<table>
<thead>
<tr>
<th>Wt.</th>
<th>W. L.</th>
<th>Wt.</th>
<th>W. L.</th>
<th>Wt.</th>
<th>W. L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>029-307</td>
<td>4</td>
<td>0729-005</td>
<td>1</td>
<td>0699-012</td>
</tr>
<tr>
<td>3</td>
<td>0256-065</td>
<td>3</td>
<td>0759-035</td>
<td>1</td>
<td>0711-031</td>
</tr>
<tr>
<td>2</td>
<td>0347-988</td>
<td>S</td>
<td>0509-925</td>
<td>1</td>
<td>0417-903</td>
</tr>
<tr>
<td>S</td>
<td>0518-109</td>
<td>4</td>
<td>0702-876</td>
<td>1</td>
<td>0718-826</td>
</tr>
<tr>
<td>S</td>
<td>0757-830</td>
<td>5</td>
<td>0507-945</td>
<td>1</td>
<td>1106-134</td>
</tr>
<tr>
<td>8</td>
<td>0355-419</td>
<td>5</td>
<td>0727-379</td>
<td>2</td>
<td>0716-259</td>
</tr>
<tr>
<td>2</td>
<td>0639-658</td>
<td>2</td>
<td>0877-851</td>
<td>1</td>
<td>1144-001</td>
</tr>
<tr>
<td>5</td>
<td>0351-293</td>
<td>2</td>
<td>0857-807</td>
<td>4</td>
<td>1374-705</td>
</tr>
<tr>
<td>4</td>
<td>0358-834</td>
<td>4</td>
<td>0854-779</td>
<td>1</td>
<td>1190-805</td>
</tr>
<tr>
<td>2</td>
<td>0649-498</td>
<td>2</td>
<td>0441-178</td>
<td>1</td>
<td>0709-039</td>
</tr>
<tr>
<td>S</td>
<td>0303-194</td>
<td>2</td>
<td>0853-348</td>
<td>1</td>
<td>0793-192</td>
</tr>
<tr>
<td>2</td>
<td>0640-453</td>
<td>3</td>
<td>0657-324</td>
<td>1</td>
<td>0700-039</td>
</tr>
<tr>
<td>5</td>
<td>0481-163</td>
<td>3</td>
<td>0865-771</td>
<td>1</td>
<td>1119-282</td>
</tr>
<tr>
<td>6</td>
<td>0411-780</td>
<td>2</td>
<td>0874-123</td>
<td>2</td>
<td>0727-839</td>
</tr>
<tr>
<td>4</td>
<td>0392-163</td>
<td>4</td>
<td>0657-342</td>
<td>1</td>
<td>0725-896</td>
</tr>
<tr>
<td>1</td>
<td>0213-894</td>
<td>2</td>
<td>0675-679</td>
<td>1</td>
<td>1233-419</td>
</tr>
<tr>
<td>6</td>
<td>0339-503</td>
<td>2</td>
<td>0675-797</td>
<td>8</td>
<td>1262-002</td>
</tr>
<tr>
<td>5</td>
<td>0439-324</td>
<td>6</td>
<td>0859-102</td>
<td>8</td>
<td>1249-879</td>
</tr>
<tr>
<td>1d</td>
<td>0662-762</td>
<td>10</td>
<td>0858-992</td>
<td>2</td>
<td>1249-060</td>
</tr>
<tr>
<td>2</td>
<td>0471-065</td>
<td>6</td>
<td>0855-755</td>
<td>8</td>
<td>1247-959</td>
</tr>
<tr>
<td>2</td>
<td>0489-188</td>
<td>9</td>
<td>0886-998</td>
<td>1</td>
<td>1269-770</td>
</tr>
<tr>
<td>4</td>
<td>0482-601</td>
<td>1</td>
<td>0890-211</td>
<td>1</td>
<td>1265-510</td>
</tr>
<tr>
<td>5</td>
<td>0533-501</td>
<td>2</td>
<td>0871-701</td>
<td>2</td>
<td>1273-233</td>
</tr>
<tr>
<td>4</td>
<td>0356-107</td>
<td>2</td>
<td>0851-022</td>
<td>1</td>
<td>1275-500</td>
</tr>
<tr>
<td>2</td>
<td>0456-016</td>
<td>2</td>
<td>0806-281</td>
<td>1</td>
<td>1295-244</td>
</tr>
<tr>
<td>3</td>
<td>0565-216</td>
<td>4</td>
<td>0419-169</td>
<td>2</td>
<td>0706-631</td>
</tr>
<tr>
<td>5</td>
<td>0353-314</td>
<td>1</td>
<td>0423-186</td>
<td>2</td>
<td>0720-993</td>
</tr>
<tr>
<td>4</td>
<td>0252-410</td>
<td>4</td>
<td>0921-210</td>
<td>2</td>
<td>1104-302</td>
</tr>
<tr>
<td>2</td>
<td>0354-098</td>
<td>2d</td>
<td>0729-697</td>
<td>2</td>
<td>1131-878</td>
</tr>
<tr>
<td>2</td>
<td>0364-349</td>
<td>4</td>
<td>0747-685</td>
<td>1</td>
<td>1331-161</td>
</tr>
<tr>
<td>2</td>
<td>0427-758</td>
<td>4</td>
<td>0650-009</td>
<td>2</td>
<td>1358-324</td>
</tr>
<tr>
<td>S</td>
<td>0652-065*</td>
<td>4</td>
<td>0609-651</td>
<td>1</td>
<td>1412-574</td>
</tr>
<tr>
<td>S</td>
<td>0561-338</td>
<td>5</td>
<td>0687-137</td>
<td>2</td>
<td>1115-911</td>
</tr>
<tr>
<td>7</td>
<td>0509-360</td>
<td>5</td>
<td>0798-386</td>
<td>2</td>
<td>1165-238</td>
</tr>
<tr>
<td>2</td>
<td>0374-796</td>
<td>6</td>
<td>0896-735</td>
<td>1</td>
<td>1511-118</td>
</tr>
<tr>
<td>2d</td>
<td>0653-860</td>
<td>2</td>
<td>0600-712</td>
<td>2</td>
<td>1246-011</td>
</tr>
<tr>
<td>2</td>
<td>0397-275</td>
<td>3</td>
<td>0590-941</td>
<td>2</td>
<td>1555-170</td>
</tr>
<tr>
<td>6</td>
<td>0637-868</td>
<td>2</td>
<td>0896-360</td>
<td>1</td>
<td>1303-191</td>
</tr>
<tr>
<td>5</td>
<td>0341-010</td>
<td>2</td>
<td>0811-341</td>
<td>2</td>
<td>1062-439</td>
</tr>
<tr>
<td>S</td>
<td>0609-334</td>
<td>3</td>
<td>0913-253</td>
<td>2</td>
<td>1072-337</td>
</tr>
<tr>
<td>2</td>
<td>0633-298</td>
<td>3</td>
<td>0916-339</td>
<td>1</td>
<td>1027-239</td>
</tr>
<tr>
<td>6</td>
<td>0613-747</td>
<td>4</td>
<td>0216-916</td>
<td>1</td>
<td>0762-895</td>
</tr>
<tr>
<td>2</td>
<td>0650-101</td>
<td>S</td>
<td>0827-975</td>
<td>1</td>
<td>1055-328</td>
</tr>
<tr>
<td>6</td>
<td>0718-141</td>
<td>S</td>
<td>0917-650</td>
<td>1</td>
<td>0709-079</td>
</tr>
<tr>
<td>5</td>
<td>0386-710</td>
<td>S</td>
<td>0533-983</td>
<td>Id</td>
<td>1055-032</td>
</tr>
<tr>
<td>5</td>
<td>0356-202</td>
<td>2</td>
<td>0854-296</td>
<td>1d</td>
<td>0761-112</td>
</tr>
<tr>
<td>8</td>
<td>0711-132</td>
<td>8</td>
<td>0804-297</td>
<td>1d</td>
<td>0761-112</td>
</tr>
</tbody>
</table>

*Framboe's C.
†First line in what may be called the head of Framboe's B.
‡Single line between what may be called the head and tail of B.
§Edge of what may be called the head of A.
∥Single line between the head and tail of A.
SCIENCE AND IMMORTALITY.

The Christian Register Symposium.

EDITED AND REVISED

BY

SAMUEL J. BARKOFS.

BOSTON:

Geo. H. Ellis, 414 Franklin Street.

1892.

PREFACE

The major part of the discussion which follows was published in the Christian Register of April 1, 1892. It attracted wide attention, and a desire has been expressed to have the "symposium" in a more permanent form.

In preparing it for the present volume, the contributions have all been submitted to their authors for revision, and the work has been much enriched by additional contributions from Prof. A. Graham Bell, Gen. A. W. Greely, of the United States Signal Service, Prof. Joseph R. Cimit, of the University of California, Prof. H. B. Rowton, of Johns Hopkins University, and Prof. Edward C. Pickering of Harvard Observatory. These new contributions give a fresh literary to the book.

In the "Notes on the Testimony" following the symposium, the converging and diverging lines of doctrine are indicated.

Interest in the discussion will be increased by the biographical notes which follow; giving a brief outline of the scientific career of the writers of this volume.

S. J. B.
CONTENTS

1. CHARLES A. YOUNG ........................................ 10
2. J. H. DAVIS ........................................... 13
3. A. A. GLEIN ........................................... 14
4. J. W. LEFFIE ........................................... 15
5. WILLIAM N. MELROSE ................................. 17
6. J. P. LEFFIE ........................................... 22
7. ALFRED E. WARD .................................... 24
8. EDWARD F. MORGAN .................................. 25
9. JOHN FRANCIS COOK .................................. 31
10. E. D. COOK ........................................... 32
11. W. J. WILSON ......................................... 42
12. T. W. HUNT ........................................... 42
13. W. J. HUMS ........................................... 45
14. R. A. HUMS ........................................... 49
15. J. WILLIAM GUTH ................................... 49
16. J. E. WILSON ......................................... 53
17. REV. THOMAS HILL .................................... 59
18. ANVILLE HALL ........................................ 62
19. EUGENE COLES ........................................ 66

SCIENCE AND IMMORTALITY

Wishing to obtain the opinions of some of the most prominent scientific men in this country concerning the relation of science to the question of immortality, the editor of the Christian Register submitted to them the following questions:

1. Are there any facts in the possession of modern science which make it difficult to believe in the immortality of the personal consciousness?
2. Is there anything in such discoveries to support or strengthen a belief in immortality?
3. Or do you consider the question out of the pale of science altogether?

These questions are asked, not too strictly to limit the scope of reply, but to indicate the directions in which testimony is desired.

The answers to these questions are given in the interesting and important communications which follow.
I.

CHARLES A. YOUNG, LL.D.,
PROFESSOR OF ASTRONOMY IN PRINCETON COLLEGE,
NEW JERSEY.

I understand that what is wanted is simply a brief statement of personal opinion upon the bearing of science on the credibility of the doctrine of immortality, without any extended dis-

I.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

and a stimulus then sets out and makes its way from the brain along certain nerve-tracks, with an

and material substance in all parts of the universe which we can reach with our investiga-

II.

JAMES D. JAYNE, LL.D.,
OS YORK COLLEGE, AND PROCTOR OF THE "AMERICAN JOURNAL OF SCIENCE AND ARTS."

I am pleased to have my words used as your

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

law and material substance in all parts of the universe which we can reach with our investiga-
tions—make it easier to accept the idea of human immortality than it would be if no such facts were recognized. But they amount to nothing more than a faint consolatio

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY

II.

SCIENCE AND IMMORTALITY
III.

ASA GRAY, "L.L.D.,

Professor of Natural History and Director of the Herbarium of Harvard University.

I can merely say, for myself, that I do not know of any facts in the possession of modern science which make it more difficult than under science of older date to believe in the immortality of the personal consciousness. This is a world of difficulties, and it is a question of the more or less in the endeavor to evade them. I suppose that, though it is not science—certainly not physical and physiological science—that brings immortality to light, modern science does not really tend to put out that light. Yet, if that light were quenched, "I know not when," in modern science alone, "is that Prometheus that can shut light where?"

Yet I would not quite, in the language of your third alternative, "consider the question out of the pale of science altogether." In the interpretation of Nature—therefore not beyond the highest scientific consideration—there are two consistent hypotheses, that of theism and of non-theism. The former of these is the best I know of for the explanation of the facts: the latter does not try to explain anything. Immor-tality of the personal consciousness is a probable, but not an unavailing inference from theism.

IV.

JOSEPH LEIBY, M.D., L.L.D.,

Professor of Anatomy (Medical Department) and Director and Professor of Zoology and Comparative Anatomy (Veterinary Department), University of Pennsylvania.

I write, in reply to your letter of 11th inst., with the following questions:

1. Are there any facts in the possession of modern science which make it difficult to believe in the immortality of the personal consciousness?

2. "Are there any facts in the possession of modern science which make it difficult to believe in the immortality of the personal consciousness?"

3. Personal consciousness is observed as a condition of each and every living animal, ranging from microscopic forms to man. The condition is observed to cease with death; and I know of no facts of modern science which make it otherwise difficult to believe in the persistence of that condition—that is, "the immortality of the personal existence." Science has learned no more than is expressed by Schopenhauer, in Excl. Ill, 19: "For that which vitalizes the mass of men beholders bears; even one thing behalfe them: as the one death, so death the other: yes, they have all one breath; so that a man hath no preeminence above a beast."

4. "Is there anything in the discoveries of science which would support or strengthen the belief in immortality?"

5. This question is a measure answered with the first one. I know of none that sustain the doctrine. I apprehend that the theory of the conservation of force gives no support to it, for the consciousness of an animal is only a manifestation of force which ceases with the death of the animal.

6. "Or do you consider the question out of the pale of science altogether?"

7. I think no question out of the pale of science; though this one may obtain no answer, like those in regard to space, time, matter, and the nature of the supreme intelligence or primary cause of everything.

V.

SIMON NEWCOMB, L.L.D.,

Washington, D.C.

1. I am inclined to regard the question as lying wholly without the pale of science, properly so called. The latter, in my opinion, concerns itself only with those conceptions and relations of things which are directly or indirectly the result of experience. But no one now living has had any experience on the subject in question; and, even if we admit the hypothesis of immor-
It is difficult to see how we could ever reach any proof of it derived from experience. Our nervous systems are so constituted that they can perceive only the material in form; and then, even if disembodied spirits exist, there is no way in which they could make their existence known to us.

3. It does not seem to me that modern investigation has brought to light any new facts which really bear upon the question. The widest generalizations of modern science, so far as they have modified the older theories of the nature, origin, and destiny of man, are, I think, reached by looking upon well-known facts from a different point of view rather than by discovering new facts. For example, I do not think the new facts tending to uphold the doctrine of evolution are any more confirming than well-known facts which have always been within the reach of everybody.

4. Still, it seems difficult to avoid the conclusion that belief in immortality may be affected by the generalizations in question by leading men to think differently. Especially is this the case with the theory of the continuity of organic life. So long as it was held that man and the lower animals were separated from each other by an impassable gulf, existing from the beginning, it was easy to imagine for them destinies which had nothing in common. A consciousness which can survive the dissolution of the material organism and a consciousness which cannot are of two distinct orders, between which no connecting link is possible. If man, as now constituted, is only the last in a series of forms of organic existence, starting from the lowest, and if consciousness itself has been a gradual development, akin to that of ascending slowly and gradually from a profound sleep, then it seems difficult to assign any link in the series at which we can suppose so great a break to have occurred as is implied in the passage from mortality to immortality.

In all this, I do not wish to be considered as either claiming or admitting that the theory of evolution or of development is a scientific conclusion rather than a philosophical theory.
family has a right, and sometimes of necessity, to go into policy, and as the citizen of a State may and often must think and act as a philanthropist and cosmopolitan, so men of science have other faculties and aims, than those of mere investiga-

SCIENCE AND IMMORTALITY

when the situation ceases; that is, at death. But that is an argument for the cessation of the in-
spiring fancy, the judging reason, the affectionate spirit. Give these a new situation (another life),

QUOTATION

then from infancy, is, in fact, only one section of the infinite; and the doctrine of autompsychosis is merely a form which this conviction has assumed, and still wears, for perhaps a majority of the individuals of our race.

SCIENCE cannot possibly either teach or deny immortality; but every man of science must ac-


QUOTATION

..." the end without the beginning, have wills, but he also loves and thinks; therefore, it follows that God must give thought and form. As we see the trinity in man, we must imagine the trinity in God; as the world-motion must be guided by word-thought and generate world-love, so man's faculties desire prompt and his reason directs the actions of his will.

These actions are directly related to man's present situation, are fitted for it, and will stop

VII.

...in its probable ground in some persistent part of our nature not other than that persistent part,

LESTER F. WARD, A.M.,

SMITHSONIAN INSTITUTION, WASHINGTON, D.C.

In reply to your note of March 24th, inviting an expression of my views on some questions re-

gard to the relation between "science and immortality," I submit the following as the best I can do in the limited space allowed.

To your first question, as to whether there are "any facts which make it difficult to believe in the immortality of the present consciousness," I give an affirmative answer, which may be briefly set forth under two heads, as follows:—

I. The consciousness, when scientifically ex-

amined, reveals itself as a quality of brain, or mode of manifestation of the molecular activities of the organized brain substances.

It is a universal induction of science that modi-

fication of brain is accompanied by modification of consciousness, and that destruction of brain

SCIENCE AND IMMORTALITY

results in destruction of consciousness. No ex-

ception to this law has ever been observed. The con-

clusion is, therefore, almost a necessary one that brain is the cause of consciousness, and that consciousness depends upon and varies with the nature and condition of the brain.

The facts in support of this are multitudinous, not only as derived from exhaustive experiments in psycho-physics, conducted expressly for that purpose, but also as derived from common observation on the effect of drugs, intoxicants, poisons, and of various injuries and diseases of the brain.

It follows that, so far as science can speak on the subject, the consciousness persists as long as the organized brain, and no longer.

II. A second class of facts, which are irrecon-

cilable with a belief in the indefinite persistence of consciousness, is found in the inability of all minds to recall states of consciousness and events antecedent to the present life. For immortality can have no claim to the consideration of rational beings, unless it means absolute independence of time and duration. All things that have a be-

ginning must have an end. The law of the ma-

terial world is change, which implies both be-

ginning and ending.
My answer to your third question, whether I consider such inquiries "out of the pale of science altogether," naturally flows from the foregoing. I certainly do consider the question of the continuous existence of a consciousness which began with birth or conception, or at any point of time, as not only out of the pale of science, but as belonging to the domain of mythology and magic; for it would be nothing less than an absurd phenomenon, which involves a flat contradiction of terms.

I would not let it be inferred from the above that science is sceptical as to the immortality of the soul. Science poisons the immortality, not of the human soul alone, but of the soul of the least atom of matter. Consciousness results from the eternal activities of the universe, is their highest and grandest product, and not one atom nor one atomic movement is ever lost. The immortality of science is the eternity of matter and its motions in the production of phenomena, and science will always object to all unphilosophical attempts to confound phenomena with these.
may in some way interfere with present laws, and sustain the спурашов перевода. She sees the order which pervades the seeming disorder of the world. The great drama of evolution, with its full share of joy and terror, but also with abundant goodness and beauty, unfolds itself before her eyes; and she learns in her heart of hearts the lesson that the foundation of morality is to have done, once and for all, with lying, to give up pretending to believe that for which there is no evidence, and rejecting unprofitable speculations about things beyond the possibility of knowledge.

"She knows that the safety of society lies neither in the natural, nor in the philosophical speculations about the best theological creed, nor in a real and living belief in that fixed order of Nature which sends social diorganization upon the track of immorality as surely as it sends physical disease after physical trespasses; and of that firm and lively faith it is her highest mission to be the priestess."

When doubts are expressed in regard to these and kindred matters, or an appeal is made to Nature and her immutable laws, it is customary for the theologian to ask, How do you know that there are not higher laws which, after all,

X.

JOSEPH PARSONS COOKE, LL.D.
Professor of Chemistry and Mineralogy in Harvard University.

[Prof. Cooke refers to his work on "Religion and Chemistry," p. 275, and authorities 80-80.

In the first place, then, I believe that the existence of an intelligent Author of Nature, infinite in wisdom and absolute in power, may be proved from the phenomena of the material-world, with as much certainty as can be any theory of science. In the second place, I am of opinion that the facts of Nature are throughout consistent with the belief that the Author of Nature is a personal being, and the one only and true God.

X.

EDWARD D. COPE, A.M., PH.D.
PHILADELPHIA, PA.

Your inquiries respecting the relation of scien
tific knowledge to the problem of human immor
tality fall under three heads, which I will take up in the order which permits of most easy discus
sion.

1. Do I consider the question beyond the pale of science altogether? Evidence on the question of immortality can scarcely be obtained by us, by direct observation, by any method given to us, excepting in the works of the dead. But it is within the pale of scientific processes to employ legitimate inference from observed facts. That there are facts bearing on this question there can be no doubt, and that our knowledge of such facts will increase I have no doubt. Inference will then be likely to give some valuable results.

2. "Are there any facts in the possession of modern science which make it difficult to believe in the immortality of the personal consciousness?"

There are such facts. Assuming, as I do, that mind, or its raw material—consciousness—is a property of some kind of matter, since the only matter which we know to exhibit this phenomena or class of phenomena has a nearly fixed chemical composition, it appears extremely reasonable to suppose that, on the destruction or decomposition of this compound, its property above mentioned would disappear with it. And the fact is that this substance is of so unstable a
character that very slight changes in the environment suffice to bring about this decomposition and the death of the person which constitutes it. Our customary failure to discover any traces of mind in persons as dead, after their death, is a fact in support of the idea of the extinction of personal consciousness so long as it goes.

3. Is there anything in the discoveries of science which would support or strengthen the belief in immortality? These are evidence in support of the idea of immortality as well as evidence against it. And any positive evidence must be regarded as of far greater value than negative evidence in this question, as in all others.

The evidence for immortality is, of course, dependent on our knowledge of the relations of mind to tridimensional matter. Thus, if we can prove that mind does or can, within certain limits, dominate matter, or direct its movements, we have rendered certain the existence of mind as capable of persistence in and of governing matter in such wise as the automatic properties of matter will permit. We thus render probable the existence of a supreme mind, which is immortal; and, from that premise, we may infer that, under proper conditions, our own minds are or may be immortal also. As to the character of that immortality, something may be said later.

The side from which to approach this problem is that of evolution, or evolution rather than that of functioning, or physiology. Functioning, be it living, or chemical reaction, or mechanical movement, is a process of decomposition, solidification, or dissolution, processes exactly the reverse of creation, which is a building up. It is the observation of this class of phenomena, in the sciences of biology, chemistry, and physics, which has led some persons to anticipate ultimate extinction of all the activities comprehended within the scope of those sciences. And such would be a correct inference, were it not that the opposite process of creation, or lifting up and building, is going on at the same time.

Three sources of evidence from the nature of creation are open to us. These are the control of mind over animal movements, the direction of organic evolution by consciousness, and the direction or exhibition of chemical energy by vitalized energy. I take up these propositions successively.

First, as regards the control of mind over ani-
SECTIONS. Assumption of a perfect being has been, in both plants and animals, the condition of the loss of consciousness as to that kind of action; and if, all things so reduced, any being, life would become entirely unconscious. It is easy to believe that this is the history of most plants, and perhaps of some animals. Without going further into the numerous questions pertaining to the evolution of organic machinery, it is easy to perceive that we have here another evidence of the control of mind over matter. Structures are produced by motion (kinetogenesis); and motion, through consciousness, directed by will.

Third, the control of vitalized energy over chemical energy. It is, perhaps, necessary to explain the use of the term "vitalized energy" before farther going.

The word "vital force" is not thereby resuscitated, for that expression covered so many various factors as to be quite useless, except to persons anxious for the etymology of words. The energies of animals and plants are, of course, different from those displayed by non-living substances. But there is a kernel of truth in the old idea. Energy which is or has been controlled by consciousness, so that it bears the stamp of "design" may be said to have been and remain "vitalized." Automatic energies may be cast off, so to speak, from a vital source, and may run down part of the line of possibility, and still show marks of intelligent or "vital" origin. Such are probable mechanical or the molecular and electrical, as displayed by plants in their laboratories, where they make organic compounds only second in complexity to their own living protoplasm.

The central fact of this part of the evidence is the creation of protoplasm, the only substance which is known to be capable of consciousness. Animals can only make it out of other protoplasm or nearly aliied substances. Plants make it from the inorganic materials of the earth and its atmosphere, but they must have protoplasm to do it with. Wherefore, then, came the first protoplasm? Light to its subject, by a consideration of the nature of this substance itself. Protoplasm cannot exist by virtue of chemical energy alone. We are conscious of a balance of temperature, it exists only by virtue of the life that is in it. Let it die, and chemistry resumes its sway; and it is quickly resolved into simpler and more stable compounds. This fact is one illustration of the character of chemistry. It is well known that, other things being equal, this form of energy acts highest and dissipates energy. It forms such substances as require for their making the greatest dissipation of energy, and is therefore, if not the process, the most antagonistic to life and incapable of exhibiting its phenomena. We cannot then but suppose that some form of energy accompanies the phenomena of life, which is not chemical, although it is evident that a certain amount of chemistry is necessary to its activity; or, rather, as with animal electricity, the living energy only requires enough control for its purpose, and not the extinction of other forms of energy in its physical basis. What may this energy be, for it is safe to assume that it is one of the vital group, and the final essential of that group which we have been able to discover is a knowledge of absolute consciousness and temperature.

If we now turn to the problem of the origin of the first protoplasm, our safest course is to believe that it was effected by a form of energy similar to that which now manufactures it from the raw, inorganic materials. It is the only form of energy which we know of which is competent to perform its function. And it does it in very imposing fashion. The vegetation of the earth is manufactured by the thousands of tons a day. In like manner, in primitive ages, that energy made the first protoplasm. But it is obvious that at that time it had a different physical basis than it has now. Perhaps the temperature was too high for the sufficient stability of protoplasm. In any case, we have here a clear view of vital energy as a property of some physical basis not protoplasm. And if, as I believe, demonstrable, that "vital energy" is only by virtue of the stamp of consciousness, present or present, we have hard evidence of primitive consciousness before the days of protoplasm. We thus destroy the evidence against the possibility of immortality as presented by its strongest antagonist, chemistry. And a physical basis of consciousness other than protoplasm is the essential to our conception of the persistence of human consciousness.

As to the nature of this supposed immortality, science can have little to say. One thing, however, the intervention of a thought in the process in plants must not be regarded as a composition of a new origin.
ever, may be asserted. We cannot be sure of retaining our personality intact, although a great change cannot be brought about by neglect. As we change our personality in the course of time during this life, we cannot be sure of retaining it in another. But we do not always regret the change which time produces here; in fact, we may generally rejoice in it. Then there is a question as to the necessary isolation or distinction of consciousness from each other, all which may be relegated to the region of speculation. But one thought has often seemed to me to be of value. It is this: Beware of automatism.

XI.

SIR J. WILLIAM DAWSON, LL.D., F.R.S.,
PRINCIPAL AND VIS-CRANCHALLON MACGILL UNIVERSITY,
MONTREAL.

[Sir William Dawson refers us to the tenth chapter of Paul Men and their Modern Representative, and audaces of the following opinions.]

What shall we say, then, of this instinct of immortality handed down through all the generations of prehistoric and savage men, and prompt-

SCIENCE AND IMMORTALITY 43

uality, and in view of the strange and absurdalogues which have regard as to the doctrine of a future life in the Old Testament, it may be necessary to ask whether a distinction between the doctrines of the Holy Scriptures and the instinct of immortality referred to in the preceding pages. In Genesis, man appears at first as endowed with an immortality both physical and spiritual. This tradition of primitive immortality, and the instinctive longing for an immortal life implied in it, the Christian should hold as not a possession of the Hebrews only, but of the whole human race, on which, if we signified it as near to the belief in God, the second great dogma of universal religion. The promise of a Redeemer to restore to man what he lost in the happy hunting grounds. Is he not rather on a level with those more degraded savage tribes, if there is no light in the prehistoric faith without receiving anything better, and who regard the future either as a mere blank or as an unknown and terrifying. How much happier than either are those on whose last days shine the brighter hope of the light and immortal revealed by the prophet? "

SCIENCE AND IMMORTALITY 44

of the soul, but also of the body; that is, the doctrine of the resurrection of the body. It is clear, therefore, that these doctrines lie at the base of the religion of the Old Testament, and that without them it would be nothing. If they are not to be swept away in the Hebrew Scriptures, this is because they were not doubted or disbelieved, even by the heathen, and because they were too needed to insist on the immediate beliefs and duties of life. At the same time, in the ancient Hebrew Church, and still more among the heathen, much obscurity hung over the immediate future of the human soul. Death was ever a painful fact, and what the state of the disembodied soul in "Sheol" and how or when it would be reunited to a body, to be known to man. Job might believe, notwithstanding the decay of his body, that with his own eyes he would see God, but this would be in the latter days. Martha might know that her brother would rise again at the last day. This was the common-sense faith of readers of the Old Testament before the Christian era; but it remained for Jesus to raise the veil from the intermediate state, and to bring "life and immortality to light." This he does by his
own teaching that the believer in him can "never die,"—that is, that to him death is not really death, but the entrance at once into a higher and broader life in and with Christ, who is himself the "resurrection and the life";—by his declarative
declaration to the thief on the cross, "To-day shalt thou be with me in Paradise"; and by his own per-
sonal resurrection as the "first-fruits of them that sleep." Thus, to the Christian, not only are the future life, its happiness, more certain and
plain than they could be to the Jew, but all the
terms of the intermediate state are taken away,
—the soul unhindered by death is at once "clothed upon," to be absent from the body is to be present with the Lord," to leave the earthly
body and to be "gaining possession in the
Father's house" prepared by the risen Saviour.
True it is that these doctrines are yet only par-
tially received by those who calling themselves Chro-
niasts; but, surely, happy are they who believe,
and whose lives are heightened and ennobled by
such belief. Yet it is a mark for them to remem-
ber that, to some small extent, these beliefs have
been shared by the pious souls of all ages and
peoples, and that the existence of the belief in
God and immortality, even among the least

XII.

T. STERRY HUNT, LL.D., F.R.S.

Your note of March 6, with a request for a
brief statement of my view as to the relation of
natural science to the doctrine of a future life, in
before me; and, had I leisure, I would gladly
write you at length thereon. But now, however,
the press of literary work is so great that I can
not take the time which the subject demands,
though I hope I may do so long. I think the arguments from the facts of mod-
ern science are rather contrary than favorable to
the doctrine of a future life. Nevertheless, I
believe in a conditional immortality, in an etern-
al life begun already in this world, which is not
man's birthright, but the gift of God. My rea-
sons for this belief are, however, psychological,
and not physiological, and to set them forth in
order and do justice to the great theme would
require more time than I can at present com-
mand.

XIII.

WILLIAM JAMES, M.D.,
PROFESSOR OF PHILOSOPHY IN HARVARD UNIVERSITY.

The whole of my philosophy of immortality is contained in a few words of Locke's, which you may like to print:

"We have no other principle for deciding the
question than this general idealistic belief: that
every created thing will continue whose condi-
tance belongs to the meaning of the world, and
so long as it does so belong, whilst every one
will pass away whose reality is justified only in
a transitory phase of the world's course. That
this principle subsists of no further application in
human hands need hardly be said. We surely
know not the merits which may give to one being
a claim on eternity which none others would
cut out others off." (Meditations, § 149.)

XIV.

BENJAMIN APHTHOPE GOULD, LL.D.,
CAMBRIDGE, MASS.

I wish it were in my power to comply with
your request, by giving you some definite state-
ments of my opinions regarding our immortality,
and the influence of scientific studies upon these
opinions. But, to my regret, time and opportu-
nity are at present wanting for any repetition of
them, notwithstanding they are so deeply
rooted as to have become part of my nature,
and are confirmed by each successive step in my
studies.

The relations between the physical and the
spiritual universe cannot, from their very nature,
be made a subject for what the mathematician
calls demonstration. Yet, even here, opportu-
nity exists for such a work to demonstrate as
is afforded by the reduction of aukedum. And
the insufficiency of Deity in all physical phe-
nomena, as well as the insufficiency of the Indi-
vidual through and beyond all physical changes
which may affect him, stem, to my mind, to
afford the only logical escape from a myriad of otherwise hopeless inconsistencies and difficulties. This I believe to be the legitimate and natural consequence of an earnest study of Nature's laws. Were it not that some of those fellows whom I most honor and respect have not yet arrived at the same result, I should have been disposed to regard it as the inevitable one.

In my belief, dogmatic theology has, through all the history of science, been its worst foe; and the minds of conscious and otherwise sound investigators have been sadly warped and disturbed by the ecclesiastical denunciations of all who should dare to avail themselves of their reasoning powers—the only means by which they can arrive at any honest opinions whatsoever. For ages, the doctrine has been instilled into Christians, with their mother's milk, that investigation into what were claimed to be religious matters was among the worst of crimes; and that any disbelief, or even doubt, of certain theological dogmas was a rejection of divine revelation—in fact, the unpardonable sin. Emancipation from the shackles of such ingrained ideas has been difficult and slow, and with its arrival comes the natural tendency to react in the opposite direction. That a profound and unblurred study of any branch of natural science should lead to disbelief in immortality seems to me preposterous. Chemistry, for example, in its best exposition, its theories, its prae dictions, can be evolved from mere combinations of nitrogen, carbon, phosphorus, oxygen, metals, and the like. Physical laws, whose workings are of course as clearly traceable in our mortal frames as in any other aggregations of matter, cannot be made to comport with what is not matter. Nor do I see how modes of action can be confounded with the agent, in any process of legitimate reasoning. Whether the mass of matter considered to be the nucleus, the earth, the sun, or vast beyond telescopic measurement, makes not an iota's difference for any of the purposes involved. It is strange, to be sure, that any one acquainted with the rudiments of physiological chemistry, or who has seriously considered the relations between spirit and matter, should not yet recall with horror from such a doctrine as that of resurrection of the body; but such a dogma as this has nothing to do with faith in the immortality of the individual, who has been for a season clothed in it and hastened by the fleshly garb from which it has been freed.

Assuming the existence of spirit, as distinct from matter, it would be absurd to suppose it limited by its physical laws. And so far as it might employ matter as an implement. In considering things spiritual, there is no opportunity for inferences or analogies drawn from the laws of matter. And well the physical investigator can show the possibility of evolving, from a combination of atoms and a development of cells, a divinity and a gratitude to God, love to man, self-sacrificing disinterestedness, self-surrender to the idea of duty, and that innate faith in reunion with our beloved, which pervades every human race. It is an integral part of the spiritual constitution of mankind—it seems a waste of words to base arguments on the subject upon physical data. It is true that all this is but an expression of personal convictions, and scarcely to be given as a presentation of reasons for such convictions. But I can only end, as I began, by saying how much I regret my present inability to prepare for you the statement which you ask.

Outside of modern Spiritualism, I know of nothing in recognized science to support the belief in immortality; and, though I consider Spiritualism to be as truly an a posteriori and experimental science as any other, it is not recognized as such.

With the consent of Mr. Wallace we present here an extract from an article written by him a year or more ago on "Science and Spiritualism."

It is a common but, I believe, a mistaken notion that the conclusions of science are antagonistic to the alleged phenomena of modern Spiritualism. The majority of our teachers and students of science are, no doubt, ardent believers; but their opinions and prejudices are not science. Every discoverer who has promulgated new and startling truths, even in the domain of physics, has been denounced or ignored by those who represented the science of the day, as witness the long line of great teachers, from Galileo, in the Dark Ages, to Boucher de Perthes, in our own time. But the opponents of Spiritualism have
the additional advantage of being able to brand the new belief as a degrading superstition, and to accuse those who accept its facts and its teachings of being the victims of delusion or im-
posture,—of being, in fact, either half-baked enthusiasts or innocent fools. Such denunciations, however, affect as little. The fact that Spino-
listism has firmly established itself in our sceptical and materialistic age; that it has continuously grown and developed for nearly forty years; that, by mere weight of evidence and in spite of the most powerful prepossessions, it has compelled recognition by the thinking body of men in all classes of society, and has gained adherents in the highest ranks of science and philosophy; and, finally, that, despite abuse and misrepresen-
tation, the folly of emigration and the tyranny of impostors, it has rarely failed to convince those who have made a thorough and painstaking in-
vestigation, and has never lost a convert thus trained,—all this affords a conclusive answer to the objections so commonly urged against it. Science may be defined a knowledge of the universe in which we live,—full and systematized knowledge leading to the discovery of laws and the comprehension of causes. The true student of science neglects nothing that may widen and deepen his knowledge of nature; and, if he is wise as well as learned, he will hesitate before he applies the term "impossible" to any facts which are widely believed, and have been repeatedly observed by men as intelligent and honest as himself. Nor is this task solely on the observation and comparison of facts in a domain of nature which has been hitherto little explored; and it is a contradiction in terms to say that such an investigation is opposed to reli-
ance. Equally absurd is the allegation that some of the phenomena of Spinoism "contradict the laws of nature," since, in the ordinary sense of these words, no natural laws are known yet to us but may be seemingly contra-
verted by the action of more recent chemical laws or forces. Spinoism does not assert nor seek to prove the "existence of a new organiza-
tion." Spinoism, on the other hand, recognizes in mind the cause of organization, and, besides, even matter itself; and, it has added greatly to our knowledge of man's nature, by demonstrating the existence of individual minds indistinguishable from those of human beings, yet separate from any human body. It has made us acquainted with forms of matter of which materialistic science has no cognizance, and with an etereal chemistry whose transfor-
mations are far more marvellous than any of those with which science deals. It thus gives us proof that there are powers or existences beyond those of our material world, and in doing so removes the greatest stumbling:
block in the way of belief in a future state of exist-
ce,—the impossibility so often felt by the student of material science of separating the con-
scious mind from its partnership with the brain and nervous system. On the spiritual theory, man consists essen-
tially of a spiritual nature and mind intimately associated with a spiritual body—an organism which are developed in and by means of a ma-
terial organism. Thus, the whole problem of the material universe is, with all its marvellous changes and adaptations, an indissoluble unity of the matter and of the ethereal forces which per-
verse and vividly it, the vast nature of the material and animal kingdom,—it serves to the grand purpose of developing human spirits in human bodies. This worldlike not only lends itself to the produ-
ction, by gradual evolution, of the physical body needed for the growth and nourishment of the human soul, but by its very imperfections
SCIENCE AND IMMORTALITY

noblest characteristics, and which it is hardly possible to conceive could have been developed by any other means.

XVI.

REV. THOMAS HILL, D.D.

Ex-PRESIDENT OF HAVARD COLLEGE.

If you will allow me to do so, I will, in my reply to your three questions, transpose their order.

If by religion, in the third question, we understand physical sciences, the question of immortality is without her pale. The whole field of science, in that sense, is bounded by space and time, is occupied simply by geometrical forms and modes of motion. But, by the terms of the first question, immortality is predicated or desired of our personal consciousness. If we appeal to the facts of science for premisses, in arguing upon immortality, they must therefore be supplemented by some direct appeal to consciousness for additional premises, before we can use them. Many facts in the possession of modern science make it difficult to believe in immortality. But these facts present no difficulties essentially different from those presented by the familiar fact that all manifestations of life exist without consciousness. Science simply invalidates a large part of what was once thought evidence for the reappearance of spirits after death.

In reply to the second question, however, I would emphatically affirm that every discovery in science is a fresh demonstration of the immortality of the soul.

By personal consciousness, I understand you to mean, in some sense, a being who not only knows, but knows that he knows; who not only acts under the impulse of emotions, as Huxley supposes his crusty old may do, but who has the power of distinguishing himself from his objects of passion and prejudice and acting after abstract ideas. Man finds these general and abstract ideas embodied in the creation around him; but it is evident that he could not find these ideas were he not preadapted to find them. The eagle's sight is incomparably sharper than a man's, but no one dreams that the eagles ever saw or even will see the likeness and differences between the three willows on the summits of the White Mountains. But these facts present no difficulties essentially different from those presented by the familiar fact that all manifestations of life exist without consciousness.
Science and Immutability

the majesty of God. Nature is an "elder Scripture," full everywhere of illustrations of those thoughts which we carry to it, and which-empires in vain enforce to reduce to more generalisations from sensations. The progress of modern science, reducing the universe more and more completely to an intelligible order and rhythm, is an experimental demonstration that the source of all being is in a Person. The human mind, in the growth of science, even more effectually than in the ordinary contemplation of Nature, has direct evidence that it is in communication with the personal Author of Nature. Hence, as Jesus told the Sadducees, if we consider the majesty of God, we shall see that he has made us immortal: he would not thus hold converse with beings whom he had doomed to perish.

XVII.

Asaph Hall, L.D.D.,
Washington, D.C.

Science does not, I think, give a positive answer to questions concerning the immortality of the human soul; and a belief or disbelief in such

Mathematical Science and Immutability

It is true that the Christian Church has opposed, sometimes with threats and sometimes with persecution, the advancement of knowledge, fearful lest some of her cherished creeds might be overthrown. But generally, the creeds have given way, and have been remodelled and improved to suit the new conditions. In all this change and progress there does not seem to me any degradation of the position of man. On the contrary, I think the soul of man, being capable of such flights of imagination and such trains of reason, shows itself worthy a continued existence. Such considerations do not, of course, amount to a proof; but they strengthen my belief in immortality. To the third question I reply that I do not consider the question of immortality out of the pale of science. All branches of speculation and knowledge are bound up together; and it is on the whole evidence, derived from the most complete information, that the final judgment must be based. We are continually having examples in science of the danger of drawing conclusions from partial and insufficient evidence. Thus, the geological question of the glacial epoch has been investigated from an astronomical and mathematical standpoint. This method is excellent; but, although the array of formulas may be imposing and their logic incontestable, a result obtained in this way is no more certain than the physical assumptions made in the investigation. Again, attempts are made to compute the age of our sun, and it cannot be admitted that the result depends rather on our ignorance than on human knowledge. The differential calculus is a powerful instrument; and it is very sure to lead us astray, if we make false assumptions.

It is not necessary to speak of the methods peculiar to science, and of the testing of hypotheses by observation and experiment. These methods do not, I think, include the whole of human knowledge. Underneath our mathematical and scientific theories lie metaphysical questions. We do not proceed far, even in elementary geometry, without meeting difficulties of this kind. These difficulties should not be evaded, but should be fairly met and considered. It seems to me, therefore, that science should share in all branches of thought and investigation.
self-love wounded by being convicted of having cherished egregious errors.

3. These questions are quite within the pale of scientific investigation, and susceptible of being answered by science in a way which goes far toward justifying faith by knowledge of the truth.

When our scientists as a body shall have recog-
nized the reality and grasped the significance of the alleged phenomena of so-called "modern Spiritualism," of seership; of mesmerism or hypnotism; of clairvoyance and clairaudience; of phantasma of the living and phantoms of the dead; of sundry other occurrences already well known and to some extent understood by com-
petent psychic scientists,—then, and not till then, will formal science furnish the natural basis of re-
ligious belief. In my judgment, that time is nearer than many of us suppose.

If he has changed his opinion since then, I do not know; but I can tell you what were the views of Mr. Herbert Spencer three years ago last sum-
mer. At that time, I had a conversation with him in one of the rooms of the United Service Club in Pall Mall. He was kind enough to sub-
mit to be catteded, and my report is based on his definite answers to my questions.

I told him that I wished him, first, to give me his opinion as to the bearing of science (and par-
ticularly the theory of evolution) on the question of personal immortality, and, secondly, his own
individual belief.

As to the first, he said he thought it did not touch the problem either way, but left it substan-
tially where it was before.

As to the second, he said he was inclined to doubt. That is, he was not aware of anything that he could regard as satisfactory proof.

Charles S. Feirce, M.D., M.D.,
MEMBERS OF THE NATIONAL ACADEMY OF SCIENCES.

What is the bearing of positively ascertained facts upon the doctrine of a future life? By the doctrine of a future life, I understand the propo-
sition that after death we shall retain or recover our individual consciousness, feeling, volition, memory, and, in short (barring an unhappy con-
tingency), all our mental powers unimpaired. The question is, laying aside all higher aspects of this doctrine, its sacrecess and sentiment,—concerning which a scientific man is not, as such, entitled to an "opinion," and judging it in the same cold way in which a proposition in physics would have to be judged, what facts are there leading us to believe or to disbelieve it?

Under the head of direct positive evidence to the affirmative would be placed that of religious
miracles, of spiritualistic marvels, and of ghosts, etc. I have little to say to all this. I take the modern catholic miracles to be the best attested.

Three members of the English Psychological...
search Society have lately published a vast book of
eighteen hundred pages, large octavo, under the
title of *Phantoms of Life Living*. This work
gives some seven hundred cases of apparitions,
etc., of a dying person to another person at a
distance. The phenomenon of telepathy, or per-
ception under conditions which forbid ordinary
perception, though not fully established, is sup-
pported by some remarkable observations. But
the authors of the book I am speaking of—
Messrs. Gurney, Myers, and Podmore—think
they have proved a kind of telepathy by which
dying persons appear to others at great distances.
Their most imposing arguments are based upon
the doctrine of probabilities, and these I have
examined with care. I am not satisfied that
these arguments are worthless, partly because of
the uncertainty and error of the numerical data,
and partly because the authors have been aston-
ingly careless in the admission of cases ruled
out by the conditions of the argumentation.

But, granting all the ghost stories that ever
were told, and the reality of all spiritual mani-
festations, what would they prove? These ghosts
and spirits exhibit but a remnant of mind. Their
stupidity is remarkable. They seem like the
lower animals. If I believed in them, I should
conclude that, while the soul was not always at
once extinguished on the death of the body,
yet it was reduced to a paltry shade, a mere
ghost, as we say, of its former self. Then these
spirits and apparitions are so painfully solemn.
I fancy, then, I was suddenly and myself lib-
erated from all the trials and responsibilities of
this life, my probation over, and my destiny put
beyond marring or making. I should feel as I do
when I find myself on an ocean steamer, and
know that for ten days no business cuta turn up,
and nothing can happen. I should regard the
situation as a stupendous frolic, should be at the
summit of gaiety, and should only be too glad to
leave the whole scene behind. Instead of that
these spectral souls come moaning back to their
former haunts, to cry over spilled milk.

Under the head of positive evidence apparently
unfavorable to the doctrine, we may reckon ordi-
nary observations of the dependence of healthy
mind-action upon the state of the body. There
are, also, those rare cases of double conscious-
ness where personal identity is utterly destroyed
or changed, even in this life. If a man or
woman, who is one day one person, another day
another, is to live hereafter, pray tell me which of
the two persons that inhabit the one body is
designed to survive?

There is certainly a large and formidable mass
of facts, which, though not bearing directly upon
the question of a future life, yet inclines us to a
general conception of the universe which does
not harmonize with that belief. We judge of the
possibility of the unseen by its analogy with the
seen. We smile at Aldrich's lamp or the elixir
of life, because they are extremely unlike all that
has come under our observation. Those of us
who have never met with spirits, or any fact at all
analogous to immortality among the things that
we indubitably know, must be excused if we smile
at that doctrine. As it appears to us, these forms
of beauty, of sentiment, and of intelligence are the
most evanescent of phenomena.

"The power that once has blossomed forever dies."

Besides, scientific studies have taught us that
human testimony, when not hedged about with
elaborate ethics, is a weak kind of evidence.
In short, the utter blankness of an immortal soul
to anything we cannot doubt, and the slightness
of all the old arguments of its existence, appear
to me to have tremendous weight.

On the other hand, the theory of another life is
very likely to be strengthened, along with spir-
ituallist views generally, when the palpable fal-
sity of that mechanical philanthropy of the universe
which dominates the modern world shall be rec-
ognized. It is sufficient to go out into the air
and open one's eyes to see that the world is not
governed altogether by mechanism, as Spencer
in accord with greater minds, would have us be-
lieve. The endless variety in the world has not
been created by law. It is not of the nature of
uniformity to originate variation, nor of law to
bestitl circumstance. When we gaze upon the
multiformness of man's nature, looking straight into
the face of a living spontaneity. A day's travel in
the country ought to bring that home to us.

Then there is the great fact of growth, of ev-
olution. I know that Herbert Spencer endeavors
to show that evolution is a consequence of the
mechanical principle of the conservation of en-
ergy. But his chapter on the subject is mathe-
matically absurd, and convinces him of being a
man who will talk pretentiously of what he
knows nothing about. The principle of the con-
servation of energy may, as is well known, be
The world has done with it. It must now give place to more spiritualistic views and it is very natural now to anticipate that a further study of nature may establish the reality of a future life.

For my part, I cannot admit the proposition of Kabbalah,—that there are certain impenetrable bounds to human knowledge; and, even if there are such bounds in regard to the infinite and absolute, the question of a future life, as distinct from the question of immortality, does not therefore require a negative answer. The history of science affords illustrations enough of the folly of saying that this, that, or the other can never be found out. Auguste Comte said that it was clearly impossible for man ever to learn anything of the chemical constitution of the fixed stars, but before his book had reached its readers the discovery which he announced as impossible had been made. Legendre said of a certain proposition in the theory of numbers that, while it appeared to be true, it was most likely beyond the power of the human mind to prove it; yet the next writer on the subject gave six independent demonstrations of the theorem. I really cannot see why the dwellers upon earth should not, in some future day, find out for certain whether there is a future life or not. But at present I apprehend that there are not facts enough in our possession to warrant our building any practical conclusion upon them. If any one likes to believe in a future life, either out of affection for the venerable creed of Christendom or for his private consolation, be he well. But I do not think it would be wise to draw from that religious or sentimental proposition any practical deduction whatever,—so, for instance, that human happiness and human rights are of little account; that all our thoughts ought to be turned away from the things of this world, etc.—unless such deduction has the independent sanction of good sense.

Daniel Coit Gilman, LL.D.,
President of Johns Hopkins University.

[President Gilman refers to the concluding portion of his annual report for 1856.]

The progress of science does not touch, or touch only to fortify, the ideals of man's spiritual nature. On themes like these, one should speak with the reserve which belongs to all that is most sacred; yet I do not hesitate to express the conviction that man's consciousness of his own personality, with its freedoms and its responsibilities, his belief in a future life, his hopes of a life to come, his recognition of a moral law and of the authority of an inward monitor, will stand firm, whatever discoveries may be made of the evolution of life, the relation of soul and body, the nature of atoms and of forces, and the conceptions of space and time. Science shows us that all knowledge proceeds from faith,—the assumption of premises in which the investigator believes. Indeed, if I may use the words of another, "some of these very discoveries, or those and larger view, seem destined to be the chief support of those cherished convictions to which they at first seemed hostile." I anticipate that the day is not distant when apprehensions now felt will be felt no more, and when science will be openly proclaimed the handmaid of religion and the ally of good government.
XXII.

GENERAL A. W. GREELY, U.S.A.,
CHIEF OF THE SERRA SERVICE.

The belief in personal immortality rests so generally on instinctive hope or faith, associated with belief in a personal God, that I doubt if all the magnificent results of scientific research have in this day directly affected this belief, either for or against, in one man out of ten thousand.

In my opinion, however, the result of modern science is rather to confirm than to weaken such a doctrine. Further, the astounding advances in knowledge continue; most eventually result in the most amazing formulae of nature’s most abstruse laws. This, to me, at least, is on the basis that natural laws apply equally to physical matters, as to physical matters, gives grounds of hope, faint though they are, that some day the proving of immortality may be as possible and satisfactory as is now the demonstration of certain physical theories which are generally admitted to be truths.

If scientific truths have weakened in some this
more animals, of spirit with mere physical and chemical forces, immortality with mere conservation of force, and thus leads to blank and universal materialism. Is there any escape? There is. The two extreme views given above are not irreconcilable. They are only views from different points of physical and structural, and therefore equally one-sided and partial; and true philosophy in this as in all other vexed questions is founded only in a view which combines and reconciles mutually excluding extremes. Can we find such a view? I think we can.

Let us, however, first trace some of the stages of this scientific materialism. I pass over, with bare mention, the physiological argument, which to many seems to identify thought with brain-processes and psychology with brain-physiology, and take up at once the argument from evolution, which concerns us more nearly, and is also more easily understood.

Man, we say, is endowed with, in fact, an immortal spirit. What is spirit? We know things only by their phenomena. What are the phenomena of spirit? Consciousness, will, intelligence, memory, love, hate, fear. Surely, these are some of them. Now, has not a dog or a mon-
now and still higher forms of force, but also still, I believe, derived from the preceding.

But some will ask, "How is this consistent with immortality?" In answer, I urge you to remember the relation of God to nature already explained. Remember that the forces of nature are made up of the different forms of the one, omnipresent, divine energy. This divine energy, in a generalised condition, undivided, diffuse, pervading all nature, is what we call physical and chemical force. The same energy in higher forms, individualising matter, and itself individualised, but not yet imperfectly, constitutes what we call the life-force of plants. The same energy more fully individualising, and itself more fully individualised, we call the animus of animals. This animus, or animal soul, individualises more and more, until it reassembles and foreshadows the spirit of man. Finally, still the same energy, completely individualised as a separate entity, and therefore self-conscious, capable of separate existence and therefore immortal, we call the spirit of man.

According to this view, the vital principle of plants and the animus of animals are but different stages of the development of spirit in embryo in the whole of nature. In man, it came to birth. Before man, it was deep embryonic sleep, unconscious of all, unmanifest, incapable of independent life, with physical, and chemical connection with nature, but now at last in man separated from nature, capable of independent life, born into a new and higher plane of existence.

Although birth is but its true correspondence and best illustration, we may vary the illustration in many ways. In animal, spirit is deep submerged in nature, as beneath a water surface, unconscious of any higher, free world above. In man, spirit emerges above the surface, into a higher world, looks down on nature beneath him, around on other emerging spirits about him, and up to the Father of all spirits above him. On, on, plant emerge from physical, cohesive connection with the central one (plant birth), in order to enter into higher gravitational relation, which, thenceforward determine all its movements in beautiful harmony: as the embryo must break away from physical connection with the mother, in order to enter into higher spiritual bonds of love—even so spirit must break away from physical and material connection with the forces of nature, which are the gene-

eralised forms of divine energy, in order thereby to enter into higher relations of filial love with God and brotherly love with man. Finally, as the new-born child differs little in grade of physical organisation from the natural embryo, but at birth there is a sudden and complete change in the whole plane of life, a change absolutely necessary for further advance, even so, at the moment of the origin of man, hostility this may have been accomplished, there may have been no great change in the grade of physical organisation, and yet a complete change in the whole plane of physical life—a change absolutely necessary for further advance. According to this view, man alone is a child of God, capable of separate spirit—separate, but not wholly independent. Nurtured by the greatest maternal love, but still nursing mother of spirits. We are wonted only by death.

"The more we reflect on this, the more we shall see that completed spirit-individuality explains, as nothing else does, that which is characteristic of man. It is this which constitutes what we call personality. This also constitutes self-consciousness and free will and moral responsibility, and out of these again give the capacity of voluntary progress. This also means separate life, spirit viability or immortality. Self-consciousness especially seems to me the sign of the very set of spirit-birth. We may imagine man to have emerged ever so gradually from animals. In this gradual development, at a moment he becomes conscious of self, the moment he turns his thoughts inward, in wonder upon the mystery of his own existence, as separate from nature, that moment marks the birth of humanity out of animality: moral responsibility, immortality, equality for indefinite progress are all involved in this event. I am quite sure that if any animal, say a dog or a monkey, could be brought to the point of self-consciousness (which, however, is impossible), that moment it or he would become a moral, responsible being, and all that is characteristic of man, immortality, and capacity of indefinite progress and will, would necessarily follow.

Thus, then, nature, through the whole geological history of the earth, was the gestative mother of spirit, which after its long embryonic development came to birth and to independent life and immortality in man. So there can any conceivable meaning in nature without this consummation?
All evolution has its beginning, its course, and its end. Without spatio-immortality, this beautiful cosmos, when evolution has run its course and all is over, would be as it never was,—an idle dream and idle tale, signifying nothing. In one word, without immortal spirit the cosmos has no meaning. Now mark: without this gestative method of creation of spirit, the whole history of the earth before man would still have no meaning.

He alone, therefore, is possessed of two natures,—a lower and a higher. The whole mission of man is the progressive and, finally, the complete dominance of the higher over the lower: the whole meaning of man is the humiliating bond-age of the higher to the lower. As the material evolution of nature found its goal and completion and significance in man, so must man enter immediately on a new and higher evolution to find its goal and completion in the ideal man, the divine man. As spirit, unconscious in the womb of nature, continued to develop by necessary law until it came to birth in man, so the new-born spirit of man, both in the individual and in the race, must ever strive to force itself to grow into a higher life and into a newer birth.

**XI**

**PROF. EDWARD C. PICKERING.**

**XXVI.**

**IRA REMSEN, PROFESSOR OF CHEMISTRY IN THE JHON'S HOPKINS UNIVERSITY AND EDITOR OF THE CHEMICAL JOURNAL.**

I find it extremely difficult to answer the questions propounded by you, the chief difficulty arising from the fact that "personal consciousness" is an expression which cannot be defined. We do not know what it is. It is undoubtedly in some wonderful way connected with the workings of the brain. Whether it is something which is capable of existence independently of the existence of the brain is, it appears to me, the first point to be decided. I do not know of any facts in the present state of science "which enable us to answer this question. If it could be shown that "personal consciousness" is necessarily connected with the workings of the brain, a strong argument would thus be furnished against its immortality. It seems to me possible that researches in the realm of psycho-physics, including observations on those whose brains do not work normally, may eventually throw some light upon the subject of "personal consciousness." You will see, therefore, that I do not consider the question open to the role of science altogether. As regards the question whether there is "anything in such disclosures to strengthen or beg the question of immortality," I can only say that the whole tendency of modern science is to show that immortality, not necessity of "personal consciousness," but immortality in a broad sense, appears to be a necessary consequence of the workings of the laws of nature.

Investigations in every subject are leading us to a clearer recognition of the truth; and I have strong faith that the more clearly we recognize it, the better we shall be. Our views on many subjects are undergoing change,—in most cases, I am convinced, for the better. Should our views regarding the immortality of "personal consciousness" undergo a radical change, higher views of man's relation to the universe would take their place, and still stronger reasons for living honest, righteous lives would be recognized. I make these last statements to indicate my ideas in regard to the tendency of modern science in its bearing upon the subject you have brought under discussion.
The emotions are so strongly enlisted as to oppose an obstacle to investigation; and the heart whispers to the brain, "Where ignorance is bliss, 'tis folly to be wise." An instinctive desire is felt to avoid issue with a blessed and consos-
tory belief, by considering the whole subject of immortality as outside the pale of harmless "science," which seeks truth, and truth alone, quite apart from any consequences that may arise.

"Personal consciousness" — or the perception of the "ego"— is one of the highest manifesta-
tions of thought.

The possibility of thought without a brain wholly to think is opposed to experience, but the persistence of "personal consciousness" after the death of the body involves this assumption. Our rhythms for idiots and insane are full of arguments favoring the hypothesis of a causal connection between the condition of the brain and the mind.

"Mens sana in corpore sano" was the experi-
ence of the past; and the verdict of modern sci-
ence, I think, only adds confirmation. So de-
pendent is "personal consciousness" upon bodily conditions that its loss may be caused by simple

pressure on the substance of the brain. Even under normal circumstances, we nightly lose con-
sciousness in sleep. Syncope may result from a distur-
bance of the circulation of the blood, and unconsciousness can be produced at will by the employment of anaesthetics.

Thus far as these show that the individ-
ual may exist without self-consciousness; and if we call "the soul" is a separate and dist-
tinct entity,—distinct from the body,—I can see nothing in science to wrest the assumption of its immortality, while at the same time I can find nothing to support the hypothesis of personal consciousness without it.

The perception of the "ego" does not neces-
sarily prove the existence of a soul as a distinct entity, any more than our other perceptions prove that light, heat, and sound are entities. Indeed we know that these are not; and the selfsame movement of the luminiferous medium may be perceived by one sense as light, and another as heat,—a dual perception from a single cause.

While, then, it is true (so far as I know) that science cannot assert that there is such a thing as a soul at all, it is equally true that it cannot postulate its non-existence.
SCIENCE AND IMMORTALITY

Some of the highest generalizations of science, the "immutability of matter" and the "conservation of energy," point to the immortality of the elements of which we are composed. If the "ego" is a distinct existence—elemental in character—every analogy would indicate its immortality.

This is the most, I think, that science can say in favor of immortality; but, if it favors the hypothesis at all, it does so haphazardly as well as forwards.

We have no personal consciousness of any prenatal existence; but, if an elemental (though unconscious) "ego" existed before birth, then we have proof from experience (in the fact of our present existence) that such a soul, under suitable conditions of environment, may acquire a body and the power of self-consciousness.

Embryology favors the belief that the wonderfully complex organism which we inhabit has arisen as a new creation out of an almost structureless mass of protoplasm, and it discredits the old idea that the perfect man was to be found in miniature in the embryo. The theory of epigenesis teaches that "the organ of the embryo arises by new formation," and not by mere enlargement of a pre-existing invisible condition.

In the egg of a bird, we can find, at first, no trace of bone or muscle or down; and yet the presence of a vitally germ determinate, in that egg, the formation of the living bird.

3. I do not think that any subject of fact can be considered as beyond the pale of science, although there are many subjects which cannot be directly investigated on account of lack of data from which to make deductions.

The question of what exists beyond death is like asking what there is on the other side of the moon. We can never know for certain till we go there! We may feel certain that something exists on the other side; and, while it may be impossible for us ever to obtain even a glimpse of the reality, we may hope to arrive at conclusions more or less probable by study of the side submitted to our view.

NOTES ON THE TESTIMONY.

BY SAMUEL J. BARROWS,

EDITOR OF THE "CHRISTIAN REGISTER."

The notable expression of scientific opinion contained in the preceding pages furnishes fruitful themes for discussion to all who are interested in the great problems of human destiny.

From time to time, science has encroached upon the domain of religious tradition. It has not so much affected the substance of religious beliefs as it has compelled a change in the form in which they have been held. One perishable dogma of the Church after another has gone to pieces under its hammer or been dissolved in its crucible. The doctrine of the literal resurrection of the body, though long held on the supposed authority of an infallible revelation, was inevitably doomed by the disclosures of science. The literal six-day interpretation of the cosmogony of Genesis can no longer be maintained against the
these articles, it is most neatly attailed in the general conclusion that Science cannot show that
immortality is impossible. This is, of course, only negatively put; but it shows that science is in
helpless to refute the doctrine as religion is to demonstrate it. It has been sometimes assumed in
modern discussion that the science has facts or tests in its possession which render a belief in
immortality irrationally impossible. The testi-
mony of this jury of scientists shows that that is not the case.
Mr. John Fiske said, not long ago, that philo-
osophical relation of science to immortality
stands to-day yet firm; it was it in the
time of Descartes; that is, there is no more posi-
tive proof against the doctrine now than there
was then. Prof. A. G. Hall, in his article, also
says, "The metaphysical arguments and analo-
gies of Spinoza, Butler, and Kant may be re-
peated today with as much force as ever; and
the answers and discussions must be essentially
the same." Prof. Novomesky does not think that "modern investigation has brought to light any
new facts which really bear upon the question."
Prof. Leesley says, "Science cannot possibly either
teach or deny immortality." Dr. Dana says, "I
have the fullest confidence that there is nothing in
science or in any possible results from investi-
gations of Nature against immortality." Prof.
Hayles, Herbert Spencer, and Prof. Morse are
unsurpassed in the subject of the theory of life.
3. It is to be noted that the evidence against
immortality presented in these articles is con-
tested by some who take the agnostic position.
Thus, Prof. Ward thinks the "proofs almost
necessarily an idea that one brain is the cause of con-
sciousness, and that consciousness depends upon and
varies with the nature and condition of the
brain," and that "destruction of brains results in
destruction of consciousness." Prof. Leidy like-
says, "Perhaps" consciousness is observed as
a condition of each and every living animal,
froming microscopical forms to man. The
condition is observed to cease with death; and I
know of no facts of modern science which make it
otherwise than difficult to believe in the per-
istence of that condition,—that is, "the immor-
tality of the personal existence." "Prof. Havi-
ley, on the other hand, challenges this very
assumption; "I [one] says that consciousness
cannot exist except in relation of cause and effect
with certain organic molecules, I must ask how
he knows that; and, if he says it can, I must put the same quib.

The difficulty, however, of believing in the persistence of the personal consciousness after death is one which is evidently felt by most of the writers whose opinions we have sought, and, in addition to Prof. Ward and Lady, Prof. Young, Newcomb, and Morse give expression to it. The phenomena of consciousness secure a fuller discussion in the papers of Prof. Cape and Le Conte.

4. While there are those in this group of scientists who entertain the question of the personal consciousness, there are others who find evidence in science which makes their belief even stronger.

It is to be noted here, however, that those who believe in the personal consciousness do not wholly agree as to why they believe in it. Prof. Asaph Hall is able to say, "I think the discoveries of modern science strengthen the belief in immortality." Prof. Gray thinks that "immortality of the personal consciousness is a pigible, but not unaccountable, inference from physics."

Dr. Gould points to the immensity of Deity in all physical phenomena as well as the persis-

SCIENCE AND IMMORALITY

ience of the individual through and beyond all physical changes which may affect him," and adds, "That a profound and unshaken belief in any blank of natural sciences should lead to disbelief in immortality seems to me prepos-
tenous.

Dr. Huxley finds the solution to be that "man is in communication with the Creator of the universe," that "the progress of modern science is an ever-accelerating demonstration that the source of all being is in a Person," and that God "would not thus hold converse with beings whom he had created for nothing."

Prof. Young, of Princeton, states strongly in the opinion that the question is not of the pole of science altogether. He cannot accept the materialistic hypothesis as scientifically satisfactory, and is forced to consider it as much more probable that a man is more than his body, and likely to survive it. In his judgment, "the knowledge of life and immortality comes only by revelation." This is substantially the position of Prof. Joseph P. Cooke and Sir William Dav-

son. Prof. T. Stryker Hunt believes in "a conditional immortality in an eternal life begun already in this world, which is not man's birth-

right, but the gift of God." Prof. Pickering holds that the question is cleary within the pale of the moral sciences, but that the results of far are negative, and "the belief of a scientific man, like that of any one else, must be based entirely on faith."

On the other hand, Prof. A. R. Wallace, the eminent English naturalist, confesses that, "outside of modern Spinozism," he "knows of nothing in recognized science to support the belief in immortality." He holds that these phenomena may be reduced to scientific tests. In this belief, he is associated with Prof. James, the English chemist. Dr. Elliott Core holds that "there is much in the discoveries of psychic sciences not only to support or strengthen the belief in immortality, but to convert that belief into knowledge."

Gen. Grant, who in the terrible era of active exploration came so near testing personally the question at issue, says, "If scientific truths have weakened in some hope of personal immor-
tality, yet in others such revelations as the im-

The Journal of Common Science and the integrity of the universe, the indistractibility of the soul and the I body, the nature of atoms and of force, and the conceptions of space and time.

Prof. Leidy, while admitted as before said, that "Science cannot possibly either teach or deny immortality," adds, "But every man of science must acquiesce in the fact of the general convictions, and in its probable ground in some persistent part of our nature."

Dr. Irwin Ross writes, "I am convinced that the whole tendency of modern science is to show that immortality—nec neessarily of personal consciousness—but immortality in a broad sense—is a necessary consequence of the workings of the laws of nature."
against the mechanical and automatic philosophy.

"In my opinion," says Prof. Peirce, "the doors of the necessitarian metaphysic are sealed. The whole has done with it. It must now give place to more spiritualistic views and is it very natural now to anticipate that a further study of nature may establish the reality of a future life." Prof. Cope, through an elaborate and thorough study of the problem of creation, finds that "we thus render probable the existence of a supreme mind which is immortal. And from that premise we may infer that under proper conditions of our own minds or are may be immortal also.

In the previous questions, presenting a variety of arguments, conclusions, and probabilities, we see on what different rational grounds the belief in immortality must be made to rest, while in some cases it is made purely a matter of religious faith. It illustrates the strength of the hold of immortality upon the human mind and heart, that so many holding it justify their belief in it on entirely different grounds. It is easy to think that immortality is one of those faiths of the soul of which it has been said that we believe it not because we can prove it, but we prove it because we believe it.
says: "As to the nature of this supposed immortali-
ty, science can have little to say. One thing, 
however, may be asserted. We cannot be sure of 
retaining our personality intact, although a 
great change might be too small a price to 
regret. As we change our personality in the course of 
time during this life, we cannot be sure of retain-
ing it in another. But we do not always regret 
the change which time produces here; in fact, 
we may generally rejoice in it. Then there is a 
question as to the necessary isolation or distinc-
tion of consciousness from each other, all of 
which may be relegated to the region of specula-
tion."

"Humanity has already experienced many 
changes in its belief in immortality during its 
progress from a lower to a higher. But, of the 
new forms of that belief which still 
remain to us, science may furnish some of 
the most 
great. Instead of chiseling our convic-
tions, it may eventually give them a greater 
glow. We do not believe that the truths of 
religion 
are to be verified by what, in the strictest 
sense, may be called scientific data. But the 
wholly new conception of the processes and 
history of the universe and its unity and magnitudes,
which science reveals, furnishes grand and inspir-
ing 
nature for the exercise and development of our 
finer powers.

The confidence that human-
ity is growing toward larger ideals and better 
hopes is well expressed in the reasoning words 
of Dr. Richmond: "Our views on many subjects are 
undergoing change,—in most cases, I am 
convinced, for the better. Should our views re-
garding the immortality of the human 
consciousness undergo a radical change, higher views 
of man's relation to the universe would take their 
place, and still higher views for living hon-
est, righteous lives would be seen."

The result of our inquiry has thus shown that 
Science has developed a new element in the 
universe or of the origin and destiny of man which pro-
vides 
Science with its highest hopes, in its most inspiring facts. 
The belief in immor-
tality may still be rationally justified by the 
processes of logic, may still be regarded by the 
world and colored by the imagination. "He must be 
an unanswerable man," says Rev. O. R. Frothing-
ham, "who can persuade himself that the belief in 
immortality has lost its hold on living minds, 
and he must be a stubbornly skeptical man who 
has not yet included in its tests. Humanity 
itself is a product of Nature, and cannot be left 
out in any estimate of Nature's tendency. With 
humanity, we must take the whole range of emo-
tions and of ethical motives that influence it. 
The hopes, the affections, the infinite yearnings 
of the human heart will not be silenced. These 
are a part of our heritage, and these are pro-
phetic of our destiny. If ethics is anything more 
than a few utilitarian precepts, if it is the 
manifestation of the life and heart of man of an 
Eternal Righteousness which broods in the uni-
verse, then science can no more ignore ethics 
than it can ignore gravitation. It is to ethics and 
philosophy that we look when we seek 
the destiny of mind. From this standpoint there 
is great significance in the quotation which Dr. 
James makes from Lassus: "We have no other 
principle for deciding the question than this gen-
eral

idealist belief: that every created thing will 
continue whose consequences belong to the 
meaning of the world, and so long as it does so 
belong; whilst every one will pass away whose 
reality is justified only in a transitory phase of 
the world's course."

Relics may lead us to the belief that the good
of the individual depends upon the final good of the whole, and psychology may assure us that the mind that wells up in us is a part of the Eternal Consciousness of the universe. When we court, therefore, to believe that the good of the individual is attained through the good of the whole, and are willing to live for such a great end in this life, then we may be willing to live for it in the next. A selfish concern for our own individual salvation may yield to a desire to contribute to the salvation of the universe, to join our little lives with the Eternal Righteousness. And when we feel that it is the Eternal Consciousness that wells up in us, we may rejoice like the raindrops to fall in the great ocean from which we derive our being.

In any case, we believe that the hope of immortality is not to be dismissed, but to be glorified. If our fears are real, they are real in God. It is a faith of the soul that we cannot go where the Eternal Love will not hold us in its protection and the Eternal Blind illumine our immortality. The immortality is the immortality of God, whose children we are and from whose endless life we are born. If we lose our lives, it is only that we may find them again in God.

**Biographical Notes.**

**FRANKLIN ACCIDENT FOSTER, D.D., LL.D., L.H.D.,** was born in Shelburne, Vt., in 1825. He graduated at Yale College in 1848, was tutor in the same college in 1852, Professor of Mathematics and Natural Philosophy in the University of Alabama in 1855-56, Professor of Chemistry and Natural History in the same institution 1858-62. President of the University of Massachusetts 1862-65, and serving as President of the United States from 1865 to 1874. He was also Chancellor of the University of Pennsylvania from 1864 to 1866. He took orders in the Protestant Episcopal Church in 1849, was ordained a deacon in the Church of England and married in 1851. He was elected President of Columbia College, New York, in 1856, and still holds the position. He has published a large number of works on scientific and educational subjects. He has been the chief author of the standard treatises on the National Academy of Science, and one of the United States Commissioners to the Paris Exposition.

**ALEXANDER GODFREY BIBLE,** was born in Edinburgh, Scotland, March 3, 1812. He is a son of Alexander Mearle Bible, the eminent electorician, and author of the *System of Vital Speech.* He

**Science and Immortality.**

He has been a voluminous contributor to scientific literature. A catalogue of his works would fill several volumes of this locality, and he has contributed to many of the titles almost unnumberable. His studies have ranged through botany and paleontology, and he is most actively known here as the author of the *United States Geological Survey of the Territories.* He has done much in succeeding in mineralogical classification. He has treated the hypothesis of evolution in various aspects, and has published a collection of essays on the subject in a book entitled *Prae Origin of the Fittest.* His last book, issued within a few weeks, makes the words "Science and Immortality." Professor Cape, as will be seen from his work, is not only strong in scientific knowledge, but in his philosophical power of grappling with scientific generalizations.

**ELLIOTT COUE, M.D., Ph.D.,** was born at Portland, Me., Sept. 24, 1842. Dr. Coque is chiefly known through his work in the field of osteopathy, neurology, osteopathy, biology, etymology, osteopathy, and anatomy. He has had the following official positions: Medical Lecter, U.S. Army, 1862-63; Acting Assistant Surgeon, U.S. Army, 1859-63; Assistant Surgeon, U.S. Army, 1864-68; resigned November 13, 1869; Professor of Geology and Comparative Anatomy, Norwich University, 1864; Surgeon and Naturalist, U.S. Western Boundary.
SCIENCE AND IMMORTALITY

Dr. Court is a member of the National Academy of Sciences, of the American Philosophical Society, Corresponding Member of the Geological Society of London, and is a member of many other societies. He is the founder of the Gnsic Theosophical Society of Philadelphia, and a Fellow of the Theosophical Society of India. He is the author of several hundred monograph and papers in scientific periodicals, besides many separate works.

JAMES DEWHURST, LL.D., was born 1814, and is a graduate of Yale. His System of Mineralogy was first published in 1834. He accompanied the Government Exploration Expedition of 1837, under command of Capt. Wilkes. He has been for years one of the editors of the American Journal of Science. In 1849, he was elected Professor of Natural History and Geology in Yale College, and entered on duty in 1854. He is one of the three American Fellows of the Royal Society.

SIR J. WILLIAM DAVIES, C. M. G., LL.D., F.R.S., F.G.S., was born in Picton, N.S., in 1814. He was educated at the University of Edinburgh. He was appointed Superintendent of Education in Nova Scotia in 1839, and Principal of McGill College, Montreal, in 1853, a position which he still holds. He is the author of Jacobus Gothicus, The Story of the Earth and Man, The Origin of the World: Life's Dawn on Earth, Fossil Men and their Modern Representatives, and many memoirs, reports, and papers on geological subjects. He is a past President of the American Association for the Advancement of Science, and president at the meeting of the British Association for the Advanceent of Science in 1860.

Danvey, C. G., LL.D., was born at Norwich, Conn., in 1851, and graduated at Yale in 1872. He was Professor of Physics and Political Geography at Yale College in 1872-75, Superintendent of Schools in Connecticut 1899-1901, President of the University of Pennsylvania 1877-79, and became President of John Hopkins University, Baltimore, 1875. He has written numerous scientific, historical, and educational papers.

BENJAMIN ANTHONY GIBSON, LL.D., was born in Boston, 1841, graduated at Harvard College in 1844, studied astronomy abroad for four years. Dr. Gould established a Cambridge in 1843 the Astronomical Journal. His contributions to astronomical science have been numerous and valuable. In 1853, he became Director of the Dudley Observatory at Albany. In 1856, he went to South America, where he established a national observatory at Cordova for the Argentine Republic. He has been a member of the National Academy of Sciences, of the Royal Astronomical Society of London, the Academie des Sciences de Paris, Berlin, St. Petersburg, Vienna, Gottingen, etc., the American Philosophical Society, and the American Academy.

HARRY F. DRAPER, D.D., was born in Paris, Orleans County, New York, 1814. He received his medical degree in 1831, made a specialty of botany, and became Professor of Natural History in Harvard University in 1857. He resigned from this position in 1879. Dr. Gray was President of the American Academy in 1854, a member of the National Academy of the Linnaean Society of London, and the Imperial Academy of Sciences of St. Petersburg. He is one of the three American Fellows of the Royal Society. He has several books on botany, How Plants Grow and Learn in Nature, are widely known; and his Manual of Botany is considered a dictionary to all students of that science.

HALL-GEN. ADOLPHUS W. GREENLY was born in Newburyport, Mass., March 27, 1824, and was educated for college in its public schools. On July 3, 1842, he was enrolled as a private in Company B, Major Brown's Parole Police Home Battalion, which formed part of the Sixteenth Regiment Massachusetts Volunteer Infantry. July 20, 1842, he was mustered into the United States service. In September, 1842, he was appointed Corporal. He served in the engagements of Bull's Island, reoccupation at Matl. Mills, siege of Yorktown, West Point, Fair Oaks, Stones River, Chickamauga, Chickanooga, Atlanta, McPherson, Chatanooga, Anietus (twice wounded and in hospital therewith), and was one of the "four-leader boys" at the crossing of the Rappahannock, Dec. 11, 1862, and at Fredericksburg. For good behavior at Fredericksburg, he was appointed First Sergeant. He rose to be a Captain, and was brevetted Major United States Volunteers, March 13, 1865, "for faithful and meritorious services during the war." He was appointed a Second Lieutenant Thirty-sixth Regular Infantry, March 5, 1867, from the State of Louisiana, and served with his regiment at Fort Sumter, Fort Beggs, and at New York, until August, 1867, when he was ordered to duty with the chief signal officer of the army. His work in the Signal Service Bureau has been of
highest honor conferred by the French Geographical Society. Gen. Greely has left a lasting memorial of his expedition in the scientific account which he has prepared of it.

5

THOMAS STEBBY HUNT, LL.D., was born at Nor-
wich, Conn., 1825; studied medicine and chemistry, and
in 1843 became assistant in chemistry to Prof. Silliman;
serve for twenty-five years as chemist and
mineralogist to the geological survey of Canada; was
Professor of Chemistry in the Local University,
Quebec, and in McGill College, Montreal, and later,
until his resignation in 1870, of Geology in the Mas-
achusetts Institute of Technology. He is a mem-
ber of the National Academy of Sciences of the
United States, the Royal Society of London, of the
L wollen-Cambridge Academy of Germany, and of
a great number of other learned societies in Amer-
ica and Europe, besides being an officer of the
Legion of Honor in France, and of the order of the
Mauritius and Lazarus of Italy. He is M.A. of
Harvard, and LL.D. of Cambridge, England. In his
two recently published volumes, entitled Mineral
Physiology and Physiography and A New Diet for
Chemistry, but especially in the first two chapters of
the former, will be found embodied his views on the
physics of matter and of life.

6

SCIENCE AND IMMORTALITY

highest honor conferred by the French Geographical Society. Gen. Greely has left a lasting memorial of his expedition in the scientific account which he has prepared of it.

4

THOMAS STEBBY HUNT, LL.D., was born at Nor-
wich, Conn., 1825; studied medicine and chemistry, and
in 1843 became assistant in chemistry to Prof. Silliman;
served for twenty-five years as chemist and
mineralogist to the geological survey of Canada; was
Professor of Chemistry in the Local University,
Quebec, and in McGill College, Montreal, and later,
until his resignation in 1870, of Geology in the Mas-
sachusetts Institute of Technology. He is a mem-
ber of the National Academy of Sciences of the
United States, the Royal Society of London, of the
Lapland-Cambridge Academy of Germany, and of
a great number of other learned societies in Amer-
ica and Europe, besides being an officer of the
Legion of Honor in France, and of the order of the
Mauritius and Lazarus of Italy. He is M.A. of
Harvard, and LL.D. of Cambridge, England. In his
two recently published volumes, entitled Mineral
Physiology and Physiography and A New Diet for
Chemistry, but especially in the first two chapters of
the former, will be found embodied his views on the
physics of matter and of life.

He is the author of the following books:
2. Elements of Geology, for colleges.
3. Course of Geology, for high schools.

5. He is about to publish a work on Evolution and its Relation to Religious Thought.

He is a member of all the principal scientific associations of this country, member National Academy, Fellow American Academy of Arts and Sciences Boston, American Philosophical Society, Philadelphia, New York Academy of Sciences, Fellow American Association for Advancement of Science, etc.

JOHN LEIGH, M.D., LL.D., was born at Philadel- phia, 1851, graduated at the University of Pennsyl- vania in 1871, devoted himself to biology, comparative anatomy, and vertebrate palaeontology, was chosen Professor of Anatomy in the Medical Department of the University of Pennsylvania in 1875, and in 1872 Professor of Natural History of Swarthmore College. He received the degree of L.L.D. from Harvard Col- lege on its two hundred and fiftieth anniversary. He has been a frequent contributor to the Smithsonian Contributions and the Journal of the Academy of Natural Sciences and Transactions of the American Philosophical Society, Philadelphia.

J. PETER LESELY was born in Philadelphia in 1859, graduated at the University of Pennsylvania in 1859, and at Princeton Theological Seminary in 1859, was assistant geologist in the first survey of Pennsyl- vania in 1859-61. He travelled on foot through France, and studied in the University of Halle in 1871. In 1873, he established the peripheral system of the America Tract Society in the northern and middle counties of Pennsylvania. He was pastor of the Dutch Reformed church in Milton, Mass., in 1871, and retired from the ministry in 1875. He has held various other official positions of a scientific charac- ter,—has been Secretary and Librarian of the American Philosophical Society, Professor of Geology and Mining Engineering in the University of Pennsyl- vania, was one of the corporate members of the National Academy, has published a variety of scien- tific monographs, and is now State Geologist of Pennsylvania. Like Mill, he is a man of great versatility; and we have before us a paper read by him before the American Philosophical Society on "The Hebrew Word 'Shadiu,'" showing a great deal of independent research in the Old Testament. Prof. Leesly is a man of wide knowledge in many departments.

EDWARD S. MORE, Ph.D., was born at Portland, Me., in 1838. He manifested at an early age a pro- found love of natural history, preferring the woods and streams to the city life, and finding special delight in the study of shells, both land and marine. He also prepared himself for close observation and careful record by prolonged studies in drawing and pain-

ing several years in this pursuit and in practice as a professional draughtsman. From 1873 to 1876, Prof. Morse was an assistant of Agassiz at Cambridge, attending also the lectures of Wymans, Conk and Lowell. He was Professor of Comparative Anatomy and Zoology in Bowdoin College, Maine, for several years. In 1886, he acted at Salem, Mass., where he still resides, as Director of the Peabody Academy of Sciences. The chief scientific societies have chosen him to their memberships and to conspicuous offers in their organizations, and he was elected President of the American Association for the Advancement of Science. In the year 1872, Prof. Morse decided to visit Japan, in order to dredge along the coast for specimens, in his favorite field of research, especially for brachiopoda,—an ancient, interesting, and widespread variety of deep-sea creatures. The Japanese authorities secured his promise to return and accept the Chair of Zoology at the Imperial University of Tokyo. Accordingly, in 1871, he removed with his family to Japan, where he dwelt for nearly two years, actively engaged at the University teaching, establishing a botanical station on the Bay of Yedo, studying the treasures of primitive and on the Japanese islands, and making voluminous notes and sketches of ethnological and general inter- est. He subsequently made a third visit to Japan, for the sole purpose of collecting and completing his Illustrations. Prof. Morse has written a fascinating
Ward has been a constant contributor for the last twelve years to the leading scientific periodicals and periodicals.

Charles A. Young, Ph.D., LL.D., born at Hanover, N.H., in 1851, graduated at Dartmouth College, 1873, studied theology in Andover Seminary 1871-73, was Professor of Natural Philosophy and Astronomy at Dartmouth, is at present Professor of Astronomy in Princeton College. He is a member of the American Academy of Arts and Sciences, and a member of the National Academy, and a Foreign Associate of the Royal Astronomical Society of Great Britain. He was President of the American Association for the Advancement of Science in 1895. He has written some popular works on Astronomy, and as an original investigator has made important discoveries. He has contributed to various scientific journals.