granite, which has forced its way through the Cambrian. Anglesea also is largely composed of gneisses and schists.

Examples in Birmingham district :—

(1) The Malverns. The core of the Malvern range, with all its highest points, is composed of a crystalline rock formed of quartz, felspar and mica (*see Section c*). As a general rule these minerals are arranged somewhat heterogeneously, so that the rock may be classed as confusedly crystalline (igneous) ; but in some cases they have a foliated arrangement, many of the bands having the character of true gneiss. Whether this rock be classed as igneous or metamorphic, it is certainly of very great antiquity, since Cambrian beds rest upon it unconformably, and are in part composed of its debris. Dr. Holl, Dr. Callaway and others claim it as Laurentian, while by others it is termed a syenite. It is cut through by innumerable igneous dykes ; some of which are of a highly acid, others of a highly basic type. The acid type is pink in colour, and is composed wholly of quartz and felspar (aplite) ; the basic type is of a blackish green, with more or less altered augite. This latter may be classed as dolerite or diabase. Along the west flank of the core, the central mass takes on a schistose character, and the crystals partly vanish. To the South, round Herefordshire Beacon, the quartz felspar rocks greatly preponderate, and form such a large proportion of the mass that they are claimed by Dr. Callaway and others as part of the "Pebidian system." Such indications of foliation as occur are transverse to the strike of the ridge. The origin, character, and age of the central core must be left for future discovery.

(2) The Wrekin. (*See Section c*). The rhyolitic lavas

and ashes, which underlie the Cambrian Quartzite of the Wrekin, are considered by Dr. Callaway to be Pre-Cambrian or Pebidian. Rounded fragments of these rocks are contained in the Quartzite, which is in its turn overlain by the Hollybush Sandstone.

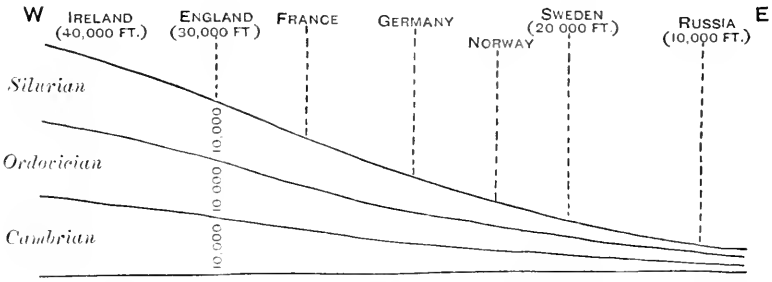
IV.

All fossiliferous strata older than the New Red Sandstone are termed PALEOZOIC. Those which underlie the Old Red are known as PROTEROZOIC, and the succeeding systems up to the New Red as DEUTEROZOIC.

PALÆOZOIC (period of *ancient* life).
- DEUTEROZOIC (period of *second* life).
  - Permian
  - Carboniferous
  - Devonian or Old Red
- PROTEROZOIC (period of *earliest* life).
  - Silurian
  - Ordovician
  - Cambrian

PROTEROZOIC ROCKS.—These are generally of a dingy grey or greenish colour, and consist of sheets of gritstones, flagstones, limestones, and shales. In the British isles the gritstones (greywackes) and shales predominate, and there are not more than half-a-dozen small limestones; but, as we pass eastwards, the limestones become more important, and the greywackes thin out. In Scandinavia and Bohemia three-quarters of the thickness consists of limestones, and there are no greywackes; while in Russia there is nothing but limestones and blue and red muds. But the three systems themselves thin out to the east, so that a thousand feet in Wales is represented by an inch in Scandinavia. From these facts we conclude that the shore of the Proterozoic ocean lay towards the West, where we find coarse and thick deposits; and that the waters gradually deepened in an easterly direction, becoming clear enough to permit the luxuriant growth of corals. The materials carried out come from a continent stretching down the middle of the present Atlantic. The whole of Europe was submerged, the deepest parts corre-

sponding to those which are now the most elevated. The rocks of all three systems were laid down under conditions such as now prevail on the flanks of continents and in deep seas.



SKETCH SHOWING GRADUAL EASTWARDLY THINNING OF PROTEROZOIC SYSTEMS.

Classification :—

The whole of the Proterozoic rocks were formerly named *Greywacke*, from their prevailing petrological character, or *Transition*, a term applied by Werner to indicate that they were physically and biologically intermediate between his so-called Primary and Secondary systems. Murchison gave the name *Silurian* to the two upper divisions of the Greywacke, and Sedgwick appropriated *Cambrian* to the two lower divisions. When, however, the fossils were examined, it was found that the upper member of the Cambrian was identical with the lower member of the Silurian. The term Cambrian was next restricted to the lowest strata, in which no fossils had been discovered, and when nearly all of these, a few years later, were found to be crowded with fossils, they were added to the Silurian. The Murchisonian party still claim all the rocks below the Old Red, excepting a few unfossiliferous patches, as Silurian ; while the Sedgwick party still adhere to his original Cambrian. A third party have adopted the following classification :—

Silurian = Murchison's Upper Silurian.

Ordovician = so-called Lower Silurian or Upper Cambrian.

Cambrian = Sedgwick's Lower Cambrian.

These three systems are separated by great unconformities ; each has its own distinct flora and fauna, and each is as thick

as any other geological system. The new nomenclature seems, therefore, to be the best yet introduced.

(I) CAMBRIAN AND ORDOVICIAN ROCKS.

(*a*) The CAMBRIANS are the oldest fossil-bearing rocks in Geology. Their characteristic genera are :—

Mollusca.—Lingula and Orttiis (Brachiopoda).

Crustacea.—Hymenocaris (Phyllopod), Paradoxides and Olenus and Agnostus (Trilobites).

DIVISIONS OF CAMBRIANS :

(1) Lower Cambrians, sometimes called Paradoxidians.

(2) Upper „ „ „ Olenidian.

(Olenus being absent from the Lower, and Paradoxides from the Upper Cambrians).

(*b*) The characteristic ORDOVICIAN genera are :—

Cœlenterata—the Dichograptidae and Dicranograptidae (Graptolites).

Mollusca—Orttus and Strephomena (Brachiopods).

Crustacea—Asaphus and Ogygia (Trilobites).

DIVISIONS OF ORDOVICIANS :

(1) Lower Ordovician. (*a*) Arenig. (*b*) Llanvern.

(2) Upper „ (*c*) Llandeilo. (*d*) Caradoc.

(Named from places where they are most characteristically shown. A better division may perhaps be founded on the Graptolites, Phyllograpsus being found in the lowest beds, Dicranograpsus in the middle beds, and Leptograpsus in the highest).

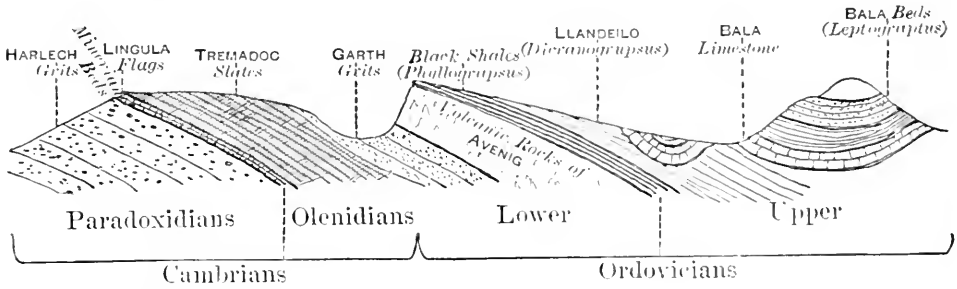
PHYLLOGRAPSUS.

DICRANOGRAPSUS.

Typical development of Cambrian and Ordovician rocks in Britain :—

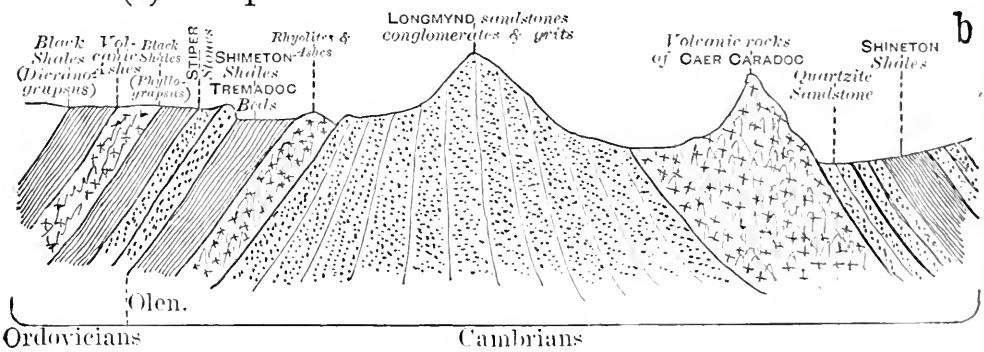
(1) Merionethshire.

a



(2) Shropshire.

b

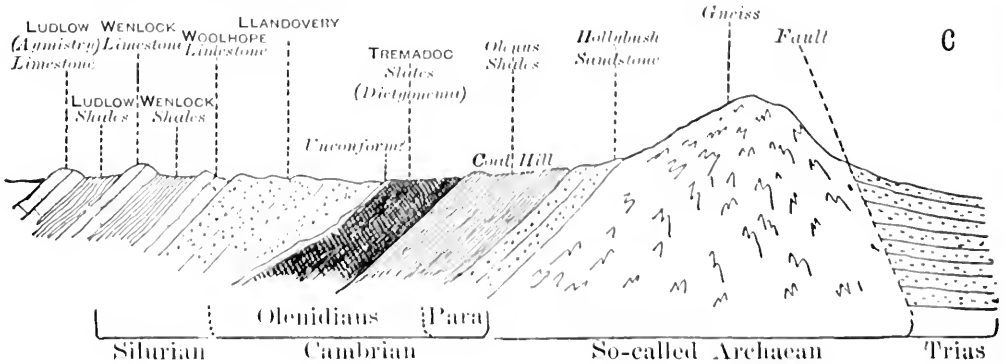


Examples in Birmingham district :—

No Ordovician rocks have been found in the Birmingham district, although the pebble beds of the Bunter contain fragments with fossils of the Armorican Sandstone (Stiper Stones of France), and of the May (Bala) Sandstone. The Cambrian, however, occurs in the Malverns, the Lickey Hills, Nuneaton, the Wrekin, while all Charnwood Forest is either Cambrian or pre-Cambrian.

(1) The Malverns.

c



The long narrow ridge of the Malvern Hills is formed of an upturned sheet of Palaeozoic rocks, crushed against a long straight fault which forms the east side of the Midland Trias. The contrast between the two sides of the ridge gives a good example of the manner in which the scenery of a district is determined by its geology. To the west lie the more ancient rocks, all more or less convoluted and contorted; to the east the newer rocks form a flat fertile plain. Northward the great axial fault of the Malverns is prolonged through the Abberley Hills, and finally vanishes in many fan-like cracks under the Trias of North Staffordshire. To the south it passes May Hill, crosses the Severn at Pyrton Passage, forms the anticline of Tortworth, and brings the Bristol coalfield to the surface.

The Palaeozoic rocks are Cambrian, Silurian and Old Red Sandstone; the Neozoic rocks are Trias, and more distant Juranic. As we have seen, the core of the range is formed of so-called Archæan rock. The sedimentary rocks which overlie it show their deepest strata at the south-east extremity. The Cambrians are as follows:—

(*a*) Holly-bush Sandstone contains in its lower beds large fragments of the gneissose rocks on which it rests. It is of a greenish-grey or brown colour, and contains few fossils. Its age is uncertain, though from the presence of the Brachiopod Obolella Sagittalis, it has been supposed to be of the same age as the Menevian Beds of Wales (see section *a*). Kutorgina cingulata, a horny Brachiopod, is also found.

(*b*) Olenus Shales are black or dark coloured, and are equivalent to the Dolgelly or Upper Lingula Flag series. They are pierced by numerous dykes of igneous rock, generally Diorite. Their fossils are Parabolina spinulosa, and in the upper parts Pettura scarabeoides. They have also yielded the Trilobites Agnostus, Conocoryphe, Olenus, Sphaerophthalmus, and the Brachiopods Lingula and Obolello.

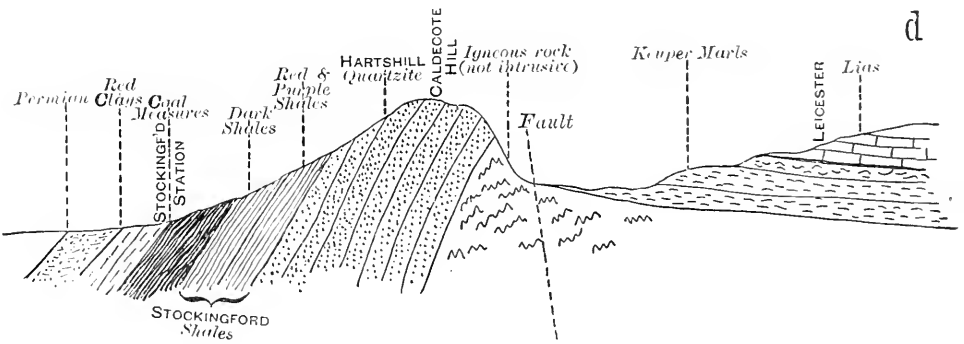
(*c*) Dictyonema Slates. The net-like Polyzoon, Dictyonema Sociale, shows that these greyish beds belong

to the upper division of the Tremadoc or Slimeton group.

(2) The Lickeys.

From Barnt Green Station to Rubery the Lickeys are composed of a dome of Cambrian quartzite, underlaid by ashy and trappy beds. It is unfossiliferous, and probably the same rock as the Hartshill quartzite of Nuneaton.

(3) Nuneaton.



(*a*) The Hartshill Quartzite are thick and flaggy and excessively hard, and are quarried for road making. In the quartzite are several thin bands of shale, and occasional intrusive dykes of diorite. At the base is a breccia made of fragments of the Caldicote ashes and quartz felsites. Owing to the intense alteration which the quartzite has undergone, no fossils are found in it.

(*b*) Above the quartzite come the Stockingford Shales. These are pierced by four principal dykes of diorite, but are not greatly altered. Their chief fossils are—Agnostus pisiformis, A. req. Lingulella ferrugina, Obolella (Sp.), Discina Caerfarensis, Beyrickia angelina, sponge spicules, Dictyonema and worm burrows. From these fossils the shales seem to be in the lower division of Upper Cambrian.

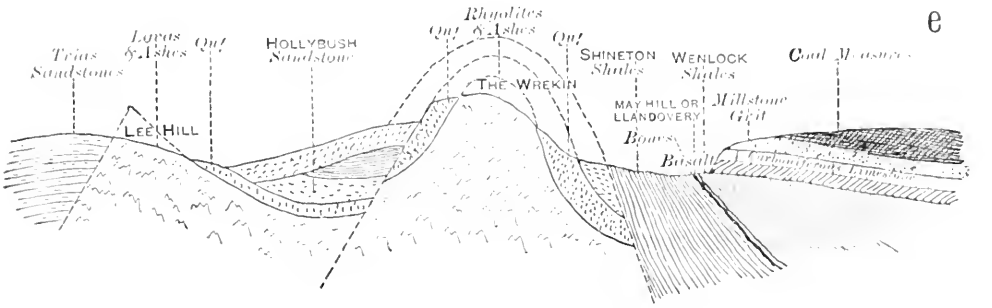
(4) The Wrekin.

(*a*) Cambrian quartzite here lies upon the rhyolites, large fragments of which are contained in its lowest beds. It is not fossiliferous.

(*b*) Next comes a bed equivalent to the Hollybush

Sandstone of the Malverns (identified from its fossils by Dr. Callaway).

(*c*) Upon these sandstones, but separated from them by a fault, lie beds supposed to be equivalent to the Slimeton (Tremadoc) Shales. Their fossils are Asaphillus Homfrayi, Lingullella, &c.



SECTION OF THE WREKIN DISTRICT.

It may be observed that the English Cambrians crop out along the axes of buried mountain ranges—*i.e.*, ranges worn down by the action of rain and rivers, and partially obliterated by the disposition of newer formations upon their flanks.

(II) SILURIAN ROCKS.

CHARACTERISTIC FOSSIL GENERA:—

Hydrozoa. — Monograpous, Cyrtograpous, Rastrites. (These Graptolites are all single, proceeding from the root in one direction only.)

Actinozoa.—Halysites, Favosites, Cyathophyllum, Heliolites.

Mollusca.—Pentamerus (P. leus, P. Oblongus, P. Knightii) Atrypa (Brachiopods), Orthoceras (Cephalopod).

Crustacea.—Phacops, Homalonotus, Illaenus (Trilobites), Eurypterus and Pterygotus (Phyllopods).

DIVISIONS OF SILURIAN:

(*a*) Llandovery Rocks (Sandstones):

Lower
Middle } containing Pentamerus leus and oblongus.
Upper

(*b*) Limestone and Shales:

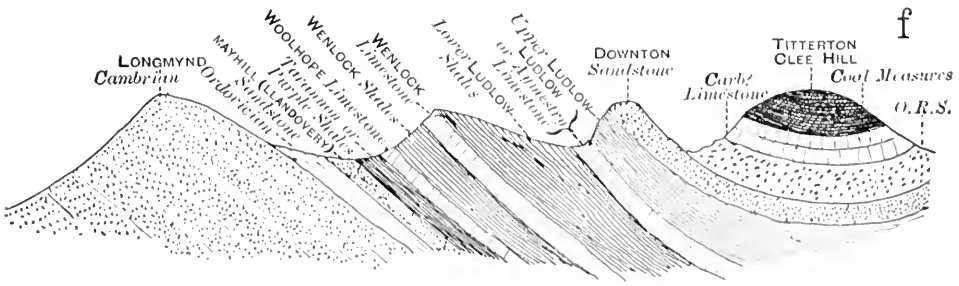
Taram Shales.
Woolhope Limestone.
Wenlock Shales.
Wenlock Limestone.
Ludlow Shales } Pentamerous Knightii.
Ludlow Limestone }

(*c*) Sandstones (Downton) like Llandovery, passing into Old Red.

Between Ordovician and Silurian times, intervened a period of oscillation; in some places the Ordovician appeared at the surface and was denuded, and the Silurian rocks, in different localities, rest upon all the underlying systems. The fossils in the last Ordovician beds, and the first Silurian Limestone are wholly distinct; but the intermediate or Llandovery beds show a gradual transition. In the top and bottom beds of the Silurian shallow water forms predominate; reef-inhabiting forms in the middle beds. The Eurypteridae are found in the highest beds, which also contain fishes' teeth and skin.

Typical development of Silurian rocks in Britain:—

The typical district, or the region where these rocks were first worked out and are best shown, is Central Shropshire. There both the limestones and the shales are perfectly developed. As we pass North-west or South-east, the rocks change their character. To the North-west they thicken rapidly, and are all flagstones and greywackes. The Llandoverys are all present. To the East—Bristol, Malverns, Dudley, the sandstones are gone, and there are only shales and limestones.



SECTION FROM LONGMYND TO TITTERTON CLEE.

Examples in the Birmingham District:—

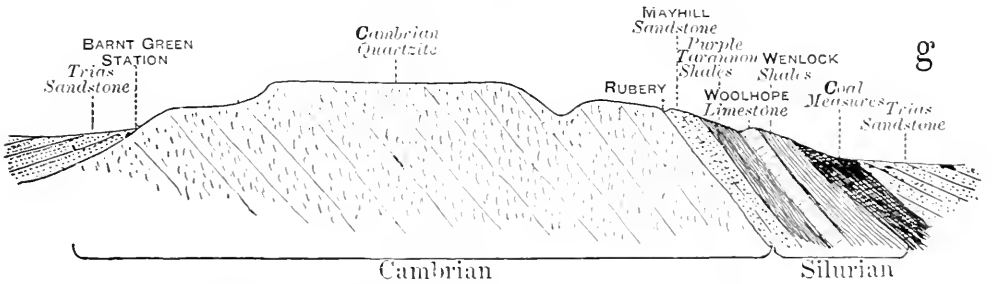
The Silurians occur in the Malverns and in the South Staffordshire district, in the Lickey Hills, the Dudley and Sedgley district, and near Walsall.

(1) The Malverns (see section *c*).

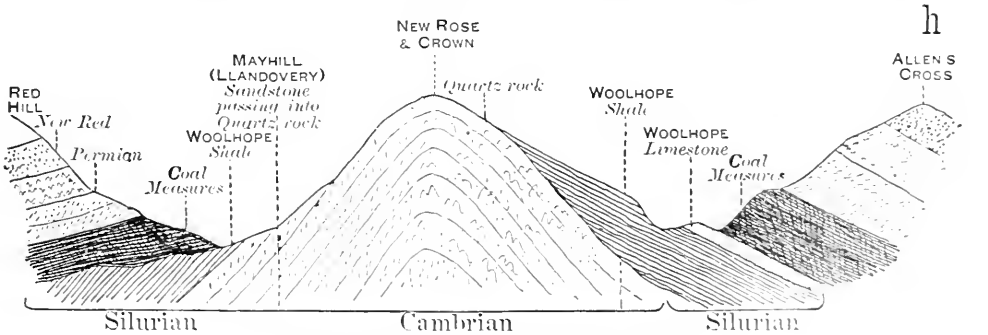
(*a*) The Dolgelly beds are covered unconformably by the May Hill or Llandovery, with P. leus and oblongus. This rests on the Cambrian to the South, and on old metamorphic rocks to the North of the district. It is about 500 feet thick.

(*b*) The Woolhope, Wenlock, and Aymestry Limestones and Shales follow in natural sequence, but frequently inverted in position. The place of every limestone band is represented by a conspicuous ridge, the place of every shale by a valley. The Silurian beds have been much excavated—they are crowded with fossils. The country they originate is hilly and very picturesque, but not well suited to agriculture; thus contrasting with the overlying Old Red Sandstone, which forms a broad basin covered with orchards, and continuous with the great plain of Central Herefordshire.

(2) The Lickeys show the base of the Silurians.



SECTION THROUGH BARNT GREEN AND RUBERY.



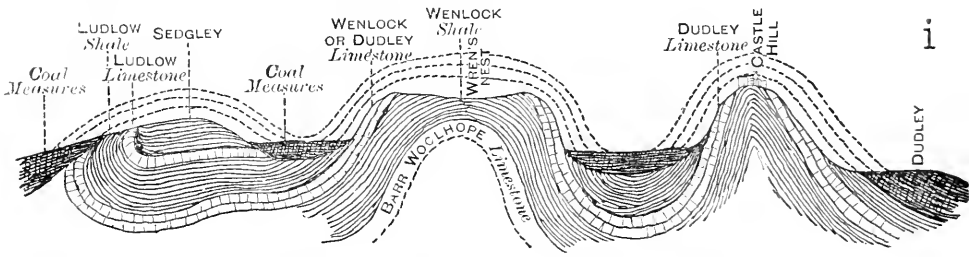
SECTION THROUGH LOWER LICKEY.

As in all South Staffordshire examples, there is here a strategraphical break both above and below, so that the system is perfectly isolated; the beds resting unconformably on pre-Silurian sediments, and covered unconformably by post-Devonian.

(*a*) May-hill Sandstone, 200 feet thick, containing casts of P. oblongus, P. leus, Strephomena, Orthocerus, &c.

(*b*) Woolhope shales and limestone. This limestone is grey and somewhat crystalline, and its fossils are very abundant. Among them are Atrypa hemispherica, A. reticularis, Ortlin, Illaenus, Encrinurus, &c.

(3) Dudley and Sedgley district.



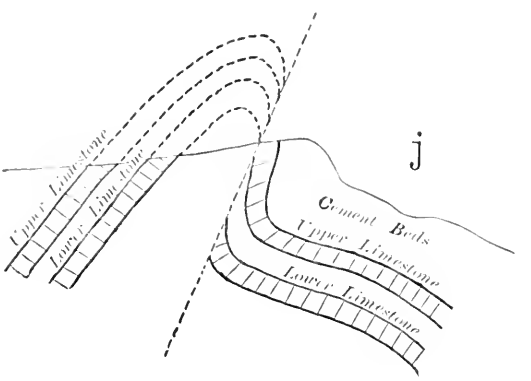
SECTION FROM SEDGLEY TO DUDLEY.

The Wenlock Limestone and Shale form two domes, one at the Castle Hill, the other at the Wren's Nest. The Wenlocks and also the Ludlows crop out at Sedgley. The coal beds must originally have formed a complete mantle over the older formations; but they have been worn away by denudation, so that the harder limestones and shales protrude from beneath them.

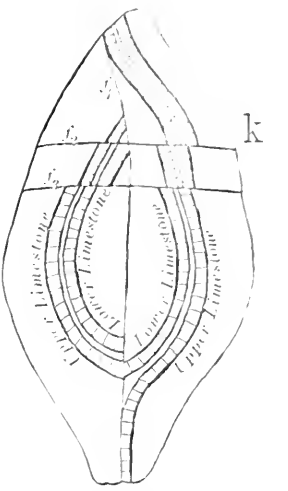
Dipping outwards on each side of the Castle Hill, at an angle of 30°—40°, are two bands of limestone, which have been so largely excavated, that their places are marked by trenches encircling the hill. Only a few pillars of limestone remain standing, and the intermediate shales form enormous embankments. The hill is perfectly honey-combed with galleries and caverns.

In the Wren's Nest the same two bands crop out, but they are much distorted by faults, the most important of which runs along the axis, and is crossed at right angles by two subordinate ones. At the South-east end of the dome, the

lower band of limestone is apparently continuous with the upper. In addition to many caverns, partly open to the day, the Wren's Nest is pierced by tunnels and a canal.



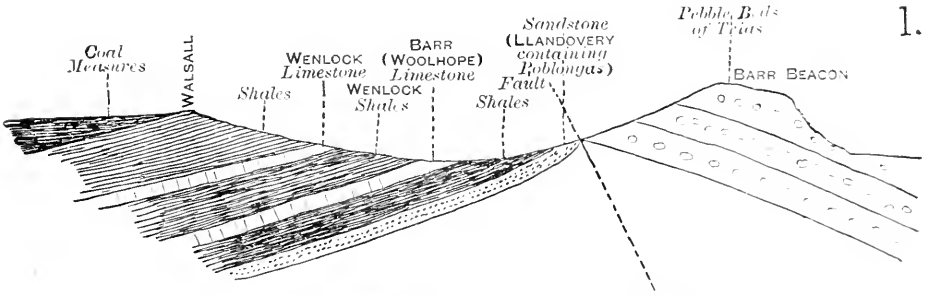
SECTION OF AXIAL FAULT OF WREN'S NEST, SHOWING CONTORTION OF LIMESTONE BANDS.



GROUND PLAN OF WREN'S NEST.

The Dudley rocks are richly fossiliferous, Atrypa, Orthis, and Lingula being very common. The characteristic Wenlock Corals and Trilobites are also abundant. In the Sedgley Limestone, Pentamerus Knightii is found.

(4) Walsall.



SECTION FROM WALSALL TO BARR BEACON.

The Walsall rocks are very prolific in fossils, especially the Barr Limestone and the Wenlock Shale.

It will be noticed that, except where the contour has been greatly changed by faults, the Proterozoic rocks of South Staffordshire rise like islands from a sea of newer formations,

and that the three principal ridges or chains of islands all lie North-west and South-east. With the Archæous and the igneous rocks, these strata constitute all the bolder features of our scenery.

V.—DEUTEROZOIC ROCKS.

These consist of red and grey sandstones, limestones, and shales, at the base of the system; limestones, grits, and coals in the middle; and red sandstones again at the top. At the close of the Silurian period, there seems to have been a general upheaval to the West. Mountain ranges which hitherto had lain far to the West, towards the centre of the Atlantic, now travelled eastward, and took up their position along a line from the North Cape through Scandinavia, the Scottish Highlands, and Western Ireland. In front of this great range lay several parallel ranges, only a few of which were of great height. One of these stretched through the Cheviots, the Malverns, and the Bristol Channel, cutting off a vast inland lake. A second one formed a branch of this, passing through the Midland districts. Within these ranges, which decreased in height eastwards, lay great inland lakes, in which coarse red sands were laid down. These deposits are known as the *Old Red Sandstone*. To the East and South, outside these ranges of hills, lay the open sea, in which grey sands and muds, now called *Devonian*, were deposited. At the end of the O.R. Sandstone period a great wave of depression set in, and Western Europe again descended below the ocean level, leaving only a few islands above the surface, which were covered with vast coral reefs, forming the present Carboniferous limestone. This period of depression was followed by a great wave of elevation. The Ocean floor rose, and coarse sands were laid down, now termed the Millstone Grit. Following this was an estuarine period, in which elevation and depression alternated. Great jungles and forests flourished, and the lower Coal measures were formed, some from buried forests, some from drifted wood. At the latter

part of the period the land again began to rise, and inland seas were formed, in which the last coals were laid down. The rocks gradually grew redder (from precipitation of oxide of iron), the lakes salter, and the Carboniferous vegetation disappeared.

Finally came the Continental desert time known as the Permian epoch. Britain and Western Europe were carried up far above the sea level ; few waters remained except those of inland lakes between mountain ridges. The sea margin lay East, and finally travelled so far in that direction that we lose it for a time.

(1) Old Red Sandstone.

In the Birmingham district there is a great break between the Carboniferous and the underlying rocks ; the O.R. Sandstone being absent. As the Birmingham region lies along the line separating the O.R.S. from the Devonian, it is probable that land existed here when these strata were deposited. It is, however, possible that the O.R.S. may have been laid down, and been worn away in Carboniferous times. The New Red Sandstone beds are filled with quartzite pebbles, identical with those which make up the mass of the O.R.S. conglomerates ; but intermixed with these are other quartzite pebbles filled with Devonian forms. If either O.R.S. or Devonian was present, the strata were probably excessively thin, and easily denuded. The nearest point at which the O.R.S. is found is Bewdley, where it rises conformably from under the coal. Near Warr's Hill, twenty miles to the West, it is quarried for building stone. The Devonian lies to the East under London and elsewhere, and to the South in Devonshire.

(2) Carboniferous Rocks.

The Carboniferous formation includes three principal members :—

(1) Lower Carboniferous :

(*a*) Limestone Shale (in W. England only).

(*b*) Carboniferous Limestone (best seen in Central England and Ireland).

(2) Middle Carboniferous:

(*a*) Yoredale Rocks (grits with limestone bands, only in N.W. England).

(*b*) Millstone grit (coarse sandstone, especially in Yorkshire, and grits in N.W. England).

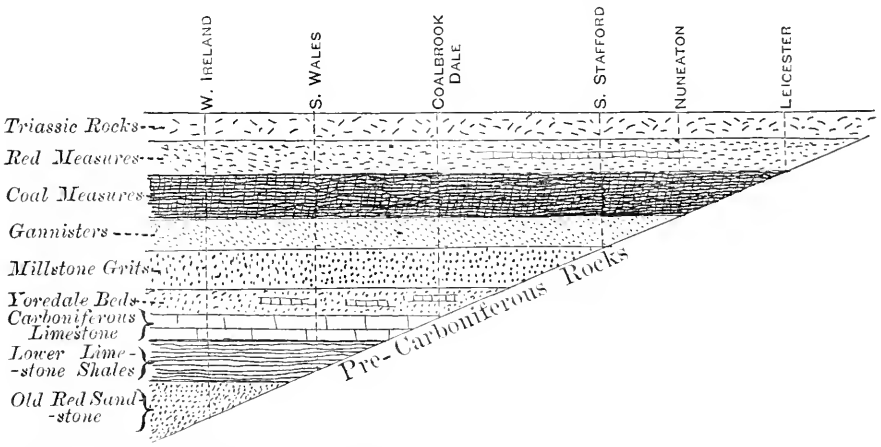
(*c*) Gannister Rocks (flags and grits with occasional coals found in central England only.)

(3) Upper Carboniferous:

(*a*) Lower or Grey Coal Measures.

(*b*) Upper or Red Measures (frequently mapped as Permian.)

The following section shows the manner in which the lower members thin out, from the West of Ireland to Leicester:—



Life of Carboniferous times:—

Caboniferous fossils are of two types, marine and freshwater; the former being found in the lower, and the latter in the upper strata; while both are obtained from the intermediate beds.

(I.) Lower Carboniferous fossils:

Corals.—Lithostrotion, Cyathophyllum, and many others. (It should be noticed that the corals of formation older than the Permian all show a quadripartite arrangement of the stony lamellae, while in newer forms the arrangement is nearly always sixfold.)

Mollusca.—Productus giganteus, &c., several Spirefers, Terebratuluhastala (Brachiopoda), Euomphalus (Gasteropod), Orthoceratiles and Goniotiles (Cephalopoda).

Fishes.—Sharks and mail-clad fish, some having teeth sharp and pointed, as in ordinary sharks, but the majority, as Psammodus and Cochliodus, having massive palatal teeth fitted for grinding.

Foraminifera are also abundant.

(II.) Upper Carboniferous fossils:—

(1) Fauna:

Mollusca.—Marine and fresh-water, several species of the latter belonging to the genus *Unio* (Anthracosia.)

Crustacea.—Limulus, resembling the modern king-crab, and a long-tailed crustacean referred to the genus Glyphaca.

Fishes.—Megalichthys, Holoptychius, &c.

Several species of *scorpions*, of *beetles*, and of *neuropterous insects* have been found.

In 1844 the footprints of a large animal were discovered in the coal strata of Greensburg, Pennsylvania. It was supposed to have been an air-breathing reptile, and was provisionally named Cheirotherium.* From the structure of some bones discovered later, it is now referred to the Labyrinthodont family of sauroid batrachians. The skeletons of three other reptiles have been described under the generic name of Archegosaurus.

(2) Flora:

Cryptogams. These largely predominate. The commonest coal-measure plant is the Lepidodendron, allied to the modern club-moss. Specimens are found 100 feet high, and 15 feet in circumference, branched, with cones at the ends of the branches, leaves long and thin, leaf-scars arranged in spirals. The Segillaria is as tall as the Lepidodendron, but is unbranched, its fruit is unknown, and its leaf-scars are arranged vertically. Its root is the so-called Stigmaren, found in the clay under the coal. *Calamites* (corresponding to our horse-tails or Equisetum, but generally of gigantic size), are very abundant, and vary much in length and mode of branching. The branching forms have names determined

* Of a different genus from the European Cheirotherium, whose footprints were discovered in the trias.

by the form and arrangement of the leaves, as Asterophyllites, Annularia, &c. The *Ferns* are of the same type as modern ferns, with similar spores arranged in a similar manner. Both tree-ferns and ordinary ferns of undergrowth are found. The commonest are Neuropteris, Pecopteris, and Sphenopteris.

Gymnosperms. These are much rarer than the Cryptogams. They consist of conifers, allied to the yew. One, bearing a triangular seat, has been named Trigonocarpum.

Examples in the Birmingham district :—

Carboniferous rocks are found in three distinct areas, viz. :

(1) South Staffordshire.
(2) East Warwickshire.
(3) Forest of Wyre.

In all three the lower and middle members of the formation are missing, and the upper or coal-bearing division alone occurs, even this being of less thickness than in other coal-fields. In E. Warwickshire the thickness is greatest, not only of the interposed "partings" of shale and sandstone, but of the coal itself.

(1) South Staffordshire Coal-field :—

Three divisions occurring in regular sequence have been clearly made out :

(*a*) The true Dudley coal-measures, consisting of coal-seams separated by "partings" of brownish-grey fire-clays, grey and yellow sandstones, and grey or black shales. Ironstones occur either in thin regular seams or in layers of nodules, balls, or concretions. The thickness of this division varies much from north to south : in the northern parts being thousands of feet, and in the extreme south, near the Leckey, diminishing to a few hundreds.

(*b*) Above the coal-measures lie the brickclays. These are purple, white, red, green, and blue, and occasionally contain small coals and fireclays. At Essington,

Walsall, and Rowley they are worked for brickmaking. Their thickness is about 200-400 feet. In the East Warwickshire coal-field they are also found and worked, but they are much thinner.

(*c*) Hales Owen Sandstones. Upon the fire-clays, in the southern portion of the coal-field, lie a series of coarse sandstones, olive-green, brownish, yellow, or inclining to red, and containing bands of gravel, calcareous seams, and a few thin patches of impure coal. At the summit is a calcareous bed, known as the Spirorbis limestone, from its characteristic fossil, a small annelid. The bed is of freshwater formation. It is of great value as a geological horizon, its equivalent being found, not only at Coalbrook Dale, Shrewsbury, but also in Lancashire, Cumberland and South Scotland. The Hales Owen Sandstones are about 800 feet thick.

Sequence of South Staffordshire coal-measures proper. It will be seen later, that the grouping of the coals and ironstones changes so greatly from the northern to the southern extremities of the coal-field, that it is not possible to give a general section which will be true throughout. The following section is of the Central and Southern parts:—

	BEDS.	THICKNESS.
Beds above Brooch.	Upper Sulphur Coal	1 ft.
	Sulphur Measures (Sandstones)	140 ft.
	Little Coal (Two-foot)	2 ft.
	Two-foot Measures	50 ft.
	Brooch Coal	4 ft.
Thick Coal Division.	Ironstone Measures	7— 20 ft.
	Herring Coal	2— 4 ft.
	Penny-earth Ironstone Measures	7— 30 ft.
	Intermediate Measures	38— 157 ft.
	Thick Coal with Blackery and Whitery Ironstone	30 ft.
Heathen Division.	Gubbin Ironstone Measures, Table Balt, &c.	30 ft.
	Heathen Coal	3 ft.
	Heathen Measures	0— 43 ft.
	Lower Heathen Coal	2— 4 ft.
	Intermediate Measures	10— 30 ft.
	Measures with Pennystone Ironstone	10— 25 ft.
	Lower Sulphur Coal	2— 9 ft.

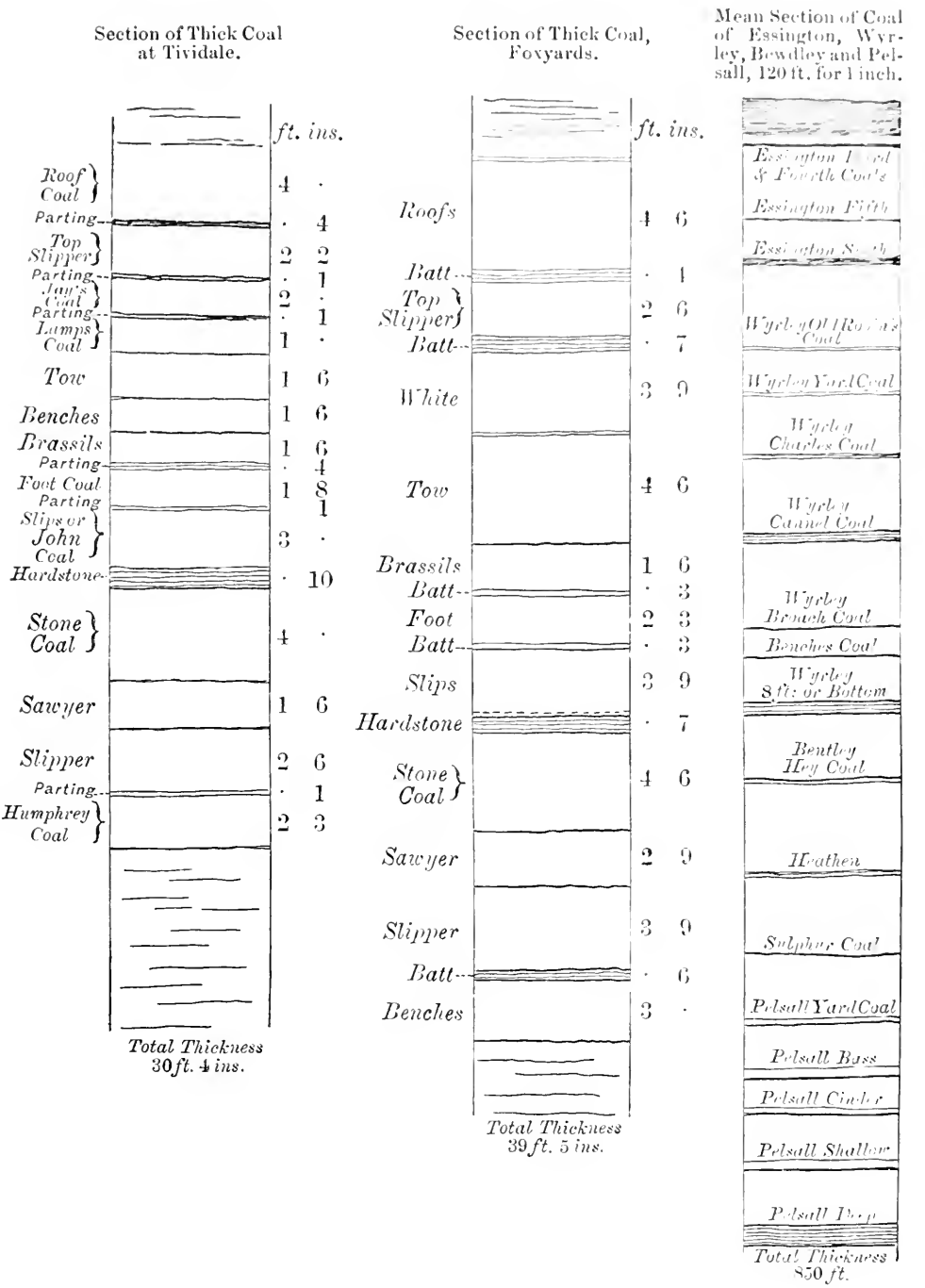
	BEDS.	THICKNESS.
New Mine and bottom Coal Division.	Intermediate Measures	100 ft.
	New Mine Coal*	2— 11 ft.
	Measures with Fireclay Ironstone	2— 40 ft.
	Fireclay Coal	1— 14 ft.
	Measures with poor Robin Ironstone, &c.	11— 48 ft.
	Bottom Coal	3— 12 ft.
	Intermediate Measures	5— 30 ft.
	Gubbin Ironstone	3— 10 ft.
Lowest Division.	Intermediate Measures	18— 50 ft.
	Singing or Mealy Grey Coal (occasional)	2— 4 ft.
	Intermediate Measures	16— 50 ft.
	Blue Flats Ironstone	2— 9 ft.
	Intermediate Measures	10— 14 ft.
	Silver threads Ironstone.	4— 7 ft.
	Intermediate Measures	6— 15 ft.
	Diamond Ironstone	2— 3 ft.
	Lowest Measures	50 ft.

* Below the New Mine the beds contain marine fossils; above, fresh-water fossils. The beds below are sometimes referred to the Gannisters.

Arrangement of strata :—

No constant order is observable, except that the coals are generally in contact with clays, and rarely with sandstones. The beds of coal are very constant in thickness, a bed of one or two feet sometimes being traceable over the whole coal-field. The ironstone beds come next in regularity, and, lastly, come the sandstones which often vary suddenly in thickness and character.

The thick or 10-yard coal, which characterises the South Staffordshire field, is formed of a number of coal seams, with but little shale between. Fourteen are recognizable. In some places the aggregate thickness of the coals is 20 feet, with 10 feet of partings; while in others, the coals attain a thickness of 36 feet, and the partings are only 3 feet.



The structure of the Thick Coal at Foxyards and Tividale is retained over the area including Dudley, Bilston, Wednesbury, and Oldbury, and everywhere along its outcrop from West Bromwich to Dudley Castle. Westwards, however, towards Kingswinford, and northwards, towards Bilston, the

partings of shale and sandstone, which separate the two upper beds of the Thick Coal from the rest, thicken rapidly, till in the space of about a mile the two beds form a distinct seam, called the "Flying Reed," 100 feet above the thick coal in a westerly direction, and more than 200 feet in a northerly. Towards the North, between Bilston and Wolverhampton, a similar separation occurs in the middle of the Thick Coal, between the "Foot" and the "Slips." These partings thicken and multiply as we pass northwards, till the Thick Coal of the south is represented in the Pelsall and Essington district by fourteen distinct seams, separated by great thicknesses of shale and sandstone. In the diagram on p. 41, the coals from the Essington Fifth down to the Bentley Hey, may probably all be regarded as continuous with the Thick Coal. The total quantity of coal remains nearly the same throughout, although the aggregate thickness of the beds varies from 30 to 300 feet. There is a similar change in the ironstone, some of those which are rich and important, between Wolverhampton and Walsall, dwindling away towards Dudley, and not appearing further south in any workable form.

The beds below the Thick Coal are more variable as regards extent. The Bottom Coal, which is 12 feet at Wolverhampton, is only one foot at Dudley, and does not occur further south. North of Walsall it is thickest, and is called the Thick or 4 yard Coal. At Pelsall it separates into two coals, 2 feet and 7 feet, and northwards it again breaks up.

Sandwell and Hampstead Collieries :—

To the East and West of the Coal-field, as well as South of Hales Owen, the Permian rocks lie conformably on the coal-measures, although in the two former directions fault-lines separate the two formations. The upper beds of the Carboniferous strata differ from the Permian only in their greenish or yellow colour, and in their occasional seams of coal. East of the fault-line of Great Barr occur a series of rocks corresponding in position to the Permians of the southern districts, but much thicker. These rocks have been successfully bored through for the underlying coal, at two points—Sandwell, one

mile east of the coal-measures, and Hampstead, 1½ miles in the same direction. Sandwell shaft was completed in 1874. For the first 110 yards the strata were red, containing numerous fossil plants of Permian times. At 200 yards a seam of coal 7 inches thick was found, and below this fire-clay with Stigmaria. The plants found, however, were specifically identical with those in the upper strata. At 230 and 244 yards other seams were found, and the distance from the third down to the thick coal was 174 yards. The section at *Hampstead* is the same. The pit is 1845 feet deep, and the thick coal (26 feet) covers 40 acres. The beds dip 300 feet per half mile. These sinkings are important, from a geological point of view, as showing that there is no break, either physical or biological, between the Carboniferous and Permian formations, and, from a practical point, as proving that the greater part of the Coal-measures still lie hidden under the Red Sandstones of the great Warwickshire plain.

Character of the S. Staffordshire coal :—

Each seam has its own special character, which is so constant that the blocks can be recognised at the pit's mouth by experienced miners. The Coals are usually "bituminous," *i.e.* they retain, mixed with the carbon, such a proportion of oxygen and hydrogen as would allow of bitumen being formed from them by distillation. Usually they are got in large blocks, not caking, easily lighted, burning clearly, leaving a white ash and not many cinders.

Stratigraphical relations and physical features of the S. Staffordshire carboniferous strata :—

The coalfield is a narrow plateau of coal measures, bounded E. and W. by downcast faults, covered on the North by unconformable New Red Sandstone, and dipping on the South under conformable Permian rocks. The measures rest everywhere upon Silurian rocks, which are of high economic value. The depth at which they occur is nowhere great, and they yield lime in such abundance that the ironstone can be worked as cheaply as where there is Carboniferous Limestone. Every horizon in the Silurian system is covered in turn by the basement bed of the coal; a phenomenon which is due to

denudation, giving evidence of a hiatus between the Silurian and Carboniferous systems, and accounting for the absence of the Old Red Sandstone. It is probable, that during the period when the Old Red and the Carboniferous Limestone were in course of formation, a narrow ridge of land ran E. and W. across our present Midland district, from Leicestershire, through Warwickshire, South Staffordshire, North Shropshire, and into Montgomeryshire. While the Coal measures were being deposited this ridge must have been wholly or partly depressed; and since that time it has been again raised, and dislocated and distorted, by subterranean agencies. Two lines, marking the directions of the disturbing forces which produced the principal inclinations and fractures of the rocks, may be drawn within the area of the coal-field. One runs from Barnt Green to the termination of the Sedgley Silurian ground south of Wolverhampton. This passes along the ridge of the Lower Lickey, and lies parallel to the direction of the boundaries of the southern part of the coal-field, to the Russell's Hall fault, to the longest axis of the Rowley basalt, and to the general direction of the Dudley and Sedgley anticline. The second line starts from the S.W. angle of the coal-field near Pedmore, and ends at the Brereton coal-pits, in the extreme N.E. angle. It forms the axis of the Netherton anticline, and runs nearly parallel to the outcrop of all the beds (Coal-measures and Silurian) along the E. margin of the district from West Bromwich to the Brown Hills, to the outcrop of the Wyrley and Essington beds, to the western boundary fault north of Wolverhampton, and to the general direction of the northern part of the coal-field from Dudley northwards. All the lines of outcrop, and all important faults, run either parallel to one of these lines or to the lines which are their resultants.

Igneous rocks of the Coal-field:—

In several places the South Staffordshire measures are pierced by igneous rocks. The best examples are at Rowley Regis, South of Dudley, and Ponk Hill, near Walsall; the former appearing to lie about 600 feet above the Thick Coal, and the latter between the Fireclay and the Bottom Coal.

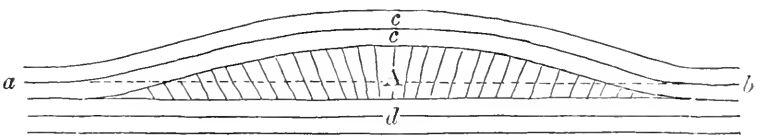
The Rowley Basalt forces its way west for two miles beyond Dudley, wandering along different horizons. The Ponk Hill Basalt ranges from Bilston on the South almost to the extreme North of the coal field. The columnar structure of basalt is very marked, especially at Ponk Hill, some of the columns being vertical, others bent, horizontal, or radiating. There is also a tendency to form spheroids, having a solid ball in the middle enveloped by several concentric cones.

Three theories have been suggested as to the origin of these igneous rocks:

(*a*) Plugs of fused matter forced their way up to the surface (Murchison). This rests on a theory of volcanic action which is now discredited.

(*b*) The basalt was an eruptive rock, poured out at the surface in the form of a sheet of lava (Jukes).

(*c*) The patches of basalt were originally *lacoliths*. When strata are laterally compressed, they tend to bulge apart like the leaves of a book, and the more fusible components of the rocks are squeezed out, and fill up the spaces. The lenticular masses of crystalline rock thus formed are termed *lacoliths*.



A, Lacolith, *c c*, compressed strata, *d*, strata less compressed, *a*, *b*, line showing how subsequent denudation may expose the basaltic rock.

The manner in which the basalt not only passes *between*, but cuts *across*, the strata, charring and spoiling the coal both above and below, while its own colour is altered to white or greyish green, seems to show that it cannot have been a lava flow contemporaneous with the measures. The method of formation above described would also account for the radiating structure sometimes observed, which would be produced by the splitting of the basalt at right angles to a curved surface of cooling, as represented in the above diagram. Probably the same strain

upon the beds which brought up the Silurian beds at Sedgley and Dudley, and caused the Russell's Hall Fault, was relieved at Rowley by the formation of a lacolith.

Comparison with the North Staffordshire Coal-field, and with others in the N. and N.W. of Britain :—

The lowest coal in the South Staffordshire district is in the Gannisters. The two highest (unworkable) are only a short distance below the Spirorbis Limestone. The rocks missing from this field—*i.e.* Yordales and Millstone Grit—yield coals in N. Stafford, Yorkshire, and the central parts of England. The Coal-seams extend deeper and deeper towards the North-west, till in Scotland and parts of Ireland, some of the richest seams are found in representatives of the Carboniferous Limestone. The North Stafford strata are four times as thick as those of South Stafford. Their sequence is as follows :

(I.) Carboniferous Limestone..... 4,000 ft.
(II.) Coal Measures ..... 9,100 „
(*a*) Lower measures with black shales and clays—4100 ft.
consisting of (1) Yoredales. (2) Millstone Grit. (3) Gannisters with Peeten, Somatites, &c.
(*b*) Middle measures with 40 coal seams—4000 ft.
(*c*) Upper measures, with Spirorbis limestone—1000 ft.

Altogether there are 150 workable coals.

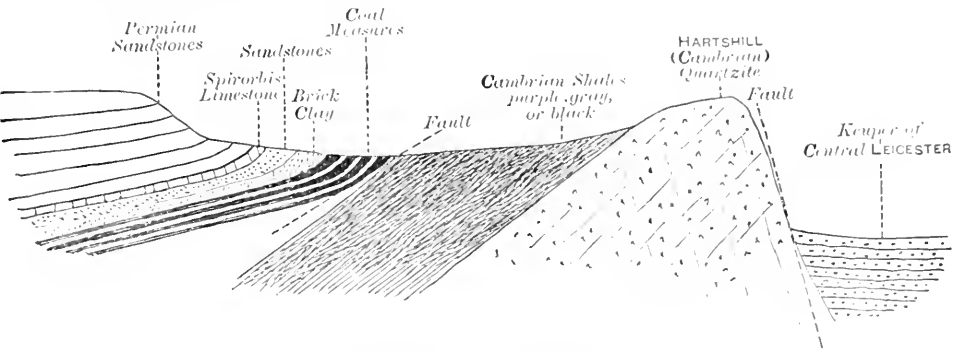
(II) East Warwickshire Coalfield :—

The East Warwick Coalfield resembles that of South Stafford in all respects except thickness. The sequence is as follows :

(1) Coal Measures..... 800 ft.
(2) Coloured Clays ..... 400 „
(3) Sandstones ..... 2—400
(4) Sandstone and Shales with Spirorbis Limestone ..... 2—3

The measures contain six main coals—*i.e.* Two-yard Four-foot, Rider, Bare Coal, Ell Coal and Slate Coal. Below these is the seven-foot Coal. The beds are separated to the North

by great thicknesses of sandstones and shales; to the South they all come together, and form the Hawksbury Thick Coal. It is possible that this is continuous with the Thick Coal of South Staffordshire. The Permian sandstones which cover the E. Warwick area are of great thickness, and form the largest extent of Permian rocks in Britain, from Coventry on the South, to Nuneaton on the North. Coal is probably forming beneath them.



SECTION AT NUNEATON.

In the coal field to the north-west, at Ashby de la Zouch, both Millstone, Grit and Carboniferous Limestone occur, and except that the coarser beds generally occur to the North, and the finer ones to the South, no parallel can be drawn between it and those already described.

(III) Forest of Wyre:—

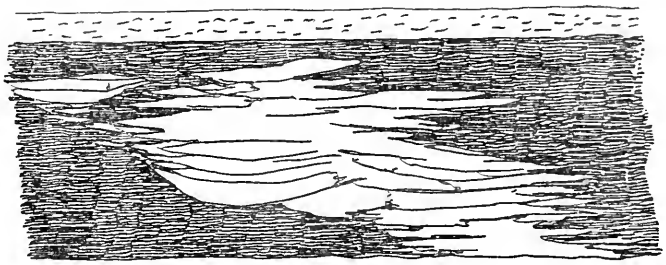
This belongs to the same type as the E. Warwick and S. Stafford. The main coal is 300 yards below the Spirorbis Limestone, and is only worked locally.

Throughout the coal fields we find evidences of local elevation and depression, with denudation between the close of the Silurian and the middle of the Carboniferous period, and also after the close of the Carboniferous, similar to those already noted in South Staffordshire. Thus the Carboniferous rocks rest upon the Cambrian at the Wrekin, the Silurian at Coalbrook Dale, Old Red at Forest of Wyre, Silurian again in South Stafford, Cambrian again in E. Warwick and Ashby. They are covered conformably by Permian in South Stafford and East Warwick, unconformably by Permian at Coalbrook Dale, Forest of Wyre, and Ashby, unconformably by Bunter

in South Stafford (north end) and Ashby, unconformably by Keuper (Waterstones), at the east side of East Warwick, and east side of Ashby.

Accidents to Coal Measures.

These are *rockfaults* and *horsebacks*. In the former, the coals and sandstones are mixed together in confused wedges, the sandstone fragments increasing in thickness towards the middle of the fault, where the coal disappears, and again thinning out.



ROCK-FAULT.

Horsebacks are rounded ridges or depressions, apparently formed by the rising of the floor or sinking of the roof of the coal-bed into the measure itself. The boundary between the sandstone and the coal is sometimes very regular.

HORSEBACK.

Rock-faults have been interpreted as irregularities of deposition, horsebacks as sandy ridges, or sand-banks against which the coal was deposited in lagoons, and when they descend from above as filled-up river-courses. In both cases, however, the coals are generally smashed and highly slickensided, so that many of them are probably of secondary origin. The horseback may be a fault in which the coal has yielded to the strain, while the harder sandstone has remained intact; while, in the rock-fault, fragments of overlying sandstone have become wedged into the fissure.

Theories of Coal Formation.

(1) *Logan's theory.* The plants which form the coal grew and perished on the site of the present coal-beds. The ground alternately rose and sank, sandstones and shales being deposited during times of depression, and vegetation flourishing when the land rose above water. This hypothesis is supported by the fact that upright stems of Sigillaria are found in the coal, prolonged downwards into roots (Stigmaria) which are embedded in the underclay.

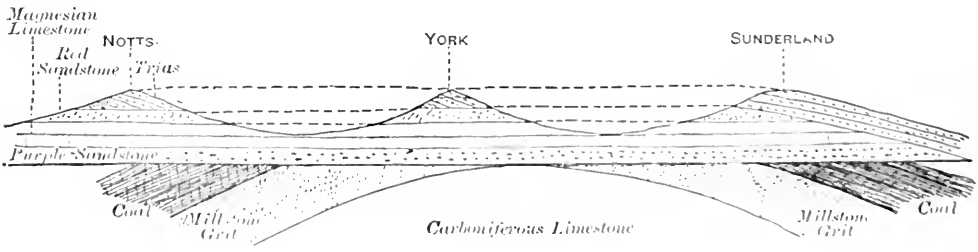
(2) *Jukes's theory.* Trees and plants were drifted into large lakes, estuaries, and shallow seas, and there becoming water-logged, sank to the bottom, and were subsequently covered by other accumulation. The sands and conglomerates were heaped up near the shore, while the lighter and finer organic sediments were equally diffused over the whole area. The deposition was thicker where there was a hollow, thinner where there was a rise in the ocean floor. This would explain the manner in which the S. Stafford and E. Warwick measures gradually thicken northwards, also the superior constancy of the coal seams over the sandstones. Indeed, the delta-like form, which the coal measures of S. Stafford must originally have possessed, does not seem explicable on any other theory.

(III) PERMIAN ROCKS.

The Permian or Dyassic rocks consist of marls, sandstones, clays, breccias, calcareous conglomerates, and limestones. The marls and sandstones are generally of a red or purple colour, although in districts, where they overlie the Carboniferous conformably, a perfect gradation may be seen from the grey or greenish tints of the upper Carboniferous to the red of the true Permian.

In England, the formation extends from Exeter through Bristol, the valley of the Severn, and Central England to Derby, where it divides, one arm going to Morecambe Bay and Solway Firth, the other to Yorkshire. There are two distinct divisions, the Upper and the Lower Permian, the former being found to the North-east, the latter chiefly to the South-west.

The *Lower Permian* consists of coarse red sandstones, with intercalated sheets of conglomerates and breccias, which in the N. of England are vast accumulations of angular pebbles, chiefly Carboniferous Limestone, for which they are mined. They are locally called "brockrams." In South Scotland these sandstones show great lava-sheets, and the coal-measures are pierced by multitudes of volcanoes of Permian age. On the West side of England, especially near Shrewsbury, Enville, Clent Hills, and Lickeys, there are similar breccias, but, instead of being formed of limestone, they consist of fragments of Trappean rock, like that of the Wrekin and Caer Caradoc in Shropshire. These occur in patches over an area of more than 700 square miles, and in some cases reach a thickness of about 400 feet. Some of the stones are 3 feet in diameter, and a few are marked with striations. The principal member of the *Upper Permian* is a band of Magnesian Limestone about 600 feet thick, and stretching from Nottingham to Sunderland. Some of the beds are concretionary, running into knots and lumps like bunches of grapes or cannon balls. The limestone contains 48 per cent. Magnesium Carbonate. It is overlain by 100 feet of Red Sandstones, and underlaid by 250 feet of purple or variegated Sandstones. The section in the N.E. rests unconformably on the coal below, and is covered unconformably by the Trias above.



Continental conditions :—

In Germany, as in Britain, the Permian rocks are of two distinct types. The *Zechstein* corresponds to our Upper Permian, and contains a band of slaty marlstone (Kupferschiefer), richly impregnated with copper pyrites, for which it has long been worked. In France, South Germany and Bohemia the

Permians occur in the form of coal measures, and are mined as such. In America the Permian forms merely the upper part of the carboniferous, and is generally united with it under the name of permo-carboniferous.

Life of Permian times :—

Fossils are very rare, and generally of stunted appearance. In the Lower Permian there are occasional patches of coal, with coal-measure plants, walchias, cycads, &c. Conifers are fairly abundant, generally silicified. In the Upper Permian the only fossils are those of the magnesian limestone, in which about 100 species are found. They gradually decrease, in number and in size, from the lower beds to the upper. Numerous delicate bryozoa are formed, and among the mollusca we note the last productus and strophalosia, with species of spirifes, lingula and other brachiopoda of palæozoic type. All the fishes are heterocereal, *i. e.* their tails are unequally lobed, and the vertebral column runs along the upper lobe. In all species from strata newer than the Permian the tail-fin is either single or equally divided, and the vertebræ are not continued into either lobe (homocereal).

Probable conditions of deposition :—

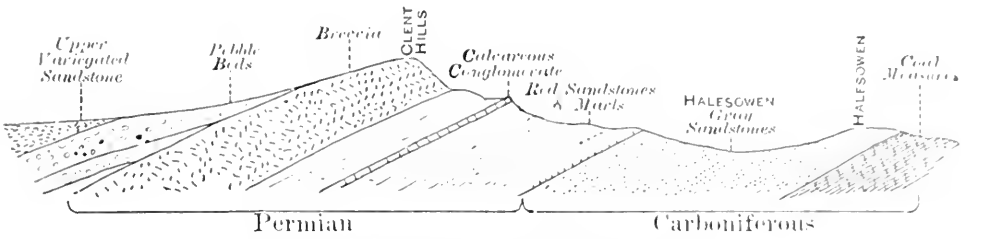
The red Permian sandstones seem to have been laid down in great inland lakes, resembling the Caspian, and gradually increasing in saltness until they dried up altogether. The lower rocks of the series appear to be aqueous, and the upper sub-aërial. The great coal-bearing period of Britain was brought to a close by the elevation of the country, and the shutting off of the lakes from the ocean. The ridges between were forced up into mountain ranges, which grew in height and approached each other, while the lakes decreased in size and depth. Vegetation gradually died out from the salt waters, and the iron, which had formerly helped to feed the plants, or deposit itself in balls and concretions round their decaying remains, was now diffused through the sands which were laid down in the lakes, colouring them red. The *magnesian limestone* was doubtless also formed in an inland sea, and owes its composition to the chemical character of the

waters from which it was deposited. The *breccias* were probably accumulated in fiords, where the coast was steep and the mountains high. Owing to the striation of some of the stones, Professor Ramsay considers that they give evidence of a glacial period succeeding the carboniferous. At the close of the Permian period the sea-shore lay east, passing through Lyons, the Vosges and Bohemia. Britain had become a rugged, sun-dried district, visited occasionally by fierce rains, after which sheets of glittering water appeared in some of its desert valleys, drying up in summer, and leaving plains of salt. This period, in Britain and Germany, marks the greatest biological break in the whole history of geology. Before that time we have Palæozoic life, after that time Neozoic. Similar conditions prevailed in N. America, from Newfoundland on the N. to Virginia on the S., but in the Rocky Mountains, E. Asia and elsewhere, the conditions were so wholly different that we cannot synchronize the strata.

Examples in the Birmingham district :—

The Permian rocks surround the coal measures of South Staffordshire, but are much broken by faults. Their total thickness is estimated at 3000 ft., but this is probably far too great. Two main members can be distinguished—a sandstone series, and beds of breccia lying above, sometimes covered by another series of sandstones.

(1) *Clent and Lickey Hills.* A tract of hilly country stretches east and west along the southern margin of the Dudley coal field. The best section is to the S.W. of Hales Owen. Close to the station we notice the green Hales Owen sandstones. Passing to the hills the lower slopes are occupied by red sandstones and marls, while the higher parts are formed of beds of breccia. This is composed of fragments of quartz porphyry, altered lava with zeolites, hornstone, quartzite pebbles, &c. The calcareous bed intercalated in the breccia is also well shown.



SECTION ACROSS THE CLENT HILLS.

Professor Ramsay considers that many of the fragments which form the breccia have been conveyed by glaciers from the neighbourhood of the Longmynd; since among them are pieces of Silurian sandstone and limestone, containing fossils by which they can be identified. It is, however, more probable that they are the debris of the hilly ground of Permian times, buried in lake-shore mud, and that the old Silurian rocks may lie concealed beneath them.

(2) The Permian beds of *E. Warwickshire* occupy a large area along the south and west of the coalfield, and resemble the lower series of South Stafford.

VI.

All rocks above the Permian are termed NEOZOIC, since the fossils which they contain are similar in general character to the animals and plants of the present. The strata below the Eocene are MESOZOIC; from the Eocene to the Phocine CAINOZOIC.

The MESOZOIC age begins with a period of gradual descent, followed by a long series of oscillations, in which depression predominates, and ending with an oceanic period, in which no trace of land appears nearer than Scandinavia and South Spain.

(I) *Trias or New Red Sandstone.*

The Triassic rocks are nearly all red sandstones, more or less variegated, red marls with layers of gypsum, and coarse boulder conglomerates, usually quartzite. Up to within the last few years the Trias and Permian formations were grouped

together under the common name of New Red Sandstone, or Poikilitic (variegated). Sedgwick first suggested their separation, on the ground of the wholly distinct character of their fossils; but this was at first opposed by Murchison, who afterwards discovered his error while engaged in working out the geology of Russia, and proposed the name "Permian" for the lower division from the Russian province of Perm. In Germany the distinction had long been recognized.

The outcrop of Triassic rocks is widest at Birmingham, thence it passes south to Exeter, crosses the Channel to Normandy, and joins the French Trias. North of Birmingham it divides in the latitude of Derby, one branch passing through Cheshire towards the sheets of Carlisle and Belfast. The other branch runs through York and Sunderland, and reappears on the other side of the North Sea in Heligoland, where it is continuous with the German Trias.

Divisions of Trias :—

In England the Trias consists of two members, each of which is broken up into subdivisions. The following table shows the manner in which they thin off towards the south-east :—

	Liverpool.	Central Plains.	Leicester and Warwick.
Bunter (Lower Trias) .	1500—1200	600	250—0 ft.
Lower Mottled Sandstones.	500— 200	100	0 ft.
Pebble Beds . . .	500	300	100—0 ft.
Upper Mottled Sandstones	500	200	150—0 ft.
Unconformity.			
Keuper (Upper Trias) .	1250	950	870 ft.
Waterstones . . .	450	200	150 ft.
Keuper Marls . . .	800	750	720 ft.

The various members of the Trias overlie the older rocks unconformably in every case. There is a great unconformity between the upper and lower divisions, and some of the subordinate members are unconformable among themselves, so that the lowest beds in any district may belong to any one of them.

In Germany the Trias consists of three members (whence

its name). Between the Bunter and Keuper is a limestone called the Muschelkalk, very rich in fossils at its base. As the Bunter and Keuper pass towards the Alps they become limestones, and are very fossiliferous; the German formation being intermediate both palaeontologically and petrologically.

Life of Triassic times:—

The British fossils are few. A few trunks of silicified trees (conifers) have been found in the Bunter of Allesley Hill, near Coventry, some of them 1½ feet in diameter, and several yards long. Footsteps of the Cheirotherium (Labyrinthodon) have also been found in Lancashire, Cheshire and other localities. These impressions are curiously arranged, each small foot print (4 by 3 in.) being followed immediately by a large one (8 by 5 in.), and the distance between each pair being about 14 inches. From remains afterwards discovered, both in Germany and England, Professor Owen concluded that the animal must have been a gigantic Batrachian; and the name Labyrinthodon was given from the curiously complicated structure of the teeth.

Probable conditions of deposition:—

The Triassic period was on the whole a time of gradual descent, increasing rainfall, and increasing deposition. This is shown by the evidences of deep-sea conditions observable in Germany and the Alps, by the relics of vegetation found in Britain, the other fossil remains above described, and the waterworn pebbles which take the place of the Permian breccias. The descent was broken by several upheavals. The waters were in Britain those of inland seas, containing concentrated salts of sodium and calcium in solution. These were deposited in layers on the lake beds; hence the Upper Trias is sometimes called the Saliferous formation. The pre-Triassic rocks had been greatly contorted in Permian times, and the Trias forms a continuous, gently undulating sheet, filling up all their hollows.

Examples in the Birmingham district:—

The Trias occupies a larger area in this district than any other formation. The superficial extent of the Upper and

Lower divisions is about equal, but the Lower is of greater thickness:

(1) The *Lower Trias* or Bunter occurs in patches, surrounding the South Staffordshire coal-field, the continuity of its members being much interrupted by faults and local unconformities. Its three divisions are all fairly developed.

(*a*) The lower mottled sandstone is of fine bright red sandstone, streaked or mottled with yellow, often false bedded, containing no pebbles.

(*b*) The pebble beds consist of fragments of quartzite, trap rock, with here and there carboniferous limestone, chert and Silurian rock, all well rounded and imbedded in a matrix of coarse sand. The Trappean pebbles are blue, black or liver-coloured, not resembling any known British rock. The Quartzite pebbles are of four geological ages. (1) A liver-coloured quartzite, destitute of fossils, and unknown anywhere in Europe. (2) Dense quartzite, breaking with conchoidal fracture, probably of Cambrian age; containing numerous fossils unknown in British rocks, but common in the Cambrian of Brittany and Normandy (Grai Armorica). (3) Llandovery quartzite, with fossils of May Hill age. (4) Quartzite probably of Mid-Ordovician age, containing fossils of the famous building stone of Normandy and Brittany (Grai de Mai). In this district fossils of all these ages are found, being well shown at Harborne and Bromsgrove, in Ladywood Pool, where quartzite of the Grai Armorica contains fossil Lingulae, at Sutton Park, where there are the best examples of Llandovery, with Orthis elegantula and fragments of Plutamerus. Grai de Mai is rarest here, though by far the commonest towards the South of England. At Budleigh Salterton, in Devonshire, there is a magnificent exhibition of these pebble beds in the cliffs.

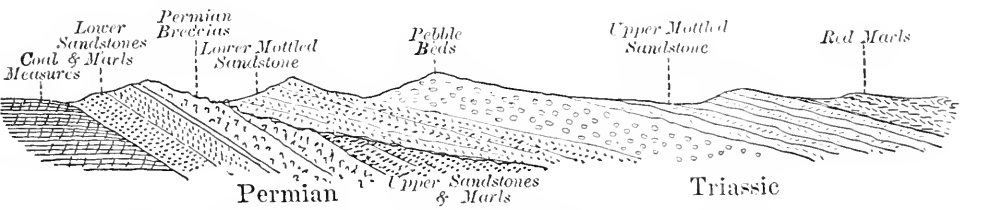
(*c*) Upper Mottled Sandstone is much like the lower, but somewhat finer in grain. The town of Birmingham

is built upon it, and doubtless owes much of its healthiness to this dry and porous foundation.

(2) The *Upper Trias or Keuper* extends in one vast sheet over the region east of Birmingham, towards Warwick and Leicester, where it passes below the Lias. It is monotonous in character, consisting chiefly of marls, clays and sandstones, and throughout the greater part no division is recognizable.

(*d*) The *Waterstones* can, however, be distinguished near Bromsgrove, and in the E. Warwick district, where they form a nearly continuous belt round the Carboniferous and Permian rocks, as beds of white and brown sandstone, frequently rippled or current-marked. In E. Warwick they contain Labyrinthodon remains.

(*e*) *Keuper Marls.* These are of a dull red colour, with occasional thin blue shaly beds, and small layers of bluish-white sandstone. The division occupies very large trails of undulating country in Warwickshire and Leicestershire. Brine springs and beds of rock salt are found at Droitwich and Stoke in Worcestershire, and Shirleywich in Staffordshire. Beds of gypsum crop out at Tutbury and Uttoxeter.



ROCKS OF WEST SIDE OF SOUTH STAFFORDSHIRE COAL FIELD.

The typical configuration of the Trias consists of two escarpments or ridges, with valleys bordering them; the lower ridge formed by the Pebble Beds of the Bunter, the upper by the brecciated base of the Keuper.

Economic value of the Triassic Strata :—

The Bunter sandstone is the most important water-bearing formation in England, owing to its permeability, its homo-

geneous texture, its composition, and to the large unbroken areas which it occupies. It supplies the towns of Birmingham and Wolverhampton, besides Liverpool, Manchester, Crewe, Southport and others.

The Lower Keuper sandstone is quarried for building near Warwick, and the Red Marl, besides yielding rock-salt and gypsum, forms excellent agricultural land.

(II) *Rhætic formation.*

This formation may be considered either as the highest layer of the Trias, or the lowest of the Jurassic. It is of no great thickness anywhere in England, though it forms a very persistent strip from the Bristol Channel to Whitby, about fifty feet thick throughout its course; but in the Alpine region it is immensely developed. In the Dolomite Mountains, it consists of three members, some thousands of feet thick; the upper part being shale, the middle limestone, the lower Dolomite. It forms the Dachstein near Salzburg. These beds were laid down partly under oceanic conditions, and the fossils are abundant and of enormous size. The same beds occur south of the Alps, between Trieste and Lake Garda, and East, forming the Rhætian Alps. In England, the strata are known as the *Penarth* beds, from a place near Chepstow.

Divisions of the Rhætic:—

(1) Rhætic Marls—red and grey, 24 feet thick, shading into Trias below.

(2) Paper or tea-green shales. In certain districts these contain a layer of bones, including the teeth and palates of fish.

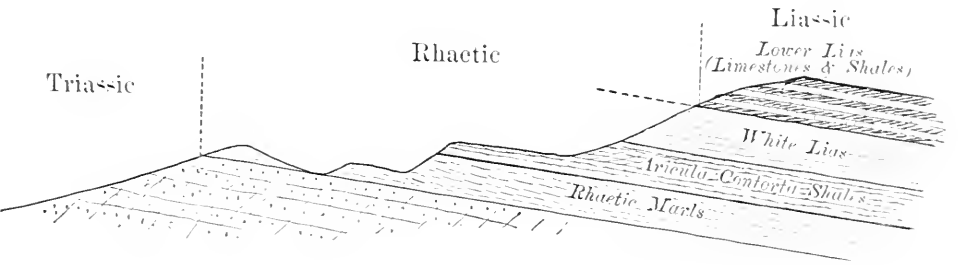
(3) White Lias, 12 feet thick, a white or cream-coloured sandstone, highly calcareous, rarely containing fossils. The lowest bed is the famous Cotham marble, and stretches from Somerset to Lyme Regis. The highest bed is known as the sun-bed, and is used for lithographic purposes.

Rhætic Fossils. The grey marls contain the first mammal

in Geology—Microlestes rhæticus, allied to the opossums. In the bone-bed are Pecten valoniensis and Avicula contorta; in the White Lias, Ostrea liassica, Cardium rhœticum, tubes of annelids, and Lima gigantea. These all represent the life of brackish water.

Examples in the Birmingham district:—

The Rhætic and Lower Lias bound the Red Marls to the East, along a line stretching from Stratford-on-Avon to the banks of the Humber, at its junction with the Trent. There is also a Liassic outline at Barston in Warwickshire.



PROBABLE SECTION OF RAILWAY CUTTING AT HARBURY.

The Rhœtic of Harbury is covered by the *Lower Lias* quarried for lime, and consisting of horizontal strata of limestone (white, weathering to yellow) and shale (black). The fossils found are ammonites, Gryphaea incurva, scales of ganoid fishes, &c. Note the V faults, which gradually merge into one, owing to decrease of tension downwards.

SECTION AT HARBURY LIME-PITS.

III. *Mesozoic formations unrepresented in the Birmingham district.*

(1) *Upper Lias and Oolite.* The lias is composed of layers of clays and limestones, the clays predominating and forming great plains, very retentive of moisture. In the Oolite, the limestones predominate. During these periods, the sea bottom gradually descended, but the descent was broken by frequent waves of elevation, and times of rapid deposition alternated with times of clear water and no deposition.

(2) *Cretaceous formation.* To this belong the Weald Clay of Sussex and Surrey, and the Lower Greensands and Speeton Clay of other parts of England, grouped as Lower Cretaceous or Neocomian (from Neufchatel); while the Upper Cretaceous consists of true chalk, resting on the Upper Greensand and a dense clay called Gault. The Weald Clay is an estuarine deposit, formed during a period of oscillation, while the Chalk marks a period during which all central and southern Europe was submerged to a vast depth.

IV. *Cainozoic formations unrepresented in the Birmingham district.*

The Tertiary or Cainozoic epoch marks the time of the building of Europe:—

(1) The Lower Tertiary or Eocene is represented in Britain by the London clay, which rests on the locally eroded surface of the chalk. Generally speaking, it is an estuarine deposit, brought in by rivers from a land west or south-west of Britain, inhabited by a fauna and flora now characteristic of Tropical regions, including palms, tree-ferns, cycads and screw-pines; with crocodiles, serpents, turtles, tortoises, opossums, tapirs. The shells are like those of the Eastern Archipelago. In Eocene times, the water, though locally shallowing, was still deep enough to allow the formation of a foraminiferal (Nummulitic) limestone, hund-

reds of feet in thickness, formed of organic remains, with only a few traces of sediment, and stretching in an unbroken sheet over France, Italy, Spain, the Balkan Peninsula, the Sahara, Egypt, Persia, Central China, and the Himalayas; attaining its greatest thickness along a line drawn from Cape Ortegal through Mt. Blanc, Constantinople, Damascus, to the Himalaya range; so that at the close of Eocene times all the ocean floor between England and China had been covered with limestone. The upper part of the Nummulitic limestone, however, passes into sands, gravels, &c. of great thickness; in the Alpine regions, forming the Flytch and Nagelfluе conglomerates and sandstones, which flank the Alps on both sides.

(2 & 3) The Middle and Upper Tertiaries (Miocene and Pleiocene) are wanting in Britain; the Miocene being represented in three spots only.

(*a*) In a small river basin in Devonshire, at Bovey Tracey, where an old lake deposit yields brown coal. (*b*) Under the basalts of Antrim, as red marl and clay. (*c*) Under the basalts of the Island of Mull as clay. In all three cases, however, the fossils are freshwater, and are therefore only doubtfully referred to the Miocene.

In the middle and upper Tertiary time, Europe as it now exists was made, the mountain peaks first appearing above the waters as small islands of Nummulitic lime-stone. Elevations running east and west through Britain were formed during the making of the Alps, and are continuous with the present Alpine system. Elevations running north-west and south-east are results of the "buried Atlantis"—the continent, which in Proterozoic times stretched down the middle of the present Atlantic. The former predominate in S. E. England, the latter in the N.W. parts. Between the two lies the greatly faulted Birmingham district, where the elevations and depressions were produced by complex movements of rock areas. The influence of the Western Continent is manifested underground; that of the Alps at the surface.

The folds of the Chalk formation of Eastern England are due to the Alpine compression; the faults of the Coal Measures of Central England chiefly to the movements of the Western Continent.

Proofs of a former existence of Post-Triassic beds in the Midlands. West of a line drawn north and south through the Birmingham district, there are outlines of Post Triassic beds. The Lias occurs in central Cheshire, resting on the Trias, and the same zones are found there as at Harbury. It occurs again at Carlisle, and round the shores of Belfast Lough, through Skye, and on both sides of the Moray Firth. Oolitic beds appear in the Hebrides and Sutherlandshire, to almost as great a thickness as in central England. White Chalk is found everywhere under the basalt of Antrim, in the Isle of Mull and the Peninsula of Morvern. These patches are doubtless relics of a continuous sheet, which once overspread the Midlands and the northwest of Britain, but have since been removed by denudation, chiefly since Miocene times. There could have been little denudation earlier; since vast sheets of the basalt of Skye cover the Oolites in undiminished thickness, while the basalt of Antrim rests on a very slightly reduced thickness of chalk; the fossils between the basalt and the sedimentaries being plants common to Miocene beds of Switzerland and Germany.

VII.—GLACIAL DEPOSITS.

Hitherto we have been considering *solid* or *subterranean* rocks, which form the true earth-crust, vary through all degrees of hardness, and as a rule contain extinct animals in a fossil or stony condition. But there is another set of formations, known as *superficial*. These consist of loose materials, worn off the solid rocks by rain, rivers and atmospheric action, and containing modern animals in an unaltered or semi-fossil state. In some of these strata are found relics of man and his works. The subterranean deposits are stationary, while the superficial deposits are in process of transportation.

The *Glacial* rocks stand midway between the two. They are generally unconsolidated, and form a continuous mantle over the underlying solid rocks; but, except in certain small areas, their formation has ceased. Some of them, however, have certainly been formed since the appearance of man upon the earth.

Towards the end of Pleiocene times the fossils became more and more Arctic, testifying to a rapid change of climate. The succeeding period is one which has greatly perplexed geologists. Its deposits are confined to the more northerly temperate regions, and to a few mountainous districts within the tropics. They are of a peculiar nature, and were for a long time considered to be unique in geology. Heaps of coarse earth and stony débris, smoothed and striated boulders, great sheets and masses of a firm, tough, tenacious, stony clay, unstratified and impervious to water, rarely fossiliferous, lying most thickly in the lower valleys, and thinning off towards the hills. The stones which it contains are of a blunted angular or sub-angular shape, polished, and generally striated in the direction of the longest axis. The clay or *till* usually resembles in colour the rocks of the district in which it is found, but the stones frequently have no local relationships, and seem to have been brought from a considerable distance. They are then called "erratics." When the till is removed the surface of the ground beneath (if sufficiently hard to retain superficial marks) is seen to be polished and scratched. Generally the scratches coincide with the trend of the valley, but occasionally they cross the tops of high hills. The clay consists of two divisions, upper and lower, the name *till* being sometimes restricted to the lower, the upper being known as *boulder clay*. Between the two lie bedded sands and gravels, often containing marine fossils. Several theories have been invented to account for these phenomena. It was at first imagined that they were due to a mighty deluge from the north, rolling across the land, and carrying with it a burden of rocks. But the water evidently could not have rolled the stones uphill. Next it was assumed that the land had been submerged, and that great icebergs had ground along the ocean

floor, gradually melting as they floated southward, and letting fall the stones which had been frozen into their mass. This may account for some of the phenomena observed, but it cannot be shown that icebergs ever grind continuously along the ocean bed so as to produce regular striations.

The *Glacier* theory was first formulated by Agassiz. A Swiss glacier moves downwards with a steady river-like motion, descending from the snow-line to a certain distance in the valley below. Generally water circulates beneath it, and a stream flows from its foot. From the crags above and at the sides large stones are from time to time loosened by the action of frost, and fall upon the glacier, which bears them downward. Sometimes it will leave one or more stranded on a ridge, or the side of a peak which happens to project through the ice. At its foot there will be an accumulation of stones and earth, called the *terminal moraine*, while the lines of stones along the sides are called *lateral moraines*. When two glaciers unite their lateral moraines coalesce into a *median moraine*. The glacier bed is subjected to a continuous process of scraping and grinding and scratching, by fragments of rock torn away from it, or by stones which fall down the crevasses, and are frozen into the bottom of the glacier. A soft impalpable mud is formed from the material scraped away, and is generally carried off by the streams to the nearest lake. This represents the glacial *till*, which must have accumulated under conditions similar to those which prevail in Greenland at the present day—the whole country being covered with snow and ice, and the water which may circulate beneath being powerless to carry away more than a small proportion of the mud which is manufactured. The moraines represent the stony heaps, and the fragments of rock borne and pushed along by the glacier represent the boulders. In a country quite moulded by ice immense glaciers will creep outwards from the centre, crossing all minor eminences, though more or less deflected by the resistance they encounter.

Divisions of Glacial Period.

The glacial period divides itself into two cold periods of

elevation, separated by a warmer period of depression. These are :—

Lower Glacial, represented by till.
Interglacial „ „ bedded sands and gravels.
Upper Glacial „ „ boulder clay.

The older glacial deposits are separated from the last tertiary beds by the forest bed of Norfolk. The newer shade into those of modern times through post-glacial rocks, in which there are relics of glacial conditions on mountain tops and elsewhere.

(1) The lower glacial period is the most important, both as to duration and the thickness and extent of its deposits. The till is crammed with boulders, sometimes hundreds of yards in length and thousands of tons weight, which (in England) have been torn off rocks of the districts to the north and north-west. Many of the clays are contorted and twisted into fantastic forms of bedding by the onward movement of the glacier. Sometimes they are spread over whole counties in thick sheets, with scattered boulders here and there. At this time the whole of Britain north of the Thames, Europe as far south as Saxony, and North America down to 39° were covered with ice. Its southern limit stretched from Bristol to the mouth of the Thames, and thence to the boundary between Holland and Belgium, crossing the Rhine near Dusseldorf. The Harz Mountains, Saxony, and Bohemia were buried beneath the ice ; as also the whole of Russia north of a line from Cracow to the south end of the Ourals. Even excluding Finland, Scandinavia, and the British Isles, it covered more than 1,000,000 square miles in Europe. In the Scottish Highlands it was 2,000 feet thick, and some mountains were glaciated to a height of 3,000 feet. When the great sheet began to melt, various ice-sheets from mountain ranges coalesced in the lower grounds. In Norway the ice was 6-7,000 feet thick. On the Harz Mountains, 1,500 feet. From Zuyder Zee to Perm stretches

a flat plain, entirely composed of glacial material. There is much clay intermixed with stones, and the hollows between the hills are filled with lakes. In Pomerania the material is all of this character. Great deposits of tertiary coals have been transported by glaciers from the Baltic to Berlin. In the Pyrenees, Alps and Carpathians, the glaciers extended outwards farther than at present, the longest modern glacier being thirteen miles, while the longest in those times was 30 or 40. Zurich, Geneva, Konstanz, and the lakes south of the Alps were filled with ice, which was banked up against the Black Forest and the Jura Hills. Boulders, several tons in weight, were carried from the Alps across the plain, and flung down on the flanks of the Juras. The till is generally speaking unfossiliferous.*

(2) The interglacial period is distinguished by vast sheets of sands and gravels, containing here and there beds of shells, usually unbroken, and more or less Arctic in character. These rise 700 feet above the sea in South Scotland, 700 at Macclesfield, 1,300 near Snowdon. Resting on these, enormous boulders are scattered, but confined as a rule to special localities, and so distributed that we can follow with accuracy their line of transportation. The parts previously glaciated were buried sometimes thousands of feet under the sea, and crossed by cold currents bearing icebergs, laden with stoney débris. In Scandinavia long ridges of sand and stones run along the hillsides, forming terraces miles long, and from thirteen to fifty feet above the sea level. These are called *Kames*—in Ireland *eskers*. They cross rivers and form islands in lakes, and at last pass out to sea. Their exact origin is not known, but they may be old river beds. The interglacial beds are richly fossiliferous.

(3) In the upper glacial period we find a looser clay

* Some of the formations here described belong in part to interglacial and upper glacial times, but they are grouped together for convenience.

than in the lower, filled with pebbles, and here and there beds of sand, sometimes containing fossils. It is not so widely distributed as the first clay, and contains here and there erratics, as in the interglacial. It was a period of re-elevation.

Biological consequences :—

All along the Alps, Carpathians, Pyrenees, and the highest points of the British Islands, Arctic and Scandanavian flora occur ; while the intervening plains and valleys are peopled by wholly distinct forms of life, which probably have changed little since the Glacial period. The Scandinavian flora must at that time have been driven southward in front of the ice, and the old European life must have taken refuge in South Spain, Sicily, and North Africa. During the time of intensest cold, the Scandinavian flora ranged from Oporto through Southern France to the mouth of the Danube. As the glaciers retreated northward, the Scandinavian flora followed, and the more southerly flora returned to its old haunts But the northern life not only returned to Sweden and Norway, but also ascended the mountains of Mid-Europe, till it reached an altitude where the temperature was suited to its constitution. There it remains to the present day. The commonest Glacial fossils are Peeters icelandicus, Leda tremcata, Saxicalia rugosa, Buccinum greenlandicum, found in Norwegian seas and fiords at the present day.

Causes of the Glacial period :—

Several theories have been advanced to explain the excessive cold in the Northern hemisphere, and the enormous condensation of water as snow and ice, which characterised Glacial times.

(1) *Lyell's theory.* All the land was grouped at the Poles. Owing to its low specific heat, it would be rapidly chilled in winter, and the water evaporated from the equatorial ocean would be condensed as snow and ice. It can be shown, however, that at the beginning and end of the glacial age, the land was distributed much as it is at present.

(2) There has been a change in the Earth's axis of rotation. But this is rendered mathematically impossible by the protuberance of 13 miles at the Equator.

(3) The outer crust has moved over the inner and liquid portion, so that, though the axis as a whole is unchanged, it pierces the crust in a different position. The change required, however, could not have been accomplished in the given time.

(4) Astronomical theory—originated by Adhémar, controverted by Herschell, revived by Croll.

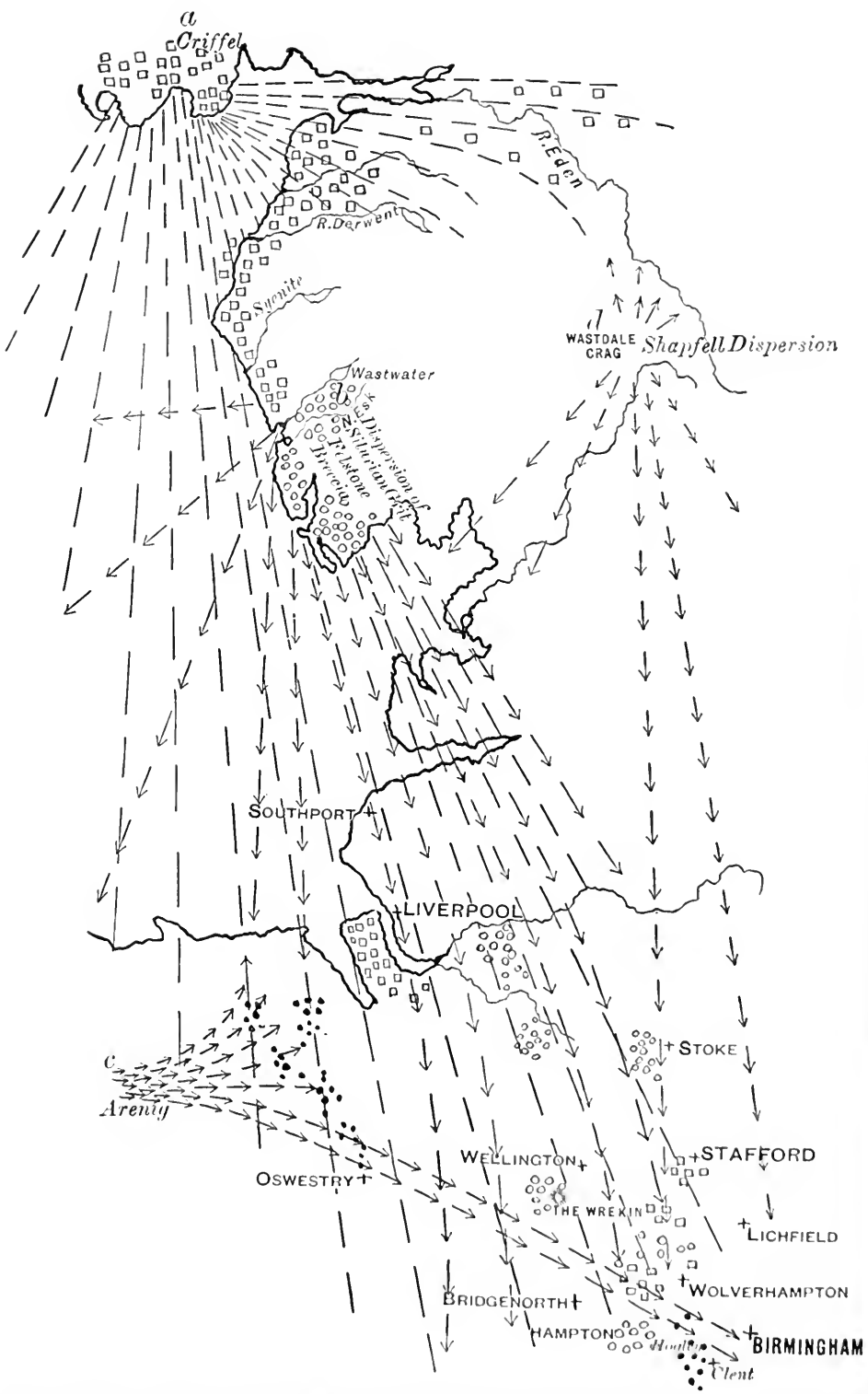
The earth's orbit is an ellipse, of which the sun occupies one of the foci. There is, therefore, one point at which the earth is nearest to the sun (perihelion), and an opposite point at which it is farthest from the sun (aphelion). But this eccentricity is affected by the pull of the planets, and is in a state of constant change. After arriving at a maximum, it begins to decrease, till the orbit is nearly circular; then, having reached a minimum, it again increases. A complete cycle of change takes place in an enormous but varying number of years. At present the difference between the distances of perihelion and aphelion is about 1,000,000 miles; but at the period of the greatest eccentricity it is about 8,000,000. The summer of the northern hemisphere now occurs during aphelion, its winter during perihelion. But, owing to the attraction of the sun and moon, the inclination of the earth's axis to the ecliptic changes a little every year, so that summer comes a little earlier in the northern hemisphere, and in the course of about 10,500 years, winter will be at the time of aphelion, summer at the time of perihelion. This movement is called the procession of the equinoxes, because it involves a shifting of the times of equal day and night, which lie midway between the summer and the winter solstice. As the earth travels more slowly round that part of its orbit which is farthest from the sun, the season which occurs at aphelion will be the longest. It is supposed that the "Great Ice Age" occurred when the northern winter was in aphelion, and in a period of maximum eccentricity. Winter in the north would then be 36 days longer than summer, so

that the land would have time to part with most of its heat, and the moisture evaporated from the southern ocean would be condensed as snow and ice on the northern continents. The short but hot summer would impart little of its heat to the earth, and would only be able to melt some of the mantle of ice, of which a second coating would be formed next winter; and this would go on until the continents became covered with solid ice sheets. But the solstices effect several revolutions during one period of maximum eccentricity; so that there will be alternations of glacial and comparatively genial conditions. It is supposed that the period of submergence was one of these warmer interludes; and it is possible that others may be marked by the intercalated beds of sand and gravel which occur here and there in the till; but the whole matter is very doubtful.

If this hypothesis be correct, glacial periods must have recurred from time to time during the world's history; and it is thought that their traces have been found in the (*a*) Permian, (*b*) Miocene of Alps, and (*c*) Flysch and Nagelflue of Alps, belonging to Eocene times.

Examples in the Birmingham district:—

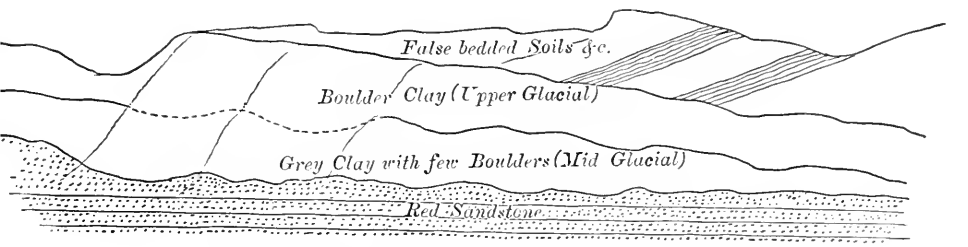
Till and boulders have travelled southwards to the neighbourhood of Birmingham from four chief centres—(*a*) Criffel in Kircudbrightshire, (*b*) Eskdale in Cumberland, (*c*) Arenig in Merionethshire, and (d) Wasdale Crag in Westmoreland.



MAP SHOWING CHIEF CENTRES AND DIRECTIONS OF BOULDER DISPERSION, AS AFFECTING THE BIRMINGHAM DISTRICT.

(1) Wolverhampton.

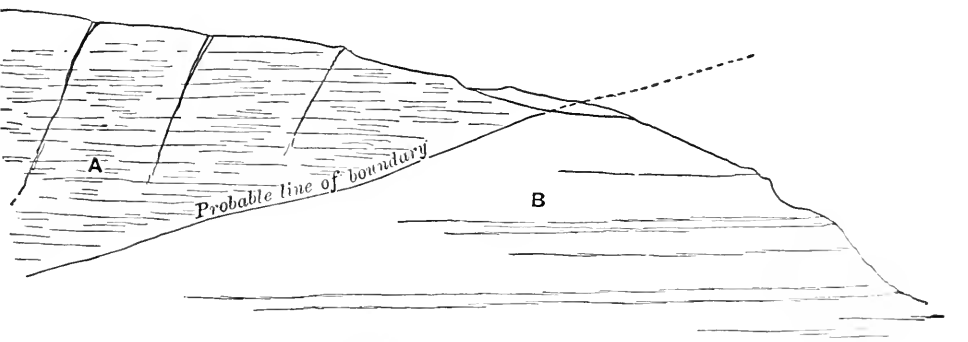
In the quarry at the Oaks, just outside the town, Mid and Upper Glacial beds rest upon Permian rocks. The boulders and pebbles consist chiefly of Wasdale granite, porphyrites, with large orthoclose crystals and Criffel granite, much finer in grain, with black mica. The Wasdale boulders can be traced as far south as Cheltenham. Pebbles of andesite, diabase, and syenite are also found. Going on towards the Seven Stars we notice the flatness and unfertility of the land, owing to the sandstone being covered by a thick layer of boulder clay. The Erratics are abundant, but do not show striation. Towards Tettenhall the sandstone crops out, and the land becomes more fertile.



SECTION AT SANDPITS, WOLVERHAMPTON.

(2) Harborne, California, and Northfield neighbourhood.

At Chad Valley Quarry the pebbles show a mixture of all the rocks between Harborne and North Wales. Carboniferous limestone from the Gannisters, shales, ironstones, Rowley rag, Silurian limestones, quartzites, trap-rock from Arenig, are all mingled. The drift here is all mid-glacial, and stratified. Crossing the coal-measures to California we find on the way



SECTION AT CALIFORNIA QUARRY.

large boulders of greywacke, and at Stone House a large mass of Wasdale granite.

At California there is drift of Upper and Middle Glacial age, with striated boulders.

(A) Purple upper Boulder Clay, not bedded, chocolate coloured with vertical blue-green stripes, dense. (B) Mid-Glacial Sand and Gravels, fine, with quartz pebbles. Yellow in colour, with false-bedded dark layers here and there. Base not seen.

In the south-west corner of California Quarry there is a fine section of Upper Boulder clay, thirty feet thick. It is chocolate coloured, dense, intensely indurated, yielding to blows of the hammer like indiarubber. Such lines of separation as are visible show a sort of flow from N.W. to S.E., at angles of about 45°. In the S.E. corner of the excavation the clay is cleft by a shear plane showing the usual slickensides. The chocolate clays rest at once on fine sands of mid-glacial age, forming the floor of the quarry.

Passing over the Waterstones, we cross the Permian Brevin at Bangham Pit; a formation resembling the glacial drift of later times, and containing fragments of Silurian limestone, with fossils.

(3) At the *Wrekin*, the Arenig, Criffel, and Eskdale dispersions meet and mingle.

Recent or Post-glacial Rocks.

The *Recent* period is merely an extension of the Glacial, differing merely in its milder temperature. It is sometimes called *Human* or *Anthropozoic*, from the relics of man and his works which its strata contain. Generally it is divided anthropologically, according to the material and workmanship of the implements found in the different beds. This division is as follows:—

1 *Palæolithic* (Old Stone Age, implements rough).

2 { (*a*) *Neolithic* (New Stone Age, implements smooth and polished).
  { (*b*) *Bronze.*
  { (*c*) *Iron.*

It is, indeed, supposed that the Palæolithic age was anterior to the second glacial period. Implements of stone and of metal are often contemporaneously used even in the same country, so that the above classification is correct only in a broad and general sense.

To the Palæolithic and Neolithic ages belong :—

(*a*) Cave-dwellings, shown in England at Brixham, near Torquay, and the Peek, Derbyshire, in Belgium near Liège.

(*b*) Remains found in river-gravels, shown in the Valley of the Somme.

To the Neolithic, Bronze and Iron ages belong—

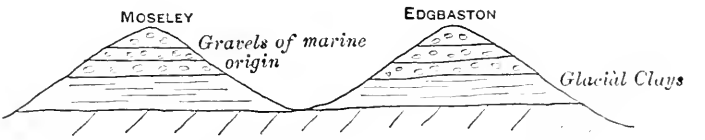
(*a*) Lake-dwellings of Switzerland.

(*b*) Kjökken-möddens of Denmark.

None of these remains, however, are found in the Birmingham district ; I shall, therefore, use the following physical divisions :—

(1) *Subsoils and gravels*, including—

(*a*) Gravels, generally lying along old river valleys, but sometimes of marine origin.



SECTION FROM MOSELEY TO EDGBASTON.

True River deposits are well shown at Shustoke, in the Tame valley.

(*b*) Brick-earths, or soft clays, formed of fine sediment filtered through reeds and grass in back waters on the flanks of rivers.

(*c*) Lake deposits, and (*d*) Peat mosses do not occur in this neighbourhood.

(2) *Soils.*

(*a*) River alluvia.

These are formed of material spread out in river valleys during flood times, marking the height of the highest floods. Where the country rises quickly and erosion is rapid, little is

formed; but where the country sinks, or erosion is locally slow, much is formed. The soil is very fertile, and complex in character. It generally makes good meadow-land, being too damp for agriculture. Owing to the rising or sinking of the land, and the silting-up or excavation of the channel, the river is constantly varying its course, and thus producing a series of terraces—an effect well shown in a meadow near Holly Hill at Rubery.

(*b*) Agricultural soils.

These generally spread like a mantle over the rocks and below the turf. They are due to weathering, and the rotting away of the subjacent strata, and consequently vary locally to a much greater extent than the river alluvia. They are thickest in hollows, and thinnest in ridges. Three divisions can be distinguished—(1) Frail angular fragments of the rocks below, breaking up under the spade. (2) Warp—the same material, further disintegrated. (3) Mould, the upper layer, most of which has passed through the bodies of earth-worms. Agricultural soils cover the greater part of the Warwickshire and Worcestershire plains.

VIII.

Influence of the Geology of the District on the characters and occupations of its inhabitants.

The Triassic and Permian plains, with their fertile soil and their quietly beautiful scenery, tend to form that slow, steady, vegetative class of mind, characteristic of the agriculturist; but when the intellect happens to be naturally of a high order, it becomes contemplative and analytic, as in Shakespeare, and still more markedly in "George Eliot."

The Black Country supports a population of miners, puddlers, rollers, &c. Impure air, hard and exhausting labour, and a total absence of the graces of life, are not likely to foster mental and moral elevation; yet these very conditions, com-

bined with the fluctuations in wages caused by depressions in trade, do conduce to some degree of interest in political and social questions. A politician, but not a poet, may arise from the Collieries.

The agricultural and mining industries are both necessary to the progress of manufactures and arts, and favour the growth of large towns, where the more energetic and ambitious among the population gather themselves together. Through the medium of these aggregations the different sections of the district reciprocally influence each other, so that the towns act as foci, where the rays of light and heat are concentrated, and whence they radiate. In Birmingham, more especially, the intellect is quickened by association and competition, and the leading type is keen, practical and self-confident, firmly believing in the motto "Forward," and appreciating Knowledge chiefly as a synonym of Power.

THE EVOLUTION OF THE SENSE OF BEAUTY.*

I.

"WHAT is Beauty?" This is one of those enigmas which the world of to-day is almost ready to give up. A quality which may with equal truth be predicated of a humming-bird and of the Parthenon, of a daffodil and of the Venus de' Medici, may well perplex the most skilful æsthetic analyst. Besides, esoteric art-critics occasionally make confusion worse confounded by finding beauty where laymen find pure and simple ugliness, and by treating everyone who worships not with them as a heathen man and a publican.

Thus excommunicated, whither shall we turn? The easiest plan, perhaps, were to found a sect of our own, and name ourselves, not pre-Raphaelites, but pre-Adamites. Can we not see in imagination an enthusiastic professor of Fine Arts, holding in his hand a fragment of ivory scratched with a portrait of the mammoth, and dilating upon the truth, the sincerity, the absolute rightness of this primitive masterpiece? Can we not hear him eloquently exalt the Cave-man above his degenerate descendants, who debase the pure outline with impious accessories of colour and of shade? Can we not prospectively triumph in his denunciation of unutterable woes upon a generation which will neither understand nor emulate the calm severe majesty attained by their Palæolithic ancestors? Yes, we must found a sect.

But, to avoid waste of time, we can first assume some rough practical answer to the question, "What is Beauty?" We know, or think we know, beautiful objects when we see them; and that, for the present, shall be enough. Leaving entirely out of consideration the beauty of sound, of senti-

* Read at a meeting of the Mason Science College Union, Nov. 21, 1884.

ment, of character, let us provisionally define beauty as that quality, or assemblage of qualities, which pleases the eye; putting aside, for the present, the further question, "But *what* eye?"

Suppose, instead of pressing on in this direction, we adopt the historical method, and ask, "How did beauty come to exist?" Yet, even under this seemingly modest query, lurks one of those assumptions which are apt to persist in the most highly-developed intellects as rudiments of a pre-scientific age, much as the human body retains vestiges of a tail and a pointed ear. The assumption is that beauty exists as something definite and objective; something which might maintain its quality in the absence of eyes to see or mind to appreciate; something which, at all times, in all places, to all orders of intellect, must be intrinsically the same. Yet, if there be any inhabitants of the planet Mars, possessing powers of vision and taste in art, it is probable, considering the conditions under which they must live, that they would regard Titian's Venus or Raphael's Madonna della Sedia as the portrait of a monstrosity. And there would be no reason, other than planetary patriotism, for rating our own taste higher than theirs. We need not go so far as Mars for an example; save that an art-critic might be moved to a scornful smile were the opinion of any terrestrial mortal urged against his own. Therefore, we may pass lightly over the familiar examples of the Botocudos, with their perforated lower lips, distended by a disc of wood; the Malayans, with their filed and blackened teeth; the American Indians, with their red paint and tattooing; and the Cochin Chinese, who speak with disdain of white teeth like a dog's, and a complexion like potato-flowers.

But to return to our problem, which must be formulated a third time. This, perhaps, is better: "What is the genesis of the *sense* of beauty, and in what manner has it been evolved?" Now we shall offend no one, saving possibly some dogmatist of the "*Quod ubique, quod semper, quod ab omnibus*" school, and even he may listen with some languid interest if the question be worded thus:—"What has caused us to take

pleasure in various classes of objects, natural and artificial?" Even supposing our æsthetic views to be utterly wrong, the history of their development may be as instructive as the history of the rise and progress of any other heresy.

First, it is as well to indicate in a general way the nature of the æsthetic pleasures. All philosophers, from Aristotle to Herbert Spencer, have insisted on their necessarily disinterested character; and they may be defined as "those pleasures which are shareable; which are not directly connected with essential life-serving function; and which do not involve muscular exertion on a large scale, or of great intensity."

It is also possible to classify the materials with which the sense of visual beauty has to deal.

These are *colour* and *form*.* A colour which pleases may be bright, or rich, or delicate. A combination of colours may charm by contrast or gradation. A line may please by straightness or curvature; a combination of lines by symmetry or variety, or by the two united.

But it by no means follows that we are delighted by *all* bright, rich, delicate, contrasted, or gradated colours; by *all* straight or curved lines, or symmetrical or varied shapes; and it does not yet appear why they should ever give us delight.

However, we will not begin with our exalted selves. Let us "consider the lilies of the field," and "behold the fowls of the air." They are far more likely to be helpful companions than the most accomplished lounger through Italian picture-galleries.

The "lilies of the field" and the "fowls of the air" are to guide us in our search for the well-springs of the sense of beauty. And, first, we take the flowers. Here the inquiry splits into two parts. How have they gained their varied shapes, their delicacy of texture, their brilliancy of colour? And how is it that these qualities give us pleasure?

* Light and shade, for present purposes, are included in colour-contrast, and gradation.

The latter question must be postponed for a time, but the answer to the former is becoming an evolutional commonplace. Look, for instance, at the broad yellow sepals of the marsh marigold; look at the wastefully-beautiful water-lily; or, better still, look at the quaint form and economical adornments of the lotus. Notice how she leaves a space in her stamen-tube through which the bee can suck honey, and spreads her yellow wings to supply an alluring seat, but a seat so cunningly contrived that he cannot alight on it without pressing open a casket of pollen, and receiving some of its grains upon his breast. Directly he flies away, the casket shuts with a spring. Now, brightness of colour in flowers tends to what we call beauty, and clever mechanical arrangements may or may not have the same tendency; but the important point to notice is, that both have the same object. The flower wants to send her golden treasure to another flower, and not being able to travel herself, employs and pays a commercial traveller. Are we to suppose that the bee finds the lotus *beautiful*, and is therefore attracted? No, but the bee finds the lotus conspicuous, and learns to regard this particular kind of conspicuousness as an index of sweetness. As we shall see, bright colour does probably produce some faint gratification of the bee's senses, but doubtless the agreeable sensation aroused in the bee by purple or golden petals is chiefly of the same kind as the agreeable sensation aroused in the "*bonâ-fide* traveller" by the sign of the White Lion. The lilies of the field, then, have gained their charm simply by making themselves conspicuous primarily for their own benefit, and secondarily for that of the bee; and the bee approves those charms from the most mercenary of motives.

Turn we now to the fowls of the air. Here we will take up the first part of the inquiry, leaving the rest for future consideration.

How did the birds obtain their fine feathers? They obtained them by *courtship*. How the *Rupicola Crocea* capers about, spreads his beautiful orange wings and his tail like an orange fan, that so he may win him a bride; how the gold pheasants "expand and raise their splendid frills," and even

"twist them obliquely towards the female on whichever side she may be standing," at the same time turning "their beautiful tails and tail-coverts a little toward the same side"; how the peacock shows similar good judgment in displaying to the best advantage, not only his train, but his rich blue throat and breast; is it not written in the book of Darwin, in the book of the Chronicles of the Descent of Man? Is it not likewise written how the fancy of the female birds has continually been caught by accidental variations of form or colour; how, generation after generation, they have consistently chosen the more ornamented males, and thus put a premium on beauty—a prize offered to much better purpose than that golden apple which bred dissension among the gods, and all the woes of Ilion?

But we do not learn *why* the female prefers a bright-hued mate to a sombre-hued mate, or a husband who sports eccentrically shaped tail-feathers to one with a tail of the ordinary orthodox cut. She is not guided by utilitarian principles, for the variations which she approves are not usually helpful in the "struggle for existence." Sometimes, indeed, they are absolutely disadvantageous. Why should any sane and sensible bird-bride prefer a bird-bridegroom who finds his streaming wings or tail-feathers as much in his way as a newly-presented courtier finds his sword? The African night-jar, the Argus pheasant, and the widow-bird are among those who in this way sacrifice comfort and safety to magnificence. How can we explain the fact that a game hen admires her hero for the possession of an ornament which adds to the dangers of battle, because it offers so easy a hold to his enemy's beak, and which, indeed, is always trimmed away by cock-fighters? Shall we set down her conduct to mere feminine caprice, or believe her to be a votary of "art for art's sake?"

"It is easy," perhaps you say, "to explain the bird's liking for decorations. She likes them, just as we do, because they are beautiful." Yes, *you* think them beautiful, but that only means that they please *your* eyes. Be sure that her taste is not guided by yours. "No," you hasten to explain, "they are

beautiful to *her*." Well, that only means that they please *her* eyes; so you have managed to explain that she likes them—because she likes them. That is what is libellously called a woman's reason, and so may do well enough for a female bird; but it will not do for the would-be analyst of that bird's psychology. Nor can we seriously believe that the hen could not see the cock well enough without his dangerously beautiful comb, or that the pea-hen would not recognise her mate unless he advertised himself by a gorgeous but cumbrous "train." Besides, conspicuousness to friends involves conspicuousness to enemies.

Our inquiry into the origin of the love for brilliant hues and varied contours receives a partial answer from the obvious utility of the sense of colour, and still more of the sense of form. Mr. Grant Allen shows that the colour sense in insects has probably been developed in connection with the flowers on which they feed, while that of birds and of mammals has similarly been developed in connection with fruits, and that in both cases the faculty thus evolved has been secondarily applied in the selection of gaily-coloured partners. "If," he says, "the eyes of insects were capable of distinguishing these bright colours, in however imperfect a degree, it would naturally follow that the hues would go on deepening from generation to generation among the plants, while the perception would go on sharpening itself from generation to generation among the insects. For while the flowers which thus become more and more readily distinguishable by their fertilisers would thereby better secure the chance of descendants, the insects which most readily distinguished flowers would thereby secure for themselves the greatest amount of the available food-stores."* Similar reasoning may be applied in the case of birds which live on fruits and on resplendent insects, and the same nerve structure which enables a bird or butterfly to discern the colour of its food, will, of course, enable it to discern the colour of its mate. It is further shown that the most brilliantly-coloured animals, as butterflies, rose-beetles, hum-

* "The Colour-sense: its Origin and Development," p. 46.

ming-birds, barbets, parrots, macaws, toucans, fruit-pigeons, frugivorous lizards and quadrumana, are those which live on the most brilliantly-coloured food, while, conversely, carrion-feeders and nocturnal and carnivorous animals are generally dull of hue.

But all this, as Mr. Allen points out, does not in any way explain the *love* of colour, neither, I may add, do the very evident advantages of a clear discrimination of form explain the love of special shapes.*

We must leave the track which we have hitherto followed, and look a little deeper for our explanation. It is a well-known physiological fact that the normal—that is, the natural and healthy—exercise of any function is pleasurable.† It is naturally pleasant to the eye to look, to the ear to hear; except when the sights or sounds presented are in some way immediately harmful, and therefore painful. Even were this not an induction, we might deduce it from the theory of natural selection. An animal which found its vital activities irksome would soon succumb to more energetic congeners. To say that any being would rather not see, or hear, or smell, or taste, or touch, or feel, or think, is practically to say that it would rather not *live*, and, consequently, that it would not be likely to take very efficient measures to keep itself alive. The survivors, then, will generally be those which not only have the greatest fulness of life, but also the greatest enjoyment of life; and both endowments will usually be transmitted to the offspring. Hence we may conclude that so long as no direct pain, and

* Perhaps I may say that the next few paragraphs were written before I had read Mr. Grant Allen's "Physiological Æsthetics," and that, when I did read the book, I was pleased to find that I had hit upon a similar line of argument, and, in one case, upon nearly the same formula.

† I do not except even the functions of those organs, or parts of organs, which do not receive afferent fibres from the cerebro-spinal system. Normal secretions, digestion, circulation, and respiration, though not distinguishably pleasurable, unite to produce that state of *bien-aise* known as good health; which is, as it were, the background and matrix of all other pleasures.

no inherited or personal experience, testifies against a sound or sight, it will be more or less agreeable to a healthy organ. Till proved guilty, it is not only innocent, but welcome.

Since exercise is in itself a gratification, the amount of gratification will, within certain limits, depend on the amount of exercise, and therefore upon the strength of the stimulus. These limits are reached when the organ begins to feel fatigued; that is, when it gives warning that it is unable to do very much more work, and asks for a holiday. This happens when the waste of tissue exceeds the immediate repairing power. The greatest pleasure is therefore derived from the maximum of activity with the minimum of fatigue.*

This depends upon two conditions. First, the stimuli must be *varied*. They must appeal either to different organs, or to different parts of the same organ, so that one part may not suffer from weariness while another suffers from inertia. When one set of cells has for the time outworn its power of enjoyment, another set must be called into play fresh from its sleep, exquisitely sensitive, and eager to spend its accumulated energies.

The second condition of easy action is *smoothness* or continuity. A rapid succession of stoppages and renewals in the activity of any organ, caused by the quick withdrawal and return of its appropriate stimulus, is unpleasant, because the organ is constantly trying to accommodate itself to altered circumstances, and never has time allowed it for complete fruition. This second condition should be carefully remembered, because it is the basis of some of my future arguments.†

We can now see that the love for light and colour is not a

* Mr. Allen's formula is "the maximum of *stimulation* with the minimum of fatigue." This, however, seems open to objection, since activity and the consequent enjoyment do not always increase directly with the stimulus.

† It is, indeed, the chief point in which my theory differs from that of Mr. Allen.

product of natural selection, though without natural selection it could not have been perpetuated. The first animal which developed a dim colour-perception would from the outset find pleasure in exercising the new faculty. As the animal grew and throve, the multifarious stimuli conveyed to it from the external world would incline it to free exercise of all its parts; and any slightly excessive exercise of the dawning sense would bring a larger supply of nutriment to the new and as yet unstable organ, tending to improve and to diversify its structure, and to make it better able, and therefore more ready, to perform and to vary its functions. Increase in efficiency would mean increase of pleasure, and the pleasure by inducing greater exertion, would in its turn promote efficiency. Such evolution could, of course, not take place (at least in these early stages) unless the added sense were more or less serviceable to the organism. But manifestations similar to those which we associate with the pleasures of vivid sensation are observed in some creatures which we can scarcely credit with consciousness. The *objective*—that is, the physical—side of the process is present; but the subjective—that is, the mental—has yet to be developed. Mr. Romanes* tells us that the tiny Euglena Viridis—a mere speck of jelly—"definitely seeks the light. It prefers the blue rays [probably because, for some unknown reason, they act upon it more strongly than the other rays of the spectrum]. A colourless and transparent area of protoplasm in the interior part of its body is the most sensitive." Actual organs of sight first occur in the medusæ, which "seek the light following a lantern moved round a bell-jar containing them in a dark room," while "starfish and echini crawl towards and remain in the light, even though of such feeble intensity as scarcely to be perceptible to human eyes." Yet, whatever may be said of medusæ and starfish, it is difficult to credit our little Euglena with what is usually called *sensation*.

Here, then, we have to state our law a little differently, substituting "well-being" for "pleasure," and "waste" for "fatigue." The greatest well-being is derived from the

* "Mental Evolution in Animals."

maximum of activity with the minimum of waste. The vigorous discharge of any function, when not carried to great excess, reacts beneficially on the organism as a whole. Therefore, those organisms which court varied stimulation are the most likely, other things being equal, to survive and to replenish the earth.

As we ascend in the scale of existence, consciousness emerges, and this well-being is translated into its subjective correlate—pleasure. Flies and moths even commit suicide from sheer love of light. Bees, as we have seen, are mercenary in their fondness for colours; but this cupboard-love is probably mingled with a purer passion. Sir J. Lubbock finds that they show a decided preference for blue. It is in birds, however, that we have the first trace of something like human æstheticism.

Let us now investigate somewhat more in detail the pleasures and pains given by *light and shade*, by *colour* and by *form*. The discrimination of colour doubtless succeeds that of light and shade, but it will be more conveniently treated first.

I must briefly explain the "Young Helmholtz" hypothesis which is good till a better is suggested; but it scarcely claims to be more than a symbolic expression of facts, and its correctness or incorrectness will not affect the validity of the general theory set forth in this paper.

It is supposed that every part of the retina is furnished with three kinds of nerve-fibres. The first set is chiefly stimulated by the longest ether-waves, producing the sensation of *red*, the second by those of medium length, giving *green*, the third by the shortest, giving *violet*. The sensations of yellow, blue, and orange are each produced by the simultaneous stimulation of *two* of these sets of fibres. For instance, those ether waves which are shorter than the red waves, and longer than the green waves, stimulate moderately both those fibres which perceive red, and those which perceive green, and give the sensation of *yellow*. Stimulation of all these sets gives *white*. A perfectly pure colour is never perceived, because while light-waves of any given

length are *strongly* exciting their own special nerve-fibres, they are also very *weakly* exciting fibres of the two other kinds. The longest waves, for example, which strongly stimulate the red fibres, at the same time faintly stimulate the green and the violet fibres, so that the red always appears mixed with a little white.

But this faint excitement is not sufficient to cause fatigue. After an object of any definite colour has been presented to the eye for an appreciable time, the fibres which have been comparatively idle while their companions have been exhausted will be fresh and eager for action.

If we look at a bright red object, and then turn our eyes to a white surface, a bluish-green image will appear of the same size and shape as the original object. The red nerves have been tired, and only the green and violet nerves are acting; so that practically only the green and violet constituents of white light will be seen by that part of the retina which has been exposed to the red light. The colour of the image is said to be *complementary* to that of the object, because their mixture would form white light.

We now have data on which to explain both the pleasure in isolated colours and the pleasure in contrasted colours. A single pure, bright colour pleases for a time, because it stimulates powerfully, and yet permits a partial rest; but a contrast of colours gives a greater and more lasting pleasure, since it occasions easy and varied action. When the red waves, for instance, have fatigued the delicate structures which receive them, the complementary bluish-green waves are welcomed as a relief and diversion. The red-perceiving fibres rest and undergo repair while the others are exercised. It may be objected that a red and a bluish-green object, placed in juxtaposition, do not affect the same part of the retina. The eye, however, is never kept perfectly steady, but ceaselessly wanders from point to point, so that the pleasure derived from chromatic combination is generally due to what is known as *Successive Contrast*.

Simultaneous contrast, or the effect of one colour in heightening or modifying another, when both are seen at the

same instant, produces much the same results, but seems to be attributable to a different cause. Here we are concerned with deception of the judgment rather than with retinal fatigue, since pale hues, differing little, produce a greater effect upon each other than intense hues, differing much. It seems likely that we unconsciously accept the colour of the larger mass as our standard, and accept it the more readily as it approaches nearer to white. A strip of grey paper on a sheet of pale green paper will look reddish, because it reflects more red light than is reflected by the green sheet. It should be remembered that white is merely a relative term, and that as each set of light-waves stimulates to some extent all three sets of nerves, every colour which is seen differs from white not in kind, but in degree. All ordinary colours, that is, are grades of white. Any pleasure given by simultaneous contrast must obviously be mental rather than purely sensuous.

The explanation of colour discord seems a little difficult. Mr. Grant Allen suggests* that while the red-perceiving fibres are rested by green, they are fatigued by orange or yellow, which continue the stimulation, though in a somewhat slighter degree, and thus make fresh demands upon their wearied energies. Continued contemplation of the same colour overworks the nerves which perceive it, and lessens its apparent brilliancy. The same is true, in a less degree, of continued contemplation of colours standing near each other in the chromatic scale—as, for instance, red and orange. Yet the sufficiency of this explanation seems at least doubtful. The discomfort created by discord certainly is not very similar to our feeling of fatigue, when we gaze long at an uninterrupted mass of one colour. Mr. Sully, in a criticism of "Physiological Æsthetics,"† points this out, and urges that the weariness and consequent distaste should on this theory be *greatest* when the colour is monotonous. Mr. Allen replies that our eyes seek the *boundary* of each colour, and that thus they keep travelling to and fro between the two, instead of escaping into black, white, or neutral

* "Physiological Æsthetics," p. 167. † *Mind*. July, 1879.

tint, as they might were there but one hue, with an uncoloured boundary. It may still be asked,—when the eyes have reached the limit of the red, why should they not go straight on to the opposite limit of the orange? They would be *less* fatigued by thus travelling across a small patch of red and the small patch of orange than by journeying from end to end of a uniform patch of red, large enough to cover both the small patch of red and the small patch of orange. If, on the other hand, they travel back again, they will not be more tired by a double journey across the small red patch, than by a single journey across the large red patch. Besides, if the feeling of discord arises from this species of fatigue, a strong eye, able to bear much stimulation, ought to suffer less from discord than a delicate eye; but we find that the eye is affected in proportion to its *cultivation*, not in proportion to its weakness. A gradation from red to orange is absolutely pleasant; and yet, on Mr. Allen's hypothesis, it should be only one degree less painful than monotony.

Discord of colour probably gives a negative rather than a positive discomfort; a disappointment rather than a pain. We have a certain variety of colour, but we do not get the treat which we expected, and which we should have received from those combinations known as harmonious. Instead of appearing *brighter* by contrast, the tints actually appear duller. Consequently, we are dissatisfied. The effect is much like that of a false rhyme.

However, there may be some physical disturbance as well, and I venture to suggest a theory. The fibres which have been excited by red are still excited by the neighbouring patch of orange; but they are now called upon to respond to light waves of a slightly different length. There may be some discomfort attendant on the sudden necessity of accommodation to this new stimulus, while the vibrations due to the old stimulus still persist. This discomfort will last till the red vibrations have ceased, and the fibres are tuned for orange, and will recur when they have again to be tuned for red. It will be remembered that *smoothness* or *continuity* is one of the essential conditions of easy action.

In *gradation* this condition is fulfilled. The transition from red to orange is made almost imperceptibly, giving time for the fibres to accommodate themselves to the fresh light waves. "All good colour," Ruskin tells us, "is gradated. A blush-rose [or, better still, a blush itself], is the type of rightness in arrangement of pure hue." The painfulness of very crude contrast probably arises partly from over-stimulation of too sensitive a structure, and partly from the too sudden withdrawal of the stimulus from one set of structures, and the equally sudden excitement of another set.

It will now be well understood that the enjoyment of gradated *light and shade* is due to a gradual passing of action into rest and rest into action. The disagreeable effect of flickering must be noticed, because the explanation offered by Mr. Grant Allen seems at least inadequate. He says "all intermittent and jerky stimulation of the optic nerve is unpleasant, because it attacks the fibres just as they are freshly repaired, and therefore most sensitive. To this class belong the unpleasant effects of flickering and unsteady lights." This may be partly correct, but if it be wholly correct flickering ought to be actually pleasant, when the light is very faint. For supposing that the brightest light of the flicker is only strong enough to stimulate the freshly-repaired fibre, just as much as ordinary sunshine would stimulate a fibre somewhat blunted by exposure to daylight, the resulting sensation ought to resemble that produced by the soft radiance of a spring morning. Certainly it ought not to be more painful than the stimulus given by green to "freshly-repaired" fibres which have stood nearly idle, while their neighbours have been receiving waves of red.

It seems that we must again take into consideration the principle of smoothness and continuity. When we look at a flickering candle or lamp, the pupil contracted at any particular moment to the degree required by the intensity of the light which it receives, is suddenly called upon to dilate in order to admit a greater amount of fainter light. It has not quite adapted itself to its new circumstances when a stronger stimulus obliges it again to contract, and before it

has quite accomplished this task, again it is required to dilate. If the illumination be feeble, even at its brightest, the amount of light admitted at any time might not be sufficient to injure the eye, though the pupil should remain dilated. But, as a general rule, contraction is necessary when there is an increase of brightness, and the automatic instinct acts according to this rule, making no exception for particular cases. No doubt the rods and cones of the retina have their share in the discomfort, and are in their own manner continually trying and failing to adjust themselves to the change of circumstances.

In speaking of the æsthetic use of black, Mr. Allen remarks, "in short, the real pleasure in every instance is derived from the positive light, and the blackness only acts as a repairer or non-stimulant." Why, then, does not the positive light produce the disagreeable sensation of a flicker? On our own hypothesis we can answer that when the light occurs in large masses there is generally a sensible *gradation* from light to dark; when it occurs in small bright points, the brightness and darkness are perceived *simultaneously* not *successively*. If, however, the points be too near together, so that the eye ranges from one to the other, the effect is bad. A black dress, thickly sprinkled with well-defined white spots, is almost unbearably dazzling.

From pleasure in *colour* I pass to pleasure in *form*, which seems at first sight scarcely explicable on our theory. However, let us take heart of grace, and inquire into the matter.

Except that there is no actual contact, form exercises the eye much as it exercises the hand. The baby enjoys feeling shapes as it enjoys seeing shapes; and for a long time it wants to handle everything that it can see. But, growing older, it learns that many things can be seen which cannot be handled; that very often it "can't reach," and very often, too, it "mustn't touch"; that, besides, it can look at a great many objects at a time, while it can *grasp* only a very few; so that nature and parental discipline combine to diminish the pleasure of feeling shapes, and to increase the pleasure of seeing shapes. For the faculty which has the most numerous

and varied opportunities of exercise will always be that which brings the greatest enjoyment; so that baby learns to prefer lines followed by the eye to lines followed by the hand. The bird, of course, has no choice, for she possesses no instrument of touch which can trace out forms.

But all kinds of contours will not be equally liked. Curved lines afford an exercise more varied than that given by straight lines, and less fatiguing than that given by angles. Herbert Spencer observes that "the delight in flowing outlines, rather than in outlines which are angular, is partly due to that more harmonious, unstrained action of the ocular muscles implied by the perception of such outlines; there is no jar from sudden stoppage of motion or change of direction, such as results in carrying the eye along a zigzag line." Another example, be it noted, of the principle of smoothness. Mr. Sully carries out a similar idea with more detail.* He shows that "gradation in direction, which is at the basis of all curvilinear movements, depends on a gradual alteration in the relative degrees of activity of two or more muscles, and so corresponds to gradation in colour or tone, which is supposed to rest on a gradual increase of activity in certain nerve elements, and decrease in others." He further points out that a straight line is the easiest to follow, and therefore gives a certain negative comfort, and that the pleasure taken in symmetry may be partially explained by the harmony in the movements of the two eyes, and by the relationship which the parts of a symmetrical object seem to bear to a real or imaginary centre. "Owing," he says, "to the structure of the retina, the centre of an object, or a group of objects, is naturally raised to a place of honour."

Yet the purely physical gratification derived from varieties of form is probably less vivid than the corresponding mental gratification. Not only the lower, but the higher nerve-structures, require diversified and congenial occupation. The cerebral hemispheres want to be kept active, and they exert themselves healthily and pleasurably by taking note of the similarities and dissimilarities of surrounding objects. Every

* "Pleasure of Visual Form" (*Mind*, April, 1880).

fresh curve, every new kind of contour, every pattern of twining and waving and intersecting lines, is a new intellectual stimulus.

The bird is exactly at that stage of evolution where, on this theory, a taste for new combinations might be expected to attain a distinct development. Not only is the average weight of the brain in proportion to the body greater than in the lower Vertebrata, but this increased weight is chiefly due to the greater development of the cerebral hemispheres. Yet the hemispheres are still unconvoluted, and the intellect correspondingly simple, so that the stimuli which it craves must be elementary, abundant, easily assimilated. These conditions are satisfied by those freaks of conformation which catch the keen eye and fix the practised attention of the bird.

We now begin to see why the hen is pleased where one of her lovers develops a new streak or spot or eye of colour, or a tuft of feathers arranged in an unhackneyed and conspicuous fashion. She likes vivid sensations and vivid ideas. It is a joy to be alive, and to be as much alive as possible she must have her faculties brought into vigorous play. So she chooses the mate who will best satisfy this craving for fulness of life. Artist she is not. Of beauty, properly so called, she has perhaps no conception; but she is a healthy living being, who instinctively takes measures to be as healthy and as living as she can. In fact, she is a flying refutation of pessimism.

All this, as we shall see, is true under certain limitations. I can imagine that someone will object—"But has the hen-bird, like many human females, an undiscriminating admiration for 'the latest novelty'? Does she select her husband simply because the fashion of his coat is 'new this season'? If she did, would such a process of selection be more likely to lead to the evolution of the *beautiful* than to the evolution of the *queer*? Would it, indeed, lead to any evolution at all, and not rather, as in human fashion, to a capricious see-saw?"

We must remember that the possibilities of organic evolution are always limited. The human female may one year

sprout out at the head, the next year at the shoulders, the third year just below the waist. In the course of a lifetime, she may indulge in every hue and every shape which has ever disguised the human form divine. The "weight of too much liberty" may be her æsthetic ruin. Yet even with her, custom counts for much, and she does not make the most of her advantages or disadvantages.

But the bird has no such power of capricious change. If he has begun to grow a crest, the chances are, not that he will begin next season to grow a ruff or a hood, but that he will develop the crest, and pass it on to his descendants. And, since the welfare of every being depends on its ability to accommodate itself to its environment, the hen-bird has wisely adjusted her ways to her means. Her hankering after novelty is checked by a deep-seated conservatism. She likes the *fresh*, but not the *strange*. The male must be recognisable as belonging to her own family, otherwise she will have none of him. Besides, she always prefers the more vigorous male, when other things are equal, and even when they are *not* equal, and this sensible preference naturally limits her choice. Albino birds are shunned by the rest of their species. Dovecot pigeons dislike all the highly-improved birds; doubtless suspecting something uncanny beneath the outlandish attire. There seems to be a good deal of individual difference in this respect, some hens being much more advanced in their ideas than others, and less imbued with tribal prejudice. A male blackbird and thrush (living in a state of nature) have been known to pair; a male widgeon chose a pintail duck; a Canada goose, living with twenty-three others of her own kind, selected a Bernicle gander; indeed, it appears that geese are peculiarly susceptible to these irregular attachments.* But such instances are exceptions to the general rule.

The evolution of the *queer* has, however, very often occurred. Behold the toucan, with its enormous and highly-coloured beak; the turkey-cock, with his solemn strut and inflated wattles; the "indescribably odd" attitudes into which the

* "Descent of Man," p. 414.

carrion vulture throws himself at the beginning of the love season. Even the delicately-adorned Argus pheasant presents a decidedly ludicrous appearance when courting, expanding his wing-feathers into an enormous fan, and pushing his head between two of them to watch the effect produced.

Still, it is natural to suppose that our idea of beauty, in its simplest form, would coincide pretty well with the bird's taste, since it has been nourished on very much the same materials. It is from contrasts of bright colour and from varieties of curved form that the baby and the bird receive their earliest visual satisfaction.

We have seen that the baby and the bird are much alike in the origin and nature of their love for "pretty things." But the æsthetic faculty in man, though springing primarily from very simple germs, is subjected to very numerous and complex influences, which increase in number and in complexity as he advances in civilisation. Savages, children, and uneducated persons generally show an almost unbounded love for the brilliant and the novel. The Andaman islanders paint one side of the face red, the other green. One tribe in South America had for its only apparel a macaw's feather stuck in a hole at each corner of the mouth, and strings of shells hanging from noses, ears, and under-lips. In the cave-dwellings are found hollowed stones, used by primitive man for grinding the ochres with which he painted himself.*

Why is it that we do not all keep our childish taste; that we tone down our carpets and wall-papers; that we prefer an interior by Rembrandt to a gaily-coloured nursery picture-book? Why do we not tattoo ourselves, paint our faces red, blue, white, black and yellow; scar our cheeks and distend our lips? And why do we care about the rainbow and the clouds and the sea, which never seem to awaken the slightest emotion either in a bird or a monkey, and very little in a savage?

As civilisation proceeds, and a leisure class begins to be formed, energies hitherto needed for the maintenance of life are set free for its adornment. We are more and more in-

* Tylor's "Anthropology."

clined to employ ourselves in observing evanescent distinctions, half-shades and half-tones, subtle lights which melt into shadows, subtle shadows which relieve masses of light. Glaring contrasts are sufficiently obvious, and have attracted enough attention; and the very same natural love of variety, which makes gaudiness pleasing to the savage, inclines the civilised man to seek new and refined combinations. In his search for a fresh sensation he becomes unsensational. He begins to desire that his art shall be true, as well as attractive and symbolic; and perfect truth can be attained only by the imitation of soft natural hues. The human cheek cannot be adequately represented by a splash of vermilion, nor the human eye by a dot of blue.

Accustomed to the prevalence of subdued tints, and to the sparing use of bright ones, the retina grows more and more sensitive. It is offended by the immediate juxta-position of complementary colours, while gradation affords the perfection of easy enjoyment. The finer instrument must be kept for finer uses. The razor is unfitted for the function of a hatchet.

The æsthetic and emotional values of different colours now begin to be more definitely settled. Those at the red end of the spectrum are associated with warmth and pleasure; those at the violet end, with coldness and comparative gloom. The golden splendour of the sun, the gleam of sunlit water, the golden-brown or golden-green tinge of the landscape on a bright summer day, the orange-red of ordinary flame, the crimson of sunrise and sunset, the scarlet, orange, or purple colours of summer and autumn fruits; all these belong to the family of reds, and to "the warm precincts of the cheerful day." The cloudless sky is indeed blue, but the prevailing tint of a sunshiny day is certainly not blue, but gold. Blue is associated with gloom and coldness, because it is the last colour which remains visible when the shadows fall. Yellow and red and green are lost one after the other, and the prevailing tint of a clear midnight is deep violet blue. It may also be noticed that the brighter among the colours which belong to the violet end of the spectrum are rarely met with in nature, and displease, partly because they seem unnatural,

and partly because the nerve-endings are not tuned to their special rate of vibration. Very brilliant blue or violet is much more painful than the very brilliant red which reminds us of sunrise and sunset, of mountain-ash berries and of poppies. Brilliant green is unpleasant in the same way, while the tender greens of grass and trees can give only a gentle and sober satisfaction. Even magenta would doubtless be a delightful colour if we were accustomed to magenta roses, but the cultured taste finds it strange and untrue. The highly evolved organ, being in a state of harmony with external nature, craves for less variety than the imperfect and unstable organ, so that the most cultivated eye will demand little save what is supplied by the environment.

But the utilitarian element has played a large part in the evolution of that æsthetic faculty which finds its best joy in the contemplation of the human form divine. The hen-bird who preferred the most vigorous partner transmitted her taste to her vigorous offspring, so that the taste went on increasing from generation to generation; and the same thing happened to man—at least in his earlier stages. In primeval days the race was to the swift and the battle to the strong, and swiftness and strength were titles to all power, all glory, all honour. Full development of the muscles, due proportion of the limbs, suppleness and ease of movement, a broad chest, an erect carriage, were the primitive patents of nobility. They were envied, praised, admired. The woman, though not sharing the dangers of the chase and the field, had yet a variety of occupations, and must be healthy and vigorous that she might do her work and bear warrior-children. Luxuriant hair and healthy complexion betokened the natural princess. The love of curved lines and of symmetry were confirmed by the curvatures and the proportions of the body, and by the rhythmic action of the muscles and limbs. Weapons and tools, the products and the instruments of this action, again ministered to the taste for symmetry, and taught a regard for straightness.*

* See Mr. Grant Allen's "Origin of the Sense of Symmetry" (*Mind*, July, 1879), and "Æsthetic Evolution in Man" (*Mind*, October, 1880).

As time went on success began to depend upon mind more than upon muscle, and the face, the index of intellect, was more attentively studied. It was perceived that the projecting jaw, the receding forehead, the high cheek-bones, and the flat nose, with nostrils opening forwards, are characteristics of the lower races, and that they are generally associated with deficient intelligence. As Herbert Spencer points out, "the ideal Greek head is not only free from these peculiarities, but possesses the opposite ones." With its large facial angle, straight nose, delicate mouth and chin, small cheek-bones, it is the very antithesis of the primitive anthropoid ape. It is the type of the god-man, if approach to the divine means recession from the bestial.

And thus grew those glorious images of perfect health and perfect beauty which move us to worship in the Vatican, on the Capitoline Hill, and in the Uffizi Palace in Florence. We worship not Apollo, or Jove, or Venus, but the great goddess Hygeia.

The formation of the Greek ideal, or of any ideal, presents an interesting problem. How did it grow? What was the manner of its evolution? No one now imagines that the sculptor took a nose here and a mouth there, from one model a leg and from another an arm, and combined such *disjecta membra* into a complete body. Nor is it generally supposed that prior to all experience he carried in his mind an Archetype, which enabled him to outdo Nature, and to reveal the true design of her imperfect work.

A solution of the problem is suggested by a very modern invention. Mr. Galton's method of composite photography gives us the clue to the evolution of Greek art.*

A number of portraits are selected, similar in size and attitude, and having the same general type of physiognomy, although the individual differences may be many and marked. Their images are thrown in rapid succession upon the same portion of the same sensitised photographic plate, and the result is a *generic* portrait—like all, yet bearing

* See Mr. Galton's "Researches into Human Faculty;" also an article on "Generic Images," *Nineteenth Century*, March, 1879.

exact resemblance to none. Individual peculiarities disappear, and only the lines common to all, or to most, are preserved. But this typical face is almost invariably far more beautiful than any of the faces from which it is composed. A composite taken from five portraits of Cleopatra is described as being, "as usual, better-looking than any of the components, none of which, however, give any indication of her reputed beauty." Family portraits, compounded of old and young, male and female, are in most cases, "flatteringly handsome."

Mr. Galton points out that the generic portrait is strikingly analogous to a mental concept, and that the formation of the one may help to explain the formation of the other. The brain of the observer may be regarded as a sensitised plate—weakly sensitised in the ordinary man, strongly sensitised in the artist. The plate, or brain, receives a number of superimposed impressions; those which are in some degree similar blend and coalesce, the lines which coincide being strengthened, while those which deviate widely tend to fade away. What remains is the pure type, which may be the portrait of a race, a class, or a family. Though perhaps never seen in real life, it is abidingly present to the mind's eye, and becomes a standard by which real life is judged.

The analogy (as Mr. Galton himself remarks) is not perfect. The mind does not always distinguish between superficial and essential resemblance; and even when it has been trained to such discrimination, there is another important source of error. A single picture displayed ten times as long as any of the others would produce on the sensitised plate an effect ten times as great; but this is not always true of brain-images. The impression produced by the more common outlines does not increase in the ratio of their frequency, and therefore is not sufficiently strong to overpower the impression produced by outlines which are less common. Extreme forms will, therefore, leave very visible traces. However, this flaw in our analogy really only makes the explanation more complete; for it is noticeable that all

art tends to exaggerate the distinctive features of its ideal. Indeed, the natural craving for variety and intensity carries art even beyond the boundary of actually-existing shapes. The facial angle of the Greek type—as remarked by Herbert Spencer—is larger than we ever find it in nature, the cheek-bones smaller, the nose straighter.

But why does the generic image appear beautiful? Mr. Galton ascribes its beauty to the smoothing away of individual irregularities; but this obviously is a mere re-statement of the facts, not an answer to the question. We must look a little deeper for our reply.

Impressions of every kind are received by the artist, as by the ordinary observer, and unconsciously combined into generic ideas. Wisdom, power, love and majesty—these abstractions, produced by the synthesis of many concrete experiences, dwell in the mind, and crave for embodiment. They ask to be born into the visible world.

But, clearly, the best incarnation of Power must be the compound image of many strong men; the best incarnation of Love must be the compound image of many attractive and lovable women. Wisdom will be symbolised by the ideal portrait of a sage, and divine majesty by the union of those outward attributes which mark the born kings of men. And since the qualities to be thus represented are such as have been gained through ages of evolution, and are therefore advantageous to the race, their physical correlates will be proportionately valued; till at last the reason for admiration is forgotten, and prosaic utilitarianism merges into æsthetic adoration. Yet the incarnation must never lose its soul, and degenerate into simple fleshliness: the more perfect the symbol, the more perfect the beauty.

With Christianity comes the gradual development of a more spiritual and emotional character, not to be typified save by the manifold expressiveness of painting. It would be out of my province to attempt even a sketch of the progress of Christian art, from the stiff outlines in the Catacombs, to the awaking, but still fettered, genius of Cimabue and Giotto, and the full freedom of Michelangelo

and Raphael. But it is Raphael's glory that he has satisfied the three demands which the human soul addresses to its artistic ministers: he has stimulated the eye by rich colour and contrast of light and shade; he has gratified the love of life by his healthful mothers and chubby infants; he has responded to the emotional instinct by suggestions of tender human feeling in his Madonnas, and of rapt ideal devotion in his wondrous St. Cecilia.

I need say little about the taste for the "picturesque" and the rise of the landscape art, since here I fully agree with Mr. Grant Allen.* He points out that the primitive love of beauty is never evoked except by an object more or less closely connected with some physical need. The bird concentrates its attention on its own species, and does not trouble itself, so far as we know, about the unpractical beauties of sky and sea. Primitive man takes the liveliest interest in the decoration of his weapons and tools, and in those natural objects which he can use as ornaments for his person; then he begins to take pride in adorning the home, the palace, and the temple; when he cultivates the ground, his orchard and garden are pleasing in his eyes; and, finally, when travel has become easy, and the mountain, the precipice, the ravine, the glacier, the forest, the sea, are no longer symbols of weariness and terror, of cold and hunger, of long toilsome journeys amid savage tribes, he at last feels a free and fearless pleasure in the lines and lights and hues of landscape and seascape.

If I have succeeded in nothing else, I think I have at least indicated the difficulty and complication of my subject. Our ideal of beauty has not been miraculously cast down from the skies as a golden image to be worshipped for ever and ever. It is a growing organism, sprung from simple germs, always evolving into more complex forms, varying, like all organisms, with its position in time and space, and with all the conditions which surround it. Every change in climate, in custom, in morality, in government, in religion, has left its trace on this sensitive part of our nature. There

* "Æsthetic Evolution in Man" (*Mind*, October, 1880).

is no warrior, no ruler, no anarchist, no saint, no philosopher, no man of science, who has not, consciously or unconsciously, influenced its growth. Not a need, or emotion, or illusion, but has helped to mould the private and public ideal.

The very intolerance which makes the æsthetic reformer pose as a prophet, and deliver the burden of the Lord against his fellows, may often be a sign or a source of strength; the very tolerance with which the eclectic art-critic admits the merits of all styles and schools, may be only the last flower of weakness. Yet there should be times when the veriest specialist in art looks up from his own little valley, and, beholding the mountains which surround it, dimly believes that from its heights may be seen rivers and plains and seas, and a broader heaven.

WHAT IS RELIGION?*

A VINDICATION OF NEO-MATERIALISM.

Annotated by Robert Lewins, M.D.

"Take the Godhead into your own being,
And He abdicates His heavenly throne."
Schiller's *Life and the Ideal.*†

To exponents of a rational system of thought and practice, suited to the spirit and requirements of our age, and freed from the anachronisms of pre-scientific times, no question can be more important than that which stands at the head of this paper. Its meaning is as follows:—Has religion been a supernatural, formative influence, moulding the lives of men and the history of the world, and standing steadfast amid the changes of which it was the primal cause; or is it a product of the human brain itself, reacting upon the destinies of its creator, yet modified by every variation in his mode of life, and serving as a sensitive index by which the state of his circumstances and character may at any time be determined? The last clause of this question needs, indeed, some revision, for it may more fitly be inquired whether religion has had any practical existence at all in national or public affairs for the last two hundred years. For the present, however, we will simply ask: "Can there be any genuine division between the spiritual and the

* Published by William Stewart & Co., 1883.

† In his correspondence, the immortal Suabian poet and thinker dwells much on the great philosophical significance of this *Lehrgedicht*, as he terms it, under its original title, in the *Horen* for 1795, of the "Realm of Shadows" [Phenomena].—R.L.

secular? Can the former live if dissociated from the latter? Has it any pure and irresistible force which it can oppose to mere carnal weapons, whether these be the pen or the sword?" John Stuart Mill has said that the Church of Rome has befriended human freedom by the "separation, unknown to antiquity, between temporal and spiritual authority. . . . The separation between temporal and spiritual is founded on the idea that material force has no right, no hold, over the mind, over conviction, over truth." This, at first sight, seems plausible; but the confusion of thought soon becomes evident when we investigate the means by which "spiritual authority" was enforced, and the manner in which the so-called separation was carried out. The fair ideal of an empire of conscience, upheld by no baser forces than righteousness and truth, will melt into thin air when we find that the Church emancipated herself from the control of the State only to usurp its power. The Church was no pure immaterial essence, inspiring the souls of men and ruling them by divine love or divine law, but a very tangible political agent, a diplomatist, a warrior, and, in short, the fitting earthly representative of a monarchical deity. Here was no separation, but a partial transference of function; for what was lost by the secular was gained by the ecclesiastical State. The ends to be obtained were somewhat altered; the means used remained the same. After the first young enthusiasm for Christianity had passed away, the threat of hell and the promise of heaven ceased to exercise any general or paramount influence over the minds of men, unless supported by some more mundane force; and when a band of heretics dared to assert the supremacy of conscience and conviction, they were brought to their right mind, not by argument or persuasion, not by empty anathemas, but by fire, sword and famine. Spiritual authority separated from temporal is the law without the magistrate. In theory the two may be dissociated; in practice they are ever one. Influence, inspiration, or gentle guidance can only be exercised when there is substantial harmony between the leader and the led; while the very

word "authority" implies the possibility of resistance, and, therefore, the possibility of its forcible suppression.*

The career of Gregory VII, in whom were incarnated the ambition, the intellect, and the piety of Romanism in its most glorious days, aptly illustrates the dependence of religion upon the temporal power, and its utter impotence when deprived of all save its own proper resources. Dean Milman eloquently describes the ideas which inspired that stern yet politic reformer of the Roman hierarchy: "The first, the avowed object of Gregory's pontificate, was the absolute independence of the clergy, of the Pope, of the great prelates throughout Latin Christendom down to the lowest functionary whose person was to become sacred; that independence under which lurked the undisguised pretensions to superiority. His remote and somewhat more indistinct vision was the foundation of a vast spiritual authority in the person of the Pope, who was to rule mankind by the consentient but subordinate authority of the clergy throughout the world. For this end the clergy were to become still more completely a separate, inviolable caste, their property equally sacred with their persons. Each in his separate sphere, the Pope above all and comprehending all, was to be sovereign arbiter of all disputes; to hold in his hands the supreme mediation in questions of war and peace; to adjudge contested successions to kingdoms; to be a great feudal lord, to whom other kings became beneficiaries. His own arms were to be chiefly spiritual; but the temporal power was to be always ready to execute the ecclesiastical behest against the ungodly rebels who might revolt from its authority; nor did the Church refuse altogether to use secular weapons, to employ armies in its own name, or even to permit the use of arms to the priesthood"

* Of course, I do not here include such ideas as the "authority of tradition," "of custom," etc., which imply merely that influence of our environment from which it is so hard to free ourselves, but which can exercise no compulsion upon an independent mind and a strong will. This dead-weight is essentially different from that active and resistless control necessary for the mental or moral government of a community.

(*History of Latin Christianity*, vol. iii, p. 104). What more sublime and comprehensive idea could have possessed the mind of a mediæval Churchman? What could be more alien from any renunciation of political power?

The whole career of Hildebrand and his relations with the German empire enforce the same lesson. His spiritual influence kept pace, in its progress and decline, with his temporal authority; and nowhere is this more strikingly shown than in the different effect of the two sentences of excommunication, separated by an interval of only four years, which he pronounced against the Emperor Henry. In 1076, when the first was uttered, Henry was an undeveloped and indolent boy, not yet aroused from the debaucheries of his youth, and comprehending neither the powers nor the responsibilities of his position. The nominal sovereign of a country ruled by turbulent princes and priests, bearing the imperial title, but destitute alike of self-respect and of the reverence and loyalty of his subjects, there can be little wonder that, when his most powerful vassals sided with Rome, he cowered before the Papal anathemas, and was goaded at last to a frantic and fitful resistance, only to sink into yet deeper humiliation. But four years later, when, with a character ripened by strife and suffering, he was about to cross the Alps and beleaguer the Eternal City at the head of a victorious army, the emperor was able to meet a new excommunication with dauntless spirit and prompt action. Not one of his supporters was intimidated by the threats which so short a time before would have sufficed to sever the most sacred ties and annul the most devoted allegiance. Yet another proof was to be given—that, rather than trust to spiritual influence alone, the Holy See must avail itself of the grossest and most violent material force. When Rome, after three years' siege, was saved from the vengeance of Henry, only to become the prey of Robert Guiscard with his horde of Normans and Saracens, what commands or menaces were issued to his quondam allies by the imprisoned Gregory? Had his spiritual suzerainty been independent of political power, he should have

stayed by a few inspired words the mutual rage of his subjects and his avowed defenders, and have saved the Holy city from a desolation by blood and by fire more fearful than any wrought by the barbarians who laid it waste in ancient days. But "no powerful intercession is now made—no threatened excommunication is now menaced—in behalf of his rebellious and perfidious, yet subdued subjects—most of the sufferers no doubt guiltless and defenceless. The ferocious Guiscard is still recognised as his ally, his deliverer, his protector, perhaps his avenger," (*History of Latin Christianity*, vol. iii, p. 198). Thus, even Hildebrand, the representative of Rome in her zenith of glory, was powerless against the steel and flame of his friends and enemies unless he had similar instruments at his own command. If this is done in the green tree, what shall be done in the dry?

How can the idea have arisen that the Church of Rome is the "parent of liberty of conscience"? Doubtless from the fact that she was the first foe of Erastianism, and that the existence of a clerical caste, answerable only to their ecclesiastical superior, and potent where the civil government was impotent, must have been a disintegrating agency, helpful in many cases to the cause of freedom. Like any other great party animated by a single idea, it contained the germs of revolt and reform. But though the pope was independent of the king, it by no means follows that right was independent of might. The truth is, rather, that the spiritual power, which was also temporal, claims jurisdiction over the temporal power, which was not spiritual. There was no real disjunction between Church and State, but a most perfect and intimate union. Just as in early Greek philosophy the soul was but a subtle material essence, and as modern physiology regards consciousness and volition as the function of the cerebral hemispheres, so the Roman hierarchy was at once body and soul, spirit and matter. It is true that the brain rules the members; but the brain is itself a material organ, exercising "material force." The influence of Church upon State was that of nerve upon muscle.

Only in later days of decadence and indifference can a distinction be drawn between religion and politics; and it is an instructive task to trace out the general restriction of theological modes of thought to wholly unpractical questions. When theology was, like its Deity, omnipresent, it could not fail to interpenetrate all secular affairs, as an imponderable ether flows round and envelopes the close-set atoms of a metallic body. The synthesis was natural: the analysis was the laborious duty of a sceptical epoch, and is not yet fully accomplished, since it has to be extended to the spheres of morals and education. Its completion will mark the death of all earnest religious feeling. If religion be a living reality, and contains a rule for daily life, there seems no reason why the party politician or the practical statesman should be shy of quoting the Bible in support of their principles, or why our foreign and domestic policy should not be avowedly regulated by the Sermon on the Mount. I am not aware that a business transaction between professed Christians is ever decided by an appeal to Scripture, or that an action at law between members of the same Church is ever stopped by a remembrance of St. Paul's condemnation of those who "go to law before the unjust [unbelievers], and not before the saints." Our very existence as a commercial nation is diametrically opposed to the spirit of both the Old and New Testaments; and the denunciations of "Babylon, that great city," in the Book of Revelation, might well be uttered of nineteenth-century London.*

Considerations of this kind are sufficient to dispose of the oft-repeated plea, that our belief is too sacred for frequent

* Lord Bacon, in his *Essay on the True Greatness of Kingdoms and Estates*, as elsewhere, is also most emphatic in his doctrine that arts, commerce, and manufactures are most flourishing during the decline of nations. The intense "industrialism" of England and America is thus—as Mr. Herbert Spencer recently said of the latter at New York—not true progress, but the worst form, not merely of political and social, but of *racial* degeneration and decay. Arts, science, learning, commerce and manufactures are *per se* not evil, but good; yet a noble race of men is better still. "*Le mieux est toujours l'ennemi du bon.*"—R. L.

utterance, and must ever remain a secret spring of conduct. Every ardent and deep-seated emotion, especially if common to an entire people, must constantly betray itself in action and speech, as well as in the general tenor of life. We are certainly not more profoundly religious than Cromwell and his Ironside warriors, who sang psalms as they charged the foe; or than that Scotch Parliament which, when required by James II. to pass an Act for the toleration of Catholics, and bribed by the offer of free trade with England, replied indignantly! "Shall we sell our God?" The Revolution of 1688, which rendered for ever null and void the dogma of Divine Right, is the last great event in our history deeply coloured by religious feeling; and questions which were then discussed theologically would now be argued, even by ministers of the gospel, on purely political grounds. If Theology ventured to raise her voice, she would be viewed in the same light as some emotional and sensitive woman, who may, perhaps, be heard with forbearance, but must not be suffered to meddle actively in matters of business.

The circumstances connected with Mr. Bradlaugh's claim to take the Parliamentary oath, which may seem to contradict this conclusion, really confirm it, for a nation of practical secularists can tolerate passive religion better than active atheism. With the one they have been from childhood so familiar, that it seems to them an indispensable accessory of civilised life, settling problems which they have no inclination to settle for themselves, and not interfering with their daily habits. But the other bids them to penetrate into those very regions of speculation which they know only by report, and which present all the terrors of the untried, the obscure, the forbidden. Even dealing with such unaccustomed—and therefore objectionable—phenomena, they scrupulously avoid any defence of the position assailed, and prefer to represent their hostility as based on moral or technical considerations. In the present case the question has been made largely a political one, and neither side can claim any monopoly of religious zeal, the ayes and noes in a division affording no clue to the theological beliefs of the members

voting. Mr. Gladstone is certainly no less staunch a Christian than Sir Stafford Northcote; and, were their party positions reversed, the policy of each in reference to Mr. Bradlaugh would doubtless suffer a corresponding change. It is a noteworthy fact that his admission to Parliament was advocated by the great majority of orthodox Nonconformists, who certainly are not the least earnest members of the religious community. One of their most able pulpit exponents and orators, Dr. R. W. Dale, in the course of a speech delivered at Birmingham in favour of Mr. Bradlaugh's claims, mentioned with approval the conduct of the Northampton constituency, which "prefers to be represented by a Liberal, even though he is an atheist, to being represented by a Tory, no matter what his religious faith may be." With these examples before us, we can scarcely attribute the conventional dislike of Atheism to any ardent zeal for Christianity, or burning love for spiritual truth.

But it is doubtless desirable that the public mind should be awakened, not only to interest in topics of transcendent importance, but to conscientious and fruitful inquiry; and it might not be a national loss, even though the accumulation of wealth were for a time subordinate to the search for truth, and if eyes, from which the sunlight is now hidden by dingy walls of factories and warehouses, were permitted to rove onward and upward through the boundless heavens, their range only restricted by the necessary limitation of human vision. Can such a stimulus to active thought be supplied in the present day by supernatural religion, or must we seek it from the party of revolution and reform? To solve this problem it would be necessary to consider the relation of genuine faith to genuine reason, and to decide whether a Christian can consistently regard the latter as the judge of revelation. Without such freedom he is obviously forbidden to investigate the highest problems accessible to the intellect of man. Let us hear Cardinal Newman on this point, remembering that, since every religious system is based on certain fundamental dogmas, which transcend experience, and do not admit of evidential or rational proof, the following

quotation applies not less to Protestant than to Catholic theology, although our liberal Churchmen shrink from the logical application of principles which they implicitly profess: —"It is perfectly true that the Church does not allow her children to entertain any doubt of her teaching, and that, first of all, simply for this reason, because they are Catholics only while they have faith, and faith is incompatible with doubt. . . . If it is true that God became man, what is the meaning of my anticipating a time when, perhaps, I shall not believe that God became man? This is nothing short of anticipating a time when I shall disbelieve a truth. And if I bargain to be allowed in time to come not to believe or to doubt that God became man, I am but asking to be allowed to doubt or to disbelieve what is an eternal truth. . . . And so again, when a man has become a Catholic, were he to set about following out a doubt which has occurred to him, he has already disbelieved. . . . This, then, is the direct and obvious reason why the Church cannot allow her children the liberty of doubting the truth of her word. . . . Let a man cease to inquire, or cease to call himself her child" (*Characteristics from the Writings of J. H. Newman*). If all the world had strictly followed this injunction, choosing the former alternative, it is clear that modern science and philosophy would have died in their cradle.* Uncoloured reason can no more enter the church than white light can stream through the emblazoned windows of her cathedrals. And since the party of faith is logically incapacitated from inquiry into subjects already decided by the Bible, if not by the church, let us turn with hope and gratitude to the party of doubt, to whom truth is not a prison, but a world whose horizon ever broadens with their advancing steps.†

* Luther and the Protestant Churches are not one whit less intolerant. Even John Locke, unwarrantably assuming the infallibility of the Scriptures and the supernatural character of Christ, in his *Epistola de Tolerantia*, published in 1689, and therefore *after* our Revolution, excluded both Atheists and Roman Catholics! Unitarianism, the sect of Sir Isaac Newton, was, in his day, proscribed by a law, only repealed in 1813.—R. L.

† The term "religion" is derived by most grammarians from *religare*,

Since the principles of Catholicism maintained their supremacy, not only by faith and spiritual enthusiasm, but by fraud and material force, they can in this respect claim no superiority over those which inspired the French Revolution. Nor should the fact that fearful excesses of cruelty and vice were committed in 1789 and the six following years make us unwilling to recognise the fresh life infused into the world even by the sanguinary zealots who knew not what they did. They were the avengers of centuries of oppression and accumulated wrong, and, like the inexorable forces of nature necessarily confounded the innocent with the guilty, and visited upon the children the sins of their fathers. The French Revolution was, indeed, the unexpected yet inevitable consequence of antecedent conditions, not only in France, but throughout Europe. Its evils differed from those of the monarchy as the tumult of life differs from the corruption of death. They were the swift and concentrated result of slow and steady preparation, begun by Charles VII., when he gained the power of levying the *taille* by his own authority, and laying upon the poor a burden from which the rich were exempt; continued by Charles IX. and Catherine de Medicis when they consummated the massacre of St. Bartholomew; by Louis XIV. in the revocation of the Edict of Nantes; by every sovereign who withdrew political and even municipal power from the towns, and aided centralization by concentrating the life of the community in Paris; by every seigneur who neglected and scorned the peasantry of his estate; for these, no less than Voltaire, Rousseau, Diderot, were pioneers and progenitors of the Revolution. Its path was made straight by that declaration of July 17th, 1724, which, while ostensibly aiming at the relief of the poor and the suppression of mendicancy, crowded thousands of shivering wretches, "almost

to bind fast the mind [as if by manacles]. And surely the above argument of Cardinal Newman—quite at one with that even of John Locke, *Logos* of our Revolution of 1688, as Milton of the Puritan revolt—is a true *phimosis mentis et cerebri*, the only radical cure for which is its sheer root and branch *extirpation* by free thought. The snake must be killed, not merely scotched. Its day of grace is for ever fled.—R. L.

without clothes and without food, into the narrow precincts of the hospital," and by the brutal Comptroller-General, who wrote to his subordinates: "Lay them on straw and feed them with bread and water, and they will take up less room" (*Histoire de France*, par Henri Martin, vol. xv, p. 125). Another accomplice in future horrors was Cardinal Fleury, under whose indolent administration "the peasants died off in their poverty like flies." When Louis XV., crossing the Faubourg St. Victoire to the new Maison de Chaise, the scene of his licentious pleasures, heard the throng shout, not "Vive le roi!" but "Misère, famine, et du pain!" some foreshadowing of the fate which was soon to overwhelm the monarchy should have passed for a moment before even his debauched and sensual mind. When, in 1724, all Protestant forms of worship were again forbidden on pain of death to those concerned, while even connivance in secret meetings of the sect was made punishable with perpetual slavery in the galleys; when the bed of death itself was not sacred from the intrusion of the priest, empowered by Government to exhort and threaten the sufferer, and to denounce any heretical minister who might be rendering him the last services of his religion; when, if the sick man died, having refused the sacrament, a posthumous suit was instituted, and his property confiscated; when it was no uncommon thing for the priest, before he would consent to marry the children of Protestants, to make them curse their deceased parents and swear belief in their eternal damnation; and when persecutions such as these coexisted with open and general mockery of the religion they were designed to enforce, it might have been clear to any keen-sighted and impartial observer that the end was not far distant.*

The positive evils which I have enumerated were indeed great; but they might have been endured for a time and gradually remedied had the whole political and social organism

* The Penal laws against the Roman Catholics of Ireland—sanctioned in principle even by the "tolerant," liberal John Locke—may be compared with the above persecution of the French monarchy.—"*Tantum Religio potuit suadere malorum.*"

been vivified by the spirit of the age. In earlier days heavier fetters had been borne with less injury. The Inquisition was an engine of cruelty more terrible than any which has existed in recent times, and feudal serfdom was an oppression more stringent, and often more degrading, than that to which the French peasantry were subjected in the eighteenth century. But a living ideal bears vigorously good as well as bad fruits, while a dead ideal brings forth nothing but corruption. Every anachronism is criminal, and is destined to sure and sudden destruction. An anachronistic condition of national life is manifested in the artificial tone of society, in an atrophy of the generous emotions, and in the habit of playing with problems which should be handled with conscientious earnestness. The Marquis d'Argenson writes: "The heart is a faculty which we are gradually losing for the lack of exercise, while the mind grows subtler and keener day by day. We are becoming purely intellectual beings, and I predict that this kingdom will be brought to destruction by the extinction of those faculties which are derived from the heart." The unreality which pervaded social life was not absent from the administration of the law. "Rigid rules and lax practice were its characteristics;" while "the slightest excitement led to violence, which again was almost always repressed by counter violence and arbitrary power, not by the law." (De Tocqueville on *The State of Society in France before the Revolution of* 1789, p. 123). Freedom of thought was subjected to an intermittent persecution, "enough to excite compassion —not enough to inspire terror."

Under such circumstances the Freethought philosophers were the truest friends of fair but callous France; for, while she slumbered, feasted, or danced, they were developing the principles to which she was to owe her final regeneration. Even her unheeding ear and heart were at last penetrated by the spirit of their ideas, and a desire for some nobler and larger life sprang up in her bosom. Religion was dead; but they created an enthusiasm which should supply its place. "The French Revolution proceeded, as far as this world is concerned, in precisely the same manner that religious revo-

lutions proceed with regard to the next; it looked upon the citizen in the abstract, just as most religions looked upon men in general, independently of time or country. It did not endeavour merely to define what were the especial rites of a French citizen, but what were the universal duties and rights of all men in political matters" (*De Tocqueville*, p. 280).

The thinkers of France thus furnished their country with weapons and armour, which, for lack of practical experience, she could use but unskilfully in the hour of trial, but which yet served her well when her hand became more practised and her head more firm.* Nor can their political theories be separated from their opposition to the reigning theology. The Revolution was the offspring of religious as well as of political Freethought; for the two are organically connected as assertions of two great correlated principles. To assert that the king rules for the good of his people will soon lead us to deny that man exists for the glory of God.

Our own literature and constitution may claim to have contributed largely to the intellectual nutriment of the leaders of revolutionary thought. "During the two generations which have elapsed between the death of Louis XIV and the French Revolution there was hardly a Frenchman of eminence who did not either visit our island or learn English, while many of them did both" (Buckle's *History of Civilisation*, p. 215). To Voltaire and the Marquise du Châtelet the French owed their first knowledge of that Newtonian philosophy which, by proving the inherent energy

* It should be specially noted that all those leaders in the French Revolution, from Mirabeau and the chiefs of the Girondins to Napoleon, who stemmed the excesses of the French Revolution and (much sooner than at the Reformation, which devastated especially Germany for more than one hundred years) brought order out of chaos, were Freethinkers. Napoleon had no belief whatever in the "immortality of the soul" when he re-established Christianity. Voltaire and the Encyclopedists thus *directly* served, by their labours, the cause of patriotism and true enlightened reason and humanity *then*, as avowed open infidelity in England *now*. Let Parliament and the British Public and the Press lay the lesson to heart. Forewarned, forearmed.—R. L.

of every atom of the material universe, renders superfluous and untenable every Animistic hypothesis. "Our great English geometrician, by his discovery of universal gravitation, was the real founder, in Christian times, of scientific, common-sense Materialism, although, from prejudices of his own education in the still prevalent scholastic philosophy of his age, he himself failed to carry out his own data to their legitimate conclusion in the domain of biology. The tremendous revolution in European thought at the close of the seventeenth century can even yet be well appreciated by comparing the mystic idealism of Milton's *Paradise Lost*, and—though in a less degree—of Dryden, with the common-sense realism of Pope's *Essay on Man*, or Swift's *Tale of a Tub*, and especially with that of eighteenth century Deism, so momentous in its bearing on French and German thought" (*Life and Mind: on the Basis of Modern Medicine*, by Robert Lewins, M.D., p. 13). These influences continued in full activity down to the very time of the French Revolution, which must thus, coupled with the revolt of our American colonists, be regarded as the offspring of English science, English scepticism, and English liberty.

Yet those health-bringing storms and plague-destroying fires which have devastated and renewed France have not been paralleled in our own recent history. We boast of England as—

> "A land of settled government,
> A land of just and old renown,
> Where freedom broadens slowly down
> From precedent to precedent;
> Where faction seldom gathers head,
> But by degrees to fulness wrought,
> The strength of some diffused thought
> Hath time and space to work and spread."

Perhaps the difference observable between ourselves and our neighbours may be accounted for without invoking that convenient *deus ex machina*, national character. When freedom of action is conceded to a nation, its energies are usually turned to practical politics, and the higher regions of thought are in process of time almost entirely deserted.

Few men will devote much attention to abstract problems when concrete events afford scope for energy and ambition, so that, in the end, principles are only valued when they can be turned to immediate account, and are never pursued to their logical conclusion. The expression of opinion is restrained by no law; but there is a tacit understanding that it shall not pass beyond certain limits. Compromise is the cardinal virtue, and consistency the only unpardonable sin. But in a country which offers no practical career to aspiring natures, they are thrown back upon the contemplation of first principles.* Freedom of thought will at first take delight in the exercise of its own fresh power, and will care little for the imperfections of the actual world, which makes the universe of ideas all the more sublime by contrast; but this purely intellectual joy will soon be followed by a passionate desire for the incarnation of Freethought in free action. The lover of divine Astræa will not hesitate to summon her back to earth, even though she comes as a destroying angel. Nor, while welcoming her in the territory of politics, will he exclude her from that of religion. If, like the French Encyclopedists, he is the child of a morally corrupt generation, his devotion will probably be flecked with many stains of extravagance, licence and sophistry; but he may claim to be judged with no less tolerance than those Christian hermits who forsook home and the sweet charities of life for desert lairs, haunted by the obscene creations of their own distempered brains; or than those Christian warriors who perpetrated in the Holy Land "more wanton and cold-blooded atrocities" (Milman's *Latin Christianity*, vol. III, p. 238) than had entered into the imagination of its "Infidel" conquerors.

Not even a free nation, however, can long pursue a course of systematic inconsistency without a radical deterioration of

* There can be no doubt that since Germany became a political nation with representative institutions, the national mind has retrograded in the sphere of thought. The Augustan age of German literature and philosophy was the era when, as a political power in Europe, Germany was at zero, and constitutional government a dead letter.—R. L.

character; and in time the nobler spirits will begin to rebel against the intangible boundaries which confine them. Even in commoner minds, especially in those of the class which has no career and but scanty comforts, with just enough education to understand and envy the superiority of their masters, a vague spirit of discontent will grow up, which will be ready, at the first popular disappointment, the first national reverse, to shake itself free from all control, violently to overthrow existing institutions in Church and State, and loudly to assert its independence of all political and religious dogmas held by the powers that were. In such a crisis England would have this advantage over eighteenth-century France that the revolutionary leaders could not be so utterly inexperienced in the practical working of governments as were the members of the National Assembly. After the first cataclysmic shock, their principles would be more skilfully embodied in durable legislation, and there would be less danger that the new freedom should immediately give rise to a retrograde despotism, which must for the time over-shadow and well-nigh extinguish it.

That such a catastrophe may produce the maximum of good with the minimum of evil, ideas must be current which will determine its form and result; for nothing can be more disastrous than a blind rising of the proletariat without guidance or definite aim. It follows that none can be greater benefactors of mankind than those who set such ideas in circulation, and who endeavour to show, by theory and practice, that morality is not dependent for life and strength upon a "creed outworn," and that the rejection of theological dogmas does not involve the defiance of moral laws, or even of social restraints.

The subjective basis of Pantheism must be sought in that sense of identity with the material universe common alike to the most naïvely instinctive and the most ideal natures. To such the visible heaven and earth, and the human body itself, seem transient forms or incarnations of an eternal mind, which includes all finite and mortal beings, as drops of water are included in the ocean, or light-waves in the flood of noon-

day sunshine. The most ordinary metaphors, and often the names of inanimate objects, afford evidence of this feeling. Sun and rain are translated by imagination into smiles and tears; the glow of summer and the gloom of winter seem to express the joy and grief of the world-spirit. Man sees himself mirrored in nature,* and bows down before his own image, which seems to respond to his devotion.

"As once, with ardent supplication,
Pygmalion clasped the sculptured form,
Until the pale, cold cheeks of marble
Flushed with emotion, bright and warm;
So I, aflame with youthful passion,
Dead Nature to my bosom pressed,
Till she to breathe, to glow, to tremble,
Began upon my poet-breast.†"

The ancient scriptures of India furnish an example of a Pantheistic religion developed by imperceptible stages, from the instinctive poetry of primitive minds, which regard the forces of nature in the same light as human actions, and describe them in the same terms, while yet incapable of direct or conscious personification. When Indra, Agni, Vishnu, and all the celestial company of devas were at last fully evolved, and received by their creators as objects of faith and worship, there remained a further process, which might at first sight seem, not continued evolution, but pure destruction. The host of deities vanished; but from the ruins of the Pantheon rose the Pantheos, the true self of the universe and of man. To know and to love this omnipotent self of which the world is but a fleeting and finite manifestation, was the beginning and end of wisdom.‡

* Hylo-Idealism reverses this order, so that man feels and knows that nature is mirrored in himself, being the image of his Ego, and not *vice versâ*. "We see in her only what we ourselves have written," says Schiller, in his hexameters on *Human Knowledge*. Even so late as during my own youth, I have constantly heard from the mouths of Germans the saying "To the French has been granted the sovereignty of the land; to the English that of the sea; to the Germans that of—the air." *Tempora mutantur* indeed!—R. L.

† Schiller, *Die Ideale*.

‡ All this mysticism, this ascription to an objective deity of our own

All pre-scientific thought must terminate in a like conclusion. Scholasticism, in the ninth century, gave birth to Erigena; Mohammedanism, in the twelfth, to Averroes; Humanism, in the sixteenth, to Giordano Bruno; Judaism, in the seventeenth, to Spinoza; and these sublime thinkers, each representing the highest culture of his age, all found in Pantheism their spiritual home. It is probable that Goethe shared the same belief, if, indeed, his keen insight had not already perceived that Pantheism is but the mystical converse of Materialism.

Modern physical science, while frequently swerving very far from what should be its final aim,—the promotion of human happiness,—has rendered us at least one inestimable service. It has taught us the lesson that "man is the measure of all things," enforced of old by the sophist Protagoras,—and indeed by Aristotle himself,*—but, for lack of concrete evidence, never clearly comprehended by the ancient world. The necessary demonstration has since been supplied by those simple physiological facts which now form an indispensable part of education, and must be carefully pondered by every mind which desires to attain philosophical certitude. When we know that what can be imaged in thought only as an ethereal tremor striking the retina, and, conveyed by the optic nerve to certain specialized cells of the cerebral tissue, is there transmuted into the

subjective feelings, seems quite elucidated by the principle of Hylo-Idealism. Mind in nature there is, but it is our own mind, alike the concipient and percipient of "Nature"—*Primum Mobile*—as existent in Hylo-Phenomenology. Pure Ontology human reason *must* now entirely *agnose*.—R. L.

* See Sir A. Grant's article on the Stagyrite in the new *Encyclopædia Britannica:* "Aristotle, spite of his attachment to physical science, never gave up, but always held to, Idealism. He declared that universals and the truths apprehensible by the highest reason were better known, and surer, than concrete phenomena and objects of sense. God, he says, can only think of Himself. His life is thinking upon thought, an argument which seems to foreclose providence and prayer." So that in Aristotelianism "divine worship" is also a mockery, delusion, and snare—a complete *reductio ad absurdum*.—R. L.

sensation of light, which can have nothing in common with its external cause, we have acquired the elements of a thorough understanding of our own creative power. The ear receives sound-waves, the eye light-waves; but the optic and auditory nerves transmit identically similar vibrations to their respective centres. "When the excitement has entered the nerve it is always the same. That it afterwards elicits different sensations in us depends, again, on the character of the nerve cells in which the nerve fibres end. . . . The sensations which we receive from outward impressions are therefore not dependent on the nature of those impressions, but on the nature of our nerve cells. We feel not that which acts upon our body, but only that which goes on in our brain" (*Muscles and Nerves*, by Dr. J. Rosenthal, p. 283). Thus, if light could be transmitted by the auditory and sound by the optic nerve, colour would affect us as music, and *vice versâ*, so that a sonata by Beethoven might seem a picture by Raphael. We might then literally have a "Symphony in Blue and Silver," or a "Nocturne in Black and Gold." *

What we know as the external world is composed of colours, sounds, tastes, touches, and odours; and, since these can have no existence prior to their birth in the sensory ganglia, we see clearly that every man is the maker of his own cosmos. It comes into embryonic existence with his very first gleam of conscious life,—

> "What time his tender palm is prest
> Against the circle of the breast,"—

and developes with his development, as he gradually learns to combine its lights and shades into symbols of form, size, and distance, and to indue its varying tones with relation and significance; it becomes less vivid with his decline, and at last dies for ever with his death. As soon as the per-

* Diderot goes so far (see *Littré's Dict. under head of Medicine*) as to affirm that no one has a claim to attention in mental philosophy, who has not much experience as a practical physician. See also Lord King's *Life of John Locke*, who had this advantage. Mere mathematics and physics seem *positive disqualifications* for *thorough* valid mental research.—R.L.

ceptive organs have laid a foundation for memory and comparison, the present is supplemented and explained by the past; and the union of the two renders possible a new cosmos of emotion and intellect, which obeys the same organic laws of growth and decay.

If our simple sensuous perceptions are the result of cerebral organization, it is evident that the same must be affirmed of the ideas produced from their synthesis. This is not only a necessary corollary of the facts just quoted, but a well-ascertained scientific truth, supported not only by experiments upon the lower animals, but by careful observation of the human subject in health and disease.* The phenomena of exhilaration and subsequent stupefaction by stimulants, and of insanity,—which, since the labours of Pinel in France and Conolly in England,† has been treated by alienists as a disease, not of some immaterial vital principle, but of the grey matter of the cerebral hemispheres,—are alone sufficient to convince any unprejudiced observer that the brain is no mere passive machine, controlled by an indwelling Archæus. Its

* "Having thus surveyed each of these elementary properties of the nervous elements in their origin, in their evolution through the organism, in their normal manifestation and pathological deviation, I arrive at the demonstration that it is by means of their combination, and by the harmonious co-ordination of all their truly specific energies, that the brain feels, remembers, and re-acts, and that, in fact, being the properties in which all the others originate, they are the only living forces that are always present . . . . and that, without them, that admirable and complex apparatus, at once so delicate and so simple, would be as absolutely without life and without movement as the earth would be without the sun" (*The Brain and its Functions*, by Dr. Luys, preface, p. viii.). "Mind may be defined physiologically as a general term, denoting the sum-total of those functions of the brain which are known as thought, feeling, and will. By disorder of mind is meant disorder of those functions" (*Responsibility in Mental Disease*, by Henry Maudsley, M.D., p. 15).

† "Very much progress has been made, during the last thirty-five years, in our definite knowledge of brain diseases through the impetus given to their study by the Lunacy Laws of 1845, and the reforms in Alienist Medicine, consequent on the enlightened and philanthropic labours of Dr. John Conolly at Hanwell" (*Life and Mind on the Basis of Modern Medicine*, by R. Lewins, M.D., p. 54).

mode of action depends chiefly upon its original structure, but to a large extent upon subsequent modification by the conditions of its material environment, or by other purely physical causes, which may effect radical changes in the character of its functions.

The ideas to which the brain gives birth cannot, of course, represent any but subjective truth; and, as being more complex than the sensations, and in less intimate communication with that external reality which we are compelled to postulate, they are more liable to represent subjective error. Subjective truth, or the highest certitude within our reach, consists of conclusions from the whole range of our experience, carefully and clearly formed by the same rules of reasoning which are found valid in practical life; subjective error, of hasty inferences from scanty or ill-attested phenomena, drawn by methods which cannot be tested in the sphere of natural events. Since, then, we cannot transcend the range of our own being, and, if we will have deities, are forced to create them ourselves, we must banish all transcendental phantasms from our positive creed to the domain of poetry and art. If we are Pantheists in moments of exaltation and ecstacy, we shall be Materialists in hours of introspection and stern self-analysis. Though incapable of universal scepticism, and forced to assume the real existence of some proplasmic substance, generating all those images of which our consciousness is composed, we shall not clothe this proplasm with divine attributes and bow in worship of the Absolute and Unknowable. Having traced our intellectual and moral faculties to their seat in the brain, we shall cease to inquire for the noumenon of this ultimate phenomenon, and shall find ample scope for ideal aspirations in the sublime generalization, that "the sun, the moon, the stars, the seas, the hills, and the plains" are but products of our own *finitely infinite** personality. Man, if pure of heart and lofty of

* This apparent *catachresis* will be seen to be rigidly scientific when we recognise the sublime fact that life and death are only changes of condition, not of essence—that "the glories of our birth and state are shadows, not substantial things."—R. L.

mind, must be "crowned with glory and honour," whatever be the first cause of his sovereignty. A material origin cannot degrade his thoughts if they be lofty; a spiritual origin cannot ennoble them if they be base. Nor does it seem more glorious to be "a little lower than the angels" than to be the creator and fashioner of an ideal host of heaven, even though their bright array be the offspring of a material organ.

This Hylo-Idealistic conception of human nature cannot, in truth, be either new or startling to any cultured Englishman, since it is implicitly asserted in the Darwinian theory of evolution, which acknowledges no impassable gulf between man and "the brute creation."* All consistent advocates of this theory must assume the possibility of an organic ladder from the amœba to man, unbroken by the intervention of any spiritual essence. If the primary germs of intelligence are evolved from a special organization, which produces, in its growing complexity, the different stages of mental development, we cannot invoke a supernatural agent to complete the process. Fear, love, anger, suspicion, wonder, memory—all exist in the lower animals, and are essentially the same as in man. Volition is regarded by dualists as a function of the "*anima*"; but if so, every bee and butterfly visiting flowers for their honey and pollen, every spider weaving and adjusting its web, every ant waiting on its pupæ or enslaving members of hostile tribes, must be inspired with an immaterial vital principle.

Were we perfectly consistent, we should renew the old doctrine, not only of an animal but also of a vegetal soul, and believe with the old alchemists that the subtle essence of a calcined rose may hover above its embers, and shape itself into a faint spectre of its former beauty. Not with intellect, not with consciousness, not even with life, the true marvel begins; but with force, as an inalienable function of

* "We must also admit that there is a much wider interval in mental power between one of the lowest fishes, as a lamprey or lancelet, and one of the higher apes, than between an ape and man; yet this interval is filled up by numberless gradations." (*Descent of Man*, p. 65).

matter. This indwelling energy, impelling and restraining the suns and satellites of heaven, belongs not less to every ultimate particle of their mass. Our solid earth is therefore no mere dead weight, but an active body, instinct with that power which manifests itself in the varying forms of motion, heat, light, electricity, and chemical action.

The assertion that our mental powers are correlated with these material forces may appear questionable; yet it is capable of scientific demonstration. Chemical combination is invariably attended with evolution of heat; and this heat may be again converted into various forms of energy; thus the combustion of a certain quantity of fuel will enable a steam-engine to do a definite amount of work in a given time. A similar transformation takes place in every tissue of the human body, producing special phenomena in each. The oxygenated blood from the lungs, after passing through the heart to the great vessels, is distributed by the capillaries, parting with its oxygen as it travels, and setting up a process of slow combustion. In all the tissues this function is the same; but its result differs with their several modifications. In the muscles the heat produced by oxidation is converted into muscular contraction; in the glands it causes secretion, and in the brain thought.* It is true that we have no means of estimating the total results of this activity, and of showing its numerical relation to the primary stimulus;

* "It is the blood alone which makes them (the nerve-cells) live and feel; it is this alone which, as sole agent of their incessant activity, percolates everywhere through the nervous tissue, and carries with it the elements of all life and all movement. This is so true that, if we succeed in momentarily suspending the circulation in the encephalon, the whole vital machinery stops at once, and every phenomenon of nervous activity is at the same instant interrupted. Decapitated animals are by this very fact deprived of all cerebral functionment, and it is a very remarkable fact that . . . if, by means of injections of defibrinated blood, such as Brown-Sequard has experimented with, we succeed in giving their habitual stimulation to the nerve-cells, the signs of life come back as if by enchantment, and the head of a dog, thus momentarily revived, will still afford ephemeral manifestations of a conscious perception of external things." (*The Brain and its Functions* by Dr. Luys. p. 68).

but the general correspondence with ordinary chemical operations is unmistakeable. As the flame of a candle goes out when its supply of oxygen is cut off, so man's mental and physical powers decline when respiration is feeble, and are extinguished when it fails; and as the smouldering torch may be relighted, by plunging it into a phial of oxygen gas, so human life may be revived when apparently extinct by such mechanical means as will restore the vital functions of lungs and heart.

A similar process of oxidation is carried on in the bodies of all animals, and is essential even to vegetable life, being most marked during germination and in darkness, also in the blossoming of many inflorescences. Thus man is linked with the whole of the organic and inorganic world in body and 'soul;' since this invisible fire caused by chemical action must be considered as the scientific equivalent of the ancient '*divinæ particulam auræ*,' which was an isolated portion of the '*anima mundi*,' or cosmic soul.

Cosmic energy, indeed, constitutes our sole source of knowledge of the world around us, since without it even extension, which has been universally assumed as the fundamental property of matter, would be inconceivable. Unless the light-waves were able to strike our retina, we could not conceive visible space; and unless outward objects had power to affect our nerves of touch, we could form no conception of tangible space. Our ideas of external existence must be entirely subjective;* but assuming, as we are by our mental constitution bound to assume, the objective reality of such existence, our whole knowledge is comprised in the simple statement that it is active, not passive. If, then, in our definition of matter we substitute energy for extension, we shall no longer be able to distinguish between

* In a recent number of *Knowledge* (a serial devoted to exact science) is an article by Mr. W. C. Thomas on "Libration of Sensation," which contains the following complete vindication of Hylo-Idealism: "The sentient eye is the only 'colour-box.' External to it there is nothing but mechanical vibrations," etc.—and which vibrations are continuous and identical both within and "without" the Ego.—R. L.

matter and spirit, and shall be forced to find in Hylo-Idealism the reconciliation of poetry, philosophy, and science.*

We have seen that the commonplaces of modern physics and physiology leave a fairly-educated man no excuse for any display of Pharisaic horror in dealing with so-called 'Infidelity.' Hylo-Phenomenalism,—*i.e.* psychology as distinguished from ontology,—the true creed of the scientific secularist†, is so far justified; but its moral consequences have still to be subjected to rigid examination. If intellectual truth appears to land us in moral evil, it is at least probable either that the seeming truth is in reality a falsehood, or that we have failed to form a just estimate of its bearings. If we have arrived at the conclusion that Selfism is the logical result of a purely rational view of life, and that enlightened self-love is compatible with sensual indulgence, we may reasonably suspect some flaw in our theory or in our inferences. Let us see whether the path which has hitherto seemed so clear and straight can be at once intellectually right and morally wrong, and whether our supreme good can be attained only by self-deception. Let it be granted that morality, during the Christian era,

* I have always striven to render intelligible the significance of Hylo-Idealism by the following illustration:—Our bodies and the so-called external universe—*i.e.* the Ego and Non-Ego, or in other words, Subjectivity and Objectivity—resemble a porous vessel of ice, filled with water, immersed in an infinite ocean. What is within and without, and the septum that seems to divide the two, are all three consubstantial or identical, and, owing to the porosity, always interchanging particles. So that, in reality, the seemingly three are—like the mystic Athanasian Trinity—virtually one and essentially indivisible. It is thus *a distinction without real difference* to speak of division between substances homogeneous and virtually *solidaire*.—R. L.

† The whole gist of Hylo-Idealism is comprised in the truism that we think by means of our brain; that psychosis is kinetic vesiculo-neurosis —(function of the neurine of the cellular, or grey cerebral substance); and that all "objects" (see the article "Object" in the eighth edition of the *Encyclopædia Britannica*) are only *projects* of the "subject," or Ego, and therefore identical with it. It is a complete *ignorantia elenchi* to conceive the mis-named objective as *extra-* or *ultra*-subjective. Psychology itself is only a branch of Physiology (Biology).—R. L.

has been very intimately associated with religious belief.* Whether it has been *determined* by that belief is another question, best answered by those who have studied the influence of varying moral conditions upon theological dogma, and the gradual decay and disappearance of such doctrines as are no longer in harmony with the ethical character of an age or nation. The creative power of man is not limited to the sphere of intellect, but extends to that of religion; and the cerebral organ which evolved the 'superhuman' and 'supernatural' may yet produce a consistently human and natural system of morality. Those who have ceased to hold that our present principles are of celestial origin may well hope for a fresh and vigorous terrestrial birth.

It can scarcely be doubted that the popular influence of religion is waning day by day, in spite of the spasmodic enthusiasm which we have lately witnessed in connection with the so-called Salvation Army.† A man actuated by an ardent desire for present gain or pleasure is not now restrained by the distant prospect of torments in another life; and it may be doubted whether the nature which could only be scourged into honesty by the fear of hell would not be forced to manifest its deep degradation in some more insidious but not less harmful mode of guilt. Heroes and reformers do not need our solicitude; they will always continue to supply their own inspiration, without the need of a "great Taskmaster;" for to them heroism is the highest happiness. The Italian physician,‡ who devoted his life for the salvation of a plague-stricken city, purchased

* I find that nations in their religious phase are always in reality most immoral. Certainly the Byzantine empire after Constantine, Europe during the Crusades, and Germany after the Reformation were so. Luther died despairing of humanity. Calvinism is, of all forms of *Pessimism*, the most horrible and immoral. Burn's *Holie Willie's Prayer* is no exaggeration of its immorality, but rather the reverse.—R. L.

† It is significant to note, that the triumphs of this nineteenth century superstitious *hyperæsthesia* are among a yet lower and more benighted class of the community than were those of Methodism in the eighteenth.—R.L.

‡ Cited by Professor Goldwin Smith in the *Contemporary Review*, February 1882.

with that glorious death exemption from years of self-dissatisfaction, life-long remorse for an unfulfilled duty and an unachieved ideal. To him moral goodness was as beauty to the painter, or melody to the musician.

But moral genius is, perhaps, even rarer than moral idiocy; and our desiderated principle must be adapted to the needs of average humanity, neither supremely virtuous nor irredeemably vile. If it can be shown that the conscience of ordinary men and women is organically connected with religion, and cannot be separated from it without destruction, our attempt has failed, however applicable our rule of life may be to exceptional saints and sinners. It is on all hands admitted that certain flagrant violations of the moral code, even when left unpunished by law or by society, bring a palpable retribution as their necessary consequence, and that gross forms of selfishness alienate man from his kind, and deprive him of their service and sympathy in his hour of need. We must not strike directly at these, but at the low moral standard of which they, as well as more subtle vices of thought, word and deed, are manifestations, and which is the special danger of a mercantile community, chiefly guided by custom and calculation. If we would win such a society to inward as well as outward goodness, we must not only assert, but scientifically prove, that "true self-love and social are the same." My readers must bear with me if I seek to establish my position by some well-worn truisms.

A superficial display, at least, of the social virtues—including integrity and truthfulness, as well as mutual kindness, helpfulness, and forbearance, as embodied in the vulgar proverb "Honesty is the best policy"—is essential to the lasting happiness and solid welfare-of individuals, as well as to that of the common weal; but this outward goodness cannot be consistently maintained if its inward source be absent. No man can be uniformly truthful if he be a liar and a coward, or uniformly kind if he be at heart selfish and base. But the knowledge that regular habits of veracity and benevolence will conduce to his welfare will be the best incentive to the acquirement of corresponding

moral qualities. Even in our imperfectly-constituted society, the fearless truth-speaker, the just and generous friend, has an advantage over the liar and cheat; and were the former tempted to some isolated act of wrong-doing, apparently useful to himself or to others, he would prefer any loss or inconvenience to the irreparable injury which a violation of conscience would inflict upon his moral character. With the habitual liar or voluptuary reason may, and probably will, fail of its effect; but it stands, at least, as fair a chance as religion.

Speaking generally, our highest good consists in that healthy and harmonious development of the intellectual, moral and physical faculties which best fits us for the duties and enjoyments of life, though the special form of good varies with special conditions. There are cases in which we must voluntarily relinquish some constituent of this perfection in order to retain a more important element; there are even cases in which life itself is to be sacrificed, rather than the ideal which gives its beauty and value. Good is therefore not that which we happen to like at any moment, but that which, if chosen, will finally bring us the greatest happiness. In the words of Sir James Mackintosh: "It would be fatal to the existence of morality if the utility of every particular act were to be the subject of deliberation in the mind of every moral agent. A general moral maxim is to be obeyed, even if the inutility is evident, because the precedent of deviating more than balances any utility that may exist in the particular deviation." The sum and substance of the whole controversy may, indeed, be thus epitomized. Perplexities as to the relation of morality and utility have arisen from the consideration of isolated acts rather than of general character. In an isolated act there is nothing either moral or immoral, unless it be considered as part of a moral or immoral whole. A virtuous deed has not necessarily any direct connection with utility —that is, it need not immediately conduce to the happiness either of the agent or others who are affected by it. But a virtuous disposition, taken as a whole, is conducive both to

individual and general happiness. Morally good actions, therefore, may be divided into two classes—those which aid in the formation of a morally good constitution, and those which are the natural outcome of such a constitution when formed. Now, since the habit of self-denial to a certain extent is a necessity of social intercourse, and since this habit must be considerably developed to admit of social happiness, the most completely-formed character will be irresistibly impelled, under certain circumstances, to that supreme self-denial which we call self-sacrifice. It will be at once a necessity and a proof of that perfection without which life, to such a nature, would be worthless. An egoistic Utilitarian is therefore logically justified in commending actions of which the common voice of mankind proclaims the beauty and grandeur, though they may result in immediate positive loss to the individual, or even to the community.

These principles cannot be fully carried out until we have ceased trying to "make the best of both worlds," and finally decided between earth and heaven. Even by orthodox Christians the value of religion is made to consist in its supposed ethical necessity, rather than in any intrinsic and transcendental worth. It is justified as an indispensable means of human welfare, not glorified as the supreme end of human endeavour; with the implied inference that, should it cease to be useful, it will at the same time cease to be desirable. Those who implicitly hold such views have no right to blame others, who, equally impressed with the importance of morality, try to establish it on some firmer foundation. We are not bound to build our châlets on the crumbling mountain slopes because, to our forefathers, they seemed firm as adamant; rather let us cheerfully accept the inevitable, and seek to accommodate our habits of life and thought to the conditions of our age and country. Those highly-praised Agnostic thinkers, who look back to "those things which are behind," instead of "reaching forward to those things which are before," and cast, wistfully regretful glances upon what they deem "a creed outworn," instead of filling eyes and heart with the glory of ascer-

tained truth, should not be commended for their faltering testimony.

Emotion and conviction must co-operate, otherwise both will be inefficient. The outspoken and practical apostles of Freethought are certainly better deserving of praise than their superfine and timidly-reticent contemporaries. It is surely desirable to free the essential elements of moral truth from the dogmas of a decaying theology, so that fashionable scientists might well take a lesson from men who are seeking to accomplish by natural means tasks which can no longer be performed by supernatural machinery. They themselves would be strengthened and ennobled by such endeavours; for every man, earnestly devoted to an abstract ideal, which he strives to clothe in concrete form, must possess those high qualities and unselfish aspirations which were once the true life of religion. He may recognise his own type of perfection as a mere subjective image, but must none the less expand the sphere of self-love till it includes an ideal cosmos, of which all mankind are citizens. All are cognized by his brain, and so come within the range of his own being; let him render that being as perfect as he may. But he who, having lost one ideal, refuses to give his heart and soul to another and a nobler, is like a man who declines to build a house on the rock because the wind and rain have ruined his house on the sand. He has simply given up one shelter, one inspiration, one set of motives, without gaining anything in return. Surely nothing can be more unmanly, or more unworthy of a rational being, than to spend life in idle lamentations because what we or our fathers once believed to be true has now proved to be false. Why not set to work to discover a new principle of cohesion which will bind together the observed facts of life?

Doubtless even the sincere thinkers often differ widely in their conclusions; but the degree of concordance attainable will be strictly proportional to the diffusion of clear and symmetrically-developed habits of thought, united with intellectual courage. Error is but refracted truth, and the

manifold colours of the spectrum blend into one white sunbeam. Since truth is but one, and yet comprehends and harmonizes all forms of error, careful and honest contemporary reasoners should draw substantially the same conclusions from the same premises, although one mind, from custom or from natural bias, will be most deeply impressed with that side of a subject which to another seems unimportant. We must make our mental lens as achromatic as possible, that the interference of a rainbow-hued error with clear sight may be reduced to a minimum.

It is not uncommon to find a set of irreconcilable assumptions dwelling, like a happy family, in the same mind, which will stoutly resist the attempt to eject any one of them. I well remember hearing a physician apologize for the Materialistic heresies of a distinguished *confrère* on the ground that "his cerebral organization rendered him incapable of any higher belief." This is an extreme instance of that habit of unconscious self-contradiction which is but too frequent, especially among our State-appointed "pastors and masters." Apparent inconsistency of speech is too often unavoidable, from the imperfection of human language; but a mind really large enough to embrace and harmonize seeming opposites must be distinguished from one which merely offers an asylum to antitheses, half understood and wholly unreconciled. It is our duty to examine our mental, no less than our financial accounts, and to be certain that each item corresponds to a fact, and that the whole is correctly added up and balanced. Till this duty is clearly recognised, it is vain to hope for any such agreement in the results of thought as will form a new epoch in the history of enlightened reason.

The great desideratum of our own day differs from that of all preceding ages since the triumph of Christianity. Truth, or the highest intellectual certainty attainable by man, has not always been a necessity of human welfare. Simpler states of society may well be guided by those unreasoned principles, which are generated in the mind by intercourse with nature, and are transmitted from father to son, serving

the same purpose as the instincts of the lower animals. The savage cannot grasp, and does not need, abstract verity; indeed, it should be an injurious waste of time to endeavour to instil into his primitive mind even the rudiments of those truths which he practically exemplifies.

In an age when some ideal of artistic or moral beauty inspires all the noblest and most beneficent natures, rigorous analysis is, for the time, undesirable. It would desecrate those elements of truth which are always interwoven with every vital and beautiful form of error, and, by a premature disenchantment and disintegration, would destroy the old principle before the new one is ready to take its place. By dissecting away what was still throbbing with life, it would cripple where it meant to heal, and would pull the skin from the snake instead of waiting till it became a slough. But in our own day, when art, morality, thought, politics, and education are finally separated from religion; when the living soul of ancient theosophies has departed; when the stern beauty of "divine philosophy" has well-nigh ceased to attract even youthful votaries, our only hope of salvation lies in the conscientious endeavour to draw new life from nature, and to make science itself a well-spring of ideal truth.

Vide APPENDICES III-VII.

PHILOSOPHICAL TRACTS.

INTRODUCTION.

NO man, however unsocial, can isolate himself from his kind. Secluded in a hermitage, he still cannot renounce his membership of human society; that is to say, his human nature. Intellect and morality belong to him only as a social being; so that society not only encompasses him, but *constitutes* his very mind and character; and he may as well try to escape from his own brain as to detach himself from humanity. It has been said that no one could be moral or immoral, if alone on a desert island; but this is a false way of expressing a true idea. Defoe's hero is capable of morality, because a social ideal, to which he can refer his actions and mental phases, already exists in his mind. He reproaches himself for yielding to despondent thought, and regards his misfortunes as the just punishment of his sins. But a lonely Adam would know nothing of duty or of justice, because these are conceptions which imply membership of a community. Adam, so far from being the perfect type of man, would not be man at all; for moral qualities are really moral relations, and a character unrelated to other characters would be unqualified; that is, would be purely negative. It might be said to exist potentially; but potential existence is what in ordinary *parlance* we call non-existence. As to intellectual qualities, these might germinate in our solitary Adam, from his relationship to the non-human world, but they would never be developed beyond the bare elements of perception and memory. Our defined concepts and linked reasonings grow from the need of communication —the compulsion to make thought intelligible to ourselves,

that it may be intelligible to others. The world, to an isolated being—I cannot say an isolated *man*, since the creature would not be human—could only be a limited storehouse for individual wants; not an illimitable cosmos, interpreted by racial experience.

Everyone who has a conscience and is capable of thought ought to reflect that these endowments, which belong to the individual only as a member of society, should be put to social uses. In the most literal sense, he owes *himself* to the community. Remove, one by one, the bonds which unite him to past and present humanity, and you will have stripped away all the qualities of self, leaving an eating and drinking brute in the semblance of a man. But by paying his debt to the community, he gains more than he receives; he enriches the Self that he gives away, and strengthens his individuality as he becomes more completely social. The philosopher, above all other men, ought to lay this truth to heart, and keep it constantly in remembrance. If high thinking cannot be so embodied as in any way to promote the general good, it must renounce its chief title to be respected; or indeed to be kept alive and nourished by the waste of brain-tissue. Every system of thought must claim universal validity. The whole significance of Philosophy consists in its pretension to be what every sane man would necessarily think, if he could rationally and completely analyze the contents of his own mind. So far as we understand the laws of thought and of conduct, we are "no longer individuals, but the species; the judgment of all minds is expressed in our judgment; the choice of all hearts is represented by our action."* That is, all minds would reach our standpoint, could they discard illusions, and think consistently. But, if a system of thought, which *can* be a system only in the sense of being valid for the whole race, is understood only by its author, and misunderstood by a few sympathetic disciples, while the outer world cares not a rush for the entire fabric, that system has not so far fulfilled its purpose. The philosopher's own mental habitation has been set in order; but this

* Schiller's Letters on the Æsthetic Education of Man. Letter XII.

was not his chief end and aim. He worked as an impersonation of the species, and if no section of the species can be benefited by his labour, he might have been better employed in building houses, or sowing corn, or even in writing novels. For his lucubrations, though quite as unimportant as the average novel, are certainly not so amusing.

Every thinker should desire the general acceptance of his conclusions; for their nature, not less than their publication, implies that in his belief they *ought* to be generally accepted. Till the "ought" is realized, his ideal cannot be perfectly accomplished. Yet, failing general acceptance—and this *must* fail under present conditions—there is still a measure of attainment for which he may fairly hope, and which may solace, if it cannot satisfy, his desire to serve mankind. Through the mediation of a few select minds he may influence a larger circle, whence the wave-motion will gradually broaden out until it is felt by multitudes who never heard the master's name, and to whom his close reasoning would be unintelligible, if not repellent. His disciples can embody his method and results in concrete forms, varying with the special character of each, and interpret his philosophy in literature, in conversation, in definite action, or, best of all, in the consistent tenour of their daily life. The single impulse manifests itself in divers forms, and may even end in changing the general set of men's thoughts and lives; or at least in rendering it impossible that the main current of belief should ever flow back into the old channels.

Locke and Hume have closed the door for ever on what—in defiance of purism—I may call the palæo-deductive method of Spinoza and Descartes; which consisted in drawing the whole universe out of a perfectly empty concept. The neo-deductive method of Kant, as used by some of his recent exponents, is now making clear the defects of pure empiricism even to its principal champions. Professor Bain, for instance, recognizes the uniformity of Nature as a necessary assumption not derived from experience; and he needs to take only one step farther to see that it is *implied* in all experience, and is the fundamental principle involved in all

reasoning; that, in short, it can be deduced from the very fact that we are able to perceive and to reason. Such stages of progress are not confined to the world of abstract thought, which so few can inhabit. Every truth, besides its intellectual aspect, has its moral and emotional aspect, which is sometimes only too influential in determining the manner of its reception. Hume's scepticism, for instance, was effective in a very wide sphere. Discrediting the tyranny of abstract concepts, he implicitly discredits all doctrines guaranteed by authority and not derived from experience, and this implication has been more potent than his actual arguments, which have been misunderstood by none more than by the empiricist school. On the moral and emotional side the chief tendency of his analytical spirit has been to check enthusiasm, and to foster a moderate if not mediocre type of character, governed by rules which are found experimentally to work primarily for individual and secondarily for social welfare. The empirical school has proceeded in the same direction, bringing into greater and greater prominence the material as opposed to the ideal side of life.

The Kantian philosophy, especially in its latest developments, reconciles the material with the ideal, showing that the simplest perception and the most abstract thought involve the same mental functions, and imply the same cosmic laws. No object is despicable simply because material; and no concept simply because ideal has any peculiar or ethereal dignity; but on the other hand the concept is just as real as the object. Further, those principles of Reason which are implied in the very fact of our humanity, must be explicitly recognized as the laws which sway our conduct. This ideal, when expressed in philosophical language, may no doubt appear too remote from common life to influence any but a few theorists. And yet it is capable of being translated not only into simple words but into concrete actions, and thus of affecting those who do not and cannot theorise.

It must, however, be admitted, that no individual thinker and no school of thought, has as yet fulfilled the perfect conception of Philosophy. Fully conceived, Philosophy is that

science which takes for its subject-matter the whole sphere of consciousness, and has for its object the detachment and systematisation of the ultimate principles of thought and conduct, and the exhibition of their point of unity. The world of knowledge and the world of action are not two distinct planets, but two hemispheres divided by an imaginary meridian, and each implying the other. Those empirical laws which summarise the logical procedure of the mind, and those other empirical laws which constitute the working concept of duty, must be shown to spring from one central law of reason.

So far, there have been great systems dealing with the problem of knowledge, and great systems dealing with the problem of conduct; but the two problems have never been completely fused; or rather they have never been so analyzed to their simplest elements, that the identity of these elements could become visible. Hume's philosophy has its ethical side; but his explicit system of ethics does not logically follow from his theory of knowledge. The Kantian philosophy is fundamentally ethical; and yet Kant is not able to unify the practical with the pure reason, but is obliged to credit practical reason with categories of which pure reason can take no cognizance.

The unification of practice under one consistent scheme of thought is the problem which must be set before the philosophy of the present and future. No abstract theory, however ingenious, which cannot be shown to bear a distinct relation to human welfare, will have any chance of passing, in its original form, beyond the limited circle of those who have the leisure and the taste to indulge in manipulation of thought. I say in its original form, because it is impossible to limit the *indirect* influence of the most remote abstraction. This influence, indeed, depends on a relation to human welfare which lies latent in the abstraction, though never unfolded in any clear exposition. It is obviously necessary that the practical implications and applications of an idea *should* be unfolded if it is to become a definite rule of life, recognized even by the comparatively few who feel the want of moral

consistency. Ages of progressive enlightenment will perhaps be needed before a rational ideal can supplant irrational dogmas in the mind and heart of the many.

The philosopher is not a creative Logos ; he does not bring into existence the form and content of his times by brooding upon the face of the deep. He himself is the creature of various physical and social conditions, and such conditions as chiefly decide the mental attitude of the public towards his ideas. No force of genius will enable anachronistic views to gain more than a local and temporary success ; the true intellectual is he who *thinks* what the world is prepared to *feel* and to *do*.

But neither is the philosopher a mere registering instrument—a conscious barometer, supposing itself to aid in producing changes of atmospheric pressure. To make life *articulate* is to endow it with new practical powers. Principles consciously held are very different in effect from the same principles unconsciously exemplified. They are, as it were, crystallised, consolidated, set up as a standard by which life may be tested, and which may itself be tested by life ; they are brought to the light of day, and can be deliberately scrutinised. If rejected, they at least constitute a definite point of departure ; and, if adopted by reason—that is, by conscience —they form a law which cannot be transgressed without remorse. Such law brings sin into the world, making criminal the lapses from principle which, when blind, had no moral quality. But it also renders those lapses impossible to conscientious natures, and gives a rule for wise and consistent action. Law is not the source of conscience, which is, indeed, concrete and unanalysed law ; and analysis might be unneeded could we always trust to the automatic action of healthy feeling. Healthy feeling, however, is dependent on many fluctuating circumstances. Some inner or outer change takes place, and the unity which was practical merely, and not ideal, suddenly vanishes. No sure results *can be* hoped for till *feeling* is specialised as *vision*. Instinctive right conduct is blind and seems able to dispense with sight, but this can last only so long as the conditions remain simple ; just as

none but the most humbly organised creatures can subsist and thrive without the aid of the special senses. Philosophy endows intuition with eyes, ears, and with speech, so that it may see where it goes, distinguish the voices that appeal to it, and enounce the direction of its path.

Such is the *regulative* function of philosophy. Whether it also exercises a *stimulative* function may be matter of dispute, and by many, doubtless, this will be denied. It will be said that, while intellectual conceptions may regulate an existent morality, they cannot give any fresh impulse ; that no slumbering sense of duty can be awakened, no feeble desire to do good can be reinforced by the acceptance of rational beliefs ; that, in short, the amount of available goodness must remain unchanged, though it may be prevented from defeating its own purposes.

As I said, the philosopher is not, except to himself, a creator, and he cannot change the basis of human nature in general, or of any given character in particular. But he *can* awaken the forces of character, and so increase the amount of available goodness. It is just as possible to be "converted" by a rational ideal as by a mystical one, and the conversion brings with it the same sense of new joy, new strength, and new life. This is a matter not of theory, but of actual experience. The fact remains, whether explicable or not.

Philosophy, it may be said, does not touch the springs of action. It can never provide motives. Having no access to the passions of hope and fear, it can neither impel nor restrain. In the sense that philosophy cannot permit to virtue a purely *im*moral character these assertions are true but irrelevant, for no moral result can be obtained from immoral material. In the sense that philosophy has no means of effectual contact with the emotions, and cannot be a source of motives, they are relevant but false. For, consider what is meant by the word " motive." A motive, certainly, is not a mere intellectual apprehension, but neither is it a mere unintelligent craving. It implies both understanding and feeling ; or, rather, it is the unity of the two. It is an idea which is also an emotion. To be an emotion an idea need not take

the form of a command, nor need it in any way appeal to appetite or to individual interests. It may be simply an abstract principle. For instance, the conception of the organic unity of mankind is in itself an inspiration. It humanised the stoicism of Marcus Aurelius ; in a less self-conscious and more naïve form it was the soul of Christianity ; it has lived in all systems of socialism and communism ; transformed to a superstition, it is the fundamental tenet of positivism ; rightly interpreted, the assertion that principles cannot be motives resolves itself into the truism that they are not motives, unless the mind into which they are received is that of a moral being, able to *feel* as well as to understand them.

If the recognition of universal laws is needed for the unification of individual conduct, much more is it needed for the unification of social aims. The common saying that all ages of great achievement have been ages of faith is not historically correct, but it is the one-sided expression of a historical fact and a philosophical truth. Faith in the ordinary sense of the word—that is belief based on emotion—is not essential to great achievement. But the sovereignty of some ideal which governs and inspires the best thought and feeling of the time, and concentrates its powers upon one comprehensive purpose, is essential to every great advance in social evolution. Every ideal hitherto regnant has failed at last owing to that "admixture of a lie" which "doth ever give pleasure." The Athens of Pericles, the Roman Republic and Empire, the Jewish commonwealth, the early Christian church, the Papacy, the Renaissance, the Reformation, the era of physical science not yet over—in short, every state and every epoch of signal importance in human history is the embodiment of an ideal. But in each there has been some defect or extravagance which, under changing conditions, has ended by neutralizing the true elements, and rendering the whole fabric obsolete and ruinous. The attempt to trace a given ethical type to ultimate principles has often been made, and sometimes with results of permanent value. But the analysis has never been complete. No operative ideal has ever been

exhibited as a corollary of the primary laws of thought; on which, nevertheless, all ideals must rest, so far as they can claim universal validity. That no deduction of any operative ideal in its entirety from ultimate principles has yet been effected, does not prove its impossibility. The evidence, indeed, is on the other side, for it is in virtue of the deducible, that is, of the universal element, that religions and philosophies have in the first instance risen above their competitors, and have retained their potency long after the conditions under which they were formed had passed away. This universal element, since it belongs, not to any clan, or nation, or race, but to the whole human family, is in its nature indestructible, and an ideal constituted solely by this element could never perish, although it might alter its garb with altered circumstances. Although the laws of thought, which may equally well be named the postulates of reason or the conditions of experience, have never yet furnished mankind with a complete scheme of life as their legitimate corollary, they have furnished the "vital principle" of all effective schemes of life, the principle of their success and their longevity.

Human inconsistency would assuredly not be banished by any conceivable triumph of philosophy, but it would be placed in a clear light and known to be what it is. The passions of the selfish, especially the "self-regarding" instincts, can perhaps never be wholly subordinated to reason, but the mental confusion which is one source of schism both within the mind and within the social organism could at least be cleared away. Many pursue a crooked course from naturally crooked impulses, but many also because they cannot see the straight path; and were this mental *strabismus* cured, one cause of the practical obliquity would be done away with.

The strength devoted to practical reforms is wasted unless it can be consistently and continuously directed to its object, and unless that object is one which can be achieved without defeating its own purpose. But every achievement will finally defeat its own purpose unless it is planned in accordance with universal truths, and the only universal truths which exist are the fundamental laws of the mind. Philo-

sophy, then, which is the science of the fundamental laws of the mind, forms the true basis of practical right conduct. I do not, of course, mean that there can be no right conduct in the absence of philosophical culture. Such a proposition would be too obviously absurd to be maintained even for a moment. I mean that all right conduct, when analyzed, will be found to rest on the ultimate principles of reason, and further, that unless it is analyzed and until these ultimate principles are brought into consciousness, and recognized not only as formulæ, expressing mental processes, but as furnishing a law to be obeyed and an ideal to be cherished, there is no security that even the noblest nature, and the least swayed by selfish passions, will not swerve from right conduct through mere intellectual confusion. Practical justice and beneficence, whether manifested in the maintenance of the present social order and the mitigation of present evils, or in preparation for a new social order, must depend for continuity and cohesion upon right philosophical conceptions. The man of thought and the man of action play into each other's hands, and neither has a right to despise the other. Without action thought would be paralysed, and without thought action would be blind.

The philosopher, then, should direct his efforts to the unification of life. No grander task can be proposed to any human being; none certainly, the accomplishment of which would contribute more to the regeneration of the race. Putting away the pride of ingenious thought-spinning and word-spinning, and also that affectation of extreme simplicity which deludes the crowd into the belief that it understands metaphysics, he should bend his mind to analysis for the purpose of synthesis; an analysis of experience, a synthesis of principles. If he should not succeed in this endeavour, he may help to lay the foundations of future success; and if even this modest hope be frustrated, and he remain without hearers, and without even the sympathy of kindred minds, he will at least have paid his debt to the best of his ability. He will have given *himself* to the community, worthless or ill-timed though the gift may prove.

TRANSCENDENTAL PSYCHOLOGY.

THE first step towards knowledge is the exclusion from our search of all that we cannot know. Especially is this needed in Philosophy, the boundaries of which still remain doubtful. Until the question of the limitation of reason was definitely settled, there was indeed nothing that could properly be called philosophical progress, but only philosophical fluctuation. On the principles of the Platonic Idealism, or even on those of Descartes, Spinoza, and Leibnitz, it would be easy, by the exercise of a little ingenuity, to justify the most disparate conclusions. Open the door to the use of abstract ideas in a manner not warranted by experience, and you let in at once a troop of phantoms, enough to people a whole Pantheon and Pandemonium, and as many intermediate regions as the imagination can construct.

Before proceeding further, I shall draw what I believe to be one of the boundary lines of human thought. The others will appear later on. At present, it is necessary to show why the point from which my investigation might perhaps be expected to start, really lies outside its scope.

Transcendental psychology is at present the chosen sphere of philosophy. Empirical psychology analyzes and classifies the workings of the mind, and describes the processes which constitute mental actions. But transcendental psychology has a different function; to analyze the world of consciousness, till it reaches an ultimate conscious entity, an unchangeable self, which includes all feelings, binding them together into objects, events, and finally into the entire cosmos. This binding power is its *raison d'être*. "The cosmos of our experience is only possible in relation to a thinking subject, as that for which appearances, past *as feelings*, are

present as facts determining and determined by all others."* That is, if there were nothing but the succession of feelings, one being over before the next begins, there would be no relation between feelings, because relation is only possible when two or more feelings are held together in consciousness. But if there were no relation between feelings, there could be no objects, and consequently no world. The essence of thought, of science, of the commonest experience consists in the possibility of making past and present feelings co-existent. Not only the co-existence, but even the sequence of feelings presupposes a permanent background. "The possibility of a succession implies something other than the things which succeed. In order to their being related even in the way of sequence, there must be some *unit, other than the events*, and not passing with them, through relation to which they are related to each other; *a, b, c*, are points in succession; *a* is over when *b* begins, otherwise they are not successive. There must be *something else*, then, for which *a* is not over when *b* begins—for which it is still present—in order that the two may be related to each other as present to past."† This "unit" must be conscious, because "if you suppose an ultimate unconscious unit, you still require a further conscious unit to correlate the unconscious unit with the manifold events which, through relation to it, are related to each other."‡ This conscious unit, then, is the unchangeable self, which forms the eternal element in our fleeting perceptions. It is pure subject, without trace of objectivity, and imposes, but does not submit to, the conditions of time and space. It may be designated as thought, or as the ego, or simply as the subject; but in each case the name has a tendency to retain some colour of objective significance. This tendency appears in the very sentences by which it is explicitly disavowed. For instance, Professor Green observes: "But if by Thought we understand the self-conscious principle which, present to all feelings, forms out of them a world of mutually related

* Works of Thomas Hill Green, vol. II, § 63.

† Ibid, § 10, the italics are my own. ‡ Ibid.

objects, permanent with its own permanence, we shall also understand that the relations by which thought qualifies its objects are not qualities of itself—that, in thinking of its object as made up of parts, it does not become itself a *quantum*."* Very well; but here is a complete hypostasis. "Thought" has become an entity, which can be "present," which can act, by qualifying objects, and forming them into a world. It is no longer mere "thought," but has already become that which thinks. The relations by which it qualifies its objects, we are told, are not qualities of itself; but this can hardly be correct, since the very conceptions of "presence" and "permanence" have no meaning that is not objective. This, indeed, is explicitly admitted in another place. "The matter or something," which really does not begin or cease, is the thinking self as *an object to itself*, which is not *in time* at all, but is the condition of the possibility of time and is only called *permanent* by a kind of metaphor and at the cost of contradiction."† But thought, though not "permanent," and not "in time," is here avowedly the "thinking self." As such, it is clearly an object, and occupies the anomalous position of being *an object to itself*. That is, the nominal division between subject and object has been carried into the very "unit" which is at the same time the distinctive subject "other than events" and objects. We find, however, that this is only done by a kind of delusion; that the objectified subject is a subject no longer, and that the ultimate "conscious unit" still eludes our grasp.

I make this excursion into the region of transcendental Psychology merely to show that transcendental psychology cannot form the root of any true philosophical system, because its central conception cannot be kept constant, and when analyzed is forced to drop one by one all the attributes which make it conceivable. For whatever is determined by attributes, whatever can be thought about, whatever, in short, is conceivable, is an object of thought, and not the pure thinking subject.

* Works, vol. I, § 268.

† Ibid, vol. II, § 46, the italics are Professor Green's.

No sane thinker denies the existence of the Ego, taken in the sense of the unity of consciousness. But when the term "unity of consciousness" is made convertible with the term "conscious unit," and we attempt to separate ideally this unit from that which it unifies, the task is seen to be impossible. The Ego recedes and fades away before the pursuit of thought. First, it is a thinking subject present to all sensations, distinguishing feelings, and constituting them into objects; then it is the spectator of the experience thus constituted; next, it separates itself from its own emotions and ideas, even the most intimate and most general; finally, even this inmost self becomes something which can be analysed into the pure forms of the understanding. But of the *analyser* of this inmost self nothing can be said, because nothing can be thought. Evidently we can never objectify the subject, because, however far we carry our analysis, there always will remain a subject engaged in thinking, and not itself thinkable. If we push the relation backward till the remaining subject is unanalysable, it will thus be absolutely without thinkable content; that is, it will be nothing.

The same argument may be put in another form. All our notions and expressions with regard to the Ego are derived from our experience of mental and physical phenomena. "Presence" for instance implies the coexistence of bodies or of ideas, and is not applicable to that which is essentially distinct from bodies and from ideas. To speak of the "Transcendental Ego" as a spectator, an actor, a bond, or even as a relation is not "metaphorical" only, but is absolutely meaningless. Your "spectator" or "actor" is a mere reinstatement of the empirical Ego. That is, you take the empirical Ego twice over, once as the world of consciousness which you are analysing, and again as the conscious agent within the world of consciousness; whereas the conscious agent *is* the world of consciousness, and is no more within it than without it. The "bond," the "relation," the "principle which forms the unity of the world," even the empty concept, "something," are all abstractions from experience misapplied to that which is distinguished as not being an object of experience.

Professor Green explicitly acknowledges that the "unity of understanding" is "nothing real apart from the multiplicity of phenomena any more than these apart from it."* Strange that so subtle and penetrative an intellect did not perceive—or rather did not consistently hold—that the unity of understanding or the subjective element in experience is not, even in idea, separable from the objective element; that the two are not merely inseparable in reality, but that neither can be ideally isolated.

For, to turn to the other side of the matter, feelings, bodies, and events are not thinkable as isolated from consciousness, or, as Professor Green would express it, from thought. This he clearly sees with some uncertainty—upon which I shall remark later—with regard to elementary *feelings*. But his language is often misleading, and perhaps indicates a more than merely verbal confusion. For example, in his criticism of Kant's account of number, he says: "In order to there being number there must be present to successive different feelings a subject *distinguishing itself from them*, which can retain their mere differences, and at the same time put them together as one to one. In order to there being numerable objects (*quanta*) there must have taken place (*a*) *a distinction by a thinking subject of a feeling from itself, and the presentation of it to itself as an object* to be attended to; and (*b*) a reference to this object of the data of successive acts of attention as its parts."† Still more definite is the clause already quoted: "There must be *some unit other than the events*, and not passing with them."

Now, the italicised expressions may be so taken as to convey an unquestionable truth. We do think of sensations, bodies and events, as of things that may be detached leaving the Ego intact. We do actually detach them in idea, setting them over against the real self, as though in some way they were not only separable from it, but in some way opposed to it. In other words, we objectify.

This is the account of a mental fact, but the mental fact

* Ibid, § 30.

† Ibid, § 31. The italics are my own.

does not correspond to any fixed or definite distinction. For just as, when we contemplate the subject, we find that it turns to an object, so, when we contemplate the object, we shall find that the subject has "distinguished itself" in vain, and is still on the objective side of the boundary line. Vainly, indeed, from the philosophical point of view, does the thinking subject detach sensations, and present them to itself as objects. It is but presenting itself to itself. As distinguished from consciousness—from thought if you will—feelings and relations of feelings have no thinkable existence.

The same difficulty meets us in the sphere of Moral Philosophy. Here the conscious unit is a volitional unit; it is *that which wills*, but it cannot really be considered apart from *that which is willed*. In Kantian phraseology we may say that the "intelligible character" (the free course of actions) becomes, as soon as we try to define it in thought, the "empirical character" (the character as displayed in action). If we abstract from our conception all the possible modes in which character can display itself, we have abstracted character, and left nothing either moral or intelligible. Take away all that is empirical—that is, both the inner motive and the outer result of conduct—and you have taken away all that is good or bad, moral or immoral. The "free cause" would then have no moral or other quality whatsoever, and, in fact, would be quite indistinguishable from the abstractions opprobriously known as "blind chance" or "brute matter." But define the "free cause" or "conscious unit" as that which thinks and wills, which constitutes sensations into a cosmos, and orders conduct, choosing between right and wrong, and you have the entire man, empirical and intelligible. You meant to analyse him, but he has defied analysis, and returns on your hands entire.

This is the one fatal defect of Transcendental Psychology —that its analyses are illusory. In the very act of taking the mind to pieces it unconsciously puts it together again, endowing its abstraction with the very qualities which had been carefully stripped away.

To change the metaphor, we strenuously chase the Ego

towards the realm of subjectivity and nothingness; we dislodge our fugitive from the objective resting-places which it has constructed, and which it maintains; and at last, when all behind us is ruin and all before us is darkness, we pause to look round, and lo: the elements are re-united, the cosmos is restored, and the exiled Ego has returned to objectivity and to life. Rather, the elements were never divided, the Ego never banished, and the whole chase was but an illusion and a dream. But we are not aware of our failure, and we go on complacently believing that the pursuit has been successful.

The error would be harmless, or would lead to nothing worse than waste of mental energies, but that it lends in appearance at least the sanction of philosophy to ideas which philosophy has no right to sanction. An unchangeable unit which thinks and wills, and which distinguishes itself from objects, *seems* to be a ready-made soul or spirit. We can easily forget—and, in popular exposition, we certainly shall forget—that this unit has no reality apart from objects, and that the distinction which we have drawn does not permit, but indeed forbids, the notion of actual separability. The "subject," the "free cause" is not really conceivable except as the entire man, and if it is to be distinguished from an outer self, it must be a man within a man. This will be at once clear to the vulgar, and would be clear to the philosopher, did he not blind himself with ambiguous phraseology. The hypostatised unity of consciousness is thus identified with that crude fancy of a self within the self, which lies at the root of Animism. As a "free cause," as undetermined by the conditions which it imposes, and as existing in relation to a cosmos which can be thought of only as extending indefinitely in Time and Space, the "unit" becomes an Eternal and Infinite Self—that is, it becomes God. Not, of course, to the original thinker, the God of popular theology, but merely a kind of link, a sort of relationship, which he finds is necessary in order to hold together his conception of the Universe. But the vulgar, having already identified the "unit" with that man within a man which to them is the

soul, must go on to identify the same unit as eternal and infinite with that magnified man which they call God.

The philosopher is sorely tempted to look with complacent eyes upon these identifications, which allow him to preserve the appearance of orthodoxy, and to express his ideas freely without jarring upon the prejudices of society. He may even persuade himself that the popular faith is merely a form of that truth which he contemplates in its pure reality, and that, so long as this particular form is generally acceptable, it is better to leave it undisturbed. If so, well; but in that case Philosophy has failed in its object, which was to exhibit a higher and more consistent truth than the people had yet attained. If, on the other hand, the popular faith represents an erroneous ideal, which, when realised in conduct, must result in practical antinomies, then Philosophy has abdicated its function altogether by countenancing a theory which produces intellectual and moral discord. The task of philosophy is the unification of life; evading this, it can achieve nothing.

For the above reasons, I hold that what I have called Transcendental Psychology is a foundation of sand rather than of rock. Any system apparently constructed on this basis can be valid only so far as it can be traced to some principle, independent of theories respecting the "thinking subject."

The real service rendered by the Transcendental Psychologists is that they have insisted upon the unity of the world, although the conception has always been marred by inconsistencies. Kant laboured to provide a mediator between reason and experience in the form of "Schemations of the Pure Conceptions of the Understanding," when, according to his own ideas, reason is involved in experience, and experience is impossible without reason. Professor Green isolates the "thinking subject" on the one hand, and "simple feeling" on the other. But Kant, and, still more explicitly, Professor Green, show that between percepts and concepts, between the commonest experience and the highest thought, there is no solution of continuity. The percept is not more real than

the concept, for it *is* the concept under special conditions; the concept is not more valid or more sacred than the percept for it *is* the incompletely specialised percept. "Abstractions" do not exist, except as abstractions from experience. The gratitude of every student of philosophy is due to Professor Green for his reiterated statement of this truth; and but for the flaw which I have noted, and also for what seems to me the fallacious manner in which he has applied his principle to certain great problems, any further elucidation might for the present be considered unnecessary.* As, however, this identification of idealism and realism seems in some respects imperfect and confused, several questions of the highest importance remain to be answered, or at least to be investigated.

First among these comes the enquiry, "What is the true starting point of philosophy?" We have seen that it cannot begin either with the subject or the object, because neither can be considered in its purity, and each, even in the last analysis, will be found to include the other. This question need not detain us long, for after our previous study it answers itself. For if subject and object be indissolubly one, the simplest unit from which we can start must be the Ego in its entirety; that is, the universe as felt and known. This may seem a paradox, since this Ego or universe fills up the whole sphere of possible thought, and would seem to be, not a unit, but the synthesis of all possible units. Yet, since everything which is known exists under certain conditions, and therefore implies those conditions, and again *their* conditions *ad infinitum*, each unit implies the whole synthesis, and virtually *is* the whole synthesis; so that, conversely, we are correct in saying that the synthesis is the true unit.

Of course, each of the units or objects which make up the universe, is so far a *real* unit that it has a distinctive content of its own, and can be practically isolated in thought by the concentration of attention on this content. Each is both subjective and objective, and is therefore real, not being

* For a popular exposition and criticism of Prof. Green's views, the reader may consult "Knowing and Being," by Prof. Veitch, of Glasgow. (Blackwood, 1889.)—Ed.

nullified by the untenable division of transcendental psychology. But, for philosophical and scientific purposes, our attention must be concentrated not on objects as units, but on objects as implying the universe; that is, on the *relations* of objects.

This leads us to the true significance of the distinction between subject and object, which may also be expressed as a distinction between the universe and the Ego. When properly understood, the distinction is not between two units, or between a "unit" and a manifold, but between two relations, two aspects. We can speak either of the unity of consciousness or of the uniformity of nature; but in so doing we are not speaking of two different things, but of one thing regarded from different points of view. Or again, we can objectify the unity of consciousness as contrasted with the consciousness of that unity; but still we are dealing with relations, which must not be hypostatised. The relation *between* subject and object should properly be called the subjective and objective relation. We should then have no such extraordinary personifications as the unity of consciousness contemplating the uniformity of nature, or the consciousness of unity contemplating the unity of consciousness!

What is usually spoken of as the self, which we consider apart from objects, is really only a *relationship* between more or less naturally determined portions of the subjective-objective world, or rather the term connotes several different relationships, and is taken to signify now one, now another. Sometimes the self is the body, with its physical pains and pleasures; sometimes it is a synthesis, the higher forms of intellect and emotion, as distinct from the lower instincts and passions, and from the physical frame. Sometimes it is the individual, as distinct from other individuals, with his interests, as contrasted with theirs. The metaphysician's self is the consciousness of intellectual unity, of which the varying thoughts and perceptions are merely phases, which might conceivably have been different in form, without any difference in the laws of the intellect; the moralist's self is the consciousness of moral unity, of which in the same way

varying actions are merely phases, which might conceivably have been different without any difference in the laws of the character.

In all these senses self is real, because all involve real relations. Error comes in, first, when these relations are supposed to exist between distinct entities, rather than to constitute distinct aspects of one entity, and second, when the relations are confused one with another, and the metaphysician's self, for instance, is taken as though it were identical with one of the several popular connotations of the term. For the philosopher who deals with the universe as a synthesis, the self or Ego is that same synthesis, including all the various relationships of self and not-self which can be set up in thought. There is indeed a sense, which I shall explain later, in which the universe may be said to exist independently of the Ego. But this very "independence" and the way in which it is manifested can be known only as Ego-istic relations.

The philosopher's problem, then, is to discover the relation of all relations—that synthetic principle which renders possible all syntheses and all analyses; in short, the primary postulate of reason. This principle found he has to apply it to the whole of life, showing it as the root of logic and of ethics, explaining the intellectual errors and the moral faults which come from its imperfect recognition, and setting forth the practical harmony which would result from its complete realisation.

SUMMARY.

Transcendental psychology does right in binding phenomena together in a single egoistic synthesis; it does wrong in distinguishing from them crude sensation at the one extreme, and the conscious unit at the other extreme. The "conscious unit" or "thinking subject" cannot be distinguished in thought without being hypostatised; that is, without becoming an object. Neither can the object be distinguished in thought from the subject, for apart from consciousness, feelings and their relations are inconceivable.

In the same way, the "intelligible character" or the free cause of action cannot be thought of as distinct from the "empirical" character, or the character as displayed in action.

The over-analysis of transcendental psychology would be harmless, but that the distinguishable subject is easily mistaken for a separable soul.

Philosophy must insist, not on the conscious unit, but on the unity of consciousness, which may be otherwise expressed as the uniformity of nature. The complete synthesis, which from one point of view may be called the universe, from another point of view the Ego is the only real unit; since every object which it includes is found to imply and condition every other object. Thus our attention must be directed not to units, but to relations; and chiefly to that synthetic principle or fundamental postulate which is the ground both of thought and action.

ONTOLOGY AND SCEPTICISM.

IN the preceding essay I described the latest and subtlest form assumed by that disease of human thought called Ontology. This latest form is indeed so subtle that it may deceive the very elect, who abjure the Spirit of Hegel, the Will of Schopenhauer, the Unconscious of Von Hartmann, and even that emptiest of all abstractions, the *Ding an Sich* of Kant. Against Ontology in its grosser forms I need hardly protest. And yet, perhaps, it will be as well that I should define, in a few words, the precise injury which it has inflicted on philosophy.

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At the outset of studies in any special science, it is generally considered safe to assume that the science really exists. Chemistry, physics, biology, are fairly sure of their ground. They are built of facts and can be tested by facts. We wrangle less concerning their matter than concerning their form. We may construct various hypotheses as to the exact manner of the decomposition of a salt, or the fertilization of a flower; but we do not doubt that salts are decomposed and flowers fertilized, or that these processes take place according to definite, discoverable laws. Even when the science does not at present exist, we are often willing to admit the abstract possibility of its existence. A meteorology, competent to predict the storm and shine of a century; an evolutional biology, laying bare all the causes and conditions of variation and development; a sociology, gathering the laws of social progress and retrogression into one harmonious whole; these, even when believed unattainable in practice, are yet acknowledged to be possible in theory. Success is thinkable. The difficulties in the way differ in degree, not in kind, from

those already overcome. Even when these difficulties are so great or so numerous as to constitute a barrier practically impassable, we are yet able to think them away, and to substitute ideal conditions in which the desired result would certainly be attained. An impossible length of life, patience of search, delicacy of instruments, keenness of sense, capacity of intellect: all these can be assumed, because they are not generically, but only specifically, superior to the means which we at present command. The wildest exaggeration of the known is more intelligible than the simplest presentation of the altogether unknown. Talk to a blind man of the harpings of angels, or the music of the spheres, and you convey some idea to his mind; talk to him of the simple sensation of red, and your words are nothing but words. You are speaking of the inconceivable.

Philosophy, which should be the science of principles, has well-nigh forfeited the birth-right of all sciences, by consenting or rather demanding that its validity should be tested by its success in fulfilling certain impossible conditions. To discover the real nature of being and of its primary attributes, or, more modestly, to decide that there *must* exist a substance or being which constitutes the ultimate reality, although its nature and attributes are unknown; this has been regarded as the principal task of philosophy. Further, if this unknown being is supposed to be the absolutely real, all known objects must fade into relative unreality. The conceived is a phantom, fluctuating at the caprice of the inconceivable.

A thinker comes by, without the orthodox philosophic spectacles, and sees that the inconceivable is assuredly a phantom whatever the conceived may be. The absolutely real turns out to be an empty concept; that is to say, no concept at all. It is a mere word, and does not correspond to any idea, still less to any impression. The immediate effect of this discovery, however, is not to reinstate the world of experience in its true position. While abstract being was the one reality, particular beings were fleeting illusions. When abstract being is disestablished, the particular beings are still, for a time, treated as illusory. Hence arises that

universal scepticism which attempts to destroy philosophy with its own weapons.

It cannot be wondered that this schism in the philosophic household should breed distrust among the intelligent public. Not only are the assertions of philosophy disputed, but its very right to assert is called in question. It must fight for bare life; the militant stage demands so much of its energies, that it has scarcely time or strength to enter on the industrial stage, till its right to *Be* is made clear, its right to *Do* must remain in abeyance.

I shall try, in the following pages, to prove both the right to *Be* and the right to *Do*. If possible, I shall show that the solution of the initial problem of philosophy leads naturally to the solution of subsequent problems.

We are in doubt, let us say, whether a certain door can be opened, or whether it is a mere square of dead wall painted to look like a door. We may ask other people about it—or we may contemplate it from a distance—but still we have not entered. But if, instead of listening or looking, we can find the key, here is at once the proof that we sought, and the means of entrance that we desired.

I hope that my essay may serve as such a key. But first, let me state strongly the difficulties which confront me. "Mind" and "Matter" have been held to be the subjects of philosophy; but, before asking *what* these are, we have to ask *whether* they are. And this enquiry seems unanswerable, not like the questions of sociology and meteorology, but like the old scholastic problems touching "substance" and "attribute," which inhabit the hazy border-land between words actually expressing ideas and words which are faint inarticulate echoes of ideas, like the twentieth reverberation of a sound-wave.

The scientific imagination is unlimited in its own direction. We can imagine Archimedes resting the fulcrum of his gigantic lever in Sirius, and perturbing the earth in its orbit. But how is Archimedes to be sure that this seeming motion of the earth has any reality; or that the earth itself is more than a permanent phantom? Provide him with fabulously

powerful telescopes and telephones; how can he affirm that what he sees and hears may not be due to some occult flaw in his instruments? Nay, dispense with the instruments, and strengthen his sight and hearing a myriad-fold; can he trust his eyes and ears? These organs are sometimes oddly creative; how does he know that they are not always creative? The senses may be poets rather than reporters. Perhaps they invent the earth which they seem to represent. Perhaps, in short, there is no earth outside his own mind. But it is clear that, to cherish doubts like these, the sage need not be one hundred and twenty-three billions of miles away. Though he cross the intervening depths of space, and land on our planet, his problem is not one whit nearer solution. The Sirius end of his lever is just as real, and just as unreal as the earth end. His own planet with its inhabitants, nay, his own bodily frame, even his own mind, are so many spectral apparitions. He cannot positively say that there are any corresponding realities which continue to exist when he is asleep or unconscious; or that the material particles of which his body seems to be composed are anything but mental images, or whether, supposing them to be something more, they preceded and will outlast his conscious life. Of kindred sentient beings he knows nothing. Ghosts there certainly are which mock him; some dim and fleeting, some distinct and more enduring and consistent. Those he calls dreams, these realities; but there is no definite line of demarcation between the two classes. The "realities" may be simply more vivid inspirations of the senses, which, like all artists, sometimes sketch and sometimes turn out masterpieces. Possibly he is alone in the world; or rather he alone *is* the world.

And yet this world of self; in the last analysis, what is it? Our sage can know nothing but his own sensations and thoughts; and at any given moment, he can know only that moment's thoughts and sensations. He appeals to memory. In vain! Why should he suppose that memory is trustworthy? It may be a false record; or it may be no record at all. It pretends, doubtless, to tell the truth about Time;

but so do the already discredited senses pretend to tell the truth about space. There is no reason why memory should not be discredited likewise.

The philosopher has now decided that at the present instant he has certain feelings; or rather that certain feelings exist. But he can decide nothing more. Whether his consciousness existed two seconds ago, and if so, what manner of consciousness it was, whether his reasonings are based or baseless; whether in short he is a coherent being at all, and not a chance momentary concourse of heterogeneous sensations, among which there happens to arise a delusive feeling of unity; concerning all this he is quite in the dark. Indeed, since he is bound to doubt the possibility of introspection and self-analysis—there being conceivably no self to analyse—it may be that he has not even been arguing; that there is no such thing as argument; that premises have no influence on conclusions; that therefore all conclusions (including, of course, sceptical ones) are the phantasmal end of a non-existent chain. Let Archimedes go back to Sirius, and perturb or seem to perturb the earth. That will be easier than to prove its existence—or his own.

Now that he (if it be permissible to apply the personal pronoun to a doubt of personality) has completed his "destructive criticism," let us step in and try to gather up the scattered fragments of the Ego. The first thing to be noticed is that the philosopher has set out, Irish fashion, by "turning his back upon himself." Starting with an assumption, he has gone on to argue as though he had started without assumptions. Then he turns round and questions that primary assumption, using arguments which must fall to pieces directly they are accepted as valid. They must die in the moment of victory. He is proving by ocular evidence that sight is impossible; using persuasive evidence to show that there is no such thing as speech.

What has been assumed is the *possibility and validity of reasoning*.

SUMMARY.

The idea that nothing is real, except abstract being, has generated the counter-idea that, since abstract being is unreal, there can be no reality. Philosophy, which dealt with being, is thus deprived of its occupation and of its right to exist. This is the conclusion of scepticism. But if we can show that *some* reality is presupposed by the sceptic, we shall have laid afresh the foundations of philosophy. Now the sceptic assumes that it is possible to reason, and that his own reasonings, at least, are valid.

COSMIC IDENTITY.

"Flower in the crannied wall,
I pluck you out of the crannies,
Hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

THE sceptic, as we have seen, assumes at least the validity of his own arguments. But he must have some ground for this assumption, and the only conceivable ground is the unconditional validity of reasoning, when it deals with correct premises. These correct premises must be of universal application, or they would not serve the purpose of the philosopher. For instance, suppose it to be true that the whole world of real or imaginary knowledge is built up from isolated "impressions" which "strike upon the senses" and are then "copied by the mind," and that no idea has any truth or indeed any existence, unless it is copied from some impression. This hypothesis must be a principle of experience or it is utterly baseless, but it must also be a necessary principle, true at all times and in all places, or it has no philosophic significance. Yet it certainly is not the copy of an impression, so that in reality it cannot exist, even as an illusion, and the whole human philosophy does not rise to the level of a dream. It has not even a spectral reality.

No principle, indeed, can be the copy of an impression; therefore, according to the sceptic, no principle can be valid or can even exist as a conception. But, obviously, it cannot be the fundamental principle of philosophy that there are no philosophical principles!

Philosophy is bound to take experience as it stands, and to explain it, not to analyse it away. For philosophy is based on experience, and consequently on those principles which

make experience what it is. That we can identify objects, and that we can know the relations which bind them together, are the pre-suppositions of all reasoning which concerns itself with objects. But there is no kind of reasoning which does not concern itself with objects if we take the word "object" in its broadest sense, as denoting a "concept, an emotion, or a sensation," as well as a material thing. Even if the word were taken in its narrower sense, we might almost say the same. For every concept, emotion and sensation, and consequently all learning about these psychological phenomena, will be found to hinge in some way upon material things, their properties and their relations. No moving story was ever written which would not be meaningless were we wholly ignorant of the physical laws of nature. Fairy tales owe their charm to open defiance of these laws, and would lose piquancy and point were the laws themselves taken away. Even the authors of the Old and New Testament recognise implicitly the general fixity of natural relations, and show their recognition in the very act of narrating miracles and prodigies, as cases of Divine interference.

The very essence of a natural relation is obviously that it should be *constant*. For if it were *not* constant it could not be used as the basis of reasoning, and as reasoning has no other basis, so far as it concerns the physical world, including manifestations of morality and intellect which are subject to physical conditions, we should not be able to think at all about the qualities of our dwelling-place, or the events of our daily life.

It is not, of course, implied that every sequence or co-existence which we notice and do not test must eternally repeat itself. In this essay we need not discuss the tests which can be applied, or the principles which must guide our discrimination of law from mere coincidence. What must here be insisted upon is the general truth, the universal pre-supposition of our common sense as well as our philosophy, that the world eternally and infinitely is one with itself; that there are laws which belong both to reason and to nature, are independent of time and space, and persist through all vicissitudes; that there are

subordinate relations, due to the interaction of these fundamental laws,* which when perfectly understood will appear as necessary resultants; and that, so far as we reason about the history of the world, we must assume the persistence even of these subordinate relations, unless we find some internal evidence which leads us to believe that they have suffered change.

The truism that philosophy cannot exist without general principles will be very easily accepted by the reader, who may, however, utterly refuse to take a step further, and to admit that the possibility of thought implies the constancy of nature. "No," he will protest, "you ask me to draw too large a conclusion from narrow premises. It is absurd to say that my faculty of reason implies any corresponding trait in the Cosmos. You might as well inform me that, if I will only consider the earth as the centre of the universe, and steadfastly refuse to consider it in any other light, then the sun will immediately begin to revolve round the earth, and the planets will assume the cyclical and epicyclical movements with which they were credited before the days of Copernicus." Let us put the recalcitrant reader through the ordeal of a Socratic dialogue if he will pardon the introduction of a Neo-Socrates, who has laid aside his Platonic prepossessions.

Socrates.—I entreat you to resolve my doubt. In what does reason consist?

R.—Reason, oh Socrates, consists in the apprehension and application of principles.

S.—But of what use are these principles?

R.—Without them the universe could not be known. Unless our thought were guided by the knowledge of certain laws, the world around us would be an unintelligible chaos.

S.—But you have only cleared away part of my difficulty.

* I must ask pardon for speaking of the "action" or "interaction" of laws. I know that a law is the statement of a natural relation, and therefore cannot "act" or "interact." But I have taken the liberty to use the phrase "interaction of laws," instead of the more cumbrous "combination of relations."

What do these laws? Do they relate merely to the mind itself, or do they relate merely to the real world?

R.—Some, perhaps, relate to the mind, and some to the world.

S.—Then the world and the mind are separate existences. The world is outside the mind, and is quite independent of it. Yet, if so, it is difficult to see how principles in the mind can have anything to do with the world?

R.—No, now you misunderstand me. The world, so far as we know it, exists only *for* the human mind, and you may say if you like only *in* the human mind. The world, so far as we know it, exists in our perceptions and ideas.

S.—I see. But is not this equivalent to saying that the principles of thought must be the principles of the world?

R.—It is so, oh Socrates.

S.—And has reason any object besides the world which influences the mind?

R.—None, whatever.

S.—But does not the world include mind, whenever mind becomes an object of thought?

R.—Truly.

S.—Then to say that reason consists in the apprehension and application of principles or laws means either that these principles govern the world, or that they govern nothing, and that reason is therefore an illusion?

R.—It seems so.

S.—To think is the same as to reason?

R.—No. I can think of you, and yet not reason about you.

S.—But if you affirm anything of me, saying "Socrates is ugly," or "Socrates is wearisome"; or if you doubt that I am Socrates, and seek proofs of my identity, you reason concerning me?

R.—Yes.

S.—Then to think, in the sense of connecting ideas is to reason?

R.—It is admitted.

S.—Now we saw that thought which is valid is thought which relates to the world. But when we think, do not we always assume that our thought is valid?

R.—We do.

S.—A principle, considered as true of the world, is a law?

R.—It is.

S.—Then we always assume that whatever we are thinking about is governed by laws?

R.—Apparently.

S.—Are these laws mutable or immutable?

R.—Either immutable, or they flow from immutable principles.

S.—Why so?

R.—If they were mutable, or if they depended on what is mutable, then we could never reason at all, for we could not know that the foundation of our reasoning did not shift from moment to moment.

S.—Excellent; but suppose it *does* shift?

R.—It may do so, but we cannot possibly reason on that assumption, unless we assume also a deeper and unshifting foundation.

S.—It is certain then whatever we can think about must be subject to laws which are constant, even when it is not certain that the laws we know of are constant laws?

R.—Exactly.

S.—We must always assume that there are fundamental principles according to which these inconstant laws suffer change?

R.—Yes.

S.—So that inconstancy is really a kind of constancy?

R.—It would seem so.

S.—Now is there anything in the world that we cannot reason about?

R.—Yes, there are many things that we cannot reason about, for there are many things of which we are ignorant, and many others which are matters of faith.

S.—Then are these things a perfect blank to us?

R.—Far from it. We can always try to know the things of which we are ignorant.

S.—That is, we can try to find out their laws?

R.—We can.

S.—And we do this by imagining laws for them, and by comparing the consequences of these imaginary laws with our observations?

R.—We do; and in this way I see that we really reason about things of which we are ignorant, and make laws for them.

S.—Now, as to matters of faith. I suppose, from what you say, that you never think about these at all, and therefore you can never talk about them, or act with reference to them. They are apparently like the Epicurean gods, apart and irresponsible.

R.—Now, you are greatly mistaken. Matters of faith have exercised the keenest and subtlest brains from the beginning of the world. Theology has been, from time immemorial, the battle-ground of logicians; though it may possibly be doubted whether they have made much advance.

S.—You said that we could not reason about matters of faith; and now it appears that there is nothing which we are so fond of reasoning about?

R.—We do not reason, we only believe.

S.—Then your theologians do not connect idea with idea?

R.—They, indeed, attempt to do so, oh Socrates.

S.—In fact, they use reason to condemn reason?

R.—I must confess that they do.

S.—But now we have discovered that we do in reality reason concerning things whereof we are ignorant, and likewise concerning matters of faith. In short, we can imagine nothing which is exempted from the rule of reason?

R.—Nothing.

S.—Then, there is no conceivable corner of the universe which is outside the government of law.

R.—It must be admitted that there is none.

The reader shall now be rescued from the tender mercies of Socrates; if indeed he has not already effected his own deliverance, leaving an empty *eidolon* to continue the controversy. If he is not too weary, he may be invited to consider the subject from a different standpoint. And this time he will not be required to make even the tiresome

assumption that he can reason, unless we include under the term "reasoning" the simple act of recognizing a familiar object. It is true that in the sequel he may be beguiled into an argument, but at the outset this is all that he need assume.

First, we will look at the mode, and then at the meaning, of a typical recognition, or—to use a more precise term—identification. I take a flower in my hand, and consider it, not as a botanist, which would complicate matters too much, but simply as a particular point of organism, with a history and properties of its own. I do not at present try to distinguish it as a member of a species, but only to see a small part what is implied in the elementary statements. "This is an object in space; this is an organism; this is a flowering plant—." Countless volumes might be occupied in the development of *all* that these propositions imply; and their range might be found to include the whole circle of the sciences. The full comprehension of a rose or of a convolvulus would tax the resources of Mathematics, Physics and Biology, and would demand a completeness to which biological science, at least, has certainly not attained, and perhaps will not attain. But I am incompetent to write even a modest treatise on any one of these branches of knowledge, and fortunately it is not desirable that I should make the attempt. This bare indication of the wide fields, into which our investigations might possibly extend, must not be dwelt upon until it has been ratified by the argument which follows.

Each of the parts of the plant has its own shape and size; for the sake of simplicity we will keep to the corolla. This is bell-shaped and of a given length and diameter, from petal point to petal point. That is, it has definite relations in space to other perceived objects. They are relations, indeed, which might be conceived as varying to a considerable extent, without much variation in the character of the flower. But this is beside the question, for we are now considering not a botanical individual, but an object in space. The important thing to notice is, that they are relations which do not depend on *time* or on *position*. The flower may certainly wither and shrink till it loses its fair proportions,

but the fact that in its prime these proportions did belong to it, will always remain. Again, no position in which the blossom can be held makes any difference to the relative space which it occupies.

Even could we imagine the flower to be completely isolated from all other material objects, it would still be related to an ideal standard of measurement, by which the proportions of its different parts would be determined. An ideal standard, however, is not distinguishable from a real standard. For measurement, as we shall see later, is ideal only so far as it is real, and real only so far as it is ideal.

The flowering plant came from a seed. Leaves were put forth, the stem grew, buds appeared and opened. Yesterday the flowers expanded: they will wither to-morrow. Their seed will set and be scattered, and in its turn will produce fresh plants. Various conditions are essential to the germination and growth of the seedling, and for the budding and unfolding of the blossom. Moisture and sunshine and certain nutritive salts and gases combine to sustain and develop its life, and are either actually incorporated in its substance, or give the necessary stimulus to its vital functions. As an organism, it grows by the transubstantiation of its food; as a plant, it absorbs food of a particular kind, and forms it into special products. If we were asked "What is the cause of this bud or this petal?" we could reply only by reciting the whole past history of the plant, of the rain and the sunshine, and the mineral constituents of the soil. None of its relations could be changed, leaving it still a plant. There might indeed have been more or less sun, more or less rain, more or less iron in the soil; but the facts of vital chemistry admit of no alternative. Convince me that no vital chemistry has been at work; that no food has been supplied, no light admitted, and no stages of growth have taken place, and you will have convinced me at the same time that what I hold in my hand is but the cunning *simulacrum* of a vegetable organism. My recognition, then, of this object as organic, and as a flowering plant, implies that it stands in certain constant relations to the environing world. For, if these

constant relations were taken away, the flower would lose its identity, and could no longer be recognised for what it is.

All this is simple common sense. Let us pause for a moment, and see whither common sense has conducted us. When we treated the flower simply as an object in space, we assumed the existence of certain fixed relations which do not depend either on position in time and space, on the nature of the flower, either as an organism, or as an individual thing possessing certain properties. They are independent even of the particular shape and size which we noticed; for this shape and size exist only relatively to other shapes and sizes, and all must be ultimately referred to an ideal standard. The shape is a combination of elements which can be recombined in infinite variety, and are not appropriated in any special way to the present mode of union. The idea of a curve or a straight line would mean nothing, if it could not be realised in any sort of material at any time, and in any place. The size again is nothing, except as measured according to some rule, which would be without significance were it not universally applicable.

It is clear that we cannot even recognise an object by its shape and size, without taking for granted the constancy of spatial relations. This "necessity and universality" of which so much has been said, might more justly and less vaguely be called "independence." Spatial relations are necessary and universal, because none of the other conditions under which objects are known can have any influence upon them. Nor is this an assertion which requires empirical proof. For when we attend to shape and size, we expressly shut out from our thought all other conditions; which cannot therefore intrude upon us, except under some misapprehension. Even when material practically affects shape—as in some kinds of workmanship it does affect shape, lending itself more readily to harsh than to flowing outlines, or *vice versâ*, it cannot effect spatial relations; for it is by our knowledge of these relations that we are aware of the deviation towards angularity or rotundity.

Our identification of the bell-shaped flower involved the

conception immature, perhaps, and with its mathematical implications not unfolded, of space in three dimensions, and of an ideal standard of measurement. The absolute constancy of these conceptions, and their universal applicability, cannot for a moment be questioned; since the doubt would at once destroy the possibility of identifying any object by their agency. And that objects can be thus identified, is the presupposition of all experience of the physical world. So that the whole universe of space is assumed by our recognition of the form of a blue bell.

It may seem idle to spend much time in asserting anything so elementary as the absolute certitude of mathematical truths; since at this moment I am writing, not for empirical or other philosophers, but for the "general reader" who, if he would analyse his consciousness, might find himself empiricist and transcendentalist in one. But we now have to consider other truths, whose certitude may not be so plainly obvious.

The plant has a history of its own. We have already agreed that, if it is a vegetable at all, it must come from a seed or a cutting; must depend on the ordinary aliment of plants; must grow by the ordinary vital processes; and must at some time in its life prepare to re-produce itself. I speak of natural flowers, not of garden monsters. If none of these things are true, then it may be a fabric of paper or silk or wax, sufficiently life-like to impose on our credulity; but it is certainly not a plant. The plant is an object standing in constant relations of action and re-action to surrounding objects, and of cause and effect to past and future actions and re-actions. If any of these relations fail, we shall be quite sure that we have made a mistake, and that the pretty trifle must find its place not in a bouquet or a *hortus siccus*, but in a lady's bonnet or under a glass case. So that the identification of the plant as a vegetable organism, like its identification as an object in space, presupposes the knowledge of certain necessary relations, in the absence of which the recognition falls to the ground. Without them, it would be quite meaningless and unknowable; and, if they are stripped away,

we immediately set to work to construct for it a new group of relations, so that some sort of identification may be possible. It did not grow, we say, but it *was made*. And we affirm this quite irrespectively of *time*, *place*, of shape and size, of colour or odour or of any other property which is not essential to the aspect in which we are now considering the supposed flower. The relations with which we now deal, are "universal" and "necessary" just as spatial relations are so; although there is a difference which need not here be accented. Isolated from irrelevant conditions, they are seen to be independent, and therefore constant, "universal" and "necessary."

The plant, as a plant, is identified by its history and by its present actions and re-actions. But all the objects towards which it bears constant relations are identified in the same manner.

For "Universal" does not mean attaching to all objects; it means unreservedly true of a certain order of objects, without regard to any other properties or conditions. Or it may mean unreservedly true of but one individual; so far is the term from implying any allusion to mere number. Space is not universal in the sense that all things are in space. A sound or an odour is not in space; neither is an emotion or an abstract idea. But things that *are* in space are so unreservedly.

The chain of cause and effect, of action and re-action, is unending. The existence of the flower implies the existence of the earth and of the sun, and they imply the solar system and the law of gravitation, which is the relation binding together the worlds of space. Thus the full history and description of the plant would be the history and description of the universe; and the constant relations in which the plant stands to its environment in time and space, the uniformity or rather the identity of nature. For the identification of the plant by its constant relations to soil, rain and sunshine, implies the identification of soil, rain and sunshine by constant relations to terrestrial and celestial conditions, and of Earth and Sun by relations of their own,

to each other, to the planetary mechanism, and to the other orbs of Heaven.

The whole of our experience and of our thought rests on the possibility of identifying our percepts. Identification, as we have seen, implies relations which remain constant throughout time and space, because they are independent of time and space. Even when we are mistaken as to any special relations, or cannot discover their existence, we are obliged to assume that there *are* certain constant relations, which are at least theoretically discoverable. Otherwise we must renounce experience except as a chimera, and thought except as a delusion.

Identity means unity of character, in the midst of variable circumstances. Identification is the knowledge or discovery of this unity. It is a unity which may exist in the different phases of one object, and is then spoken of as continuity, or individuality; or it may exist in different objects, and is then called likeness, or relationship, or even sameness. It is found under the strangest disguises; as when the solid ground is proved to share in the tidal movements of the ocean, and the Andes and Himalayas to be literally, not metaphorically, billows of the earth crust. Forms of energy so diverse as light, heat, and electricity are but the varying forms of a central unity; not a unity of matter, but a unity of motion. Science employs its best powers in unmasking the versatile forces of Nature, which act many parts on the stage of the world.

But whether we have to recognise some simple object, as a flower or a bird, or whether we are required to discover the hidden character of some apparently anomalous set of phenomena, we can do it only by a knowledge or an assumption of constant relations. What we do not assume to be constant, we cannot even desire to know; for the irregularly fluctuant, not the phantom behind phenomena, is the true unknowable. Fluctuations there may be; growth and development there may be; but all must happen according to some law which is at least theoretically discoverable.

So far, we have considered what is usually known as the

physical world. The distinction of "physical" and "psychical" is one which can never be made accurate, because, properly speaking, it denotes two points of view rather than two sorts of subject-matter. However, the distinction has to be preserved for the sake of convenience, because it is necessary now to lay stress on the thing judged, and now on the act of judgment; now on the thing felt, and now on the function of sensation or emotion.

We now turn from "things" to "thoughts"; that is, to the inner processes which render possible the knowledge of realities and the fabrication of fictions. And here we are met by a curious antithesis. We penetrate to the very source of order, and the very essence of law; and in this, the holy of holies, we find what seems at first sight, and what has seemed to many of the ablest thinkers, the throne of chance.

Little argument is needed to prove that the thinker must assume the regularity of mental phenomena. He is obliged to take for granted that his thoughts have a real and unvarying connection with the objects about which he thinks. For, if the relation varied—if his ideas came in a haphazard fashion, undetermined by laws of experience or by the conditions of thought—his so-called "results" would not only be valueless, but they would no longer be "results" in any intelligible sense of the word. His mind would be a mere chaos, and nothing that he might chance to dignify with the title "conclusion" could possess the least validity. That there is a regular sequence of perception, memory, a recognition of our concepts in objects; that the apparent unity of our reasoning and its subordination to fixed principles are actual and not delusive: these assurances are the only guarantees we can give to ourselves and others of the value of our convictions. Reduce the mind if you will to a bundle of impressions and ideas, associated by fortuitous bonds of similarity and continuity, but the mind evades your destructive analysis, and the laws which you have refused to acknowledge reappear under your hands. Like the family who changed their abode in the hope of escaping from the household goblin, only to be greeted from the top of their piled-up furniture with

his cheery exclamation, "we're flitting," the sceptic philosopher, having taken great pains to get rid of the phantoms of substance and quality, cause and effect, identity and difference, permanence and change, finds them all tranquilly seated in his new intellectual home. He can ignore their presence to the extent of not calling it by their usual names, but he cannot help using them as his instruments. There never yet was a Scepticism which did not presuppose that its originator at least was a percipient and thinking being, and which did not lay down some rule to which his thoughts should conform. But I need not dwell upon the obvious truth that "the validity of reasoning" implies psychical as well as physical order, nor even upon the implied extension of this psychical order from the thinker himself to the whole of mankind. Reasoning—philosophic or otherwise—is not for internal use only. It takes for granted that your experience and your mind are fundamentally like my experience and my mind; and, having travelled from me to my neighbour, it can set itself no limit short of the entire human race. Or, rather, its very basis is the postulate that what is valid for me is valid for every human being whom I may chance to address. So far all is clear. Reason would not be reason were it not consistent with itself and with fact. Perception would not be perception if its reports were capricious; recognition would not be recognition if it took place at random. But what is to be said of volition, of emotion, and of passion? Human volition is said by psychologists to be the type from which our concepts of force and of law are derived, but it appears that will itself is utterly lawless, and has none of that regularity of action which the term "Force" now connotes. We seem to be aware of a freedom of choice which is opposed to the idea of causation. I can do as I will—I can will as I choose; and is not the choice itself free and undetermined? Are there not, in short, two equal possibilities of choice, towards one or other of which I turn, by a decision caused neither from without by compulsion, nor from within by motives? This, no doubt, is the popular view of the matter, and a view which has been stated and supported over and over again by

subtle metaphysicians and divines. It has many merits, and only one defect—that it is unthinkable. Perhaps our Neo-Socrates may again be a convenient ally.

Socrates.—You who are a wise man, tell me plainly what you mean by the freedom of the will. I know very well that I can do as I like, when no one is holding me back, or pushing me forward. I can drink this goblet of wine, if you do not withhold it; or refuse to drink it, if you do not forcibly pour it down my throat. But all this is plain, and the freedom of the will is a mystery for the sophists. Enlighten me then as to its real significance?

R.—I will do so. Freedom, oh, Socrates, does not consist in the absence of compulsion. It is not that you can do as you will, but that your will is self-swayed. Your volitions are not caused, even, by motives acting upon your previously formed character. The free Ego stands between the rival motives, selecting and rejecting, with power to choose the weaker motive if it will, and cast aside the stronger. Whichever path you take there was an equal possibility of taking the other.

S.—What you say is strange and perplexing. But instead of discussing your theory, which I foresee will lead us into endless difficulties, I should like to ask you one or two plain questions.

R.—I will answer them to the best of my ability.

S.—Now, tell me, when Aristides returned to counsel Themistocles, did he perform a good or an evil action?

R.—A good action.

S.—How so?

R.—Because his sole intent was to serve his country.

S.—Then, if his motive had been to betray his country, the action would have been bad?

R.—Assuredly.

S.—It would have been bad, even if the attempt had been frustrated?

R.—Certainly it would.

S.—Then it seems that an action is judged to be good or bad, according to the motive by which it is prompted?

R.—Not always. For, if we tell a falsehood in order to save life, we are not doing right.

S.—Which is the higher motive, the love of truth or the desire to save life?

R.—The love of truth.

S.—Then, when we tell a falsehood for the sake of saving life, we are acting on the lower motive and denying the higher?

R.—Evidently.

S.—The deed, then, is still measured by the motive?

R.—Apparently it is. But there is another case in which we may act from a good motive, and yet act wrongly—I mean when we act on insufficient knowledge. For instance, if a physician poisoned me in the belief that he was giving me a valuable medicine, his action would be bad in spite of his belief.

S.—Tell me what you mean by "bad." Do you mean "injurious," or do you mean "blameworthy"?

R.—I mean blameworthy.

S.—But if the physician, when he intends to cure, poisons, are there not two causes from which this might arise? Should we not say, either that he is ignorant of what, as a physician, it behoves him to know; or that, acting on what he has every reason to believe accurate and sufficient knowledge, he yet is mistaken?

R.—I suppose we might say so.

S.—In the latter case, would he be blameworthy?

R.—No, for he would suffer only from the common fallibility of man.

S.—But, in the former case, we should blame him with justice?

R.—Certainly, as we should blame all reformers and public teachers who proclaim as truth what they have not thoroughly investigated.

S.—Then it seems that, instead of using the term "motive," we should use the term "mental antecedents," in order to express the whole inner history of an action by which we judge its moral worth?

R.—Yes.

S.—We cannot know an action to be good or bad, unless we know its mental antecedents.

R.—We cannot.

S.—Then, without these antecedents, it would have no significance ?

R.—None whatever.

S.—But we must not forget the free Ego, of which you were speaking just now.

R.—I fear I had nearly forgotten its existence.

S.—Is this Ego moral ?

R.—It must be so.

S.—Then it decides on moral grounds ?

R.—Of course it does.

S.—And is there no quality in the Ego, which inclines it to decide morally rather than immorally ?

R.—I suppose there must be.

S.—Then this moral quality embodied in motives, and in all mental functions, is the cause of right decisions.

R.—It appears so, for otherwise the Ego would not be moral at all.

S.—So far as the decisions of the Ego are not due to this moral quality, they can neither be praised nor blamed ?

R.—They cannot.

S.—When you speak of a free Ego, do you mean an Ego which has no nature, or one which sometimes acts in opposition to its nature, or one which always acts in accordance with its nature ?

R.—I mean the last.

S.—Its nature is the cause of its volitions ?

R.—Yes.

S.—But now I do not see any room for the Ego, which acts by causeless volitions.

R.—I am myself puzzled to assign its place.

S.—In any case, when we call volition good or bad, right or wrong, we imply that it had in the mind antecedents of a certain order, and that these indicate a certain sort of character.

R.—We do.

S.—We cannot think of it as uncaused and unconditioned ?

R.—No; for it seems that if we could, it would lose all moral significance.

S.—So far as it is uncaused, it is immoral ?

R.—I cannot escape from the conclusion.

The *pseudo*-Socrates has shown or attempted to show that human actions are identified with respect to their moral quality, just as plants and animals are identified in their aspect of living organisms. So far as they can be known and judged —so far, that is, as they can be thought about—they are known and judged by their history, which includes their genesis and their vital continuity, with certain mental processes. Apart from these antecedents, they are nothing more than the motions of "brute" matter; and if these antecedents could be shown to be in any degree inoperative, the action would in exactly the same measure lose its significance.

Moral conduct bears a certain constant relation to the inner life. It is prompted, that is, by motives of a certain order, which presupposes certain qualities of character. Could we in any case know the precise nature of this relation we should be able to estimate the precise moral worth of the conduct; and only so far as this inner relation is known or inferred can we pass any judgment on the "outer show." Were the working of the mind fully revealed there would be no further question as to what constitutes "merit," "responsibility," "free choice." We should then praise or blame a single deed, or the conduct of an entire lifetime, according to our perception of its procedure, from an internal cause of a high or a low order. Actions would be classified according to the exact motives which prompted them, and to the exact place of these motives in the moral hierarchy, so that a system of constant relations could be drawn up, equal in authority to the most completely rationalised laws of nature. Any failure in causation, any limit of freedom in the sense of indeterminism, would throw our judgments out, and at once introduce an element of immorality and chaos into our new-found universe. This ideal can, of course, never be realised, but our right and power to judge depend entirely upon the degree of our ap-

proach to it. We can think about conduct only as correlated with character.

True, it is impossible to analyse the character of any human agent so as *accurately* to distinguish its fundamental laws from the phases produced by the complex interaction of those laws, and from their physiological and pathological modifications. For similar reasons we can never be sure that the reagents which call forth the manifestations of character do not vary. "Circumstances" combine in so complicated a manner that we can never be sure which element has produced the chief effect; and human reagents do not easily lend themselves to experiment or even to observation. Still, we can and do detect great fundamental laws of human nature, and even of individual character; and the fact that this is possible, the very idea that it *can* be possible, proves that the results obtained by observation of conduct, differ in degree, rather than in kind, from results obtained by a chemical experiment. It may be objected that we are not compelled to reason about human motives, passions and actions. We might, perhaps, be content with bare assertions about them, or we might conceivably refuse to assert, and pose as complete agnostics. But this idea involves a fallacy. "We" could not take this agnostic attitude, without dropping the "we," even "I" could not take it, without remembering the Ego. For "I" and "We" imply humanity. The Ego is the Ego, not as blank relation of subject and object, but as a being of which it can be said either that it is an organic portion of humanity, or that humanity is implied and included in its nature. I am I, not merely in virtue of my *distinction* from my race, but in virtue of my *unity* with my race. My character could not even exist apart from Society, since it is constituted by the relations of my feeling, thought and action, to the lives of others. Therefore, my character implies other characters, distinct from mine, no doubt, in certain qualities, but one with it in the fundamental relations of humanity. Were there no such fundamental relations, the concept of "character" would be meaningless. Further I can conceive these other characters

only in terms of my own feelings, thoughts and motives. Only so far as I can *identify* my neighbour with myself have I any real knowledge of him. Such an identification I am forced to make. I cannot think of myself without implicitly thinking of other men, because without the existence of other men that self could not exist; and so soon as I pass beyond the merest abstract consideration of my being, or the barest consciousness of my appetites and perceptions, and emotions, I begin to think of other men explicitly, as they affect me and I affect them. In practical life the merest egotist is constantly thinking of his neighbours, and even he cannot treat them as ninepins; he has to take their individuality into account, whether he likes it or not. He has to assume that there are general laws to which human nature is subject, and also that there are special individual qualities which may be reckoned upon to some extent. That they cannot be reckoned upon perfectly, only means that the identification of self with others is never complete. It is, indeed, complete in regard to those "fundamental relations of humanity" of which we have affirmed the existence. Everyone has a mind like mine in so far that his experience must conform to the relations of subject and object, coexistence and succession, things and quality, and causality, and to the primary relation of cosmic identity. Everyone has a character like mine in so far that he is capable of volition, and that his volitions are guided by motives; or, in other words, that he always *wills* what, under the circumstance, he prefers. The *objects* of preference are determined by the interaction of elementary passions and instincts with moral principles and with social and other conditions. Obviously, the result will differ in each individual case, and will differ for each individual at different times. Thus the practically incalculable element in conduct is always large. The passions and instincts can be allowed for, but their strength relatively to the other constituents of character cannot be precisely estimated. Of the *moral principles*, their source, and their development, I shall speak later on. According to their strength and definiteness the main lines of conduct are more or less pre-

dictable. The *social and other conditions* are most difficult to unravel in complex states of society; so that, although the principles of the civilised man may be more stable than those of the savage, and his passions kept under better control, yet he is touched by society on so many different sides, and in so many different ways, that it becomes impossible to prophecy more than the main tenour of his life.

All this, however, goes not to invalidate but to prove our contention. When we try to reason, as reason we must, about individual conduct, we assume that its incomprehensibility is not essential, but due to the complication of different strands of motive. Our inevitable question "Why did he do this?" implies a conviction that there must be a cause, that is a motive, for his action; and that the required motive must always operate in the same way under the same conditions. Otherwise the "Why?" would have no significance whatever. It points to a discoverable or undiscoverable motive; but a motive which does exist, and which, if discovered, would harmonise seeming anomalies of conduct. All our perplexities respecting the "unaccountable" actions of those about us really represent our efforts to penetrate to the laws of their respective characters, and thus to *understand* their deeds; involving the assumption that each character has its laws—that there are principles on which every inconsistency might be accounted for; fundamental relations of character which, if we knew them, we should recognise even in the wildest vagaries. So that the very terms which we use in describing the eccentricities of our fellow-creatures imply the necessity of believing that these eccentricities form no real exception to the law of Cosmic Identity. "His whole life is a riddle—an insoluble problem," means that there is an answer to the riddle, a solution to the problem, could we only find it. Otherwise there would be no problem and no riddle, but only a chaotic succession of aimless activities in which we should not even seek for a meaning.

It now becomes clear, that both in the physical and psychical world, the major premise of all reasoning, and the pre-

supposition of all knowledge, is the unity of the cosmos. We cannot reason, except on general principles, we cannot know, except by constant relations, which by their very nature cannot be confined to isolated objects, but bind together the entire universe. The answer to every "How?" and "Why?" is "Such is the law." "How will this stone act if you let it go?" "It will fall to the earth with a velocity increasing at the rate of 32 feet per second." "But why are you sure of this?" Now the answer is not "Because all the stones which I have noticed do fall to the ground, with this particular acceleration and no other." It is not even "Because very accurate observers have found that this has taken place in all the instances they noticed." Either of these answers would evidently be insufficient to account for my conviction. The objection might still be made that a very small fraction of the stones which exist on the earth's surface could have been tested by any observer or by the whole body of observers, and that this particular stone might very possibly vary in its behaviour. It is a different stone—why should it not behave differently? Or, indeed, why should not the same stone behave differently at different times? The answer to the first question is: The stone *is* different as an individual. It may be different in chemical composition, in hardness, and other properties, from all other gravitating objects which have been examined; as it is certainly different in time and place. But none of these differences affect the relations which belong to it as a portion of matter. Knowing that the stone is material, I know that it is subject to the law of gravitation. Of course, I may be mistaken, and the stone may be a mere apparition, due to a disturbance of my cerebral circulation; but, assuming that it is not an apparition, then I am certain, without experiment, that it gravitates.

It is often necessary to subject our identification to very rigorous tests. When every means of verification has been applied, there no doubt remains a residuum of theoretical uncertainty; because the object is tested by its relation to other objects, assumed as known; and, however far

back we carry the testing process, there will always remain some identification assumed, but not verified.

Suppose that we want to discover the nature of a certain chemical compound. We add a reagent, which gives a certain precipitate; and by the colour and other properties of this precipitate we recognize the compound as a salt of iron or copper, or lead. But this depends on correct recognition of the reagent employed. We may of course test the reagent, but this only pushes the difficulty a step farther back.

We have either to assume an ultimate identification, or to argue in a circle, and test oxygen by its affinity with sodium and sodium by its affinity with oxygen! But this assumed identification is necessary as a starting point of thought.

In order to think at all, we must accept many things as recognised by their immediately perceptible qualities, without requiring further proof. That pebble is material; I do not want to handle it in order to prove its solidity. This gas is chlorine; I know it by the greenish colour and the pungent smell, and do not need to trace it through its various compounds with hydrogen, with silver, with sodium. These immediately perceptible qualities may be regarded either as constant relations which certain substances bear to my organs of sense and to my faculty of intuitive judgment, or as signs and tokens of other and deeper relations, which intrude on the given substances with the fabric of the universe. In whichever light we consider them, they may quite legitimately furnish a foothold not only for practical experience, but even for scientific research. In fact, there is one point which needs just now to be strongly insisted upon, and that is, that we must not be too much afraid of assumptions. At the present day they are held in a pious horror, which would be healthy were it not irrational. Philosophy has not merely divorced itself from common life and common thought, but has done its best to commit suicide by refusing to accept postulates which are essential to its own existence. Let us by all means eschew the habit of taking for granted whatever suits our own prepossessions; but when we cannot

think at all without making an assumption, let us make it boldly, openly, and without apology. For philosophy does really demand the exercise of ordinary intelligence, and it is unworthy of a thinker to be frightened by the label "indiscriminate assumption" indiscriminately fixed upon very different kinds of wares, or to quail before the imperious demand for "verification." Verify by all means; but remember that thought must begin somewhere, and that its initial point never *can* be verified. In later pages it will be necessary to speak strongly against illegitimate assumptions; for that very reason, let us be anxious to acknowledge those which are legitimate.

The primary postulate, which is implicit in our earliest researches, and to which we return as the last result of science, is the identity of the Cosmos. For, unless we can identify the fundamental relations of our own experience with the fundamental relations of experience in general, we cannot reason about experience, even destructively. We cannot even argue that no human being has the right to make any positive assertion, except by generalising humanity as identical in its principal attributes, at all possible times and under all conceivable conditions. In order to reason about the past or the future universe, we must identify its constituent relations with the relations which constitute the present universe. We must do this, or we must reason about the universe no longer. But this would be to relinquish the formation of general ideas, for every general idea is of a relation independent of special time and place, and therefore is an idea of the universe.

The term "identity," when applied to the cosmos, has precisely the same signification as when applied to any separate object. It means *constancy of relations*. There is only one distinction to be drawn. The relations of a separate object may be classed as internal and external. That is, its different parts and functions are related *to each other*, and it is related to other objects, both as a whole, and in respect of these different parts and functions. All the organs of the human body are inter-related; they also have relations,

recognisable by the anatomist and the evolutionist, to the organs of the lower animals; and the human body as a whole is structurally related to the bodies of other vertebrates. But if there were only one kind of living organism in existence, it would obviously have none of these relations, except the inter-relation of its own organs. It could not be identified as distinct from other organisms; it could be identified only in relation to its past and its future self. Thus, its organic relations would all be internal. In the same way, cosmic relations are all internal, for the cosmos has no outside. We can say "This world is the same as the world of the most distant astronomic periods," just as we can say "Human nature is the same through all historic ages." But, while we can go on to draw a comparison between human nature and brute nature, we cannot draw any comparison between this world and other worlds, for there is no other universe by which our own can be tested.

With this proviso, the phrase "Cosmic Identity" may be accepted as indicating the fundamental truth of philosophy, of science, and of ordinary common sense.

The very search for ultimate relations, the instinct which refuses to rest in a world of chaos, and rejects the inconstant as the unreal, indicate the tacit conviction that the course of nature, when rightly understood, will appear as a unity. The conviction may never be formulated and never brought into consciousness as a definite principle. It is so deeply involved in the necessary procedure of reason, that it cannot be distinguished until reason has made its profoundest analysis. From this cause, even such acute thinkers as Mill and Jevons have held, that what they inadequately name the "Uniformity of Nature" is a mere generalisation from our experience of particulars, and that, since this experience is necessarily limited, the generalisation involves a leap in the dark. It is clear that, if this were true, the leap in the dark would be quite unjustifiable, even on grounds of "probability." What probability is there that my experience of to-morrow will be *like* my experience of to-day, except on the ground that my experience of to-day *is*, in all fundamental rela-

tions, my experience of to-morrow. In fact, the notion of "probability" is quite inadmissible in this connection. There is nothing between absolute certitude and blank agnosticism.

Ordinary common-sense, like science and philosophy, assumes the constancy of relations; though the assumption is made without due discrimination. "What happened yesterday will happen to-morrow" it says, and perhaps plumes itself on historic insight; but it too often forgets to distinguish the laws on which true prophecy must be based, from the transitory conditions due to the inter-dependence of laws.

Not only the lover of wisdom, the searcher for truth, the shrewd man of the world and the ignorant peasant, but the mystic and the poet, have felt the truth of cosmic identity. It runs through the wild caprices of Indian mythology, resolving monstrous forms and miraculous events into manifestations of a perfect unity. We might imagine that, weary of the unreason and lawlessness of their religion, the Brahman philosophers had clung all the more closely to this central truth. Banished as far as might be—for there can be no complete expulsion of what is involved from their conception of Nature and of divinity in the very rudiments of thought—it reasserted itself in the very highest sphere, and revenged its exile by reducing all lower spheres to mere illusions, the play of phantasms, the web of Maya. We have seen an analogous procession after the completion of Western philosophy, the phantasms retained sufficient vitality to rebel and take their revenge in turn by declaring themselves the sole realities; but the dreamy Hindu mind could not produce a Locke or a Hume, and just because the doctrine of the Upanishads, and of the principal schools of Indian philosophy, is so ill-defined and yet so essentially grounded on truth, it can never be refuted, but only superseded by a clearer ideal.

Mysticism, whether philosophical or wholly religious, is always an attempt to find the one in the many, and so far represents the natural effort of the mind to rise from Fact

to truth. The mistake has been in the kind of unity sought for. It has been a unity not of law but of substance, or of being; one which indeed revealed itself in the many, but which did not necessarily reveal itself by fixity of relations. The conviction was, that all natural phenomena were mere disguises of reality, and were thus falsehoods which had to be cast away before true knowledge could be reached. There is no doubt that even this stage of thought really implies a perception of the universality of law, though a perception as yet crude and self-contradictory. The idea of ontology was to arrive at a point where all phenomenal distinctions are *abolished;* that they should be all *accounted for* was a subsidiary aim. Science supplied the corrective by demanding that the differences should be *accounted for;* and philosophy completes the process by showing that, instead of being abolished, they must be recognised as essential to the very unity which they seemed to endanger. But the only kind of unity, which can thus be realized in and through varying phenomena, is not a unity of substance or of being, which makes no provision for diversities, and indeed expressly excludes them, but a unity of relation, which at once implies diversities, and renders them intelligible. The cosmos, as we know it in space and time, displays wealth of variety, yet is synthesised as the one in many are by the persistence of fundamental relations. This is the inner significance of the Platonic ideal of the neo-platonic striving to connect heaven and earth, of all forms of philosophic and poetic pantheism. For this conception is essentially poetical and is the meeting point of science and poetry. The scientific spirit diverges from the poetic spirit at the outset, because it is analytic, while poetry cares only for the general impression, or uses analysis as a means to some new and beautiful synthetic effect. Science cares for objects as parts of a whole, as symbols of a law, not for their own beauty or majesty; and we cannot wonder that poetry turns away from this heartless dissection with something like loathing, and shuts herself up in her own enchanted domains. But, in the end, science too becomes synthetic, and treats of unity

manifested in diversity, but not lost or weakened in its embodiments and not subject to further analysis. The cosmos thus constructed is the ideal of science; yet, when poetry catches a glimpse of it from afar, she finds that it is also her own ideal, and that the consummation of rational endeavour is also the fulfilment of poetic aspiration.

SUMMARY.

In assuming the validity of reasoning, the sceptic assumes the constancy of relations, physical and psychical. For reasoning necessitates the formation and application of general ideas, or principles; and, if the relations of objects are subject to causeless fluctuations, no general ideas can be formed respecting them, and therefore reasoning is impossible. Fluctuation itself must be according to law, if the contents of the world are really objects of thought. Directly we begin to think about an object, we assume that its relations are constant. Nothing, indeed, can even be *identified*, *i.e.*, recognised for what it is, except on this assumption. It is known by its relations to other objects, measured by an ideal standard. These relations may be of likeness and unlikeness, action and reaction, cause and effect. But these other objects, by which it is tested, are themselves identified in the same manner; so that the identification of a flower or insect by constant relations involves the similar identification of the whole cosmos. At first sight human actions seem to form an exception to the reign of law. But we can only think of them as good or bad, by supposing for them mental antecedents of a certain order; and any element in the action not due to these antecedents would be so far an immoral element. Freedom, causeless choice, must therefore be banished from our ethical conceptions; and its place taken by freedom, as choice, according to the laws of the chooser's nature. The result of the whole matter is the conception of Cosmic Identity. This means that the fundamental relations of the universe, being independent of position in time and space, are constant through-

out all space and all time. In other words, they are infinite and eternal.

Cosmic Identity is the reality to which all our reasonings must conform. It has been provisionally spoken of as an assumption ; but, as it stands apart from all other assumptions in being the principle of thought and the test of truth, it better deserves to be named the ultimate postulate—ultimate as the initial and final limit of reason.

HYLOZOISM *versus* ANIMISM.

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I must beg to express my deep sense of obligation to Mr. Barker for his ingenious criticism, in your July issue, of the article entitled "Hylozoic Materialism," which I contributed to the June number of this journal. No one can do me a greater service than by most rigidly and severely scrutinising the "weight and measure" of my arguments; and I am not only willing, but anxious, that they should be submitted to such a test.

I need hardly say that the word "Hylozoism," being derived from the Greek *Hyle*, matter, and *Zoe*, life, signifies the doctrine of the inherent and inseparable vitality or energy of matter. So far from being a new or unintelligible compound it is constantly used by Cudworth, in his great work on the "Intellectual System." It has been since so familiarized by other thinkers that the term will be found in any complete dictionary of our language.* Life, in its simplest and broadest sense, may be defined as potential activity, accompanied or not by the powers of reproduction and sensation; and it is a firmly established axiom of contemporary science that such life or activity belongs to every atom of the material universe. Yet, though the theories of ancient deductive philosophy are reduced by the inductions of modern physics to definite formulæ, hylozoic materialism is essentially identical with that of Democritus, Epicurus,

* In connection with this theorem of "Life and Mind" the articles "Cudworth" and "Animism," in the new edition of the "Encyclopædia Britannica," are worth the perusal of those interested in the subject. Liddell and Scott's Greek and English Lexicon may also be turned to with profit. Hylozoism is the exact equivalent of Non-Animism, the antithesis of Animism.—R. L.

Lucretius, and of all, ancient or modern, who have rejected the supernatural element from their *rationale* of existence. It is not surprising that so simple a generalisation should appear "wild and extravagant" to those who find it easy to repose their faith in spiritual mysteries; for the mind of man is always more strongly attracted by complex fictions than by plain facts. Not till he has woven and rejected or worn-out successive garbs of fable can he bear to gaze upon the naked truth; and this explains the hostility which Materialism has encountered from many grand and subtle intellects, who have chosen to deck Nature with false jewels instead of seeking docilely for her native treasures. It is true that the ignorant have displayed equal antagonism, but their ignorance has been imitative, not primitive, and they have only followed blindly in the wake of their betters. Children and savages are with difficulty made spiritualists, though their instinctive, necessarily empirical, Hylozoism is complicated by the influence of fear, wonder, and of that natural tendency to personification which is the parent of poetry and religion. In the same way men of science, even though they may recognise the fallacy of dualism, are often too apt to literalise metaphors and regard abstractions as entities. Consciously or unconsciously they elevate force, which is but a function, to the rank of an agent; and of this erroneous conception I find an apposite example in Mr. Barker's letter.* He says, on p. 428 ("Journal of Science" for July), "But will C. N. contend that nothing has a real existence but that which is cognisable by our senses?† Then he must give up his belief in the existence of almost every force in nature,—*e.g.*, magnetism or electricity, for he can-

* As a further example of the confusion still existing in the scientific mind on this subject, see Prof. Tait's Lecture, a few years since, at the Glasgow Meeting of the "British Association for the Advancement of Science," in which he rejects, most summarily, Dr. Tyndall's conception of "Force," as enunciated in the latter's Presidential Address at Belfast.—R. L.

† Miss Naden's article referred to appeared over the initials "C. N."—Ed.

not see them; indeed he cannot *see* the force in his own arm, he can only *infer* it from its visible effects; *or*, from conscious feeling in his mind that he possesses it." I accept the illustration: for the forces of magnetism and electricity, of heat, light, gravitation and muscular motion, are not independent and separable entities, but special forms of that universal activity which is an inalienable function of Matter. I believe in the effects which I see and feel, not in a hypothetical and wholly superfluous "cause." In the next sentence I find the assertion that "the very fact of our consciousness that we can, at will, exert force upon matter, proves that there is something in our bodies superior to matter, and therefore necessarily distinct from, however associated with, matter." I fail to understand the cogency of this reasoning. It seems to me that the phrase "superior to matter" begs the whole question in dispute; for if, as I contend, our physical structure is capable of thought and sensation, it possesses the attributes usually assigned to "spirit;" and thus complementary qualities, usually supposed to be divided between two entities, are united in one. Except on the principle that half is more than the whole, I do not see how a perfect being can be inferior to an imperfect one, and the very word "immaterial" implies defect and limitation. The fact that "we can, at will, exert force upon matter," does not prove the existence within our bodies of an "*anima*" or immaterial principle. One stone attracts another; is it therefore *animated* or inspired by some essence superior to stone? The brain acts upon the body, of which it is a part; but this, like the action of wind upon water, of the sun on a planet, is the effect of a relation between matter and matter, not between matter and "spirit."

Unless it can be shown that certain nervous and muscular motions are caused by constant volition apart from organisation, there remains no function for the soul, nor any method by which it can manifest itself in the outer world. If "will" be destitute of dynamic power it is a nonentity and illusion; and this is the plain teaching of modern Physiology and Pathology. That motion, even when apparently intelligent,

may be unaccompanied by thought or sensation, and due to purely physical causes, is clearly proved by the phenomena of reflex action in paralytics and in decapitated animals; and if such movements, originating in the spinal cord, are automatic, we can hardly assign a different character to those manifested by the cerebral hemispheres, since the mode of action of all the different nerve centres is essentially the same. It is surely far more credible and rational that consciousness, like other bodily functions, is evolved by complexity of organisation, than that one portion of the nervous system is self-working, while another is subjected to the constant interference of an indwelling spiritual power. The *vis insita* of matter (which etymologically means *indwelling*, but practically means *inalienable* force) supplies the place of the Divine afflatus, and affords, in the strictest sense of the phrase, a logically sufficient "cause"—*i.e.*, a *rationale* reducing apparently anomalous phenomena to a familiar category. We know that increase of weight by calcination results from chemical combination with oxygen, or other supporter of combustion, and therefore dismiss the old theory of a separable levitating factor (*phlogiston*), thus refusing to "assume two principles where one is sufficient." The dualistic hypothesis of matter and spirit is only a wider generalisation of the pre-Lavoisierian fallacy. I do not, of course, deny "what is called a chain of causation," *where it can be discovered;* but where there is no trace of such a chain neither science nor philosophy is authorised to assume its existence.

No doubt "the worst and most absurd errors are often"—I would say *always*—"the corruptions or exaggerations of truths." But in such cases the evidence must be stronger on one side than on the other; the reality must be more strongly supported than the *simulacrum;* and until I am informed in what respect the evidence for the existence of fairies, goblins, and witches fall below that for the existence of the soul, my argument is untouched. We know that men see visions and dream dreams, that their thoughts and feelings are capable of higher development

and of more indefinite range than those of the brutes; and truths such as these have been corrupted into the errors of Dualism.

Mr. Barker somewhat misapprehends the significance of my illustration drawn from the phenomena of isomerism. I wished to show that as the same components might combine in the same proportions to form an odorous or an inodorous, a hurtful or a harmless compound, so that the same particles might unite in a sentient or non-sentient organism. In the former case, as Mr. Barker himself observes, no one postulates the exit or entrance of a spiritual poison or odour; why then superadd a "soul" or thinking essence in the latter? I pass by the assertion that volition "cannot be reasonably ascribed to mere matter," only remarking that no property whatever can be "reasonably ascribed" to a hypothetical phantom like "spirit." That animal life is the outcome of certain chemical processes, upon which its energy and continuance are entirely dependent, appears to me as certain a proposition as that the combustion of a candle results from the combination of its carbon and hydrogen with the oxygen of the atmosphere. The two cases are strictly analogous; but the oxidation which sustains and vivifies our animal frame takes place under more complex conditions, and kindles a slower non-incandescent fire.

Mr. Barker regards "sensation as belonging to (not proceeding from) the nervous tissue; but perception of that sensation as belonging to the living *anima* associated with it, exclusively." The distinction between "belonging to" and "proceeding from" is not very clear: and it is evident that perception, emotion and thought, are simply the special sensations or functions of the grey vesiculo-neurine of the encephalon, upon the healthy condition of which their sanity depends, just as sight depends on the eye and hearing on the ear. If matter be simply an inert machine, which must be kept in good order that it may obey the impulse and behests of its ghostly *Archæus*, how shall we account for the fact that a merely physical stimulus—as of alcohol, opium, &c.—may suffice to change the whole current of thought and

feeling? Surely this is a case of the fiddle playing on the musician!

I have reserved for the conclusion of this paper a few remarks on Mr. Barker's theosophistical speculations, which, as outside reason, do not properly fall within the scope of a scientific argument. He will see, by a reference to my article, that the quotation from Dr. Lewins' tract, "Life and Mind," ran thus:—"*The question of* the *anima mundi* and the *anima humana* is, at bottom, one and the same." By leaving out the first three words he has incorrectly construed the sentence into the admission of the existence of a cosmic and human soul. All energy is of course an attribute of some being,—*i.e.*, of something which exists; but we need not therefore assume that this being is personal or conscious. Intelligent agents exercise energy; but this does not involve the converse proposition, that all energy must originate in a conscious agent. An "Infinite Mind" giving "existence to finite minds" must be limited by its own creations, and therefore be at once infinite and finite. Is not this an unthinkable paradox? If there be an *Omnipresent* Deity, nothing else can have any real existence, and he must be the noumenon of which the Universe, subjective and objective, is the phenomenon. It signifies little whether this one and indivisible reality be spoken of as god, force or matter (though the last term is preferable, as being the simplest and least liable to misconstruction), for *to us* it is practically non-existent. No man can transcend his own egoity or individual subjective cosmos, of which his brain is the sole proplasm, though he may people it with Jehovah and his hierarchy of angels and archangels, "good" and "evil," with the humanised gods of Hellas, with the New Testament Trinity, or with the saints and witches, goblins and fays of the Middle Ages. Neither reflection nor imagination will enable him to get "behind" Nature,—itself only a mental abstraction,—or penetrate to the substratum of his own being. If he believe in an Omnipresent God, he is, as I have shown, logically compelled to Monism; if not, he rejects "Revelation," and certainly will find in science and

reason no foundation for Dualism. From this dilemma he cannot escape, and should esteem himself happy that "salvation" or *health*—the *mens sana in corpore sano*—does not depend upon the attainment of the unattainable, but is placed within the sphere of his own knowledge and capacity.

PARACELSUS.*

"If I had time to attend to such matters I would send the Pope and the Reformers to school."—PARACELSUS.

PERHAPS I ought to apologise for occupying the time of science students with an account of one generally described as a disreputable quack. Yet I take heart of grace on reflecting that this seeming charlatan was a great power for good and evil in his own time, and has bequeathed to us certain practical benefits, a few striking ideas, and the impression of a very original and vivid personality.

To study profitably the problems involved in the life and labours of Paracelsus, we should recall the tendencies, with regard to science and speculation, of the age in which he lived. He was born in 1493, the year after the discovery of the New World,—nearly fifty years after the invention of printing,—at the noon of the Renaissance and the dawn of the Reformation. The period of his life was a time of flux, of rapid growth, fervid and bright with the agitation of new and old ideas. In spite of the enthusiasm with which the Humanists had exalted Plato, the authority of Aristotle remained supreme in physical research; and since more accurate versions of his works had appeared, the verbose argumentations of the Schools were beginning to be discredited, and something of the spirit, as well as of the mere letter, of his system was being infused into the new generation of students. But Science was still in its infancy. Astronomy awaited the publication, in 1541, of the Copernican "De Revolutionibus." Chemistry was in process of budding off from its parent Alchemy, aided by Basil Valen-

* Read at a meeting of the Mason College Union, Birmingham, February 16th, 1883.

tine, Agricola, and Paracelsus himself. Anatomy was in an inchoate condition, the human body not having been systematically depicted and described before Vesalius, in 1541. Botany was not much further developed, most of the information given in text-books being taken from Greek and Latin authors, until the Commentaries of Fuchs were published in 1542. Medicine had not advanced since Hippocrates and Galen, who still held sovereign sway in the Universities.

The province of Science was not yet distinctly marked off from that of Poetry, and the mysterious and miraculous found ready credence, whether for its own intrinsic fascination or because it had received the sanction of some venerated name. Yet a true spirit of inductive research was beginning to make itself felt, though, like a pilgrim doing penance on his way to a sacred shrine, it seemed to "take three steps in advance, and one reluctantly backward." New experiments were liable to be discredited by ancient authority, and there were many who would rather doubt their own eyesight than the dictum of Aristotle,—yet these new experiments were repeated and varied again and again, till eyes could no longer refuse to see, nor ears to hear. But if the Old Learning was obstinate, the New was oft-times presumptuous; if the Old was deaf and blind, the New was dazzled by a play of prismatic colours and confused by a medley of discordant notes. The two opposing tendencies of the time are well typified by a scene in the first and one in the second part of "Faust." In the first, Mephistopheles, disguised as a professor, is ironically commending to a bewildered little freshman the study of Theology. And what he says of Theology might well, in the days of Paracelsus, have been said of all sciences as taught in the Universities.

"*Mephistopheles.*—You'll always find it best to hear but one;
Swear by your master's words alone.
But stick to words, at any rate,
And enter by this certain gate
Into the temple of the True.
Freshman.— But with the words must be ideas too.

Mephistopheles.—Quite right ! but spare your too uneasy virtue,
For when ideas all desert you
A lucky word comes in and helps you through.
With words right well we wage our quarrels,
Words fashion codes of thought and morals,
Faith built of words can ne'er be brittle.
Since from a word you can't take jot or tittle."

But later on, in the second part, Mephistopheles again meets the student, who is now a Baccalaureus, and accosts his quondam preceptor with magnificent insolence. In the course of the dialogue he says :—

"I practise Youth's pre-eminent vocation,—
Before me was no world,—'tis my creation :*
'Twas I who raised the sun from out the sea ;
The moon began her changeful course with me ;
Day decked herself in dazzling robes to meet me ;
Earth budded forth with leaves and flowers to greet me ;
I gave the signal on that primal night,
When all the host of heaven burst forth in light.
Who but myself saves man from the dominion
Of dogmas cramping, crushing, Philistinian ?
So, free and gay, my spirit's voice I heed,
And follow where the inner life may lead,
Still hasting onward with a gladsome mind,
The Bright before me, and the Dark behind."

These latter lines may stand very fairly for the self-painted portrait of Paracelsus, or, to give him his full title, of Philippus Aureolus Theophrastus Bombastes von Hohenheim. The name by which he is usually known seems to be a bad translation of his patronymic. His father, a physician and alchemist, living at Einsiedeln, not far from Zurich, doubtless initiated him into the elements of the chemistry and medicine of those days ; and, although little can be ascertained respecting his early history, it is probable that he studied at Basel in his sixteenth year, took a regular

* A pretentious claim, virtually identical with that of Lord Bacon in his Introduction to the "Novum Organon":—"*Ut opus mentis universum de integro resumatur*"—a claim acquiesced in by the common opinion of contemporary physicists, who believe in a total breach of continuity between ancient and mediæval traditions and existing science. (See Preface to Stallo's *Concepts and Theories of Modern Physics.*)

degree,—though in what University does not appear,—and served for some time as an army surgeon in Italy and the Netherlands. However this may be, it is certain that he soon began to wander far and wide in quest of knowledge. He visited the Universities of France, Germany, and Italy; but his independent spirit revolted against the slavish veneration paid to the classics of his profession, and rushed to the other extreme of disregarding them altogether. "Reading," he said, "never made a physician. Countries are the leaves of Nature's code of laws; patients his only books." He even states that at one time he did not open a book for ten years. Instead, therefore, of pursuing a regular course of study, he led the life of a vagrant scholar, roaming through Prussia, Poland, Transylvania, Bohemia, Sweden, Spain, Portugal, and even extending his travels as far as Constantinople and Tartary, in search, it is said, of the tincture of Hermes Trismegistus, better known as the Elixir of Life or Universal Medicine. He sought new and strange information in the most obscure quarters, conversing not only with learned men, but with old women, peasants, and conjurors, picking up stray fragments of fact and fable, and welding the whole into a system by that innate originative power, which he believed himself to possess in an exceptional degree. He learnt the remedies by which the beldames cured their aches and pains; listened to the wondrous tales of magicians, endeavouring to extract their hidden truth; descended mines and examined the ores; and experimented with various chemicals upon human patients, and *pace* our Anti-Vivisectionists — probably upon animals. Besides much dross, he managed to gather some very pure gold. He was the first who introduced mercury into the pharmacopœia, or at least the first who proved its efficacy on any extensive scale. The remarkable cures which he accomplished gave rise to a popular belief, apparently countenanced by himself, that he was in possession of a medicine which materially prolonged the normal life of man, though the power of conferring actual immortality was not attributed to the Elixir Vitæ till a later period. His correspondence with

Erasmus shows the estimation in which his talents were held by that distinguished scholar, and in 1526 his fame won him a recommendation from the learned Oecolampadius to the chair of Physic and Surgery at Basel. But for this post he was unfitted by temperament and education. His disposition was haughty and impatient, and his disdain of views then regarded as established rested for the most part not on sound inductions, but on the inspirations of an enthusiastic genius which could not be expounded in any lucid form. The commencement of his course of lectures is characteristic of the man. Setting fire to some sulphur in a brazen chafing-dish, he threw into the flames the treatises of Galen and Avicenna, exclaiming "*Sic vos ardebitis in gehennâ.*" He further went on to state that all universities were less gifted than the mere hairs of his own head, and that no one of all the ancients was worthy to fasten his shoe-latchets. "You shall follow me," he cried,—"you, Avicenna, Galen, Rhasis; you gentlemen of Paris, Cologne, Vienna, and whomsoever the Rhine and Danube nourish,—you who inhabit the isles of the sea,—you likewise Dalmatians, Athenians, thou Arab, thou Greek, thou Jew,—all shall follow me, and the monarchy shall be mine." Even in an age which allowed far greater exaltation of self and depreciation of others than would now be considered permissible, this rhodomontade was sufficiently remarkable to confer a new meaning upon one of his names—*Bombast.* In opposition to the usual practice, his lectures were delivered in German (possibly because he was a poor Latin scholar), and were at first largely attended by all classes. But if his Latin would have been darkness that might be felt, his German was, to its auditors at least, little better than darkness visible. Hitherto he had confined his intemperance to language, and had lived chiefly on bread and water; but about this time he fell from ascetic purity to the grossest besottedness, and it is even said that his lectures owed all their fire and force to deep potations, and that he never came sober to the bed-side of a patient. These habits naturally tended to increase the normal obscurity of his language and to repel his hearers, who fell off one by one—

some, perhaps, having seized the cardinal points of his system, which, when clothed in clearer words, might pass as original; some, thinking that they had now spied out the nakedness of this intellectual Canaan; and the greater number, doubtless, from sheer weariness or disgust. At last matters were brought to a crisis by a quarrel between the professor and a canon of the church, named Cornelius Lichtenfels, who had promised, in the agonies of gout, to pay a thousand florins for a cure. The cure was effected, but the florins were withheld. Paracelsus brought an action at law for the recovery of his fee, but the case was decided against him; he flew into a violent rage, and applied such opprobrious epithets to his ungrateful patient, and to the magistrate who had pronounced the adverse decision, that the town council took the matter up, and dismissed the professor from his chair. He now resumed his errant career, sinking deeper and deeper into debauchery, now saving, now destroying life, by the administration of his potent medicaments. After wandering about in Alsatia, North Germany, Switzerland, and Austria, he was at length seized with a fatal illness in a tavern at Salzburg, and died in the Hospital of St. Sebastian, September 24th, 1541.

Such was the outer life of this extraordinary man, whose contributions to the theory and practice of medicine, and to other departments of thought and knowledge, I must now briefly notice. As already remarked, the chief practical service of Paracelsus was his application of chemical preparations to medicinal purposes, in lieu of the vegetable decoctions which had previously been in use. Though he repeatedly gives directions for the transmutation of the base into the noble metals, yet in intervals of sobriety or sincerity he recognises the fallacy of this *pseudo*-science, and expressly states that "the province of alchemy is not to make gold, but to prepare medicines."* It is certain that he gave a great impetus to the study of chemistry, and that after

* Alchemy must be regarded not entirely as a mere medley of dreams and fables, but as an early adumbration in the history of chemistry, which was thus not strictly the creation either of Boyle or of Lavoisier.

his time it became a necessary branch of medical education, and was taught in schools and colleges. The new force thus brought into play counts for a great deal more than the actual remedies which he has bequeathed to us, though these are of great importance. Among them are preparations of mercury, lead, antimony, sulphur, blue vitriol, iron and arsenic. His so-called "laudanum" was not opium, but a compound of mercury or antimony with other drugs.

The physiological and pathological theories of Paracelsus were of course crude, and yet they showed a certain advance upon his predecessors. All bodies, he taught, including the human frame, consist of three elements—salt, sulphur, and mercury. The just equilibrium of these is health; the excess or defect of any, disease. This seems at first sight something like nonsense; but let us examine a little further. The names of these three elements were not specific, but generic; that is, there were many sulphurs, many salts, many mercuries. Salt represented the principle of fixity, sulphur that of combustibility, and mercury that of volatility. When a substance burns, vapour is given off, a flame is seen, and ashes remain. Nothing could be more natural than to conclude that the substance was made up of three parts,—vapour, flame, and ash,—or, a volatile, a combustible, and a fixed ingredient. Excess of the first in the human body caused insanity; of the second, fever; of the third, stiffness of the joints and diseases accompanied by the deposition of calculi, which Paracelsus generalised under the name of tartareous disorders, from a supposed analogy with the precipitation of tartar during vinous fermentation. The vegetable and mineral worlds were subject to similar maladies. Gold was the only metal in which the elements were mixed in true proportion. All others were more or less out of health, and it was theoretically possible that iron and copper, lead and tin, might be "cured" by the alchemist and restored to their pristine Paradisaical purity. Spite of the errors into which he was led, some praise is due to Paracelsus for his apprehension of the fact that vital processes are identical with those which take place in the inanimate world. "*Ignis vita*,

lignum corpus"—the body is the wood, the life is the fire—was one of his sayings, to which modern Physiology has given a new import. Much mysticism enfolded this embryonic science. "Digestion," said in substance our professor, "is presided over by a spiritual ruler, who lives in the stomach, and is called the Archæus. If he is ill or out of temper, dyspepsia ensues, so that it is the business of a wise physician to keep on good terms with this gastric potentate, and to study his tastes and necessities. This will in part be accomplished by a diligent study of the stars. Man has an astral as well as a terrestrial body, and all his motions are typified and prefigured in the skies. Human destiny is not *influenced* by celestial phenomena, but runs parallel with them, in a kind of pre-established harmony." According to this theory, indeed, all Nature is literally alive. Even minerals have a feeble animation, for they grow, feed, and excrete. This may have been simply a metaphorical way of describing chemical union and decomposition, which in reality form an essential factor in that sum of forces which we have named Life. Fire, air, earth, and water are deposed from their Aristotelian position as elements, and regarded as conditions of matter, under the names of the hot, the cold, the dry, and the moist,—the cosmic vitality peculiar to each being allegorised by the invention of appropriate genii, called Salamanders, Sylphs, Gnomes, and Undines. That Paracelsus seriously considered these beings as other than poetic fictions, typifying the universality of life, is scarcely probable, though he doubtless often amused his cynical and world-worn spirit by playing on the credulity of both learned and vulgar. He may, however, have believed to some extent in his doctrine of "signatures." The form of a natural object was supposed to be an index to its properties. For instance, the venation of the leaves of the lesser celandine was compared to the venation of the liver, and this fancied resemblance was taken as a sign that the celandine must be good for jaundice. The bright petals of the little *Euphrasia* seemed dotted with tiny violet eyes; therefore the plant was a specific for ophthalmia, on the principle of "*Similia simi-*

libus curantur." It is not necessary to point out the fallacy of speculations such as these, but it may be well to show *why* they are fallacious. *A priori* absurdity has nothing to do with it. There is nothing especially ridiculous in the proposition, that things which have the same internal properties will have a similar external appearance. Nor is it more improbable that a spiritual ruler resides in the stomach, than that such a monarch is domiciled in the brain. No; these theories are inadmissible, because they do not fulfil the conditions of a sound scientific hypothesis, which should adequately generalise a whole class of phenomena,—should be able to prove a sound homological relationship with some already demonstrated law or group of facts,—and, finally, should be confirmed by every fresh experiment, accounting for facts discovered subsequently to its formulation, and enabling us to predict the path in which future discoveries are likely to be made. It should explain the unknown by the known, and thus light the way to future knowledge. Here Paracelsus failed; and here, for lack of material, he must have failed, even though his genius had really equalled his self-confidence. Yet he did good rather than harm, by following that inner light which so often led astray. The scope of his mind may best be estimated by a study of that sublime imagination of macrocosmos and microcosmos, to which all his leading ideas may be referred. "Man," he might have said, "is the universe in miniature. The universe is an enlarged edition of man. The only true science is therefore the science of the human mind and body, and he who has literally obeyed the precept 'Know thyself' has comprehended the sum of knowledge. From the rhythmic motion of his own vital organs he can deduce the orbits of the stars; by the stars, again, he can interpret his own fate. From the ill health of his body he may learn the malady which has degraded pure gold to a baser metal, and may even find a cure for both diseases. The flowers of the field are his helpful kindred. 'Herbs gladly heal our flesh, because that they find their acquaintance there.'* The

* The anachronism of a quotation from George Herbert in an

spirit of the greater world responds to the spirit of the lesser world, and reveals its mysteries with or without the aid of sense. Not every man can hold this communion, which requires a certain corporeal and spiritual purity; but to him who has attained it, the disputations of the schools and the lore of antiquity are alike worthless. He may, indeed, study Nature; but the study of Nature will only be the study of himself."

Such are the outlines of a system based on that idea of correlation between vital and physical forces, which fascinated the philosophic intellect long before it could be substantiated on scientific grounds. We find its foreshadowing in the idealism of Plato. The world, according to him, is a great living being, fashioned by God after the model of the eternal universe of ideas, and endowed with a soul. In this soul all other beings participate, each in his own degree, the fullest measure being granted to man. He, indeed, may become so noble and so pure as to catch glimpses of those immutable ideas to which his life owes its origin. In these ideas is contained the explanation and inmost essence of God, man, and the world, and to find them is to find the only true wisdom. It will be seen that we have here reached the central fire of all mysticism, whether of Greece, India or modern Christendom; but perhaps the fire may kindle other lamps than that which glows on the altar of the mystic. We may find a positive basis of scientific fact for what seems at first sight a mere poetic imagination. The details are mere metaphors, but the essential content may be a germ of pure truth.

That in studying external Nature we are really studying modifications of our own consciousness scarcely requires demonstration. Colours and sounds are manufactured by eye and ear, or rather by those cerebral centres with which eye and ear are in nervous continuity; and the ideas of colour and sound cannot reside elsewhere than in the brain which gave birth to the corresponding sensations. But eye,

imaginary speech of Paracelsus must be pardoned! It is, of course, the sober truth that both vegetable and mineral medicines "find their acquaintance" in the bodies which they heal.

ear, and brain are not separate from the so-called "external" world. They are constantly exchanging with their environment matter for matter, and force for force. They submit to the same physical laws which reign over inanimate Nature. Gravitation, heat, light, electricity, are all at work; the laws of optics or acoustics apply just as much to the eye as to the spectacles, to the ear as to the telephone. Yet more—the essential phenomena of human nutrition and development are repeated in all other animals, and even in plants. From the lowest much may be learnt which holds good of the highest. Take the *Amœba*. Is it not an *exact* homologue of the white blood-corpuscle in man? Both are contractile, irritable, automatic. Both can feed, breathe and reproduce their kind. Indeed the relation of the blood-corpuscle, or of any other living cell, to man, well typifies man's relation to the macrocosm. His body is the world, where myriads of tiny individuals are born, live, move about, perform their various functions, and die. May he not truly call himself a microcosm? Even the doctrine of reminiscence or intuition must find a place, though a humbler one than that assigned it by Plato and Paracelsus. It is what we name instinct or hereditary aptitude, and of course plays a great part in all theories of evolution. Every one will now-a-days admit that the mind is not a mere sheet of white paper, on which the external world writes. It is rather a mould, into which the external world is poured. The young of all animals—of man among the rest—come into existence with certain organic predispositions, and can perform certain actions without being taught, and others with very little teaching. The mind grows in that direction in which the organism is bent. Even abstract ideas, though not actually innate, can be implanted in some constitutions far more readily than in others; they come more naturally, as we say, to the "supreme Caucasian mind" than to the African or Red Indian. Faculties are innate, though ideas are not; and the seemingly instinctive grasp of truth, which is the privilege of a few, may not unfitly be allegorized as a direct communion between the human soul and the Anima Mundi.

I have now completed my sketch of the merits and demerits of Paracelsus, who gave a temporary incarnation to thoughts which had descended from antiquity, and which have since roamed about under various shapes and titles till they have at last transmigrated into the conceptions of modern science. The special form with which he endued them has now only an historical interest; yet his labour was not lost. Facts must be accumulated; but the human spirit cannot live on facts alone. If there are not enough to constitute the basis of a scientific theory, it demands, and will have, an unscientific one. And those who supply its needs help to maintain its vitality. But directly the scientific *rationale* becomes possible, it also becomes imperative: and he who still seeks to preserve the old unscientific dogma is a foe instead of a friend,—a poisoner instead of an almoner; for bread he gives a stone,—for an egg he offers a scorpion.

SCIENTIFIC IDEALISM.

From the *Mason College Magazine* (February, 1883).

"We are such stuff
As dreams are made of, and our little [?] life
Is rounded with a sleep."

IT is possible to imagine a world peopled by somnambulists, each interpreting the faint suggestions from without which may reach his sleeping brain into a fantastic vision of his own. One is alone with roaring winds and waves, while another by his side seems to trudge through noisy city thoroughfares; one feels the chill vapours of the Valley of the Shadow of Death, while his nearest neighbour is enjoying the fresh breezes of the Delectable Mountains. But it is also not difficult to suppose that, when two or more of these dreamers are submitted to the same external influences, their dreams may tend to correspond, and, while not in any way giving a picture of surrounding objects, may yet resemble each other, and form a medium of intercourse. The superficies of the several visions will be similar, but, saving among a few of kindred organisation, all Elysian heights and Tartarean depths will remain personal and incommunicable.

The idea that the life of man is a kind of modified somnambulism has been a centre of force in the poetry, philosophy, and religion of all ages, appearing now as a vague instinct, now as a mystical imagination, and again as a reasoned-out theory of perception. It is a far cry from Buddha to Berkeley, from Angelus Silesius to Herbert Spencer; yet all four tell the same tale in different language. From the east and from the west it comes, from Persian Sufi and Grecian sage; sometimes the war-cry of the theologian, sometimes the watchword of the sceptic. Yet, while most are agreed so far,

very few have hitherto been willing to stop short at this part of their parable. When a millstone comes under the notice of "Hans Metaphysikus,"* he will expend great ingenuity in proving that it may, can, or should be transparent, not perhaps to ordinary eyes, but to some ultra-visual organ which he and his disciples possess. This transparency is maintained as an article of faith for several centuries, until some new Hans springs up, and wins great renown by the startling discovery that the millstone really was what it seemed to be —opaque.

It might have been supposed *à priori* that the philosophers and their allies would never rest content with ignorance of things in themselves, and knowledge only of the manner in which things affect the mind. They sighed for new worlds to conquer, while the old world was yet unsubdued. The relative had been very imperfectly explored, but the virgin soil of the absolute was far more tempting. Accordingly, the fathers of thought—to whom let all reverence be paid, even for their errors—set out with the axiom, expressed or implied, that the true essence of the universe is patent to reason, even when sealed to sense. There are, they said, certain immutable realities, whose nature can be known, and of which the visible world is but a transient manifestation. It is true that the oracles disagreed the moment they began to apply criteria of truth, and to decide what these Realities were ; but this, as was natural, only strengthened the conviction of each disputant. The character of the supposed primordial principles may be briefly indicated.

Take a concrete object—an apple will do as well as anything else—divest it in thought of every sensible quality : make it invisible, intangible, tasteless, odourless. What remains will be the substratum of the apple—the *noumenon*, perceived by the intellect, as distinguished from the *phenomenon*, perceived by the senses. Now, what is this *noumenon?* "Number," says Pythagoras ; "for when you have taken away all else, the apple still remains One." "No," reply Democritus and Epicurus ; "surely there are still the

* See Schiller's poem "Die Metaphysiker."

atoms which unite to form it, and the space between them" But Plato interposes: "You have left untouched the archetypal idea, not of this particular specimen, but of the apple, generically. This alone is permanent, perfect, unchangeable. An apple must decay, but the apple decays not." Aristotle makes a correction. He neither admits that Ideas have a separate existence, nor that the senses are necessarily illusive. "The essential Form, impressed upon the sentient and cognised by the intelligent soul, is even more real than the Matter." Disregarding time and space (as becomes Idealists), we next summon up Locke, who draws a distinction between "primary" and "secondary" qualities. "Taste, scent, and colour," he says, "are not external existences, but are products of the mind. Subtract these, and extension, solidity, motion, and number still remain, as resemblances of qualities really existing in bodies, independently of perception." Our symposium must now be joined by Berkeley, Hume, and Kant; for, diverse as are the aims and the phraseology of these three great thinkers, their ground-idea is one and the same. "When we touch, taste, or smell your apple, we perceive nothing but our own sensations. When we attribute to it extension or solidity, we perceive nothing save our own thought."

Both sensation and thought are purely subjective; that is, they are within ourselves, not within the so-called object. As states of consciousness, they can give us no information with regard to anything outside that consciousness. It is as absurd to say that yellowness, sweetness, or hardness is a property of the apple, as to say that pain is a property of a pin when you have run it into your finger. Pain and yellowness are both *feelings*, and, therefore, cannot exist except in a sentient being. This reasoning seems simple enough, and yet has proved too subtle for general comprehension. A wedge of concrete fact is needed to open the way for abstract ideas; and this wedge is supplied by the discoveries of modern Physiology.

When we analyse the fabric of Nature, we find that it is built up of sights, sounds, odours, tastes, and touches. A

synthesis of these impressions forms an object, which seems as though quite distinct from and outside ourselves. Yet this "object" is really nothing but the elaborated product of a complex piece of vital mechanism, constantly engaged in transmuting unknown forces into certain well-known results. For every class of goods which it can manufacture there is in this machine a special structural arrangement, which works uniformly when in sound condition, but may be so injured as to turn out very imperfect or distorted articles, or even to stop action altogether. There is no interchange of function between the several parts. Outlying or peripheral structures, as the eye, ear, nose, mouth, skin, are all recipients of raw materials, or stimuli; but each of these organs is planned to receive only one kind of stimulus. Waves of light do not affect the ear, nor waves of sound the eye. It should be noted that these forces, when they play upon their appropriate instruments, have not yet developed into what we understand by sound and light, but are only ethereal or aërial vibrations, which, in the absence of a sensifacient brain, will never become visible and audible. From eye and ear, impulses, still blind and deaf, pass along the optic and auditory nerves; and here we must remark a very significant phenomenon. If the optic nerve be laid bare, and light be permitted to fall upon it, nothing is seen by the patient, but if it be subjected to an electric or mechanical stimulus, a flash of light instantly appears. So that while the luminiferous ether cannot act upon the optic nerve, except through the retina, other agents can do so, and all give rise to the sole sensation of light. All is grist that comes to this mill; or rather, everything that comes, be it flour or no, is straightway made into bread. This holds good for the other senses. The same message, entrusted to the different sensory nerves, will be translated into the special language of each; an electric shock being perceived as a bright scintillation, a loud noise, a smell of phosphorus, or an acid or alkaline taste. Yet this language is not spoken by the transmissory fibres themselves, which seem to be identical with each other, and even with motor nerves, in fundamental structure and mode of conduc-

tion, and are besides quite incapable of maintaining and generating consciousness when cut off from connection with the brain. Our pursuit of the Macrocosmos to its source must lead us to the utmost recesses of the nervous system—a narrow space indeed, yet the birthplace and lifelong habitation of those concepts which we name Infinitude and Eternity.

In the very centre of the brain, and directly communicating with the cerebral hemispheres, are two masses of grey nervous matter, called the *optic thalami*. Each of these masses is composed of four little ganglia, and it is the business of each of the four to receive and concentrate the impulses brought to it by a special nerve.* One is continuous with the olfactory nerve, and is the centre for impressions of smell; while the others in like manner focus converging impressions of sound, light, or touch. But they are only halfway houses, and must send on what they have collected to a definite zone of this cerebral cortex, each transmitting its own contributions to a definite area of that zone. Here, at last, the vibratory excitations attain their being's end and aim, and flash into consciousness. It is as though, in this true *sensorium commune*, dwelt a set of artists working in unison, and busily employed in converting chaos into cosmos. Here is a painter, producing from raw materials which are not even colours, but merely vibrations, forms and lines which Michael Angelo himself could only study and recombine; here a musician, creating notes and harmonies out of dead silence, which not even Beethoven or Mendelssohn could transmute into music without his aid. Here is a cook, who originates flavours; a perfumer, sublimely independent of aught save certain mechanical impacts; an architect, who endows the earth and its tenants with the attributes of solidity and tangible extension. The state of things may be very well represented by comparing the peripheral organ to a merchant who deals in only one kind of ware. The nerve-fibre is a carrier,

* For the sake of greater distinctness I have availed myself of the recent researches of Dr. Luys, described in his work on "The Brain and its Functions"; but it is scarcely necessary to observe that my argument would not be affected by any error in his localisations.

attached to the service of this merchant, but physically capable of conveying articles other than those which form his master's stock-in-trade. The centre in the brain is the artist, confined to his own special art, to which he applies everything brought to him by the carrier. Now, if we give this carrier a kind of parcel to which he is not accustomed, he will transport it faithfully, and will even travel in a direction contrary to his habitual route. The interpretation of this parable is contained in the following experiment: "If a centripetal nerve (gustatory) be divided, and its central portion be made to unite with the distal portion of a divided motor nerve (hypoglossal), the effect of irritating the former after the parts have healed is to excite contraction in the muscles supplied by the latter."* In other words, the impulse which could formerly make itself apparent only by travelling from periphery to centre, can now make itself apparent in quite a different way by travelling from centre to periphery. The structure of the nerve is unchanged, and the difference in its function is caused by the difference in the central apparatus with which it communicates.

From such data we may draw very curious conclusions, which, like the mathematical definition of a line or a point, will possess at least an abstract validity, though the conditions postulated may be such as can never exist in actual experience. Suppose every part of the optic thalami and the sensorium to be atrophied, with the sole exception of the olfactory ganglia, and the corresponding cerebral area. Now imagine that all the nerves proceeding from the various peripheral organs were made to converge, and organically united with the surviving ganglia.† What would be the result? The world would seem one great odour.‡ We should smell with eyes, ears, fingers, and tongue. A beautiful picture or song would be perceived as a succession of harmonious per-

* Kirke's "Handbook of Physiology," p. 480.

† See "Muscles and Nerves," by Dr. Rosenthal, p. 283, for a somewhat similar illustration.

‡ And "as the world is to each man as it affects him, to each a different world," so, in this case 'seeming' and being would be one, and the Cosmos *be* an odour alone.—Ed.

fumes, and we should inveigh (in language appealing to the olfactory sense) against

> "The man that hath no" fragrance "in himself,
> Nor is not moved with concord of sweet" scents.

Yet the waves of sound received by the ear, and the waves of molecular disturbance transmitted by the auditory nerve, would be the same as though these were to be made, at their journey's end, into notes of music. The difference would be internal, not external. So true is it that the Brain fashions its own universe.

But, after all, the question may occur to my readers—"Since everything is ideal, how can the nervous system be exempt from this ideality? If it is not exempt, how can you attribute any powers or functions to a mere phantom? Are you not like the man who went out to commit murder, and committed suicide instead?" My answer is that I do not deny, but affirm, the existence of matter, and, but for the limited space at my disposal, would seek to show valid reasons for this affirmation. For the present, I must be content to plagiarise from Descartes, and to say of the cerebrum "*Cogitat, ergo est.*" It can appear to us only phenomenally, and we cannot speak of it otherwise than in terms of phenomena; but here, at least, we are forced to assume an underlying noumenon, while renouncing the vain hope of penetrating to its essential nature by reason or intuition. The fact remains, and is indisputable, that all those objects which constitute our world are made up of subjective sensations, and cannot possibly be pictures, though they may in one sense be products, of the Macrocosmos. Even the vibrations supposed to impinge on the surface of the body, and the molecular tumult propagated along the nerves, are merely convenient intellectual representations of the unknown.* Conditions which, in the absence of a sentient being, would not have been even silence, darkness, or emptiness, are taken by the little artists in the cerebral hemispheres, and fashioned into a glorious universe of light, sound, and solidity, whence are born all the thoughts and all the desires of man.

* And nothing until asselfed.—Ed.

APPENDICES.

I.

CONSTANCE NADEN.

From the *Contemporary Review* (April, 1891).

IN an early number of the *Speaker* there appeared an article by Mr. Gladstone, in which he recites the names of the British poets who have contributed to the glory of our national literature during the present century. He is particularly impressed by the large number of women who have shown a rare poetic genius, and thinks that "it may be allowable to say, not only that the British poetesses of the last sixty years have developed in numerous instances splendid powers, but even that they are, as a whole, without parallel in literary history." To sustain this opinion, he gives a list of the following names: (1) Elizabeth Barrett Browning, (2) Christina Rossetti, (3) Adelaide Proctor, (4) Jean Ingelow, (5) Emily Brontë, (6) Lady C. Elliot, (7) Miss Naden, (8) "V;" (Mrs. Archer Clive).

To the immense majority of the readers of Mr. Gladstone's article, I suppose that the seventh name on the list was unknown. Miss Naden's work was not of a kind to take possession of the public mind by a sudden assault. It did not dwell much on those domestic scenes and affections which touch the common heart, and have given to the verses of many inferior poets an immediate popularity. It did not express the faith and devotion of any religious party. But in my judgment—which, indeed, is not an impartial one, for I knew her from her childhood—she had a right to the place which Mr. Gladstone gave her on this roll of honour; and I am grateful to the editor of this Review for allowing me to tell in its pages the brief story of her life, and to call attention to the two slender volumes which preserve the proofs of her poetic genius.*

* For dates and some other details, I am indebted to a Memoir of Miss Naden, recently published, edited by Mr. W. R. Hughes,

Constance Caroline Woodhill Naden was born at No. 15, Francis Road, Edgbaston, on January 24, 1858. Her father, Mr. Thomas Naden, is still living; he is an architect by profession, and has the distinction of being the President of the Birmingham Architectural Association. Her mother, Caroline Anne Naden, died twelve days after the birth of Constance, who was her only child. Those who knew the mother say that she was a bright, thoughtful woman, much given to books, and that Constance had many of her intellectual characteristics. When she was dying she begged her own mother to take charge of her child. The trust was accepted. Till their death Constance Naden lived with her grandparents.

The grandfather, Mr. J. C. Woodhill, had been a manufacturing jeweller. He had carried on a quiet, safe, unadventurous trade; had lived plainly; had received a handsome legacy from a relative; had saved some of the money he had made himself; and before the birth of his grandchild he had retired from business, and left the jewellers' quarter in the north of the town for Pakenham House, in Charlotte Road, Edgbaston. He was a man of great integrity, and of a most kindly disposition. For many years he was a member of the Committee of the Old Library, which since the days of Dr. Priestley has been one of the greatest and most useful of the institutions of Birmingham. Membership of this Committee has come to be a kind of diploma, certifying that, in the opinion of the subscribers, the holder is an authority in some department of science or literature, or that at least he has a delight in books. After Mr. Woodhill gave up business he was constantly at the Library, and it was there that I used to meet him most frequently. He died at the end of 1881. Of the grandmother, Mrs. Woodhill, I had very little personal knowledge. She died in June, 1887.

Treasurer of the City of Birmingham, and containing contributions by Professor Lapworth, Professor Tilden and Dr. Lewins; "Constance Naden: a Memoir." London: Bickers & Son. I am also indebted in other ways to Miss Maud Michell and to Mrs. Houghton, who were intimate and dear friends of Miss Naden from the time that they were schoolfellows together—and, in the case of Miss Michell, from a still earlier time—to her death.

For their motherless grandchild both grandparents had the deepest and most tender affection. She filled a large part of the life of the grandmother, and from her very early years she was her grandfather's delight and pride. All that their love could do for her they did, and in return she loved them well. She expressed her love for them in the pathetic lines prefixed as a dedication to her first volume of poems.*

But the house was very still. There was no other child. Living with persons so much older than herself, "Consie" grew up a very proper, demure, self-contained, and meditative little maiden. One of her child friends tells me that the verses in her first volume, supposed to be written by a little girl "Six Years Old," are a bit of autobiography. She is describing a visit to some neighbours, and says:—

"I could stay in that garden for ever,
And make friends with the beeches and limes.
I saw Dr. Jones—he's so clever;
He writes to the papers sometimes.

He looked at me hard through his glasses,
And said 'Now make plenty of noise,
Have a regular romp with my lasses,
And be petted and teased by the boys.'

He said that my curls wanted rumpling,
My cheeks should be red and not pink;
He called me a sweet little dumpling—
He's very insulting I think.

'Twas Nurse that made me so tidy,
And how can I help being small?
He gave me some roses on Friday—
Perhaps he is nice after all.

I stayed with the children till seven;
They're kind, but so dreadfully rough!
There were ten of them—I made eleven,
We played Tick, French and English, and Buff.

The girls are as bad as their brothers,
They teased me and played me such tricks!
But Maude isn't rude like the others,
She says I look older than six."

* "Songs and Sonnets of Spring-time." By Constance C. W. Naden. London: Kegan Paul & Co. 1881.

Fortunately, there was a garden at Pakenham House as well as at "Dr. Jones's," and to the imaginative child the garden was fairy-land, Paradise, or any other remote and strange region, on the earth, or under the sea, or among the stars, that her transient fancies might choose to make it. With a friend rather younger than herself, she would sit on the ground for hours, watching the living creatures, beetles, caterpillars, butterflies, birds, and romancing about them all; inventing wonderful histories of their adventures, their sorrows and their joys. Sometimes the garden wall was built, so "Consie" said, of the bricks which were made by the children of Israel in Egypt. She had a great affection for trees, and she talked of them as though she and they knew and loved each other. A lime-tree was a special object of her devotion. She was only repeating in after years her unforgotten childish impulses when she wrote:—

"I put my arms round him and kiss him,
And sometimes I think he can feel.

The sort of stories she used to tell to her friend, who still thinks of them with delight, may be imagined from some other verses in the same poem. The little "Six Years Old" says that at night she lies awake for hours. And she thinks of what is going on in the garden, as well as of the people who are downstairs with her grandfather and grandmother:—

"I fancy the fairies make merry,
With thorns for their knives and their forks;
They have currants for bottles of sherry,
And the little brown heads are the corks.

A leaf makes the tent they sit under,
Their ball-room's a white lily-cup;
Shall I know all about them I wonder,
For certain, when I am grown up?"

I have no distinct remembrance of her in those days, though she used to come now and then to my house to play with my children, and was an occasional guest at their little parties. I hope that it was at none of these that the boys were so rough with her. Indeed, I have had assurances, which relieve me from all uneasiness; the real offenders have been identified. I am sure that I am not the clever "Dr.

Jones," who insulted her by calling her a "dumpling." Any man who could have taken so great a liberty with her, even when she was only "six," must have been wholly depraved, and capable of committing all the seven deadly sins.

But I have a very vivid recollection of her when she was about nine or ten. It was my habit in those days to take a short constitutional immediately after breakfast, and I sometimes met or overtook "Consie" on her way to school. I can see her now—her pale but healthy-looking face slightly touched with pink; her thin lips firmly closed; her clear, thoughtful, patient, grey-blue eyes; her slight figure; her dress, not gay with bright colours, but serious, as was proper for a little maiden coming from a Puritan house—serious, but not mournful. Her dress, indeed, was part of herself. There are children whose frocks, if they were worn for the first time yesterday, look as if they had been worn for a twelvemonth. "Consie" was not a child of that description; her dress always looked fresh, it was never tumbled; every one could see that it had not been put on in a hurry; and she retained this peculiarity to the last. As I can see the little maiden I can hear her—a childish voice, which did not wholly cease to be childish when she became a woman, and which had a curious suggestion of suppressed complaint in it; an articulation definite and deliberate, though she always had a slight trouble with the letter "r." Her way of talking, too, I can remember. I am not at all clever—and never was—in talking with children; but "Consie" was a delightful companion. There was nothing vague or loose either in her thought or her expression; everything was as finely and delicately cut as the head on a cameo. She could give and take—did not wait until some one else gave her an impulse, but yet took an impulse when it was given, and went off at once in the line of it. One of these morning conversations I can distinctly recall. I suppose that I had been plunging about in Kant's antinomies and paralogisms, and the child was talking so gravely and thoughtfully that I said to her: "Consie, when you are a woman you must write a great book on the Absolute and Unconditioned, and

dedicate it to me." With the seriousness of a Lord Chancellor she promised at once that she would. Ten or eleven years later she remembered her promise.

The school which she began to attend when she was about eight years old, and at which she remained till she was seventeen or eighteen, was a small private day-school near her home, kept by two sisters, the Misses Martin—ladies of considerable culture, who did all the work of the school themselves. There were no examinations, and no prizes; it was part of the system of the school to offer no direct provocation to competition. I am not prepared to say that this system is applicable to large schools; that all teachers could work it effectively; or that it would succeed with all children; but one thinks with envy of the girls whose intellectual life had so wholesome a development, and who were spared the fierce and wasting excitements of our modern methods. It might be supposed that such a system would be defective, on account of the absence of incentives to mental effort. But judging by the results of the school in other cases than that of Miss Naden—whose delight in work might make her case exceptional—the teaching itself, apart from adventitious aids, must have afforded adequate encouragement to an effective development of intellectual life and power. And the intellectual stimulus which is given in the teaching itself must always be far more healthy and enduring than any that can be supplied from other sources.

She left school, I believe, in 1875, and for three or four years spent a considerable part of her time in general reading. She was never a pensioner of "Smith's" or "Mudie's;" the ordinary novel had no attractions for her, even in those days. For Sir Walter Scott she had a great love, and she knew her "Heart of Midlothian," and her "Antiquary," and her "Ivanhoe," and her "Old Mortality," and all the rest of the wonderful Waverley creations, as some good people know their Bible. She had also a great delight in Thackeray, in Bulwer, in Dickens, and George Eliot. Of particular books which fascinated her at this time, her friends mention the writings of James Hinton, and the "Hours with the

Mystics," by Mr. R. A. Vaughan, who a few years before had been the minister of the Congregational Church, in Steelhouse Lane, Birmingham. She also read widely in the English poets, and her tenacious memory retained for years the lines which had struck her for the felicity of their phrase, for their splendour, pathos, or wit.

She was not satisfied with general reading. During these years she attended the Botany and Field classes at the Midland Institute, conducted by Mr. J. W. Oliver; and the German classes conducted by the late Dr. Dammann. She also joined a class of four young ladies to read Latin under Mr. William Bates, who at that time was Professor of Classics at Queen's College. This class she attended for about a year, worked at Latin many hours every day, and before the year was over possessed a knowledge of the language, which amazed both her tutor and her class-fellows. She went on with her French, which she had been taught well at school, and she did something at Greek.

In 1881 she published her "Songs and Sonnets of Springtime." A few months before it appeared she came to consult me about its publication, as she knew that I had some acquaintance with the ways of publishers. She told me that she had a book ready for printing, adding that it was not the treatise on the "Absolute and Unconditioned," which, when she was a child, she had promised to write and to dedicate to me, but a collection of verses which a friend of hers, who, as I afterwards learnt, was Dr. Lewins, had been pleased with, and had persuaded her to publish.

The verses were very remarkable verses for a young woman of twenty-three, who had lived so quiet and uneventful a life. Some of them, like "The Lady Doctor," "Love *versus* Learning," and "The Lament of the Cork Cell," were humorous, and showed a delightful capacity for making fun of her own serious studies.

Others showed, as I thought, a remarkable power of entering into human experiences, which in their external conditions were altogether unlike her own. But in several of her strains there was a recurrence, though with striking

variations, of the same *motif*, and this disclosed the innermost secret of her own heart. She had become conscious of detachment from the life which surrounded her, and from the life of her own earlier years. The discovery made her sad, but there was no remedy; and she was seeking consolation in a vague, unknown, ideal world. This appears in "The Astronomer," who has lived with the stars so long that he has lost the earth and all capacity for its common sights and its common joys.

"In half-regretful ignorance I look
On common fields and trees.
". . . . And yet, could I descend
And breathe the lowland air again,
How should I find a brother or a friend
Mid earth-contented men?
"Though while I sat beside my household fire,
Some dear, dear hand should clasp my own,
Must I not pine with home-sick, sharp desire
For this my mountain home?"

He finds solace in escaping from himself, and dreaming of the time when the confusions which now afflict the life of nations will be reduced to a most perfect order. His assurance of this is given to him in the steadfast laws of the material universe. In the "harmony of worlds" he reads the prophecy of "the future of mankind;" and yet his visions do not give him perfect rest:—

"When every heart shall perfect peace attain,
And every mind celestial scope,
Such were mine own, *save for this hungry pain*,
This lack of earth-born hope."

There is the same undertone in "The Last Druid," who,

"Despairing and alone,
Where mountain winds may moan."

laments that his people are praying to a "strange god;" in the "Alchemist," in the "Carmelite Nun," and in "The Roman Philosopher to The Christian Priests." The philosopher thinks that

"The fair old myths have served their purpose well."

But

"There is room for all, the world is wide;
Zeno was great, and so, perchance, was Christ,
And so were Plato, and a score beside."

"If I were young, I might adore with you ;
But knowledge calms the heart and clears the eye ;
A thousand faiths there are, but none is true,
And I am weary, and shall shortly die.

He has been fair and generous with the preachers of the new faith ; has "never warred with doctrines but with deeds ;" but now his daughter scorns him "as a thing accursed" :—

"She deems my lordly house unclean, defiled ;
She scarce will sip my wine or taste my bread.
Ye boast of virgin martyrs—if my child
Die for her faith, my vengeance on your head."

The "detachment" which appears in all these poems was the result, in part, of the falling away of early religious faith. In the verses addressed to Dr. Lewins, the new conception of the world which she was to develop in her later writings already appears ; and the doctrine of "The Pantheist's Song of Immortality" is, in truth, not Pantheism but, to speak the modern jargon, Pancosmism.

"Yes, thou shalt die ; but these Almighty forces
That meet to form thee, live for evermore :
They hold the suns in their eternal courses,
And shape the tiny sand-grains on the shore.
"Be calmly glad, thine own true kindred seeing
In fire and storm, in flowers with dew impearled,
Rejoice in thine imperishable being,
One with the Essence of the boundless world."

In none of these early poems have I found any distinct indications of the ascendency over her mind of either of the two great poets, whose power might have been expected to cast a spell upon a young imaginative mind of this generation. Of Robert Browning there is, I think, absolutely no trace ; nor are there any very clear traces of Lord Tennyson. I inquired of one of her most intimate friends whether I was right in the inference, that neither Browning nor Tennyson had ever taken possession of her ; the reply was that I was wholly in the right about Browning, and that, though she admired Tennyson, he had never moved her to enthusiasm.*

* I learn from one of her friends that she had an intense admiration for "The Dream of Fair Women," but had no passion of delight in either the "Idylls," or "In Memoriam."

She felt far more deeply the charm of Keats and of Shelley, and she was strongly drawn to Wordsworth.

In the autumn of 1881, about the time that her "Songs and Sonnets" appeared, she became a student of Mason College. She had been fortunate, as I think, during her school-life, in her exemption from the strain of examinations, and from the hot eagerness provoked by the ambition to win prizes. She was equally fortunate in her college life. The wealth, which was certain to come to her, liberated her from the necessity of securing a degree in order to improve her chances of earning her living as a teacher; and the degree for its own sake had no attractions for her; she, therefore, had only to consider what she wanted to learn, and to learn it. In a brief paper contributed to the "Memoir," Professor Tilden has stated so accurately the views with which she entered the college, that I quote his words:—

"From the first it was evident that, although she had no university examination in view, she had planned for herself a very definite and complete course of study, with a very well defined purpose.

"The study of philosophy, undertaken with the object of forming a true theory of life, requires that no branch of modern learning shall be omitted from the necessary preparatory course. Physical and biological science must both be explored. Miss Naden knew this, and accordingly, having determined to build high, she proceeded to lay her foundations deep, submitting to a very thorough drilling in the subject matter of the sciences of physics, chemistry, botany, zoology, and geology. Then, as in one subject after another she obtained command of the fundamental principles, with no mean acquaintance with its detail, she transferred her active intelligence, her keen reasoning faculty, and great powers of acquisition, to new ground. No inducements seemed sufficient to prevail upon her to become a mere scientific specialist. For her the absorbing questions seemed to be, What is Man, Whence and Whither?"*

With the buoyant hope that she was on her way to final certainties concerning the mystery of the life of man, his origin, the stages of his development, his present relations to

* The theory on which she constructed her own scheme of education at Mason's is stated very clearly in the brilliant address, which she delivered towards the close of 1883, as President of the Ladies' Debating Society. It was published in the Annual Report of the Society.

the universe, and his destiny, she passed with a light, firm, but rapid step from botany to chemistry, from chemistry to geology, to physics, to biology, to zoology. It was her habit to put the greater part of her strength into one subject at a time, and not to touch a new science or a new language till she had made some way into the territory of its predecessor. She seemed to work without effort and without exhaustion; she never seemed worn. All her teachers were drawn to her; she became their friend almost as soon as she was their pupil.

The influence which Mason College exerted on her was immense. Her home, as I have said, was a very quiet one. Her grandfather had made very few changes in his habits of living since he left his small house at Hockley, with, I suppose, the jeweller's workshop behind it, for Charlotte Road, Edgbaston. He was an "elder" of the Baptist Church in Graham Street, of which Mr. Vince, and afterwards Mr. Platten, were ministers*; his ways were of the old Nonconformist type. "Worldly" amusements were regarded with disfavour. He gave no lively entertainments. Concerts would have been allowed, but Miss Naden confessed that she recognised no distinction, worth mentioning, between "the mental effects" of the discordant strains of a company of itinerant German performers and the interpretation of a sonata of Beethoven by Hallé's band. She had been taught to paint flowers when she was at school, and one of her flower-pieces won the distinction of being hung in our local exhibition; but she gave up painting very early. Her life, therefore, had had very little animation and variety in it. But at Mason's she found troops of friends and a new world of pleasant excitement. The classes in geology and botany had their field-days. College societies and "sections" of various kinds organised pic-nics and found their way to sequestered villages in Staffordshire, Worcestershire, and Warwickshire; wandered over the Clent Hills or the Wrekin,

* When Mr. Platten and a considerable section of the church removed to Hagley Road, Mr. Woodhill became an elder of the Hagley Road Church.

and sailed down the Severn. Miss Naden joined these excursions with the keenest zest, took her full share of the talk, and occasionally, I believe, entertained the company as they sat on the grass after lunch, by reciting some of her unpublished humorous verses. At the "Union" she was one of the most frequent and effective speakers—clear, definite, ready; her English admirable; her illustrations felicitous; her logic in reply keen and relentless; and her scorn scathing for a halting argument, or for what she regarded as an unworthy sentiment. Her knowledge, the promptness and accuracy with which she could recall all that she knew, her ingenuity and alertness, and the ease and vigour of her extemporary speaking made her an extremely dangerous opponent.

Indeed, she had tried and proved her powers as a speaker before she entered Mason's. In 1880 some young ladies in Edgbaston had formed themselves into "The Ladies' Debating Society." They held their meetings at each other's houses and Miss Naden soon spoke brilliantly. For their first two presidents they elected elder ladies, my wife and Mrs. H. W. Crosskey, but for their third they resolved to appoint one of themselves, and they chose Miss Naden. Her address, to which I have already referred, illustrates her genuine rhetorical power.

During the later years of her school-life I had seen her very rarely, but from 1881 I began to see her again rather more frequently. My younger daughter was one of the secretaries of the Ladies' Debating Society, as well as a student at Mason's; my elder daughter was for a time both a student at Mason's and sub-editor of the *College Magazine*, and, like other sub-editors, did most of the work. Their young friends from the Debating Society and the College—Miss Naden among them—spent an occasional evening at my house for "business" or for pleasure. Of course she was greatly changed since I used to gossip with her on her way to school, and yet she retained many of the characteristics of her childhood. She was not, I think, the most brilliant of the Mason College girls of her time in general conversation,

but she was always interesting, and gave one the impression that her mind was working at only "half-speed"; had it been necessary she could have doubled her pace. At times her thin upper lip would curl, and she would shoot out a barbed epithet or phrase that was very amusing for everyone, except the unfortunate person against whom it was directed. Her great powers were cordially acknowledged by all her fellow-students, but it can hardly be said that she was generally popular, either among the young men or the young women. The intellectual scorn which sometimes appeared both in her speeches and conversation discouraged affection, and there was a reserve in her manner which gave the impression of coldness; and yet the genuine admiration which she excited surrounded her with a very genial and sunny atmosphere, and her elect friends had an enthusiasm of love for her. One of these assured me that she had never known any one who was more sensitive to affection, or who responded to it more promptly, or more warmly.

It was a new and extremely interesting type of social life which was formed round Mason College very soon after it was opened. The young men and girls were drawn together by common intellectual interests. Most of them, I suppose, belonged to Birmingham and its immediate neighbourhood; but a considerable number came from other towns in the Midland Counties. The social position of their families varied considerably, but the habits and pleasures of all of them were simple and inexpensive. They had entered Mason's to work—not to play. In most of them there was eagerness and hopefulness; they were sailing into strange seas and under strange constellations, and hoped to see wonderful things. They were ready and cordial in their admiration for every proof or promise of intellectual power or grace, that was given by any of their number. There was a frank friendliness in their intercourse with each other, which seemed to me very charming. They could talk seriously, and sometimes adventured, without any misgiving, on the solution of questions which have baffled the genius of mankind for thousands of years; but they could also be merry and gay. Their

social life was one of the most powerful influences in their education. It was not merely in their classes, but in the debates of the Union, and in their animated private conversations, that they discovered intellectual limitations which they had not suspected, intellectual strength which had been unhoped for. There were some, no doubt, who had thought more highly of themselves than they had any good cause for thinking, and they learnt modesty. There were others who had distrusted their power, and they learnt confidence. To Miss Naden, the social life of the College brought a genial expansion of her whole nature; and its serious studies gave a firmer fibre to her thought.

These results were apparent in her second volume of poems,* which was published in 1887. Each of the three poems named on the title-page is of considerable length. The metre she chose for them seems to me a difficult one to keep alive and buoyant through many pages. They are all written in ten-syllable lines; the two first are broken into stanzas of eight lines; the third into stanzas of six. But she has handled her instrument with considerable success, and some of the stanzas are very vigorous and felicitous.

It was her theory that sins against form are unpardonable in a poet, because he is, first, an artist; and, only secondly, if at all, a teacher. A poem, she maintained, is worth nothing —as a *poem*—if its form is bad, whatever may be the worth of its thought.† In her "*Modern Apostle*," however, she wanted to teach as well as to sing. A young and fervent preacher, who begins his ministry under the power of a narrow and rigid creed, is troubled by the discovery that there is very much to be said for a theory of the universe very

* "*A Modern Apostle; The Elixir of Life: The Story of Clarice; and other Poems.*" By Constance C. W. Naden. London: Kegan Paul & Co.

† This was the main position asserted by Miss Naden in a debate at the Poesy Club in May, 1887. Mrs. Houghton has been good enough to furnish me with some interesting extracts from reports of these debates. In one of the extracts I find an expression of Miss Naden's great admiration for Keats.

different from his own. At first he is afraid of the books which disturb his old faith ; but he soon lets himself go :—

> "And so at last he shut his eyes and plunged,
> And took whate'er he found, both good and ill—
> Pale Christianity, with Christ expunged,
> Faint Unbelief, deploring its own skill ;
> Great tomes of metaphysic lore, that sponged
> The World away, leaving the lonely Will :
> Carlyle he conned, and—guilt of dye intenser !
> Dallied with Darwin, and with Herbert Spencer."

He sees a vision, hears a voice, and becomes the prophet of a mystical Pantheism. This, too, like his earlier faith, proves to be an illusion ; and he has to leave the mission of regenerating the thought and life of the world to a girl who loves him, whose beliefs are not explicitly stated, but who seems to have been a disciple of Mr. Herbert Spencer.

"The Elixir of Life" is, perhaps, the most powerful of the three longer poems. It tells the story of an alchemist who had discovered, four or five centuries ago, a wonderful drink, which gave to mortal men the freshness and the power of immortality. It was not for himself alone that he had devoted his wealth and his strength to the search for the great secret ; it seemed, indeed, as if the discovery might come too late to renew his own youth and prolong his own life ; but he exulted in the hope that, if he perished in the moment of triumph, he might yet make "all mankind" his "deathless heirs." When the secret was mastered he travelled over the world, with the intention of liberating men from the waste and weakness of old age, and from peril of death. He was in Florence during the splendid time of the great Lorenzo ; he was in Rome when Leo was mocking at "the thundering theses of the rebel monk." But, groaning over the crimes and the miseries of which he is the witness, the Alchemist asks :—

> "Where is a man so just,
> So wise that he should live beyond his time ?
> What poet, priest, or woman can I trust,
> To use in righteousness my gift sublime ?"

He keeps his secret close ; there is no one in Italy with whom he cares to share it. He travels through Spain, crosses

to England, goes down to Stratford-on-Avon, and meets Shakespeare :—

> "But I thought—
> Nay, let the Poet live, and leave the Man
> To die in peace—he quaffs his own rich wine
> Of immortality—what needs he mine ?"

And so, through generation after generation, he wanders over the east and the west, and nowhere does he find a man whom it would be well to make immortal. At last he finds a woman who, as he thinks, would use the gift nobly; but he discovers, happily in time that, under all the divine beauty of her form, she has a base and sensual soul. The gift is not for her.

The third poem is the story of Romola and Tito—with a difference. Clarice is the beautiful and learned daughter of a scholar, who lives with his books and leaves his fair child uncared for. Wilfred, the old man's secretary, handsome, accomplished, gracious, falls in love with her; but Clarice remains "marble-cold," and has no suspicion of what has happened :—

> "She knew the woes of Dido ; she could tell
> How Helen set the towers of Troy ablaze ;
> She thought of Love as a forgotten spell,
> Potent in far-off lands, in ancient days ;
> Obsolete now, like magic black and white,
> Or the Emission Theory of light."

But Wilfred is an honest fellow, and, after a due and not excessive amount of misery on his side, Clarice herself becomes miserable, relents, and loves him.

As compared with her first volume, the second shows a decisive increase in the vigour and solidity of her thought; the intellectual fibre is firmer, the intellectual muscles more tense. But she is too often pre-occupied with her material. There is less singing than in the first volume, more teaching. She will not, if she can help it, sacrifice her music to her doctrine, but under her singing robes you can catch a glimpse of the philosopher's cloak. It would have all come right, I think, if she had lived a few years longer : she would have risen buoyantly again and sung like the lark at heaven's gate; but in this second volume it seems to me that she is at times

too heavily weighted to soar high; there are signs of effort; at times she is weary.

She herself, indeed, during her later years had come to believe that philosophy, rather than poetry, was her true vocation. In 1876 she had met Dr. Lewins at Southport, and he at once acquired a remarkable ascendancy over her mind. He recognized her genius, and took a deep interest in her intellectual development. He was most constant and generous in his kindness to her. He had a philosophical faith of his own, for which he was eager to secure disciples, and he saw that Miss Naden would make a most charming and effective apostle. She felt and welcomed his power over her. His conversation stimulated her thought, his theory of the universe gave it a definite direction. It was with his advice, I imagine, that she laid out the scheme of her scientific studies at Mason's. It was, no doubt, with his concurrence that in 1884 she joined a "section" of the Birmingham Natural History and Microscopical Society, formed for the study of the philosophy of Mr. Herbert Spencer.* She soon became one of Mr. Spencer's enthusiastic admirers,† and Mr. Spencer himself was so impressed by the power shown in some of her writings that she wrote, at his request, a reply to what is described as "Mr. Lilly's libel on Utilitarianism in the *Fortnightly*." The reply, however, was too long, in Mr. Spencer's judgment, for publication in a magazine, but he considered "the main point good when reached."‡

The philosophical creed which, under Dr. Lewins's teaching, Miss Naden accepted is called "Hylo-Idealism." No man can give an accurate exposition of any philosophical theory, unless at some time or other in his life he has been able to

* Dr. Lewins has assured me that, in these studies, Miss Naden acted solely on her own initiative. In these years he was much abroad and can claim no merit for the "advice," with which Dr. Dale credits him.—Ed.

† This statement is also liable to objection. Enthusiasm never was a foible of Miss Naden. Earnest she was, but always with the most perfect self-possession and independence.—Ed.

‡ "Memoir," p. 47.

think himself into the intellectual position of those persons to whom the theory appears to contain a coherent account of man, and of man's relations to the universe. But I have been unable to think myself into the position of the Hylo-Idealists, and I am therefore disqualified for expounding their system. The theory begins, however, on familiar ground; its first position is that we have no knowledge of the thing as it is; that all our knowledge is relative. Its second position is also well known to all students of philosophy; it assumes that if all knowledge is *relative*, all knowledge is purely *subjective;* forgetting that a relation is the synthesis of two terms, and that, if either of the terms is suppressed, there is no relation. "*Our* universe," says Miss Naden, "is made up of sensations . . . . and beyond sensation we cannot pass."

"Practically we may say of self, as Paul of Christ. In it are all things created, in the heaven and upon the earth, things visible and things invisible, whether thrones or dominions, or principalities or powers; all things have been created through it, and unto it, and self is before all things, and in self all things consist."*

In a note by Dr. Lewins to one of Miss Naden's essays, contained in the volume from which I have just quoted, he gives his own account of the theory. He says that when Napoleon, on his way to Egypt, objected to the materialism of modern science by pointing to the stars, and asking, "Who made all that?" the answer of his *savans* was probably: "No one; they are eternal." But Dr. Lewins thinks that the true answer would have been, "*Yourself.*" What you see is a vision, or organic function, of your own *sensifacient* organism."†

Up to this point the theory is intelligible; it looks like an old friend, though in a new dress. This is Professor Tyndall's impression. "Extreme pains," says Dr. Lewins, "have been wasted in explaining to him the hylo-phenomenal theorem of existence, which he obstinately persists in confounding with Absolute Idealism."‡ It is just here that I lose the path; I

* "Induction and Deduction, and other Essays," by Constance C. W. Naden. Edited by R. Lewins, M.D. London: Bickers & Son. 1890.

† Ibid. p. 162. ‡ Ibid. p. 148.

am as dull as "our genial and skilled Royal Institution empiric," as Dr. Lewins pleasantly describes him. By some process of thought, which I cannot trace, Dr. Lewins believes, and Miss Naden believed, that it is possible to pass from a "vision, or organic function," of the "*sensificient* organism" of the individual to a real objective universe. "Matter, so far from being a nonentity, is the *fons et origo* of all entities."*

In her philosophical expositions, whatever we may think of her main theory, Miss Naden shows acuteness and a charming lightness of touch; her style is singularly graceful and clear, and her illustrations are felicitous. She wrote a large number of papers on various philosophical subjects, many of which may be found in the *Journal of Science* between 1881 and 1885. I had read one or two of these papers, but did not know with what seriousness and earnestness she held her new creed till I called upon her a few days after her grandmother's death. Then she told me how great a change had passed upon her whole conception of human life and destiny. My little "Consie," who was to write me a treatise on the "Absolute and Unconditioned," had indeed faced the eternal problem of human thought, but had reached disastrous conclusions. The heavens and the earth, truth, beauty, the awful contrasts between right and wrong, the glory of the Supreme—she had come to think that all are the creations of the grey thought-cells of the cerebral hemispheres. This conversation, in which she was as frank and affectionate as a child, and opened to me all her heart, did not extend to the philosophical and physiological grounds of her new position; with the shadow of death resting on the house it was enough to talk of how life looked to her now—and death, and Christ, and the mystery beyond death. She seemed very firm, and yet very sad. Had she lived longer would she have been content with her new creed?

In September 1887, three months after Mrs. Woodhill died, she left England with her friend, Mrs. Daniell, for a long tour. She went to Vienna and to Buda-Pesth, and sailed down the Danube; stayed for a time at Constantinople;

* Ibid. p. 161.

crossed to Broussa; visited Smyrna, Baalbec, and Damascus; and spent a few weeks in Palestine. Then she went to Cairo and up the Nile to Assouan. While in Egypt the two ladies resolved to go to India. They went to Bombay and Calcutta, to Lucknow, Benares, Agra, and Delhi, and saw the Himalayas from Darjeeling. At Mount Aboo, Miss Naden had a severe attack of fever, and was obliged to remain there for seven weeks. She and her friend reached England in June, 1888.

She called on me once or twice after her return and told me that she had resolved to settle in London. She took apartments, first in Half Moon Street and then in Old Quebec Street; and in October purchased 114, Park Street, Grosvenor Square, and was much interested in furnishing her house. For a time she keenly enjoyed her new life, but, in the course of a few months, it became apparent that she was losing her buoyancy and vigour. Her indomitable resoluteness enabled her to defy her physical weakness, and she disregarded the injunctions of her medical attendants, who insisted on the necessity of rest.* In December 1889 her condition had become desperate, and her only chance of life was in submitting to an operation. The operation was successfully performed by Mr. Lawson Tait, and for some little time it was hoped that she might have sufficient strength to recover. But the Indian fever had drawn too heavily on the resources of her splendid constitution; her strength was spent; and early on the morning of December 23rd the end came.

She died too soon. She achieved much; she promised more. Had she lived twenty years longer, I believe that she would have taken a great and enduring place in English literature. Even among the few verses which she wrote, there are some, I think, which for several generations at least, will retain their freshness and their charm.

R. W. Dale.

Birmingham.

* This alleged charge of disregarding the injunctions of her medical attendants cannot be justly brought against Miss Naden. She was too rational for such neglect.—Ed.

II.

CONSTANCE NADEN:

A Reply to Dr. Dale.

Declined by the *Contemporary Review*.

IN the April issue of this Review there appears a paper giving, in brief compass, the story of the late Miss Naden's life, together with some appreciative criticism of her poetical works. It is written by the Rev. Dr. R. W. Dale, who knew her from childhood, and at whose house, in Birmingham, she was, when grown up, a frequent visitor. The record of her earlier years could scarcely have fallen into better hands; the article is both brilliant—as everything coming from Dr. Dale's pen is—and interesting, as supplying us with many exquisite cameo-like sketches of her whom we have lost. Taking the article as a whole, its one fault is its brevity.

Before alluding to several points in Dr. Dale's paper it may be as well to state, authoritatively, from information in my possession, as editor of her remaining papers in a volume shortly to be published: (1) that Miss Naden laid out for herself, and entirely unaided, the scheme of her scientific studies at Mason College, (2) that her Spencerian researches were also self-suggested, and (3) that *before* her meeting with Dr. Lewins at Southport in 1876, she had worked herself free from the creed of Christendom—so far as she ever had accepted it. What was to take its place, in her mind, was, perhaps, at that date, undetermined, but that which Dr. Dale calls "detachment from the life which surrounded her, and from the life of her own earlier years"* had taken place prior to the date above-mentioned. The date of this "detachment" apart, Dr. Dale views it as first revealed in her initial volume of poems "Songs and Sonnets of Spring-time," in which he finds a recurrence of the same *motif*, and adds

* *Contemporary Review*, April, 1891, p. 513.

that this "detachment was the result, in part, of the falling away of early religious faith."* The discovery, he goes on to say, "made her sad, but there was no remedy, and she was seeking consolation in a vague, unknown, ideal world."† Now, with all respect to Dr. Dale, is not this passage somewhat forced?‡

As to her ever "seeking consolation in a vague, unknown, ideal world," I must say that I cannot find any foundation for the statement, and her latest reviewer furnishes none. Berkeley's would have been an ideal world, but neither "unknown," nor "vague," since his churchmanship led him to the conclusion that God decreed to produce ideas in the minds of finite spirits. This is aërial enough, annihilating as it does the *objective* Universe, but it lands one in the breast of Deity. *Absolute* Idealism is vague. Miss Naden's Hylo-idealism, being *positive*, never was, or could be, so. Speaking of Berkeley, it may be remarked that the inception (if not the coinage of the word) of Hylo-Idealism—though always implied in her literary executor's Theory of "Hylo-Zoism"—really arose from a casual suggestion on Miss Naden's part that the episcopal theory might, as regards its basis, bear reversal!

In the concluding paragraphs of his article, Dr. Dale alludes to the fact of Miss Naden having written a large number of papers on philosophical subjects, in the "Journal of Science" and elsewhere. He adds:—

> "I had read one or two of these papers, but did not "know with what seriousness and earnestness she held "her new creed, till I called upon her a few days after "her grandmother's death. Then she told me how great "a change had passed upon her whole conception of "human life and destiny. My little 'Consie,' who was to "write me a treatise on the 'Absolute and Uncondi-"tioned' had indeed faced the eternal problem of "human thought, but had reached disastrous conclu-

* *C. R.* p. 514. † *C. R.* p. 513.

‡ I have the best authority for stating that the early religious faith, which Dr. Dale attributes to her, was never hers.

"sions. The heavens and the earth, truth, beauty, the "awful contrasts between right and wrong, the glory of "the Supreme—she had come to think that all are the "creations of the grey thought cells of the cerebral "hemispheres. This conversation, in which she was as "frank and affectionate as a child, and opened to me all "her heart, did not extend to the philosophical and "physiological grounds of her new position; with the "shadow of death resting on the house, it was enough to "talk of how life looked to her now—and death, and "Christ, and the mystery beyond death. She seemed "very firm and yet very sad. Had she lived longer "would she have been content with her new creed?" *

I apologise for the length of this extract, but it is one of vital importance. It justifies the headline of my article—Is this really—this presentation by Dr. Dale, *the* "Constance Naden" whose loss we mourn? Note that during more than 11 years—from *before* 1876 to 1887, Dr. Dale had only made himself acquainted with her intellectual progress by reading "one or two" of her philosophical papers. It was only conversationally, in 1887, that he found how great a change had taken place in her opinions. Eleven years of the most fruitful part of her life, Dr. Dale virtually confesses to be a blank to him. Can any fair estimate of her life afford to omit these eleven years, the very noon of her existence, during which she did so much? She lived only two years longer, from which the year of her travels must be deducted. Miss Naden was always "firm," but how about the "sadness" which Dr. Dale discovered during this interview? Was it not natural? She had just lost her grandmother, to her the only mother she ever knew. "Had she lived longer would she have been content with her new creed?" enquires Dr. Dale, with the memory of her "sadness" fresh upon him. I question the source or cause of her "sadness," and leave the matter to public opinion. Well, the matter of her continuance in her new creed, thus stripped of adventitious surroundings, remains an open question. We must take her life as we have

* *C. R.* pp. 521-522.

it *in toto*, and guess what the rest might have been. "She died too soon," as her eloquent biographer puts it, but from what I know of her nature I venture to say that, had her brief life been prolonged, she would never have graced the ranks of English Nonconformity, or adorned that church, which Dr. Martineau has termed a "body of Death," and Prof. Momerie, in the April issue of the *Contemporary*, one "within a measurable distance of dissolution"—the Church of England. That "Macrocosm and Microcosm alike are but Auto-cosm"—for that was practically Miss Naden's creed—will not dovetail into any ecclesiastical organization presently existing is tolerably evident. And that granted, minds of the type of Miss Naden's rarely return, like the boomerang, to the point of projection. What caused her to quit her early religious faith I cannot precisely determine. As likely a cause as any might be that her dominant love of Truth—in which unswerving Justice lies implicit—revolted from the idea of vicarious suffering. But this is only surmise on my part. Any number of causes may determine a change of faith. Examples are plentiful enough—especially in the annals of the immediate past. Surely Dr. Dale does not affirm, at this time of day, that opinions, religious or otherwise, handed down from generation to generation, derive any validity from such transmission, or that anyone is bound always to act, speak, and write, only in inherited grooves. In this light, I myself am indeed at fault. Instead of writing in defence of Miss Naden's Hylo-Idealism, I ought to have been following up the lines laid down by my own literary ancestor, chronicling the controversy between "Burghers" and "Anti-Burghers," or dwelling upon the province of the civil magistrate in matters pertaining to religion!

There is an exalted condition of the human mind—a kind of second-sight, but without trace of mental alienation—occurring only in minds of the highest type, from which there is no possibility of return to earlier stages of belief; a union, for the most part, of advanced knowledge, blended with settled conviction, which permits of no retrogression to former persuasions, hallowed as these may be, by association.

In such cases, at the last moment, the "world scheme" has long ago been elaborated—be it Auto-cosmic, Pantheistic or what not. At such a crisis, even to be "sad" would argue life-earned knowledge false, in favour of a sentiment, a weakness, or to admit an adverse argument true, at a moment when the mental powers are unfit to decide for or against.

I now pass to Dr. Dale's brief reference to Hylo-Idealism. He disclaims a complete exposition of the system, on the ground that he has been "unable to think himself into the position of the Hylo-Idealists."* But he gives what he calls the two *initial* positions from which the theory rises, and calls these "familiar ground" and "well known to all students of philosophy." If so, I need not occupy any space in quoting them here. "Up to this point," he continues, "the theory is intelligible; it looks like an old friend in a new dress." But, when passing from the "familiar" to what Dr. Dale evidently believes to be the enchanted ground, he admits "It is just here that I lose the path."† This is to be deplored, but is not at all extraordinary, since it is evident that he has never been on "the path" at all. The two initial positions, which he so confidently starts with, are not necessarily those of Hylo-Idealism. At least Miss Naden's literary executor and I fail to recognize them as such. Miss Naden herself would have been the first to question Dr. Dale's dictum that "a relation is the synthesis of two terms and that, if either of the terms is suppressed, there is no relation." Dr. Dale is really arguing, not against Hylo-Idealism, but against the views of the Neo-Kantian School, as expounded by the late Prof. T. H. Green, of Oxford, and his French colleagues. In a recent volume by Prof. Veitch, of Glasgow ("Knowing and Being": *Blackwood*), the whole question of Relation is discussed in all its bearings. The Scottish professor assails the Neo-Kantian theorists especially Prof. Green. Miss Naden in her Prize Essay, "Induction and Deduction," did indeed end her list of ex-

* *C. R.* p. 520. † *C. R.* p. 521.

amined authorities with Thomas Hill Green, as undoubtedly as she commenced it with Thales, but she rises higher than Green, and her world-scheme is wholly unlike his, ending as the latter does in an Infinite Consciousness. If, again, the Neo-Kantian systems of MM. Renouvier and Pillon be examined, Relation will be found to be "all and everything—the Term nothing." It is possible to reach Hylo-Idealism from the Kantian category thus universalized. This path has been followed up by the present writer, in an article entitled "*Positive Idealism*," published last autumn in "*The Open Court*," an able weekly, edited, in Chicago, by his friend Dr. Paul Carus. In fine, on this topic, considering my contemplated preface to the volume already alluded to, I may state that Hylo-Ideal Monism does *not* pass from cerebral conception to an objective world, as Dr. Dale would have it, but subjectives the objective by immersion in the subject-self. Each one of us makes his own world, inalienably—a feat impossible vicariously. He is the Relator of a world built of Relation. Without a Relator the whole fabric of Relation instantly falls. There is not even a "tiny sand-grain" left,* though, in the imaginative paper by M. Camille Flammarion, in the April number of the *Contemporary*, this supreme fact is ignored, in the interest, I presume, of dramatic effect. Physiologically almost every modern discovery, especially in the department of Optics, tells in favour of Hylo-Idealism. Practically, for each one of us, all things are spectral; yet absolutely real and true for all that. The inward and backward pointing of the rods and cones of the retina, the essential factors in vision, the modern rationale of the inverted image on the retina (see Dr. Cleland's "Manual of Physiology," *Glasgow: Collins*), the explanation of the phosphène, that luminous circle which can be made visible by pressure on the surface of the retina in darkness—apparently distant several feet from

* Why does Dr. Dale, in quoting from "The Pantheist's Dream of Immortality," put "long sand grasses" for "tiny sand-grains"—in the last line of the penultimate verse?

the subject, whereas the point of retinal irritation is immediate—these, taken together with experiments long ago made by Cheselden on the congenitally blind patient, couched for double cataract, all go to prove that not only the "distance," but the apparent objectivity, of the material world is simply an acquired sense, and that its separateness or "outsidedness" is but an illusion—and near and far quite indifferent. This is "the path" which Dr. Dale ought to have followed—not that more tangled one which he admits he has "lost awhile."

Dr. Dale says that his childish visitor promised to write him a Treatise on the "Absolute and Unconditioned," and that she *remembered* her promise ten or eleven years later.* Perhaps so, but it was never written. Her essay on "Induction and Deduction" did not fulfil the conditions. Nor did her facing "the Eternal problem of human thought" mean with her, in 1887, what it probably did in Dr. Dale's mind. For what with her, in her latter years, was that eternal problem? Not the question of "The Absolute and Unconditioned"—not "Man, whence and whither?" but that older two-fold riddle, "What is, and what do I know?" But that riddle lay open to her as already read, for in the thought system which was her very life, Knowing and Being, "think" and "thing," are *one*, being unified in the individual self.

The reason which Dr. Dale assigns for not expounding the System of Hylo-Idealism is somewhat striking. He has been "unable to think himself into the position of the Hylo-Idealists." Unquestionably, however, he is so far acquainted with the position of the Neo-Kantian School. Now one of the prime tenets of the Neo-Kantians is, that to *know* anything *thoroughly* you must *be that thing*. To know any person through and through you must be that person. So that Dr. Dale, after thoroughly probing Hylo-Idealism, would be a Hylo-Idealist! Is it in dread of this conclusion that he has not thoroughly read-up Miss Naden's published

* *C. R.* p. 511.

writings? Had he done so, he would, at least, have understood how impossible on her part was any return to Poetry and The Absolute.

All that now remains for me (pending the appearance of Miss Naden's remaining Essays) is to venture to assign her place among women of letters. I shall endeavour to justify my verdict in the Introduction to the forthcoming volume. To attempt to do so here would occupy too much space. I estimate her personality as a whole, her philosophical researches, her scientific studies, her poetry, her brief but brilliant career, her social work and worth. Dr. Dale helps me, with a hint, to decide in what form to put my verdict. He is speaking of the influence of Lord Tennyson and Robert Browning upon her thought and style. He disclaims any trace of Browning, and learns, from one of her friends, that she had an "intense admiration" for the Laureate's "Dream of Fair Women."* Now, supposing this to be the case, there is a line in one of the songs in "Maud" which exactly conveys my verdict. I quote it without hesitation:—

"None like her, none!"

Her rich and varied gifts summed up, no woman of mark in all literature has ever been so calmly puissant as a pure scientific thinker. She is beyond all feminine competition or comparison. Before completing her thirty-second year, when she died, she was the crown and perfect flower of intellectual womanhood.

I conclude by earnestly disclaiming any discourteous intent towards Dr. Dale, for whom, as a public character and accomplished writer, I have the greatest respect. In this article I have simply endeavoured to follow his remarks,

* I wonder what lines of that poem struck her most forcibly? Was it the Vision of Jephthah's Daughter?

"Moreover it is written that my race
"Smote Ammon, hip and thigh, from Aroer
"Until thou come to Minnith. Here her face
"Glowed as I looked at her—."

in the interest of strict accuracy, and out of regard for the memory of her whose loss we mutually deplore.

"She died too soon" is Dr. Dale's closing lament. What shall mine be? Not my own halting phrase for that would be unworthy. Let me simply re-echo that most pathetic wail in all literature:—

"O! the pity of it: the pity of it!"

GEORGE M. MCCRIE.

III.

HYLO-PHENOMENALISM THE SUMMA SCIENTIÆ.*

"*Cælum ipsum petimus scientia.*"

I VENTURE to claim, in the interest of science and philosophy, a small space in your journal for a few brief remarks in further elucidation and development of some recent contributions to your pages by "C. N." under the title of "Hylozoism, or Materialism, as Opposed to Animism (Spiritualism)." Without further preamble, let me state that the Hylozoic theorem of life and the world may be formulated as the utter and self-evident impossibility, in the nature of things, to transcend or escape in any way from the limits of our own anatomy, of our own conscious Ego, the Non-Ego—or, falsely so called, "external universe"—being but the objective or projective image of our own egoity, not the *vera effigies*, or absolute substance, of any "thing" external to self—in other words, that all "things," or entities, or non-entities, abstract or concrete, from Divinity downwards, are merely ideal or phenomenal imagery of our own mind, the essential physical basis, proplasm, or *officina* of which is the vesiculo-neurine or grey tissue of the hemispherical ganglia; that, in still more concise terms, Being is perception and conception (ideation), which, apparently two abstractions, are virtually one—the function, namely, of a somatic organism, itself *fons et origo* of all cognition. On this view of nature and mind I trust your enlightened readers will be enabled to realize without difficulty, as a self-evident fact and principle, my corollary, that the only "world spirit," or "*anima mundi*," accessible to us is the animal life on the earth, and, in the last analysis, our own consciousness, by which we alone feel, "we live, move, and have our being," or, in less mystic phraseology, are cognisant of motion and sensation. So that no objection can be valid against Hylo-Idealism on the score of any contradiction between determinism or necessity and self-determinism or free will, the seemingly two being really—*i. e.* ideally, or phenomenally, or relatively—identical, the "Absolute" being to man an inaccessible *terra incognita*. Let me illustrate this reconciliation still further by quoting a fallacy embodied in a couplet of Pope's "Universal Prayer:"—

> "And, binding nature fast in fate,
> Left free the human will."

Surely it is clear and *self-evident*, on this theorem of Hylo-Idealism,—the sole legitimate creed, as I contend, of modern physics, physiology

* This brief paper originally appeared in the *Journal of Science*, a number of years since, from which it is reprinted here by the courteous permission of the editor.

and pathology,—that, though fate or natural law present itself to our conscious Ego in the domain of cosmical order "as if" rigidly immutable and inexorable, yet, as this law, which includes gravitation, or the self-activity of matter, is one with the law of *our own* organisation—is, indeed, as Mr. Ward ably shows in your January issue, a purely mental abstraction, not an actual force, in "nature," as vulgar realism conceives it,* and thus only a figment and imaginary or esoteric enactment of our own brain—the much-vexed question of free will and necessity resolves itself into a skiamachy or fight of shadows. I find this view a perfect *eirenicon* on the momentous question of free will and human responsibility to any power other than self. "We *must* must;" but compulsion there is none, since it is a law of our own nature, and is thus transformed into the law of perfect liberty.

Exact science has been justly defined by some of its most competent contemporary authorities as "*only*" reasoned-out common sense. Surely all speculation which cannot be brought to that test is condemned as anarchic by sound reason, acknowledged by the ablest apologist of Animism and Christianity, Bishop Butler, to be the plenipotent judge even of "divine revelation" itself.† Certainly modern Nosology has satisfactorily identified all "sacred" and "profane" manifestations of Animism—or spiritology, as it was called by Guiteau (assassin of the late President Garfield), the latest pretender to "divine inspiration"—with quite ordinary symptoms of disordered cerebration, "familiar as household words" to every clinical tyro, especially in the department of alienistic medicine. I need hardly add that this vital and physical thesis quite excludes all trustworthy knowledge as to any power of an Animistic kind "behind," or "above, or "beyond," or "beside" nature, whose *officina* and *artifex* is brain, leaving us in the state of quite satisfactory Agnosticism implied in the maxim, "*Ne sutor ultra crepidam.*"

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* Mr. Ward's precise words, in his letter entitled, "Professor Ball's Glimpses through the Corridors of Time," are: "The Professor obviously believes that gravitation is an absolute force in nature, and not, as Newton taught, a purely abstract [*i. e.* ideal or hylo-phenomenal] conception of the laws or principles of motion." I may mention that Professor Tyndall takes the same absolutely real view as the distinguished Astronomer Royal of Ireland, and rejects the theory of hylo-phenomenalism, or nineteenth century nominalism (see M. Littré's Dictionnaire), as a quite visionary *schwindel* and wild mental aberration unworthy of scientific notice.

† And yet Bishop Butler's "Analogy" is now seen to be quite an immoral Apology for Religion. It attempts to make one white out of two blacks. It solves the latter only by blackening "Nature," which in a theist is the climax of profanity and irreligion, as "blasphemy" towards Nature's putative Author.

The very keystone of Hylo-Phenomenalism is the impossibility and supererogation of affirmation or negation in regard to *any* phenomena outside the subjective universe of self, our only and all-sufficing "final or great first cause." The whole universe of things and thought is thus only an automorphosis, each Ego being to itself, as Protagoras postulated, the measure and standard of all existing things, of all thought and objects of thought whatsoever, and actual altruism being what the Brahmans, in their pre-historic ontology, term *mâyâ* or illusion. The animistic or spiritual heresy, of which Christianity is a variety, is thus relegated into the domain of mysticism, defined in the last (eighth) edition of the *Encyclopædia Britannica* "as that form of error, whether in religion or philosophy, *which mistakes the operation of a merely human faculty* [or organic function—the italics are mine] *for divine* [or any more subordinate animistic] *manifestations.*" On the above *data* Spiritualism or Ghostism has no validity whatsoever—dual Animism being resolved into Monistic Brain-ism or Neo-Materialism.

ROBERT LEWINS, M.D.

IV.

HYLO-IDEALISM; OR, THE EGOISTIC THEOREM OF MIND AND MATTER.

"Myth gave Nature life; the schoolmen and "ologies" slew her.
Reason again shall restore fulness of life to the corse."

SCHILLER'S *Three Ages of Nature.*

IN the little I have hitherto written for the public on this plenipotent *syntaxis vitæ et mundi*,—not judging the typical John Bull to be a very fitting confidante, in his present mental stage, or social or moral temper, for such an evangel,—it has ever been my anxious desire to convey to others my own unaffected sense of the excessive, quite germinal, and rudimentary simplicity and self-evidential naïveté of this generalization. Though familiar to myself for quite a lifetime,—all its data and their inferences having been excogitated into an entelechy when a young assistant surgeon, during convalescence from illness contracted in the Deccan in the early years of my military service,—the result seemed so commonplace a truism and foregone conclusion as the immemorial dictate of the instinctive human understanding and of scientific medicine, the "theology of Materialism,"* that during the more vivid and

* Medicine is so characterized by Lange in his *History of Materialism*, and Descartes states "that if it be possible to perfect [rationalize] mankind, it can only be by means of the medical sciences."

active portion of my life I felt it hardly worth literary exposition. Even now, when years have brought the "sad experience" of the philosophic mind,—dregs of the ample and overflowing, but not exhaustless, cornucopia of individual vitality, which brings home to us the fact that simple truth is only discovered after exhausting all possible complications,—and with health and spirit verging to zero, I have no little difficulty in preserving my gravity while seriously addressing myself to handle a topic which, from my standpoint, seems, on its very face, as clear and self-manifest as the meridian sun in a cloudless sky. For by Hylo-Idealism I mean nothing else than a less ambiguous and self-explanatory form of the term "Psychology"—a term first introduced into philosophy by Wolff about a century and a half ago, and which now, under that name, and in all past ages under other cognate names, has been, and now is, the accredited creed of all rational human knowledge, in contradistinction to the occult and morbid mysticism of ontology or metaphysics. Psychology is defined by Sir W. Hamilton as "the science conversant with the phenomena of the mind, or conscious subject, or self, or Ego"; ontology, by Littré, in his monumental French dictionary, as—"1st, Theory of being; science of being—that is, generally [*en général*] the synonym of metaphysics. 2nd, In medicine the doctrine which, opposed to the physiological one [Psychology], does not link (*ne rattache pas*) pathological phenomena to those of the phenomena of normal life (*aux phénomènes reguliers de la vie*)." Psychology is thus relative and phenomenal, the doctrine of life (biology or physiology) and *human* knowledge, beginning and ending as anthropomorphosis, and automorphosis, which is quite one with Hylo-Idealism, the notional or cerebral theory of mind and matter. By it *things* become *thinks*, or sense objects,* and nature is revealed as the creature—not separate from and independent—of the mind, which, in its turn, is no immaterial principle or entity, but only the function or symptom of brain—asymtote of which organism mind has no *locus standi* whatever.†

Ontology, on the other hand, is the doctrine of Absolute Being, with which, as occult mysticism and quite out of the range of human cognition, man can have no concern, and from which, it seems perfectly clear, right season and true science, which only deal with the knowable, are quite divorced. And yet, simple to the verge of fatuity as is this standpoint, it seems competent with an ease and certainty I look in vain for elsewhere, to reduce to a *reductio ad absurdum* all spiritual or

* See the chapter in Lange's *History of Materialism* on the "World as Representation" (Vorstellung).

† In Medicine symptoms are the synonyms for phenomena. They can always be traced to their source in an organ, and are intensified, diminished, modified, or removed, by acting on the organ affected. In no case can they be isolated and dealt with *per se*.

supernatural religion—the blight and bane of individual and social life, which, so long as it plays a practical *rôle* in the world, must entirely proscribe Freethought and humanity's sovereign good, right reason—the two principles being mutually exclusive, so that where religion is reason cannot be, and where reason is religion cannot come. For the relativity of psychology, or biology, or Hylo-Idealism, rigidly confines each sentient being to the limits of its own Egoity,* the transcendence of which to Deity is utterly impossible, all concrete objects being *subjectived* before cognition, and all abstract ones, including the God idea, being notional concepts of the mind itself. So that, in worshipping a *pseudo*-external or objective Deity, we are only indulging a Narcissus-like contemplation, thus wasting prayer and praise on an idol or fetish, or mental image of self. Since all objects are thus automorphoses, Deity or the Divine Ideal must be also, as Luther, in a lucid interval, allows: "A blank sheet on which nothing is found but what we have ourselves written," and which the Thirty-Nine Articles of the English Church transform into a *nonentity* by the definition of a "Being without parts or passions." So that, as far as human thought can reach, man himself to man, and within that circle each Ego to itself, *must* be the measure and proplasm of the universe, Absolute Being having no basis whatever in reality. I find, in all essentials, the nominalism or heterodox scholasticism of the Middle Ages—at least in its later and more mature form of conceptualism—as developed by Peter Abelard and William Occam (a native of Ockham, in Surrey), the "infallible Doctor," as opposed to realism, the orthodox school of philosophy, hardly distinguishable from Hylo-Idealism. At all events, it seems perfectly clear that, as now mirrored in modern thought, the objective can have no other than a relative existence, being thus *solidaire* with the subjective. This is only, in other words, formulating the *solidarité* of the Ego and Non-Ego, as psychosis is now diagnosed by medico-psychological symptomatology as vesiculo-neurosis in activity, thus unifying Hylo-Idealism and Materialism, and demonstrating the identity of so-called spirit or *anima* and idea.†

Let me, in conclusion, make two quotations in support of the thesis that the Ego and Non-Ego are consubstantial, from two competent

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* Surely this centering of self in self must be seen to be the sole *just and equitable* arrangement, the rival theory of a God centre being anomalous and unjust.

† It will be observed that, in the Revised Version of the New Testament, the term *soul*, which is Anglo-Saxon for *life*, is usually expressed by the latter word. *Spirit* is, etymologically, only *breath*, as indeed, all "immaterial" terms, as Pneuma, Psyche, Anima, etc., have primarily a materialistic signification.

authorities of entirely different schools—the first being the late Mr. Carlyle, a genius of the most penetrative order, though vitiated by his inability to free his mind from the churlish cross-grained narrowness of the peasant, and from the cant of Scotch divinity: the second Mr. Lloyd Morgan, F.G.S., a mind of quite a different stamp, trained in, but not fanaticized by, the vulgar realism of scientism, which in all ages,—that of Kepler, Galileo, and Newton not excepted,—but never more than in our present high-pressure one, by its exclusive devotion to specialism, quite diverts the minds of its experts from general ideas and all adequate reflection on the real problems of human life and destiny. Only in Philistine England does natural science receive the appellation of philosophy. Grand as are its triumphs in its own exoteric sphere, physics, the second philosophy of Aristotle, leaves untouched all the esoteric problems of humanity, its confessed limits being the point where matter and motion merge in consciousness or emotion. *Savants* are thus only proselytes of the gate. The inner sanctuary of the temple is to their profane footsteps forbidden ground. Mere physical knowledge, to use a familiar illustration, is like the tragedy of *Hamlet*, with the part of the Prince of Denmark omitted from the programme. To them Sir W. Hamilton's aphorism, "In nature there is [to himself] nothing great but man; in man there is nothing great but mind," which physical research professes utterly to ignore, must be thoroughly alien.

Mr. Carlyle thus writes in substantial agreement with the arguments advocated in this paper (*Sartor Resartus*, book i, chapter viii., quoting Goethe in support of his positions): "Think well. Thou, too, wilt find that space is but a mode of our human sense. There *is* no space and no time. [He might have added, with Thales, no death, since Hylo-Zoism is an established fact of human knowledge, even on the low basis of natural science realism, since the union of organic and inorganic chemistry.] We are we know not what: light sparkles floating in the ether of Deity. [Rather phantoms or shadows in the creative consciousness of Egoity.] So that this so solid seeming earth, after all, were [is] but an air image, our me the only reality; and nature, with its thousandfold production and destruction, but the reflex of our own inward force, the phantasy of our dream; or what the earth-spirit in 'Faust' names it—*the living, visible garment of God.*" Surely only integument of Egoity, on his own showing, if the world be but the reflex of our inward force, inseparably one with all outward force. He then quotes a passage from Goethe's *Faust*, and asks: "Of twenty millions that have read and spouted this thunder-speech of the *Erdgeist*, are there yet twenty units of us that have learned the meaning thereof?"*

* Miss Naden's German Poem, *Das Ideal*, in *Songs and Sonnets of*

Mr. L. Morgan's recent suggestive *Handbook of Water*,* *and its Teachings in Chemistry, Physics, and Physiography*, after dealing with his subject for two hundred and eleven pages, in the spirit of special science and vulgar realism, ends on the two hundred and twelfth with (*inter alia*) the following hylo-ideal axioms: "In like manner all our knowledge of water [for which chemical compound we may substitute any other 'object,' or the 'objective' universe itself] is obtained through our sense of sight, touch, etc. When water [or the objective] in any way affects these senses, it gives rise to states of consciousness. These are not material like the water [or macrocosm.] These immaterial [phenomenal] states of consciousness are symbols for that material [object] we call water [or the sum-total of objects.] It must be remembered [all] our knowledge is a knowledge of these symbols [emblems or sense imagery]. In other words, that all that has been said in the above notes applies to water [or whole objective universe], as it appears to you and me"—*i.e.* as a cerebral spectrum or apparition. These axioms are a quite unequivocal confession of faith in the hylo-phenomenal and relative theory of the world, and an abjuration of the vulgar realism which sees in objects the real things themselves. Before closing this outline, let me also allude to a recent testimony of the editor of the *Lancet*, quoted in the *Journal of Science*, to the truth of this theory—"that to the intelligent student of the medical sciences Idealism [which must be relative, not absolute; hyloic, not animistic] supplies the key that unlocks a [this whole] world of mystery."

ROBERT LEWINS, M.D.

Springtime, enunciates very clearly this unity of Nature and Mind, in the fine couplets:

"Denn was bist Du [Natur], als nur das Wiederhallen
Vom alten Seelen-klang." *And again:*
"Nur in des Menschen Seele wird geboren
Das Erd-und Himmelreich."

* I have always felt that Mr. Faraday's demonstration, that in every drop of water is locked up as much electricity as forms a considerable thunderclap, infuses into life a new terror unknown to earlier generations. From it, as from other appalling horrors of science, there is no escape but in the poetic or hylo-ideal (symbolic) interpretation of "things," which makes the sentient Ego the World-God, "Lord over Nature, Lord of the visible earth, Lord of the senses five," the former because the latter. It will be remembered that our bodies are composed of more than two-thirds of water, which also forms 795 and 789 parts respectively in 1000 of our blood and brain. Only in the free realm of the Ideal can we, in the Apostle's phrase, be "delivered from the body of this death," so fearfully and wonderfully interwoven with the infinite and eternal tissue of the macrocosm.

V.

HYLO-IDEALISM.*

"It is reflecting Reason that brought design [and Designer] into the world, and admires a wonder created by itself."—*Kant.*

Is there an objective world? and if so, how do we know it? have been crucial questions of thinking minds—postulated *distinctly* by philosophy—at least from the days of Protagoras, not to mention earlier Greek and Oriental speculations. Of course, the ordinary vulgar "common-sense" answer, "I can see it, can feel it," is no answer at all. Dr. Johnson, among other foolish things which he did and said, kicked a stone, and thought he had proved thereby its absolute objective existence; but what did he really prove? Certainly not that he saw the stone itself which he kicked, assuredly not its absolute objectivity. All he proved was this: that he himself did something, and this act of his own self-hood produced a certain sensation on his brain. It was his own act, entirely and throughout, of which he was conscious, *voilà tout.* His own sensations, created or rendered active by his act, constituted the sum and substance of all he knew about the matter. You sit at a table to write, and say there must be an objective table, because you write on it. But what is the real fact? Is not the whole object *in* yourself? The resistance offered is not the table; the sound produced by a knock is not the table; the form imaged on the retina of the eye is not the table; the colour is not the table; the use you put it to is not the table; nor are all of these combined an absolute objective entity. There is, in fact, only this: a creation of your own brain, an active movement of your own nerves of which you feel conscious: no more. But, you persist, you *see* the table, and it must be there. Not very satisfactory evidence, I suspect; for, if you come nearer and nearer, the table will grow larger and larger; if you retire farther and farther away, the table will grow smaller and smaller; if you shut your eyes, it will cease to be cognizable altogether; if the eye is diseased, it may appear quite another thing; if the "mind" is abnormal or undeveloped, it may be anything whatsoever, as a rag to an idiot appears an imperial robe, a paper cap to a child may appear to be a soldier's helmet, or a few pieces of stick a railway train. But you can touch it and feel it, you say. Touch what? Feel what? You feel that you yourself have done something, and that this act of yours has produced on your

* Reprinted from the Appendix to the original edition of "What is Religion?" by kind permission of the writer. The annotations are by Dr. Lewins.—Ed.

own brain a certain effect. All, therefore, that is proved is simply this, that you had, at a given time, a brain capable of sensations, and that these sensations may be excited by something you yourself have done. Suppose, instead of "kicking the stone," the stone had been thrown at our realistic Doctor from behind. How would this affect the question? Simply thus: the Doctor feels that he is hurt, and attributes this hurt to a stone. But he may be quite wrong. Some diseases will produce the effect of a sudden blow; the "objective missile" might not have been a stone at all, but something else. All, therefore, that he knows in this case is, that he feels a hurt; the rest is mere conjecture.

Every one will allow that our thoughts or ideas (mental conceptions) are from the brain; our sense of feeling, hearing, seeing, smelling, all of which are only modes of tact or touch—(perception of concrete objects)—is self-evidently the creation of the self-same organ. In some cases an impression is produced on the brain by one or more of the five senses, and this brain-impression we term an objective sensation. Sometimes it is produced wholly by a thought-recall, without the intervention of any of the five senses, and then we call it memory or recollection. Sometimes it is produced quite unconsciously, without any effort of the senses or the thought, and then we call it dream. Sometimes it is produced by brain-lesion, and then we call it diseased imagination. In every case the whole conception is *within* us, and these different modes of conception differ only as the organs employed to act on the brain differ, or the state of the brain is sound or unsound. All is in the head, and give the fancy what play you will; without that "head and its machinery," all would be nothing, or "less than nothing, and vanity." Here, then, we see the truth and force of the axiom of Protagoras: "Man is the measure of the universe." As man's mind expands, his universe enlarges; as his mind contracts, his universe grows smaller; as his mind is healthy or otherwise, the universe takes its shapes and colours. His mind is the "measure of the universe," and beyond that "measure" can no man reach, soar or sink. As it is material, it cannot but ignore immaterial "spirit"; as it is human, it can form no idea of the super-human. "Man is his own measure," and each man's universe must be measured by his own bushel. Between Protagoras and Professor Tyndall is a lapse of 2,360 years, yet we find again the same utterance: "The material universe is but the complement of man's intellect." Now the complement of anything is not something distinct and isolated, but an integral part of the same, that part without which it is incomplete, but which, being added, makes it complete. The conceptions of the intellect *alone* are absolute idealism, the conceptions of the intellect *complemented* are Hylo-Idealism.* One is mere

* Professor Tyndall has been unable hitherto to distinguish between Absolute Idealism and Hylo-Idealism.—R. L.

dream or unreal thought,* the other is substantive ideality. One is the cask without the wine, the other is the cask with its complemental contents; not a very perfect simile, but let it pass. The Roman Catholic dogma of transubstantiation comes nearer; the bread is the "idea," the added Christ the "complement." The added Christ could not be found in the wafer; there is no blood there, no bone there, no substance whatever except bread; but the communicants create (by *ideating*) their deity, and the bread then contains their ideal creation. Even Catholics themselves teach their communicants that what Protestants call bread and wine in the eucharist are only logical "accidents" —that is, creations of the five senses, and that the ideal only is to each partaker the reality. To one man his god, to another his damnation, according to the mould of his own mind. You might analyze man's brain, but you would find there no trees, no tables, no stones, no houses; only the bread-stuff or brain-stuff; but what then? If the brain creates the substantive idea of these things, they are substantively there, as the human-deity in the bread. What Professor Tyndall calls "the complement of man's intellect," Sir William Hamilton terms "the phenomena of mind," and Goethe, in his *Faust*, speaking of Deity, makes the world-spirit (Weltgeist) declare:

> "Thus at the roaring loom of Time I ply,
> And weave the garment [*i. e.* "creation" or cosmos of Ego and Non-Ego] that thou seest Him by."

In other words, the mind makes what is called creation; and creation is

* No one illustrates this contrast between reality and unreality better than "lofty Newton" himself, whose theological and *quasi* philosophical writings are fatuous in the extreme. I recall vividly the shock of disillusion and perplexity their *attempted* perusal inflicted in early life. The lines in the *Dunciad*, "Mad Mathesis alone was unconfined," and much of the satire in Swift's flying island in Gulliver refer to the *foibles* of Newton and the Royal Society. For the same anomaly is common among minds of this class—giants, as Napoleon said of Laplace in mathematics and physics, pigmies outside that line. Sir D. Brewster is another instance. More than half his biography of the discoverer of universal gravitation is unreadable from the most irrational drivel. Swedenborg is another case in point. *Et sic de multis aliis.* Mr. Faraday's religious outpourings in his Sandemanian conventicle are credibly reported to have been extravagantly wild and incoherent beyond belief in our age. Such is mortal frailty even in such exalted forms. *Chacun a les défauts de ses qualités.* Hero-worship is not less senseless than immoral. It quite subordinates every *growing* truth to Tradition and Authority. And, as its great apostle, Mr. Carlyle, says, Religion itself is only Hero-worship.—R. L.

all that man can know of Deity. Creation "God's garment," is woven by the mind of man, and all we know or can know of Deity, is this "garment" woven in the loom of man's brain. This "garment" Sir William Hamilton calls the "phenomena of mind;" Professor Tyndall calls it "the complement of man's intellect;" and Protagoras, the "measure" thereof; the fulness being commensurate with the grasp of the intellect employed on the contemplation. Dr. Lewins calls "things" *thinks*, phenomenal "thinks," complemental "thinks;" but not absolute objects. They are phenomena of mind or brain, having for us no status *per se*, or out of the brain, and no immutable existence, being subject to change according to the fancies of the mind. Macbeth's air dagger was, to him, for a time, as much an object as that which he drew. Both were to him daggers. In one case the subject was the object, and in the other the object the subject. Neither absolute but both relative to the man himself.* Brain objects, commensurate with the brain-creator; for no man can jump out of himself,—no man, even in thought, can get out of himself, or beyond himself; and hence the axiom, "Higher than oneself can no man think," for no man can measure beyond his measure, or in any way whatever transcend self. Each man can think his own thinkables, but beyond that measure of thought, can no man think. Well, if this is the case, and mind is only brain in action, of course the immaterial and superhuman are unthinkable. We allow that gods many have been thought out by man, and called spiritual, immaterial, superhuman, of different stuff to ourselves; but these are only words. Hence the ancient world had images of their gods, and no small portion of the modern would have also likenesses of what they call gods; but the very fact of a likeness, a representation, an image or picture, proves to demonstration that the brain-created deity is neither superhuman nor immaterial, except in name; for no one can think beyond himself, and as he himself is both human and material, beyond those limits mortals cannot pass even in thought. The Roman Catholics feel this, and provide accordingly a man deity, a woman deity, and a host of half-deities called saints, which show themselves from time to time to the "faithful." Their bodies are intrenchant, their powers superhuman; but this intrenchantness is only a super refinement of material subtilty,

* It must be steadily kept in mind—a fact too apt in discussion to be lost sight of—that Hylo-Idealism, which deals alone with the relative, ignoring the absolute as utterly beyond human *gnosis*, in no sense denies the objective, but only contends for *identity* of object and subject, proved as it is by natural Realism itself from the doctrine of *molecular metamorphosis*, which shows the Ego continually undergoing transubstantiation with the Non-Ego, and *vice versâ*, so as to form *one* indivisible organism. Selfism is thus not Acosmism but Egoism *plus* Cosmism.—R. L.

and these superhuman powers are only imaginary extensions of human forces—or multiples, or rather algebraic powers carried to the indefinite $a \times 1$ of a known quantity; the $a \times 1$ of man's life, the $a \times 1$ of man's power, the $a \times 1$ of man's knowledge, the $a \times 1$ of man's material subtility; and beyond this no man can think. Refine as you will, the mind cannot think of a personality without a shape; an eternity without beginning or end; a space without a limit. It is true that the mind can leap beyond any definite boundary, but that is nothing foreign to daily experience; nay, rather it is in exact accordance therewith, for every upper has an under, every up-to must have a beyond; a mathematical point, line, or superficies, is unthinkable. We can only think of the surface of something, the boundaries of which are lines, and the extremities of these lines points; but these are inseparable from the substantive article, inasmuch as, however fine our superficies, it must have an upper and an under surface; however delicate our line, it must have breadth and thickness as well as length; however minute our point, it must be possessed of length, breadth and thickness too. The utmost that can be done is to refine: the more delicate the mind, the greater its capacity of refining. The gross negro has his mumbo-jumbo; the more cultivated Asiatic has his Brahma or Buddha; the European has his Father, Son and Holy Ghost, his Virgin Mary, and his saints; but all these are only according to the measure of the intellect; "phenomena of the mind," "complements," or the highest reaches of the thinker's thought, subtilizations of intellect. No man can think of anything foreign to his material nature, for beyond oneself thought can never go. Matter and Force or Function is thus the sum and substance of human cognition.

Dr. Lewins says, in accordance with these remarks, that "Hylo-Idealism rigidly confines each sentient being to the limits of its own Egoity." Just so. How can it be otherwise? And he goes on to say, in a note, self must be the centre; for the theory of God being the centre is wholly untenable. Certainly. For if God were the centre, and that God were *Spirit* only, how could matter come out of spirit?* Man must be centre, and man's god, from the *relativity* of all human *gnosis* can only be the creature, "the Narcissus-like reflection of man himself." The multiplication of power may increase power, and the multiplication of knowledge may increase wisdom, even to an indefinite degree: but no multiplication, division, or subtraction of spirit will make matter, no modification of a superhuman deity will make man.

E. Cobham Brewer, LL.D.

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* The interaction of "Spirit" and Matter seems logically utterly unthinkable.—R. L.

VI.

MR. DARWIN AND PROFESSOR HAECKEL.*

Sir,—May I hope that you will not object to insert in an early number of *Knowledge* the following respectful remonstrance and explanation with reference to your remarks of November 10th on the letter of June 5th, 1879, written by the late Mr. Charles Darwin, in answer to Baron Mengden, as recently published by Professor Haeckel of Jena?

These remarks, to which I beg to direct your attention and that of your readers, are the following:—"One scarcely knows which most to wonder at—the impertinent curiosity which elicited the letter, or the bad taste which led to its publication. If we were not assured that every reader of *Knowledge* has already seen the letter, we should not now publish the correct form; for a man's views on such matters are no concern of others, unless he himself chooses to publish them."

Surely, sir, on mature reflection, you will be inclined to modify this harsh judgment, and to ascribe the letter of the Baron to far other motives than those of impertinent curiosity. The feelings which dictated his appeal to Mr. Darwin were self-evidently those of an "anxious inquirer" seeking an authoritative solution of perplexity and doubt. Natural science—in its very inception sceptical—has necessarily the most unsettling effect on minds educated in the vulgar "Creed of Christendom" and in a belief of supernatural revelation. And in this age of unfaith or scepticism it seems as natural and becoming to consult scientific hierophants, like Mr. Darwin, on matters which now constitute the burning problem, both in speculation and politics, of our epoch, as it was in the *pre-scientific* "Ages of Faith" to sit at the feet of approved confessors of theology. "*Nullius in verba*," etc., is no doubt the perfect canon in scientific research; but this perfection cannot with justice be expected from an immature scientific tyro in his *Lehrjahre*, being a hard-won privilege of the matured *Meisterwürde*.

I feel quite satisfied that neither Baron Mengden nor Professor Haeckel was at all actuated by the unworthy motives with which you credit them; and such, I feel convinced, will be the all but general verdict of impartial public opinion in their favour.

Before concluding, I may, without violation of any confidence, mention that, both *viva voce* and in writing, Mr. Darwin was much less reticent to myself than in this letter to Jena. For, in answer to the direct question I felt myself justified, some years since, in addressing to

* Originally published in the *Journal of Science* of December 1882, with the exception of the last sentence and the *name* of Mr. Proctor's serial. It was ignored by the latter, as editor of *Knowledge*.

that immortal expert in biology, as to the bearing of his researches on the existence of an "*anima*" or "soul" in man, he distinctly stated that, in his opinion, a vital or "spiritual" principle apart from inherent somatic energy, had no more *locus standi* in the human than in the other races of the animal kingdom—a conclusion that seems a mere corollary of, or indeed a position tantamount with, his essential doctrine of human and bestial identity of nature and genesis.

The Descent theory, which brackets certain brutes with man in the class *Mammalia*, order *Primates*, is quite irreconcilable with the exceptional divinely inspired "living soul," and "special creation" of the human race recorded in Genesis, chap. ii, 7.—I am, etc.,

ROBERT LEWINS, M.D.

VII.

PROFESSOR HUXLEY ON ANIMISTIC HYPOTHESES.

[To the EDITOR of *Journal of Science.*]

SIR,—Perhaps in the interest of modern science—physical and medical—you could spare so much space as will enable me to direct attention to a fallacy involved in an assertion of Mr. Higgins in the "correspondence" columns of your last number. While traversing Professor Huxley's contention in a lecture before the late Medical Congress, that contemporary physiological science is antagonistic to animism [immaterialism or spiritualism], your learned correspondent holds "that in our modes of thought and expression we cannot help being animistic (anti-materialistic), and that in biology 'mimicry' cannot be expressed except in terms of animism."

But surely a little reflection will satisfy even Mr. Higgins himself that the very reverse is the case, and that we cannot express animistic ideas, except in terms of Hyloism (materialism)—the nomenclature of immaterialism being strictly materialistic. The very term *anima* itself, spirit, soul, god, ghost, psyche, pneuma, angel, heaven, and even idea (vision), have all primarily a materialistic and secular or physical and somatic derivation and signification. Vain are all our attempts to escape from the mechanism of our anatomy (or Ego)—a vanity which seems conclusively to answer Mr. Higgins' challenge to Professor Huxley, by giving mechanical (histological) *rationalia* for all *pseudo*-animistic phenomena.—I am, etc.,

Dec. 5, 1881. ROBERT LEWINS, M.D.

MISS NADEN'S ALLEGED INSENSIBILITY TO MUSIC.

Extract from a letter to Dr. LEWINS *from an early intimate friend of the former.*

"I agree with you that Dr. Lapworth does not do her full justice when he says that 'neither melody nor harmony had the slightest power to move Miss Naden.' I was always under the impression that grand music affected her *too* keenly. She once told me, after a visit to the Birmingham Festival, that the music had greatly saddened her, and had acted so powerfully on her feelings that she felt obliged to leave before the end of the performance. To use her own expression, 'she felt as if she must have a good cry.' I have never known any one appreciate more thoroughly *beauty* in all its forms A lovely sunset—a snow-clad mountain—a meandering river — when seen in her company, seemed doubly beautiful. More than once have we stopped in our walks to listen to the warbling of some sweet-noted bird. Paintings, statuary, fine architecture, were seen at their best when interpreted by her fine nature. Nothing attracted her more than a beautiful face, a graceful figure, or a majestic carriage. On the other hand, she was repelled by ugliness in all its forms as well as by a jarring note."

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A MEMOIR.

BY

WILLIAM R. HUGHES, F.L.S.

Late President of the Birmingham Natural History and Microscopical Society.

WITH AN INTRODUCTION BY

PROFESSOR LAPWORTH, LL.D., F.R.S.

AND ADDITIONS BY

PROFESSOR TILDEN, D.Sc., F.R.S.

AND

ROBERT LEWINS, M.D.

Army Medical Department.

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SOME OPINIONS OF THE PRESS.

"To Mr. Hughes who is responsible for the greater portion of its contents, much gratitude is due from all friends and admirers of Miss Naden, for the great and loving care which he has devoted to the task of writing a faithful and sympathetic sketch of her short but brilliant career."—*The Literary World.*

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"It is a marvellous record for a woman who died when she was barely thirty."—*Woman.*

"The strength of the impressions made by the late Constance Naden on her friends, is now further declared by the little volume of Memoirs put together by three or four of them * * * They serve perhaps better than any one sketch could do to tell how remarkable were Miss Naden's abilities; how deep was the sense of loss that fell at her death on all who knew her; and how lovable and estimable was the moral nature with which her rare mental powers were bound up."—*The National Reformer.*

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"Miss Naden was a lady of undoubted genius, not only as a poetess, but in the more abstruse paths of philosophy; and her early death at the age of 31 years, is a national loss. * * * Mr. Hughes is a loving as well as a talented chronicler of Miss Naden's life, and his scholarly attainments are well seen in this Memoir."—*Chatham and Rochester Times.*

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"This little work ['Induction and Deduction'] acquires a melancholy interest from the fact that the talented young authoress has not lived to see its publication. The title essay, on 'Induction and Deduction,' gained in 1887 the Heslop Memorial Medal, provided out of the proceeds of a bequest to the Mason's Science College of Birmingham by the late Dr. Heslop, and awarded annually by the Council of the College. It is clear, concise, well-arranged, and carefully thought out; and leads one to believe that, had the hand of Death been withheld, Miss Naden would have made valuable contributions to philosophic thought. For Miss Naden the fundamental principle in philosophy is the famous Protagorean formula of relativity, that 'Man is the measure of all things, of things that are that they are, and of things that are not that they are not.' She insists on the close inter-connection of induction and deduction in all reasoning, the two processes not being antagonistic but complementary. Both involve cognition and recognition; but whereas induction is a process of cognition involving recognitions, deduction is a process of recognition involving cognitions. The historical development is traced from the Greek cosmologists, through Plato, Aristotle, Bacon, Descartes and Locke, Mill, Jevons, and T. H. Green; and there are many signs that Miss Naden had not merely grasped but assimilated the teachings of those whose influence on the theory of reasoning she traced. . . . ."—Lloyd Morgan, Dean of Bristol University College, in *Nature.*

"Miss Naden's departure from this world has left a blank which it will

be hard to fill up. England and India both have reason to mourn her loss, as she has identified herself with all great movements in England, and was also thinking of doing something for this country in remembrance of her visit to the Indian peninsula. The prominent part she took in conjunction with Dr. G. Anderson, regarding medical aid to Indian women, endears her name to this country, and entitles her to our gratitude and respect. To her personal attributes, which were so brilliant and varied, it is difficult to do justice. As a real thinker, genuine debater, and eloquent speaker, she remains almost unrivalled amongst her own sex, and I cannot describe with what attention and admiration her friends met at 114, Park Street, on Saturdays, which was her home day, to listen to her brilliant conversation.—U. S. Misra, Barrister-at-Law." (*Extract from the Indian "Pioneer."*)

FINIS.

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