

THE THEOSOPHIST

BROTHERHOOD : THE ETERNAL WISDOM : OCCULT RESEARCH

June 1938

Vol. LIX, No. 9



SCIENCE
NUMBER

THEOSOPHY AND SCIENCE

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THE EXPANDING UNIVERSE

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THE ETERNAL SCIENCE

The moment is more opportune than ever for the review of old philosophies. Archaeologists, philologists, astronomers, chemists and physicists are getting nearer and nearer to the point where they will be forced to consider them. Physical science has already reached the limit of exploration; dogmatic theology sees the springs of its inspiration dry. Unless we mistake the signs, the day is approaching when the world will receive the proofs that only ancient religions were in harmony with nature, and ancient science embraced all that can be known.

H. P. BLAVATSKY

THE THEOSOPHIST

(With which is incorporated *Lucifer*)

A JOURNAL OF BROTHERHOOD, THE ETERNAL WISDOM, AND OCCULT RESEARCH

EDITOR: GEORGE S. ARUNDALE

(Founded by H. P. Blavatsky in 1879. Edited by Annie Besant from 1907 to 1933)

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THE THEOSOPHICAL PUBLISHING HOUSE
ADYAR MADRAS INDIA

THE LABORATORY OF THE FUTURE

The modern man of Science, to carry on his researches, demands the vast array of apparatus that he must use for his work, for according to the delicacy of his apparatus is the extent of his observation of the forms to which his attention is directed. The man of Science of the ancient type does not ask for instruments; he is not studying the evolution of forms; he has to study life, not form; and for such study he must evolve himself, the life that is within him, for only life can measure life, only life can respond to the vibrations of the living; his work is to unfold himself, to bring out of the depths of his own nature the Divine Powers that lie hidden therein, not in the senses but in the Self.

ANNIE BESANT



On the Watch-Tower

BY THE EDITOR

[These Notes represent the personal views of the Editor, and in no case must be taken as expressing the official attitude of The Theosophical Society, or the opinions of the membership generally. THE THEOSOPHIST is the personal organ of the President, and has no official status whatever, save in so far as it may from time to time be used as a medium for the publication of official notifications. Each article, therefore, is also personal to the writer.]

Brotherhood Matters Most

AS I conceive, the fundamental greatness of The Theosophical Society lies in the fact that its mighty doors of Universal Brotherhood are ever open to all who desire its membership, be their reasons for so desiring what they may. It is true that The Society has three Objects, and that admission depends upon sympathy with all of them. Since there are three Objects, it is inevitable that each should receive endorsement from every candidate for admission. Yet it is the First Object that really counts, the Second and Third Objects being subsidiary to it, means to its furtherance.

At all times, but very specially now, it is the evocation of the

sense of Brotherhood that matters more than aught else. We may believe or disbelieve in religions, philosophies and sciences. We may or may not perceive any value in their comparative study. We may or may not desire to explore the so far uncharted seas of Truth. But it matters supremely that we realize somewhere in ourselves and somehow that there is a Universal Brotherhood of humanity, and that all our troubles and darknesses arise from its ignoring by a considerable proportion of humans.

* * *

The Theosophical Society—A Major Witness to Brotherhood

The Theosophical Society is one of the outward and visible signs

of the reality of this Universal Brotherhood. It is by no means the only sign. But it is one of the major signs, and, through the status it has achieved, one of the most potent forces in the world for the evocation of the sense of Universal Brotherhood.

Members of The Theosophical Society not only believe in this Universal Brotherhood, but have through their very membership offered overt homage to it. They have enrolled themselves in a Brotherhood Comradeship, and are in honour bound to promote such Brotherhood Comradeship in all possible ways. The pursuit of the Second and Third Objects is among such ways, as there are the ways of education, of the arts, of individual living, of industrial co-operation, of economic rectitude, of politics. But all ways are ways of friendship and goodwill. None of them are ways of antagonism and hatred.

* * *

A Crusade Against Tyranny

In the world today, however, there is most urgent need for very active expressions of Brotherhood, of Right as against Might, of Justice as against Tyranny. And in saying this I am not for a moment hinting that this country is consumed by the spirit of Might and that country by the spirit of Right. I am not by any means hinting that Japan, Italy and Germany are animated by the spirit of pure Might, while the rest of the nations pursue the Right, and the Right alone.

There is abroad everywhere a spirit of Might, and it must be

checked. It must be made impotent.

The spirit of war must go. Yet must the spirit of peace be protected against the lawlessness of the ruthless.

Which countries shall take the lead in such a crusade? Those countries which have purged themselves of their own tendencies to Might as against Right, or which are moving to this end. Purification begins at home, must begin at home, if it is safely to be extended beyond the home. It is not self-righteousness that is enough. Self-righteousness is not only not enough. It is a dangerous weakness, and a nation which desires to be in the van of the work for Universal Brotherhood must shed its self-righteousness and all sense of superiority over other nations.

* * *

What Might Britain Do?

Let us suppose that Britain desires to be among the nations which shall take the lead to establish Righteousness as against Unrighteousness. What has Britain to do? She has to set her own house in order, for only as she metes out righteousness within her borders has she any right whatever to proclaim it and demand it without. Who shall help Britain to set her house in order? Those who themselves seek to live lives of individual and co-operative righteousness. Those who are constantly challenging themselves as to their own individual righteousnesses, and who are constantly trying to change from unrighteousness to righteousness.

I very much doubt if parties can do this. I very much doubt if

Parliaments can do this. I very much doubt if this can be done by those who belong more to programmes than to principles, who are at the mercy of party whips rather than at the call of their consciences.

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Theosophists Have a Duty

I think the time has come for some, I hope perhaps for many, among the citizens of Britain to stand for a collective righteousness, and in all humility, in all sincerity, in all eagerness, in all selflessness, to probe without fear or any favour for the wrong and to exalt in its stead the right. I think Theosophists are eminently fitted to take part in such work, for they believe more in Truth than in dogma, more in Freedom than in institutions, more in Life than in form, more in Justice than in expediency, more in Duty than in compromise. And I think there are as many Theosophists outside the ranks of membership of The Theosophical Society as there are within such ranks. Indeed I earnestly hope there are many, many more.

What is unrighteous in the British Empire? Let such men and women of independence and rectitude seek it out, declare it, and strive to replace it by righteousness. There must be no fear of public opinion, no shrinking from unpopularity, no reluctance to stand alone. And above all there must be no hatred of the unrighteousness as it is perceived, nor any measure of contempt for those who seem to be the instruments of unrighteousness.

We do no good at all to righteousness, we do not advance its mission and its message, by pouring

upon that which we deem to be unrighteous the vials of our wrath, our contempt, our hatred. We, too, err, even though perchance in other ways. We too have our unrighteousnesses, which others see as we perhaps see theirs.

Where are Britain's weaknesses? Who, perceiving these, will work to transmute them into strength? I do not think we must expect such work to be performed by any Party—Labour, Liberal or Conservative. If we cause any one of them to see that they will die if they do not accept our cause as theirs, then we may expect action. But they will wait, it is their nature, until it is unsafe to wait any longer. Only will they act when they conceive that by acting they will have the votes of a majority of their fellow-countrymen behind them.

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* *

Who Makes Nations Great?

They do not see, they do not care, that there is a Britain far nobler, far greater, than any generation of its peoples. They do not see, they do not care, that it is the pioneer, the visionary, the martyr, the idealist, who makes Britain the great country that she is—not the partizan, not the political fortune-hunter, not he who is watchful for the incoming tide that he may ride upon it to place and power.

If Britain be great, if any country be great, it is because of those who have suffered that she might be in health, of those who have welcomed persecution that she might be free, of those who have gladly borne injustice that in her justice might be exalted, who have gone

down into dark unhappiness that she might know and live in happiness. Such men and women we need today. There are plenty to be afraid. There are plenty to shirk responsibility. There are plenty to take refuge in solemn words and protestations, having courage for naught else.

* * *

The Leaders Britain Needs

Britain needs men and women, inheritors of the great traditions of her men and women who have brought honour to her because they have been true to themselves to the very end. To such stalwarts conventions matter little, orthodoxies matter little, public opinion matters little, even risks matter little, dangers matter little, place and power matter not at all. They look with eyes which tolerate neither obscurity nor camouflage into Britain's life as Britain's life is, challenge it, and bend their ears to hear if its life rings true.

Such men and women may be politicians. They may be teachers. They may be poets, or writers, or painters, or sculptors, or architects. They may be business men. They may be clerks. They may be artisans or farmers. They may be mothers. They may be fathers. They may be princes. They may be peasants. They may be priests. They may be philanthropists. They may be dreamers. They may be poor. They may be rich. They may be in health, or upon beds of sickness.

* * *

Torch-Bearers of Greatness

All of them are needed. From among them must be recruited

those who will carry on in today and into tomorrow such greatness as they carried on in the yesterdays of Britain. There are the torch-bearers, I know. But Britain needs many more ere there shall come about a conflagration which shall burn her present dross into that gold which Britain needs for her adornment.

Britain needs such men and women—men and women who are free, who have no fear, who are not bound upon the wheel of small conformity, who see with visioned eyes their country's eternal glory, and are not afraid to denounce such darkness as they may judge to dim it now.

Where is Britain untrue to her finest self, to the glory that was Britain, to the glory that shall be Britain in the immediate future if she be peopled by a generation worthy of her citizenship? Where is she less true than she might be? Where is she nobly true?

There must be no false patriotism in answering these questions. There must be no sense that Britain is God's own country, still less that she is God's only country. The best that any citizen can give his motherland is his own fearless truth, nothing less indeed, not one iota less.

* * *

The Real Nation-Builders—

And in each country there must arise such men and women, even where fearlessness is met at once with persecution. Just as in Britain there must be citizens to stand against all that they conceive as wrong, all the more as the wrong is labelled right by those who are

in positions of authority and power, so must there be such citizens in every country on the face of the earth—standing for righteousness as they see it, even though most others see righteousness otherwise.

It is not those who agree with the majority, with those who are in power, who give a country her strength, but those who live free lives, who *are* free—even in the prisons into which they may be cast by ruthlessness which is afraid and therefore intolerant of all opposition.

* *

—The Fearless and the Free

Germany needs opponents of Hitler as well as admirers and followers. Italy needs opponents of Mussolini as well as admirers and followers. India needs opponents of Gandhi as well as admirers and followers. Russia needs opponents of Stalin as well as admirers and followers. Japan needs opponents of the power in control as well as admirers and followers. Or if the word "opponents" be thought unnecessarily suggestive of unreasoning opposition, then let me substitute the words "fearless critics where criticism is judged to be needed in the country's interests."

The whole world needs a Brotherhood of fearless men and women who love their countries with deep ardour, but who know that to love means to praise, and who seek, therefore, to make their countries worthy of praise.

* *

Signs of Decadence

And if a country's leaders are really great, they will be thankful

for such citizens, thankful that their land gives freedom to such citizens, honours such citizens, because they are so intent on the everlasting glory of their country. Where it is dangerous to be fearless, there the country is decadent, however powerful it may be in terms of might. Where differences of opinion are intolerable, there the country is decadent, be its power what it may. Where the few rule and brook no dissentient note, there the country is decadent, even though great works are done for all to see.

It is where the individual enriches the State with his freedom and the State strengthens him with its encouraging protection that both State and individual flourish.

* *

A State in Peril

The individual has indeed cause to be thankful to the State for the peace of his home and for the safety in which he is able to work for his home. In return he owes to the State such service as may be necessary for the peace and safety of the State. But he also owes to the State the spirit of his freedom and independence. A State deprived of these has little life wherewith to grow and to defend itself against aggression. In peril are both a State whose citizens are slaves and citizens whose State is devoid of noble leadership. Where there is one single citizen who is in prison for his Truth's sake, there the State is dishonoured. But its redemption is at hand in the very imprisonment itself.

There is urgent need for Britain to be self-challenging. And there is no less urgent need for every

other country throughout the world to be self-challenging no less.

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Foundations of a New Order

I trust that in Britain there are men and women who lead, even though there be few or none to follow. I trust that in Britain there are men and women to stand at all costs for that which they believe belongs to Britain's greatness, to stand erect and dauntless before the thrones of the powerful, of those in high places, of those who are acclaimed by the multitude.

I trust there are such men and women in Holland, in Germany, in Italy, in Russia, in Belgium, in the United States of America, in Japan, in India, in China, in Poland, in France, in Austria, and in all other countries.

Dictators, Prime Ministers, autocrats, authorities—all are heard for their insistencies. Their voices carry everywhere, and they strive to still all other voices. Yet the blood of the persecuted is the foundation of every new order, and those who are despised, injured, massacred today will be those who shall be honoured tomorrow. Ever is it thus. The whisper of the weak and helpless blasts as with lightning the strongholds of the powerful.

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* *

The Call of the Great

I wonder which country will be first to put its own house in order. I wonder which country will be first to listen to the call of its true leaders, recognizing them as they live in lonelineses and brave with steadfast heroism the execrations

of crowds and the contemptuous orthodoxies of the conventional.

Does Britain listen to those in her midst today who are the direct inheritors of her greatness, who have the blood of her great in their veins?

Does the United States so listen? Does France so listen? What country is listening now to those who are making vocal the greatest of her traditions, the noblest of her actions, the most splendid of her achievements, the finest of her sacrifices, the most compassionate of her gestures?

What country is without these in rich measure? Yet I fear much that many countries have but short memories, and have forgotten the rocks of their majesties as they build upon the sands of their passions.

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* *

Who Will Lead the World?

But are there not countries ready to respond to a Call if only some among their citizens will voice it? Is not Britain ready to give a lead to the world? Is not France ready to give a lead? Is not the United States ready to give a lead? Is not India ready to give a lead? Is not Holland, is not Belgium, is not Switzerland, is not Poland, is not Norway, is not Sweden, is not Denmark, ready to give a lead?

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The World's True Liberties

How I wish that there could be a Conference of free men and women who would frame a Charter of the True Liberties of the World—men and women without fear and without favour, men and women

who love their own countries and feel deep friendship for the lands of others, men and women who love freedom and cherish independence and respect the freedom and independence of others, men and women in whom dwell the virtues of reverence, understanding and compassion, who have graciousness and generosity, who come together to advocate righteousness and not some special shibboleth.

At such a Conference should gather all who have suffered for conscience sake, all who have spoken with courage against tyranny, all who have noble vision into the future, deep inspiration out of the past, and abiding trust in the present. At such a Conference should gather the poor in material estate, but the rich in heart; the humble in position, but the rich in godliness; the insignificant in the eyes of their fellows, but steadfast pillars in the Temple of Noble Living.

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* *

A Fire That Might Purify the World

What do we want with titled names or with prominent personalities? What do we want with names which will attract the crowd? We want the people in whom the spirit of freedom burns brightly, in whom the flames of justice soar aloft, in whom the fire of kindness and understanding shines steadfastly. We want the people who feel deeply the world's sad state, the sad state of their country such as it may be, and the sad state of all for whom they feel responsibility.

Such men and women are wanted for such a Conference, and we want

such Conferences in every village, in every town, in every city—everywhere. And we care not if but five or ten are present. We care not if the Press ignores, or arouses laughter at these Conferences.

If only one little candle is lighted, there is the beginning of a Fire which one day may consume the nation, and one day purify the whole world.

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* *

Theosophists Should Begin

Theosophists should begin these little Conferences, not as Theosophists, not with labels, not with programmes, not with a mission, not with panaceas, but with simple dedication to the beginning of a happier world and to a deep searching of heart for any wrong, any lack of righteousness, any injustice of commission or of omission—be these in individual, community or nation itself.

Theosophists—and among such I count many more than the actual members of The Society—are prisoners neither of time nor of circumstances, neither of race nor nation, neither of faith nor of sect. They have passed the comparatively uncivilized condition of believing that their right must be everybody else's right, that their standards must be everybody else's standards. They know that the whole world is a school, and that races are divisions in that school, and nations classes, that faiths are also divisions, and the sects within them classes. They know that there is not equality, but difference. But they do not make of such differences a ladder of ascent with themselves on the topmost rung.

Rather do they regard each difference as an element in a rainbow of growth—each colour having its own splendour, and no colour being superior to any other.

Theosophists are needed for the regeneration of the world—lovers of wisdom, lovers of unfrontiered lives, men and women of deep and appreciative understanding.

* *

Begin with the Home

Let such Theosophists hold, and go on holding, their little Conferences, not with any labels, but as groups of men and women eager to perceive what is wrong, eager to do what is right.

I do not think, however, that there should be any hesitation in pronouncing to be wrong that which they feel to be wrong, or in declaring to be right that which they feel to be right. And such declarations will be made in a spirit of humility, in the spirit of the phrase in the Christian Liturgies, "so far as human frailty allows me to judge."

But the declarations must begin with the home—with the nation and its living. It may be easy to declare that Italy's occupation of Abyssinia is wrong, that the persecution of the Jews by Germany is wrong, that the annexation of Austria by Germany is wrong, that Japan's aggression in China is wrong. But Italy, Germany and Japan may well counter such denunciations with counter-denunciations of Britain's wrongs, which they think they perceive as Britain may think she perceives theirs.

We must begin with home affairs. We must see where there is wrong in Britain herself, where her

citizens are neglected, where her life is vulgarized, where her honour is besmirched in any way, where the greatness built up by her men and women of the past has ceased to be an object of reverence and emulation.

* *

The Truth Shall Free the State

What is it that is now dishonouring the State? I need, I hope, hardly say that I have my own answer to this crucial question. But I do not want to give it here. Every Theosophist, every member of The Theosophical Society, should have his answer, whether it be right or wrong. And he must give it openly, strongly, confidently, and above all without fear or favour. It is the Truth that makes men free, and for us the Truth is Sincerity. We can know but little at our present stage of evolution, and even the little must needs be inaccurate. But that little we must know as well as we can, and we must give it to the world as the best we have to give. If every man and woman throughout the world were to give his Truth fiercely but deeply reverent of the Truths of others, not in substitution, but in amplification, in addition, then the clouds of misunderstanding which are the clouds of war would melt away.

We defy others with our Truths, and therein lies all the mischief.

* *

The Way of Regeneration

The regeneration of the world lies in impersonal affirmations rather than in personal denunciations. There may indeed be

occasion, I think there is even now occasion, to declare certain actions of every country as infringing the Laws of Peace and Justice. Every country is breaking these laws. But if we can begin with a Charter of the True Liberties of the World, we shall attract to its study all men and women of goodwill everywhere, of all races, nations and faiths, and so shall we begin to create a public opinion international in character, and both international and national in application.

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* *

The Hope of the World

Let men and women of goodwill gather together in their little local groups, let them gather together in their regions, let them gather together in their nations, let them gather together in international conferences—not the prominent, but the obscure, though even the prominent will indeed be welcome so long as they remember that the man in the street, the woman in the omnibus, the little men and the little women in their

little homes, are the hope of the world, for these are the salt of the earth, and live their daily, obscure, frugal lives with far more truth and justice than most of those who have the earth's rich things. It is indeed better to have good things than rich things, and to lead simple lives rather than complicated lives, to lead self-contained lives rather than lives which are dependent upon so many, often upon the shameful toil of so many, for their sustenance. It is indeed better to be happy in simple pleasures than to need the constant stimulus of the morbid.

The Beautiful, the Gracious, the Generous, must become the perfume of the daily lives of all.

Truth must become their watchword, and Justice their unquenchable intent.

So shall happiness, peace, prosperity become their daily bread and healthy sustenance.

In a sentence, let men and women of goodwill seek ways and means of substituting honour for force, understanding for suspicion, happiness for misery, justice for betrayal.

THEOSOPHY AND THE MARCH OF SCIENCE

In 1937 the council of the British Association for the Advancement of Science authorized publication of *The March of Science*, a review of the progress of science during the five years from 1931 to 1936. The whole field of science is surveyed by specialists. In this issue of *The Theosophist* certain sections of *The March of Science* are considered in relation to Theosophy. With the exception of the President's introduction on "Theosophy and Science," the articles have been contributed by members of the Science Group of The Theosophical Research Centre, London. The subjects treated may be grouped under the following headings: Cosmic Physics, The Nature of Matter, Biology, Anthropology, The Future.

THE NEW CONTINENT

From the Master K. H., in a letter to Mr. Sinnett, which the latter received while staying with Madame Blavatsky at Bombay in 1881 :

If, for generations we have "shut out the world from the Knowledge of our Knowledge," it is on account of its absolute unfitness; and if notwithstanding proofs given, it still refuses [to] yield . . . to evidence, then will we at the End of this cycle retire into solitude and our kingdom of silence once more . . . We have offered to exhume the primeval strata of man's being, his basic nature, and lay bare the wonderful complications of his inner Self—something never to be achieved by physiology or even psychology in its ultimate expression—and demonstrate it scientifically. It matters not to them, if the excavations be so deep, the rocks so rough and sharp, that in diving into that, to them, fathomless ocean, most of us perish in the dangerous exploration; for it is we who were the divers and the pioneers, and the men of science have but to reap where we have sown. It is our mission to plunge and bring the pearls of Truth to the surface; theirs—to clean and set them into scientific jewels. And, if they refuse to touch the ill-shapen oyster-shell, insisting that there is [not], nor cannot be any precious pearl inside it, then shall we once more wash our hands of any responsibility before human-kind. For countless generations hath the adept builded a fane of imperishable rocks, a giant's Tower of INFINITE THOUGHT, wherein the Titan dwelt, and will yet, if need be, dwell alone, emerging from it but at the end of every cycle, to invite the elect of mankind to co-operate with him and help in his turn enlighten superstitious man. And we will go on in that periodical work of ours; we will not allow ourselves to be baffled in our philanthropic attempts until that day when the foundations of a new continent of thought are so firmly built that no amount of opposition and ignorant malice guided by the Brethren of the Shadow will be found to prevail.

(The Mahatma Letters, pp. 50-51).

Theosophy and Science

BY GEORGE S. ARUNDALE

The President has written a foreword to a new book, which we have adapted as his introduction to this symposium on The March of Science. The book is edited by Prof. Kanga and entitled *Where Theosophy and Science Meet*. The President's comments are potently relevant in either context.

The Mountain of Truth

THEOSOPHY is the experience of the greatly wise from time immemorial. Those who have restated the Science of Life for the examination of the modern world declare it to be the fruit of their own experience, however much the greater part of the experience must needs be beyond verification even by those deemed wisest by the consent of the majority of their fellows.

Thus is Theosophy the eternal mountain of experienced Truth. It is a mountain which all are climbing, some being here and some being there on the mountain side. Theosophy is a mountain of the universal Truth, fashioned out of the kingdoms of nature we know and out of those we do not yet know, fashioned out of the intimate lives of every citizen in these kingdoms, fashioned out of the lives of Gods, of men, of the whole of evolving Life, from dwellers in valleys and in plains, from dwellers in the hills, to the God reigning on evolution's Olympian heights. Theosophy reveals the Thread of Immortality on which are strung these Beads of Living. Theosophy discloses the universal Law,

the inexorable Purpose, the Divine Design, whereby all Life is moving, through an infinite series of Divine Events, the daily happenings in the lives of all, to that far-off Divine Event which shall be the climax, the triumph, the fulfilment, and verily the justification, for the aeon-long way.

Science is busy in many fields seeking to understand this mountain of Truth, both as to its actual physical nature and in many other modes of its manifestation. Science is busy experiencing, seeking foothold after foothold for its upward climbing. Time was when all save perhaps the greater votaries of science ignored the mighty splendours of this Everest for the minutiae of the immediate fields of their endeavour. But in these days the spirit of the aeroplane dwells in man's conceiving no less than in his physical creation—indeed but for the conceiving elsewhere there could have been no physical creation. And so it is that the thoughts and the dreams and the visions of man, and in particular of the scientist, soar high, and he bows as reverently before theory as he does before fact.

Theosophy still remains theory for him. But his science is also largely theory, and no less science for that. And thus Theosophy and Science are actually beginning to meet in the realms of theory, and even in the realms of so-called fact the statements of Theosophy are slowly beginning to find endorsement in the discoveries of science.

In truth, of course, there is no distinction whatever between Theosophy and Science, only between Theosophy and what is called science. Theosophy is the experience of the Wise. What we call science is the convention of the learned, and all conventions come and go impermanent, as the more learned among the scientists, those who are beginning to be wise, are telling us with that humility which is always the beginning of wisdom.

Even, perhaps, the experience of the Wise is by no means final. Naught can be final to that which, however exalted, still is finite. But Theosophy is at the very least a magnificently bold speculation, and since science is now holding speculation no less precious than experiment, the scientist who knows that dreaming is part of his scientific function may well make contact with a boldness which will carry him right out of himself, loosen him from all his present moorings, and plunge him for his exhilaration into the vastnesses of so far uncharted seas.

Let him ignore the statement that Theosophy is the experience

of the Wise. But let him be inquiring even as to its apparent fantasies, for he himself is already in the realm of fantasy, and often the fantastic leads him to a truth. Already, I make bold to say, the scientist is dreaming Theosophy, and here and there is discovering that a dream comes true. Theosophy and Science are already meeting, both in that dreamland which is the most real land, and in this dreamland of ours which we think is fact-land.¹

¹ Dr. Arundale, in introducing Professor Kanga's book, *Where Theosophy and Science Meet*, writes :

" I most heartily commend this book, compiled by writers learned both in Theosophy and in Science, and the result of Professor Kanga's trained enthusiasm for both, to all who really want to know what the world and the individual are about, who would discover Order, Law and Purpose in Life as they perceive it in themselves and in the world about them. . . Theosophy and Science are already meeting. . . This admirable book tells how this is so, and I commend it most earnestly to all who seek Truth everywhere, and always hold it lightly, knowing that while Truth is everywhere, our understanding of it must ever be less than it really is."

Where Theosophy and Science Meet is appearing in four parts, of which the first part is already published. The other three parts will appear at intervals of two or three months. Publishers : The Adyar Library.

The Expanding Universe

BY W. T. PUGH

“What is it that is ever coming and going?—The Great Breath.”
The Rishis have given us in this simple formula, quoted below, the secret of a cosmic mystery.

IN *The March of Science*, a recent publication outlining scientific progress, we find some interesting material regarding the scientific view of Space. Under the heading of “Cosmical Physics” Sir James Jeans gives us a birdseye view of the latest astronomical theories. According to his commentary there are a number of theories with regard to Space, but, he remarks: “Much more observation is necessary before we can decide between these various alternatives.”¹ His summary of the various theories is as follows:

“In the original relativity theory of Einstein, Space was supposed to be curved, so that it bent back upon itself to form a volume of finite dimensions. It was also supposed to be static, so that its dimensions always remain the same. Some years later Friedmann and Lemaitre showed that a space of this kind could not be static; if it existed momentarily, it would be in unstable equilibrium, and would inevitably start either to expand or contract within a very short time. Recent mathematical

discussions by Einstein, de Sitter, and others have shown that three alternatives are physically possible.

“(1) Space may have started in the way Einstein imagined, and have been expanding ever since. If so, the present rate of expansion shows that it must have been in progress for some thousands of millions of years.

“(2) Space may have started of almost any size we please, contracted to a minimum and expanded ever since. If so, the epoch of minimum dimensions must have occurred some thousands of millions of years ago.

“(3) Space may have experienced regular alternative expansions and contractions in the past. If so, it will continue to do so in the future, and no limits can be assigned to the past age of space.”²

At the moment, scientific opinion seems to favour the first of these hypotheses. As a Theosophist, one would incline to the third alternative, that of regular expansion and contraction, but, we must note, this has not been established scientifically.

¹ *The March of Science*. Art. “Cosmical Physics,” p. 7.

² *Op. cit.*, p 8.

Occult Statements

We can meanwhile record what is stated in *The Secret Doctrine*. The following are a few extracts of the very many which throw a beam of light upon the subject.

"The Secret Doctrine affirms: The Eternity of the Universe *in toto* as a boundless plane; periodically 'the playground of numberless Universes incessantly manifesting and disappearing,' called the 'Manifesting Stars,' and the 'Sparks of Eternity.' . . . 'The appearance and disappearance of Worlds is like a regular tidal ebb of flux and reflux'."¹

In the *Occult Catechism*² there is a question and answer regarding Space:

"What is it that ever is?—Space, the eternal Anupadaka [Parentless.] What is it that ever was?—The Germ in the Root. What is it that is ever coming and going?—The Great Breath. Then, there are three Eternals?—No, the three are one. That which ever is is one, that which ever was is one, that which is ever being and becoming is also one: and this is Space. . . .

"Light in Darkness and Darkness in Light: the 'Breath which is Eternal.' It proceeds from without inwardly, when it is everywhere, and from within outwardly, when it is nowhere—(i.e. *Mâyá*, one of the Centres). It expands and contracts [exhalation and inhalation]. When it expands the Mother diffuses and scatters: when it contracts, the Mother draws back and ingathers.

¹ *The Secret Doctrine*, I, 44-45. Proem, Second Fundamental Proposition.

² *The Secret Doctrine*, I, 39-40.

This produces periods of Evolution and Dissolution, Manvantara and Pralaya."

It is evident from these two extracts that the ancients were well acquainted with that which is now the perplexity of many scientists. Science has yet to realize fully that Life is everywhere, that Planets are not merely huge conglomerates of metals, gases, but something very much more, and that they are most intimately related. Science will realize, as did Kepler, that planets have their own genii, are in fact but outward manifestations of living beings.

"As the human Jiva [Monad], when passing into a new womb, gets recovered with a new body, so does the Jiva of the Earth; it gets a more perfect and solid covering with each Round after re-emerging once more from the matrix of Space into objectivity."¹

In *The Expanding Universe*, Professor Eddington writes: "For completeness we must add the possible hypothesis that the system once extended much further than now, that it collapsed, and is now on the rebound. This allows the large velocities to have been produced by inward-directed force, the inward-directed velocities being turned into outward velocities by passing through the centre. So far as I know this is not advocated by anyone."²

Professor Eddington has intuitively touched a fringe of the teaching given in *The Secret Doctrine*,³ when he suggests that the velocities have been produced by

¹ *The Secret Doctrine*, II, 50.

² *The Expanding Universe*, p. 25.

³ *The Secret Doctrine*, I, 44-45.

an inward-directed force "by passing through the centre."

The names of Indian deities, when understood esoterically, portray the same knowledge. H. P. Blavatsky has a very informative footnote which runs as follows:

"The very names of the two chief deities, Brahma and Vishnu, ought to have long ago suggested their esoteric meanings. Brahman, or Brahm, is derived from the root *brih*, to grow or expand; Vishnu from the root *vish* to pervade, to enter into the nature of the essence; Brahma-Vishnu thus being infinite Space, of which the Gods, the Rishis, the Manus, and all in this Universe are simply the potencies (Vibhutayah)."¹

Says the Master K. H.: "Motion is the eternal order of things and affinity or attraction its handmaid of all works."²

Theosophists recognize two aspects of evolution, and realize furthermore that while manifestation is periodic, the progress of consciousness is a steady advance. This is the fact whether we consider the individual man, who does not go backwards in evolution whenever he drops his physical body, or the universe as a whole, wherein though manifestation is periodic, yet progress is continuous. To use Eddington's phrase, we are Evolutionists, not Multiplicationists.³ We wish that the universe should accomplish some great scheme of Evolution, rather than that its purpose should be "banalized by continual repeti-

tion." We can in fact escape from the inevitable cyclic process only by accepting the proposition that "a degradation or devolution of the physical universe is not necessarily a degradation of the world of spirit . . . that only in the dead smoke of radiation can life attain its fullest development."⁴

Life allows its physical body to dissolve into radiation because it has used it to the full and can learn no more through it. Life can, however, reincarnate in another body, not just to indulge in banal repetition, but to build upon the stepping stones of its "dead selves." And so with a Universe.

EDITORIAL NOTE

There will be much less concern for the future of the Universe—and incidentally for ourselves—when scientists get the long-range view of cosmic evolution which H. P. Blavatsky gives us in *The Secret Doctrine*. She speaks of the great periods of activity and rest following one another in regular succession—the small and the great kalpas, the minor and the maha-kalpas, though "in sober truth they are infinite; for in other words, there never was a *first* Kalpa, nor will there ever be a *last*, in Eternity."⁵

"Pralayas are periodical and follow the Manvantaras in regular succession, as the night follows the day of every human creature, animal and plant."⁶

¹ *The Secret Doctrine*, I, 37.

² *The Mahatma Letters*, p. 67.

³ *The Nature of the Physical World*, p. 86.

⁴ *Nature*, 3 November 1928, p. 703.

⁵ *The Secret Doctrine*, I, 395.

⁶ *The Secret Doctrine*, I, 400.

We might be reassured by the statement in *The Secret Doctrine* that one "half of the existence of Brahma . . . has already expired in the present Maha Kalpa."¹ Are we to conclude from this that our Universe is at the highest point of expansion and we may soon, re-

¹ *Op. cit.*, I, 395.

latively soon, expect it to begin to contract? "Relatively soon" may be a matter of a million years or so. Or have the scientists noticed the contraction already?—ASSOC. ED.

(See Dr. Trew's article, "Problems of Evolutionary Science," in this issue for further comment on this question of "The Expanding Universe.")

ASTRONOMERS OF OLD

The Chaldees nor yet our old Rishis had either your telescopes or photometers; and yet their astronomical predictions were faultless, the mistakes very slight ones in truth—fathered upon them by their modern rivals—proceeding from the mistakes of the latter.—*The Mahatma Letters*, pp. 165-166.

Science and the Mahatma Letters

BY G. NEVIN DRINKWATER

Modern science corroborates the statements of an Adept made half a century ago in astronomy and physics.

AMONG the many remarkable letters received from the Adepts by Mr. A. P. Sinnett is one from the Master K.H., dated 1882, which is of particular interest to students of astronomy and physics. It answers certain questions put to the Master by Mr. Sinnett, and among other things contains a number of observations on certain scientific theories then current, and contrasts them with the occult knowledge of the Adepts.

A portion of the letter, which deals with astronomy and physics, was first published in *The Early Teachings of the Masters—1881-1883*,¹ compiled by Mr. C. Jinarajadasa. In his foreword Mr. Jinarajadasa explains that in the early days of The Theosophical Society copies, or in some cases extracts from some of the letters received by Mr. Sinnett and others were, at the Master's request, entrusted to some of the members of The Society. It was from manuscript books—in the possession of Miss Francesca Arundale and C. W.

¹ Theosophical Publishing House, Adyar, 1923.

Leadbeater—containing some of these copies, that Mr. Jinarajadasa compiled his book.

Most of the original letters remained with Mr. Sinnett, and after his death came into the possession of Mr. A. T. Barker. Mr. Barker eventually published them in *The Mahatma Letters to A. P. Sinnett*, of which the first edition, by T. Fisher Unwin, appeared in 1923, and the second, correcting some errors in transcription, was issued by Rider in 1926.

The section on science in *The Early Teachings of the Masters* includes a long extract from the letter under consideration, while *The Mahatma Letters* gives it in full. As the additional matter supplied in the latter version does not relate to astronomy or physics it need not be considered here.²

The views expressed in the letter were so unlikely to be acceptable to the science of the day that the Master hoped Mr. Sinnett would not send it as a contribution to the

² Some other letters touched on scientific subjects, but on these letters the present writer has no observations to make.

Journal of Science. The Master went on to say:

"I answer you for your instruction as a student of occultism, . . . not at all with a view to answering the *Journal of Science*. I am no man of science with regard to, or in connection with, modern learning. My knowledge of your Western Sciences is *very* limited in fact; and you will please bear in mind that all my answers are based upon, and derived from our Eastern occult doctrines regardless of their agreement or disagreement with those of exact science."¹

Today the position is different. As we shall show, some of the Master's statements, allowing for necessarily different terminology, are extraordinarily modern on a number of important points. At the same time it is only fair to point out that scientific views are still diametrically opposed to some of the other statements made by the Master.

In what follows, the Master's remarks in each section are quoted under the heading "Occult Statements," and are followed by the present writer's comments under the heading "Scientific Corroborations." In order to avoid excessive footnotes, it may be stated that all the quotations from the Master's letter are to be found on pages 146 to 168 of *The Early Teachings of the Masters*, and on pages 159 to 178 of *The Mahatma Letters*.²

¹ *The Mahatma Letters*, p. 166.

² Mr. Jinarajadasa has ably demonstrated the authenticity of the letters in his book, *Did Madame Blavatsky Forge the Mahatma Letters?* in which facsimiles of six different handwritings from the Adepts are given.

A few errors of transcription in some of the published versions of the letter under

THE NATURE OF MATTER

Occult Statements

"We know of no phenomenon in nature—entirely unconnected with either magnetism or electricity—since, where there are motion, heat, friction, light, there magnetism and its *alter-ego* (according to *our* humble opinion)—electricity, will always appear as either cause or effect—or rather, both if we but fathom the manifestation to its origin. . . ."

"Some of her (Science's) greatest misconceptions are found in her . . . newly invented term 'force,' and the absurd and tacitly accepted idea that force is capable of existing *per se*, or of acting any

discussion may be noted. In the first edition published by A. T. Barker, certain apparatus for measuring the velocity of light, devised by "Fizean" and "Corun" is mentioned. (*The Mahatma Letters*, p. 166) This should be "Fizeau" and "Cornu," as any standard textbook on light will show. In C. Jinarajadasa's version (*The Early Teachings of the Masters*, p. 160) Fizeau is rendered correctly, but "Cornu" is also rendered "Corun." Both these mistakes have been corrected in the second edition of *The Mahatma Letters*; they have obviously arisen from the fact that in certain types of handwriting, n's and u's are easily confused, especially in unfamiliar words.

After criticising certain errors and assumptions in Fizeau's and Cornu's determinations of the velocity of light, the letter goes on to say that none "of the other devices contrived by science to measure the velocity since 1887 answer any better." This date "1887," which occurs in both of Mr. Barker's versions and in Mr. Jinarajadasa's, is obviously a slip, since the letter was received in 1882. It should read "1878," the year in which Cornu completed his celebrated series of experiments after improving Fizeau's apparatus.

more than life, *outside*, independent of, or in any other wise than *through* matter: in other words, that *force is anything but matter* in one of her highest states—the last three on the ascending scale being denied because only science knows nothing of them; and her utter ignorance of the universal Proteus, its functions and importance in the economy of nature—magnetism and electricity. . . .”

“Light is not an independent principle; and I rejoiced at the introduction with a view to facilitate means of observation—of the ‘diffraction spectrum,’ since by abolishing all these imaginary independent existences, such as heat, actinism, light, etc., it rendered to Occult Science the greatest service, by vindicating in the eye of her modern sister our very ancient theory that every phenomenon being but the diversified motion of what we call Akasa (not *your* ether) there was, in fact, but one element, the causative Principle of all. . . .”

“The latest theory of radiant energy which shows that there is no such thing in nature, properly speaking, as chemical light or heat ray is the only approximately correct one, for indeed there is but one thing—radiant energy which is *inexhaustible* and knows neither increase nor decrease, and will go on with its self-generating work to the end of the Solar manvantara.”

Scientific Corroborations

According to Occult Philosophy, all things are manifestations of the One Primordial Substance, but a careful study of the above statements shows that the Master taught that even at the physical

level, “force,” electricity, magnetism and matter are different aspects of the same thing, in marked opposition to the physicists of the day, for whom it was an article of faith that matter was quite distinct from energy.

Thus Clerk Maxwell, in his celebrated *Discourse on Molecules*, delivered in 1873 before the British Association, said:

“Though in the course of ages catastrophes have occurred and may yet occur in the heavens, though ancient systems may be dissolved, and new systems evolved out of their ruins, the molecules out of which these systems are built—the foundation stones of the material universe—remain unbroken and unworn. They continue this day as they were created—perfect in number, and measure and weight.”

The following quotation taken from Professor Dolbear’s *Matter, Ether, and Motion* (1899) shows that the idea of the indestructibility of physical matter was an article of faith with some scientific men even to the end of the last century:

“There is nothing to indicate that attrition among atoms or molecules ever removes any of their material. It appears as if one might affirm in the strongest way that the atoms of matter never wear out . . . So one may be led to the conclusion that whatever else may decay, atoms do not, but remain as types of permanency through all imaginable changes—permanent bodies in form and all physical qualities, and permanent in time, capable apparently of enduring through infinite time.”

Modern views grew out of the electrical theory of matter, which

developed from the discovery of the electron by J. J. Thomson in 1897, a considerable time after the Master's letter was written.

It may be said that the whole aim of modern theories is to achieve a unified picture including all physical entities such as light, radiation and matter, etc., mentioned by the Master, so that radiation and matter are, as he says, different forms of the same thing.

The formula connecting matter and energy is becoming a familiar one :

$$M \propto \frac{E}{C^2} \text{ where } M = \text{Mass in grams.}$$

$$E = \text{Energy in ergs.}$$

$$C = \text{Velocity of light.}$$

The occult and present-day scientific views on the nature of matter are thus seen to be in harmony, in strong contrast with the views held by the physicists in the latter part of the nineteenth century, when Mr. Sinnett was in correspondence with the Master.

INTER-STELLAR SPACE

Occult Statement

"Inter-stellar space is filled with highly attenuated matter such as may be put in air vacuum tubes and which stretches from star to star."

Scientific Corroborations

In the chapter on "Some Recent Investigations" in Sir Arthur Eddington's *Stars and Atoms* (p. 67), it is stated that recent work has shown that "the system of the stars is floating in an ocean of space—not merely an ocean of ether, but an ocean that is so far material that

one atom or thereabouts occurs in each cubic inch." Eddington goes on to say that one atom per cubic inch is really a very high vacuum, since in even the highest vacuum we can produce in the laboratory, many millions of atoms are retained.

Eddington thus supports the Master's contention. While it is true that various theories as to the existence of an attenuated sea of matter in interstellar space had already been put forward when the Master wrote,¹ there was no definite evidence thus available for its existence or as to its relative density.

STELLAR DISTANCES

Occult Statement

"The stars are distant from us at least 500,000 times as far as the sun, and some as many times more."

Scientific Corroborations

The distance of the earth from the sun is called an astronomical unit. Hence the Master's statement is equivalent to saying that in round numbers some stars are 500,000 astronomical units away, while others are 500,000 times this, or 25×10^{10} astronomical units.

At the time the Master wrote, the distances of only twelve stars were known, and even then there was doubt as to the accuracy of most of them.² The nearest, Alpha Centauri, was known to be 270,000 astronomical units away, and Sirius about 540,000 units. Since then no nearer star than Alpha Centauri

¹ See R. A. Proctor, *Mysteries of Time and Space*, 1883, p. 8 *et seq.*

² *Op. cit.*, p. 288.

has been discovered except one—Proxima Centauri—which is a little closer. Owing to great technical difficulties in measuring even the distance of the nearer stars, progress was disappointingly slow, and even as late as 1901, only fifty-eight stars were known with reasonable certainty.¹ It will be seen that the existing scientific knowledge

available when the letter was written indicated, as far as it went, distances for the nearer stars of the same order of magnitude as those given by the Master. The distances of the ten nearest stars, according to present-day measurements are given in the following table:

STAR	DISTANCE IN ASTRONOMICAL UNITS	STAR	DISTANCE IN ASTRONOMICAL UNITY
Proxima Centauri	260,000	* at 10H. 12m, 57°-2'	600,000
Alpha Centauri	270,000	Procyon	650,000
" Barnards " Star	380,000	ε Eridani	670,000
Lalande 21185	530,000	61 Cygni	680,000
Sirius	540,000	P. Ceti	680,000

The average distance for these ten is 520,000 astronomical units, in excellent agreement with the Master's value of 500,000 astronomical units, while only three stars are nearer than his estimate.

The Master's estimate of some of the more distant stars being as far away as 25×10^{10} astronomical units was far in excess of any distances that could then be measured, and also of the boundaries of the universe itself as it was then theoretically conceived. Even as late as the beginning of this century, it was estimated by Seeliger that the stars at the boundary were not more than 9000 light years away, or about 5×10^7 astronomical units, that is to say about one five-thousandth part of the value given by the Master, while still more moderate estimates were adopted by other competent authorities.²

In more recent years new methods have been developed which have

¹ H. Macpherson, *Modern Astronomy*, p. 114.

² Op. cit., p. 153.

made it possible to estimate the distance of some of the more remote stars. A cluster of nebulae has been discovered at a distance of no less than 240 million light years,³ which is equivalent to about 15×10^{12} astronomical units. Clearly the Master's estimate comes well within this value. It should be observed that the Master did not say that the most distant stars were 25×10^{10} units away, but merely that there were some stars at that distance. He was obviously conveying a rough idea of the magnitude of the universe to Mr. Sinnett, and, as we have seen, that idea is in harmony with present-day views.

SOLAR AND TERRESTRIAL MAGNETISM

Occult Statements

In one of his questions, Mr. Sinnett asked if any clue could be

³ Sir James Jeans, *The March of Science*, 1937, p. 7.

given to the causes of the variations in the earth's magnetic field. The Master's answer was :

"None can ever be given by your men of science . . . only . . . the supposition that the sun is a huge magnet can account for the production by that body of light, heat and the causes of magnetic variation as perceived on our earth. They are determined to ignore and thus reject the theory suggested to them by Jenkins of the R.A.S. of the existence of strong magnetic poles above the surface of the earth. But the theory is a correct one nevertheless, and one of these poles revolves round the north pole in a periodical cycle of several hundred years. Halley and Handsteen, besides Jenkins, were the only scientific men that ever suspected it."

Scientific Corroborations

Except that so far there does not appear to be a relation between the sun's magnetism and its light and heat, the above statements are now generally accepted.

As we shall see in the next section on the structure of the sun, it was not until 1908 and afterwards that sunspots were shown to be magnetic, and the sun itself as a whole proved to be a magnet, though weaker than the individual spots.¹

"It is practically certain that at least a substantial part of the regular diurnal changes in terrestrial magnetism is due to overhead electric currents, and the association of each current with magnetic disturbances, and of both with aurora, points to the upper atmosphere as the ultimate seat of at least disturbance phenomena. The

¹ Art. "Sun," *Enc. Brit.*, 1929.

27 day recurrence phenomenon supports the view now generally held, that aurora and magnetic disturbances are due to electrical discharges from the sun."²

In addition to the shorter periodical variations, it has been shown that the earth's magnetic field also exhibits a cyclic variation with a period of several hundred years—actually 480 years.³ Attention was first drawn to this long cycle by Prof. Rücker in 1897.⁴

It will be observed that while the scientific evidence speaks of "overhead electric currents,"⁵ the Master refers to strong magnetic poles above the surface of the earth, one of which revolves round the North Pole. These statements are really different ways of saying the same thing. Faraday's fundamental work demonstrated that an electrical current invariably generates a magnetic field, and a moving magnetic field invariably induces a current of electricity in a conductor.

THE STRUCTURE OF THE SUN

Occult Statements

Referring to sunspots, the Master wrote of :

". . . the constant fluctuations of the magnetic matter and its energy upon which also depends the variety and number of spots. During periods of magnetic inertia

² Art. "Earth Currents," *Enc. Brit.*, 1929.

³ Art. "Terrestrial Magnetism," *Enc. Brit.*, 1929.

⁴ *Nature*, 23 Dec. 1897.

⁵ Normally air is an insulator, but the upper atmosphere is ionized and has thus become a conductor.

the spots disappear, or rather, remain invisible. The further the emanations shoot out the more it loses intensity, until gradually subsiding it fades out; hence the outer corona, its rayed shape being due entirely to the latter phenomenon."

Scientific Corroborations

The corona has a vague but unquestionable relation with the sunspot period. At sunspot maximum the corona appears to extend from the sun's limit to roughly the same distance all around. At sunspot minimum, on the other hand, the poles of the sun are marked by comparatively small tufts of light, while from the equatorial region long streamers shoot out to great distances. There is also a not fully determined relation between the corona and prominences of certain types.¹

During the present century there has been a great advance in our knowledge of sunspots. In 1904 the late Prof. Young cautiously pointed out that "as regards the sunspots it seems no longer safe to assume that they are always depressions in the photosphere."

In the spring of 1908, Hale, at Mount Wilson, making use of the spectro-heliograph (invented in 1891), showed that there were whirling storms in the solar atmosphere, thus giving strong support to the hypothesis of the vortical nature of sunspots.

In scrutinizing the spectra of sunspots for traces of the Zeeman effect, Hale also found proof of the existence of magnetic fields in sunspots. He therefore suggested that sunspots were electrical vortices.

¹ Art "Sun," *Enc. Brit.*

In 1909 and 1910, Evershed and St. John, working in India and at Mount Wilson, detected evidence, based on Doppler's principle, of "an actual flow of the material of the reversing layer out of spots and of the chromospheric material into spots."

In 1922 Hale made a further striking discovery. Since most sunspots are associated in pairs of opposite polarity, he concluded that a single visible spot is associated with an "invisible" spot in which the cooling due to expansion is insufficient to cause perceptible darkening of the sun's surface. In November 1931 he detected two such invisible spots by the aid of the Zeeman effect.² This is a remarkable confirmation of the statement made by the Master in 1882 concerning the existence of invisible spots.

Occult Statements

"The sun we see is not at all the central planet of our little Universe, but only its veil or its *reflection*. . . The fact is that what you call the sun is simply the reflection of the huge 'storehouse' of our system wherein *all* its forces are generated and preserved. . . Verily when your astronomers speak of *sun matter*; term those lights and flames as 'clouds of vapour' and 'gases unknown to science' (rather)!—chased by mighty whirlwinds and cyclones—whereas we know it to be simply magnetic matter in its usual state of activity—we feel inclined to smile at the expressions. . . We *know* that the

² The above information is taken from *Modern Astronomy*, by H. Macpherson, pp. 36-38.

invisible sun is composed of that which has neither name, nor can it be compared to anything known by your science—on earth; and that its 'reflection' contains still less of anything like 'gases,' mineral matter, or fire, though even we, when treating of it in your civilized tongue, are compelled to use such expressions as 'vapour' and 'magnetic matter' . . .

"The sun is neither a *solid* nor a *liquid*, nor yet a gaseous glow, but a gigantic ball of electro-magnetic Forces, the storehouse of universal *life* and *motion* from which the latter pulsate in all directions, feeding the smallest atom as the greatest genius with the same material unto the end of the *Maha Yug*."

Elsewhere the Master refers to "minute particles like a dust cloud . . . it is this that we call 'magnetic matter'."

Scientific Corroborations

The Master's conception of the sun as a ball of electro-magnetic forces is another distinctly "modern" view.

At the time the letter was written astronomers were content to think that the sun was a mass of glowing gas, possibly partly liquid or even solid, which kept up its heat by the friction generated by contraction under its own gravitational field, a view which is not held today.¹

Today it is believed that the sun is made up of radiation, i.e. electro-magnetic waves, electrons,

and matter in a state that Eddington has graphically described as "smashed." Atoms in this state have many of the properties of terrestrial gases, but they have lost all, or nearly all of their attendant electrons, leaving merely the nuclei.²

Recently Sir James Jeans has described the state of the matter in the sun as follows:

"Until recently it was supposed that matter could exist only in three states—solid, liquid and gaseous. In all these three states, the atoms exist as the indivisible units from which they take their names. But our exploration of the Sun's interior has shown that there is a fourth state, in which the atoms are broken up into their constituent particles; we may describe it as a state of 'powdered atoms'."³

It follows that the Master's statement that solar matter is not solid, liquid or gaseous in a terrestrial sense is confirmed.

We are immediately reminded here of the occult teaching that there are seven states of physical matter—solid, liquid, gaseous, and four higher states or sub-planes somewhat misleadingly named: etheric, super-etheric, sub-atomic and atomic. Elsewhere in the letter, the Master refers to the sun's *faculae* as "the electric and magnetic" matter in its sixth and seventh state. This suggests that most, if not all, of the visible sun is in the atomic and sub-atomic state. It remains to be seen whether science will eventually recognize more than four states of matter.

¹ An account of the views held by the leading astronomers of the time will be found in Simon Newcomb's *Popular Astronomy* (1898), pp. 272-290, 520-525.

² *Star and Atoms*, 1928, p. 16 *et seq.*

³ Sir James Jeans, *The March of Science*, 1937, p. 2.

This brings us to the Master's remarkable references to the visible sun as being merely a veil or reflection of the real invisible sun.

We can see a body directly only if it emits or reflects radiation at the wave-length of ordinary light. If it emitted or reflected radiation at wave-lengths other than ordinary light, it would be invisible to physical sight.

It is a striking deduction from present-day theories of solar structure that the internal matter of the sun is emitting radiation solely at the wave-length of X-rays.¹ It would therefore be invisible if the outer veil or covering were in imagination to become transparent. As the X-rays in the interior reach the surface they are transformed into visible light. It is only the surface layers of the sun that emit visible light.

The source of all this stupendous energy is uncertain. All the older theories have proved untenable, and it is now believed that the sun's energy may be due to radio-activity or to the transformation of matter into energy.²

Another remarkable result of modern work is that the surface of the sun's photosphere has an average density of about one-millionth part of the earth's atmospheric pressure,

while the chromosphere has a density of even less.³

Truly the surface of the sun has an almost phantom-like consistency; it is of "such stuff as dreams are made on"—yet its blinding light covers the invisible sun within.

SUMMARY

Statements made in 1882 by Master K. H., since confirmed by Science :

Matter a form of energy.

Inter-stellar space filled with highly attenuated matter.

Average distances of nearest stars and distances of more distant stars far in excess of views then held.

Magnetic poles above earth's surface, one of which has a cycle of several hundred years.

The sun a magnet.

Magnetic character of sunspots.

Invisible sunspots.

The sun a ball of electro-magnetic forces.

The matter of the sun in a higher state than solids, liquids, and gases.

The sun we see, a veil or reflection of the real sun which is invisible.

¹ *Stars and Atoms*, p. 16.

² *Ibid.*, p. 99 *et seq.*

³ A. S. Eddington, *The Internal Constitution of the Stars*, p. 368.

A Fourth State of Matter

BY GERARD REILLY

The Views of the Adepts

WE are familiar with three states of matter and three dimensions of space. There has been much speculation about a fourth dimension and occasionally about a fourth state of matter.

There seems to have been a tendency to expect the fourth state of matter, when discovered, to be more attenuated than the gaseous state, to be rarer, more extensible, and to have less mass. In *Occult Chemistry* four "etheric states" are described as being more subtle than the gaseous state of matter known to science. The radiant matter of Sir William Crookes, existing in highly vacuous vessels and activated by high tension electricity, was at first "lightly termed the fourth state of matter,"¹ and that the effect was material was considered proved by the fact that the stream could move a material object and could not turn a corner. Further research showed that this effect, which is now termed the cathode ray, is a stream of electrons.

A new discovery of a fourth state of matter apparently at the other end of the scale—extreme density and high pressure—is referred to in the opening article by Sir James Jeans, entitled "Cosmical Physics," in the composite volume, *The March of Science* (1931-1935). This "new" matter has been detected in the interiors of light and dark dwarf stars and in that of our

Sun, and mathematical considerations point to the likelihood that such matter—comparable to the cold dwarf stars—may exist in the interiors of our Earth and other planets of our system.

In our search for evidence that the Adept protagonists of Theosophy (as well as contemporary trained occult observers) knew and have recorded something more of the constitution of matter and of material objects than even the latest purely scientific pronouncements, we have sought quotations from publications several or many years old which foreshadow present-day scientific discoveries. We must, however, draw attention to the impossibility of our evidence being couched in the latest scientific language. Scientists create their own expressions and name their discoveries as seems well to themselves, so we must seek the ideas and substance behind names and descriptions delivered by different minds of different nationalities and traditions, to say nothing of different decades and centuries. Supposing that the ancient Vedas described an electron in the language of their time and custom; it might be personified as fire is personified. It is unlikely to have been referred to by some single word which could be translated as electron. It would have to be identified by its description, its action, its properties, etc.

The letter from which the following quotations are extracted (in

¹ *The Secret Doctrine*, I, 614.

The Mahatma Letters, first published in December 1923) is stated to have been received by Mr. Sinnett at Simla in October 1882. The scientific statements are from *The March of Science*, 1937.

The March of Science, p. 2: "Until recently it was supposed that matter could exist only in three states—solid, liquid and gaseous. In all these three states, the atoms exist as the indivisible units from which they take their names. But our exploration of the Sun's interior has shown that there is a fourth state, in which the atoms are almost completely broken up into their constituent particles; we may describe it as a state of 'powered atoms.' And in this state the particles may be packed very closely together, so that the substance may be of very high density."

The Mahatma Letters, p. 165: "We know that the invisible sun is composed of *that* which has neither name, nor can it be compared to anything known to your science—on earth; and that its 'reflection' contains still less of anything like 'gases,' mineral matter, or *fire*, though even we when treating of it in your civilized tongue are compelled to use such expressions as 'vapour' and 'magnetic matter'."

The Mahatma Letters, p. 165: "The sun is neither a *solid* nor a *liquid*, nor yet a gaseous glow; but a gigantic ball of electromagnetic Forces, the storehouse of universal life."

How should a person avowedly unused to Western science, and not an Englishman, describe a state of

matter known to himself, but unknown to science of that day, otherwise than by saying that the said state of matter is *not* any of those states of matter already known?

The quotation from *The Mahatma Letters* just given contains a word which is placed in quotes in the original and requires some explanation—the word "reflection." This explanation is given in the following passage two pages earlier (p. 163, line 11): "The sun we see is not at all the central planet of our little Universe, but only its veil or its reflection."

These extracts we take to mean that the visible part of the sun is different in composition and quality from the interior core which would be, apparently, entirely invisible in its original unchanged condition, being composed, as the quotations says, of electro-magnetic force, which is, perhaps, the same as the etheric matter of *Occult Chemistry*. This etheric matter is stated to be composed of the smaller particles of which chemical matter is composed, and which are liberated by breaking up the gaseous atoms.

It is a new idea, but not untenable, that the etheric states as well as the gaseous states of matter could be compressed, although how it is to be done we do not at present know—except, perhaps, by the action of the trained will. Let us grant that it can be done, and consider what might be the result. If we take matter in any of its etheric states (see *Occult Chemistry*) we find the particles are much smaller than chemical atoms and are composed of various numbers and different groupings of anu on

the four levels, until we reach the atomic sub-plane, when we find only the anu, positive and negative.

Granting this debris of the broken-up atoms can be compressed, we can easily suppose that the particles could be packed together much more closely than gaseous, or even solid matter, on account of the space swept out by the specialized motions of the particles being no longer occupied.

The conditions suggested appear to be similar to the state of the "matter" in the light and dark, heavy dwarf stars, the sun and planets; atoms powdered, reduced to their constituent particles, and compressed.

The following extract from *The March of Science* continues the description of the broken-up atoms (p. 2): [In the sun] "The great number of free electrons—one for every eighty atoms—is something to which we can find no parallel on earth. Free electrons occur so plentifully because atoms are 'ionized' by heat; electrons have been loosened from the atoms to which they belong and set free to travel as independent units. The higher the temperature the greater number of electrons liberated. As the Sun's radiation necessarily flows from higher to lower temperature, it follows that as we pass from the Sun's atmosphere to its interior, the temperature must continually increase. The number of free electrons also increases, so that when we arrive at the central regions of the Sun, we shall find that almost all the electrons have been stripped off their nuclei and travel about as independent units."

With this we can correlate a few lines from *The Secret Doctrine*

(I, 643): "A nebula exists in a state of entire elemental dissociation. It is gaseous and something else besides, which can hardly be connected with gases as these are known to Physical Science; and it is self-luminous." We have here a statement printed in 1888, at which time the possibility of the dissociation of atoms was scarcely entertained, although Crookes had published his views on the building up of the elements.

These considerations appear to throw some light upon the question whether the atomic forms observed and recorded by C. W. Leadbeater in *Occult Chemistry* are the whole and complete atoms, or are the nuclei without the accompanying planetary electrons postulated by science, or their "occult" equivalent. It would appear that the planetary electrons or their "occult" equivalent are included.

The atoms described by Leadbeater are in the gaseous state; and are organized systems of small bodies in motion which sweep out, or occupy, a much larger space than the actual aggregate volume of the small bodies themselves, just as would be expected if the atoms were nuclei with their accompanying electrons as the scientific model.

Although gaseous atoms aggregate into clumps to form liquids and solids, the empty space between the small interior bodies presumably remains occupied, if not filled. Whereas if the atoms are broken up, the small bodies—again presumably—could be packed much more closely together, into a condition of greater density than that of even heavy metallic solid elements.

Are the Three States of Matter Abnormal?

To condense further lengthy quotations from this article in *The March of Science*: Stars are known "in which the greater part of the substance is packed in this very compact manner." They are called "dwarfs," and are white or black dwarfs according to whether they are hot and radiate light or are "perfectly cold."

Of the black dwarf, R. H. Fowler finds "that its electrons and nuclei would finally fall together so as to form one huge molecule." Other mathematicians have pointed out that the atoms would be "crushed to pieces by extreme pressure." There is a "simple relation between the radius and the mass of a perfectly cold star of this kind" . . . "increase of mass also increases the internal pressure and density" until a state is reached when increase in mass produces no increase in size; thereafter "increase in mass will actually reduce the size,—until we find that a star whose mass was infinite would be infinitesimal in size."

According to calculations of the sizes of dwarf stars corresponding to given masses "the radii of white dwarfs prove to be somewhat smaller than has actually been observed. But these stars are hot while those of the calculations are supposed to be completely cold."

The radii of black dwarfs of masses comparable to Jupiter and Saturn are "again somewhat smaller than those of these planets," while Venus and the Earth have "almost precisely the actual radii" of black dwarfs of similar masses. This leads to the suggestion that

"the nearest black dwarfs are very near home indeed," and that the interiors of the Earth and the other planets "would consist of matter in its fourth state, in which the nuclei of the atoms are held together as in one single huge molecule, while the electrons described ordinary orbits."

Combining hints and suggestions derived from these new scientific statements and those of occultists, we will venture to draw a composite and very speculative picture of the conditions of the material of the solar system to be encountered, traversing a line from the centre of the sun to the centre of the earth. The hypothesis suggests:

(1) That the crust of the earth—the shell of solid, liquid and gaseous chemical elements—is a state or zone of differentiated matter existing between two other undifferentiated or homogenous states of the material of the solar system; (2) That a process of sublimation or the passage of material is going on from hot sun to cold planet, with the intermediate stage, not of vapour, but of radiation; (3) That the matter of the inhabited crust of the earth is differentiated into species of elements as to its mineral kingdom, as well as its animal and vegetable kingdoms, even as humanity is individualized into separate units; (4) That this state of differentiation is a temporary and special condition to be followed by densification into the fourth state of matter as in the cold dwarf stars at the zero of temperature.

The scientific statement refers to matter existing in both sun and planet in this fourth state. In the sun the matter is said to be ionized

by the high temperature, the nuclei and electrons being separated. In the cold dwarf stars and planets the electrons are said to have fallen on to their nuclei. In both cases the configuration of nucleus and circulating planetary electrons is absent, and since chemical properties are derived from the circulating electrons, it would seem that these dense states of matter are bereft of chemical properties, thus being matter without character or differentiation, probably homogeneous.

But we would suggest the chemical properties are in reality derived from or are an expression of separateness, of differentiation of the life, and the configuration of nucleus and revolving electrons (or the central body and its accompanying cone-configurations of particles as in *Occult Chemistry*) is a mechanism for giving expression to this.

It is significant that these two extreme states of substance are implied, in Sir James Jeans' article, "Cosmical Physics," to be homogeneous. The expression "one huge molecule" is used (p. 3); and on page 4 *op. cit.* he states that if the calculations of the Delhi scientists (Kothari and Magendar) are right, as to sizes of stars corresponding to various different masses, "the interior of the earth would be a single molecule formed out of millions of atoms of iron, silicon, sodium and so forth, the 'substance' of the greatest known molecular weight."

And here it is interesting to compare a passage of *The Secret Doctrine* (I, 638): "Hitherto, Alchemy alone, within the historical period, and in the so-called civi-

lized countries, has succeeded in obtaining a real *element*, or a particle of homogeneous matter, the *Mysterium Magnum* of Paracelsus."

From both sources we find hints that the undifferentiated state is the usual and normal condition of substance. *The Secret Doctrine* (I, 619) speaks of "Inchoate matter in its first undifferentiated condition, or in the Laya state, the eternal and normal condition of Substance, which differentiates only periodically; during that differentiation, Substance is really in an abnormal state." And again (I, 644): "Primeval matter . . . is yet to this day homogeneous, at immense distances, in the depths of infinitude."

Living on the chemical shell of the earth, we have assumed that our conditions are common to other stars and systems, although hints of the possibility of the uniqueness thereof have been given by Sir James Jeans: "That other matter in other stars is also 'chemical' . . . appears . . . by no means a necessary assumption."

The *March of Science* article, referring to the dwarf stars and the difficulty of their detection, says: "Nevertheless a considerable number have been identified in recent years, and it even begins to seem possible that they may be the commonest type of stars in space."

The material of the core of the sun seems to consist of ionized matter in its fourth state, nuclei and electrons separated from each other by the high temperature. This material appears to be resolving itself into radiation, doubtless of many sorts. The photosphere of the sun—the visible envelope, or

veil—contains chemical elements, shown by the existence of line spectra. It possibly tones down a radiation that would be too fierce for us on earth if received direct.

In *The Mysterious Universe* (p. 73), Sir James Jeans says it is recognized that matter becomes radiation; the sun losing mass at the rate of 250 million tons each minute (p. 58). Also that "some scientists . . . maintain that somewhere out in the depths of space the radiation may be re-consolidating itself again into matter," thus giving the universe a cyclic character. Now we suggest, very tentatively, that this process of re-consolidation may be taking place close at hand, in the chemical region of the crust of the earth, and that perhaps one of the chief mechanisms may be the life of the animal and vegetable kingdoms, especially the latter.

There is no particularly spectacular evidence as yet that the chemical elements of the crust of the earth are changed into the dense matter of the core. We may note, of course, the absorption of light by vegetation, and the densification of vegetation into coal and eventually into graphite.

We thus speculate that perhaps the solar substance—consisting of separated nuclei and electrons (or maybe, in the occult view of matter, of the etheric sub-planes of *Occult Chemistry*), and therefore not matter as we know it—becomes solar radiation, and, as far as the earth is concerned, reconsolidates into matter by the organized association of these nuclei and electrons to express the differentiations of the life embodied on the earth's crust, and later consolidates still

further by coalescence of electrons and nuclei into the "heaviest substance," which finds a final resting-place in the earth's core.

Such a hypothesis offers some light on several points:

The Alchemist sought to produce gold, the heaviest substance with which he was acquainted (with the exception of lead).

It is an embodiment of the well known principle of the cycle from homogeneity through differentiation to homogeneity again.

It is interesting, also, to think that the chemical elements achieve their differentiation, or individualization in the same place and time as mankind, that there they develop their smaller amount of freewill as choice which we call chemical affinity, and also a polarity to some extent comparable to sex.

And lastly, it may be that some variety of this non-chemical material may be known to science as the neutron, of which Rutherford in *The Newer Alchemy* (p. 36) says: "A convenient and steady source of neutrons can be made by mixing a pure radium salt with powdered beryllium in a sealed tube. The bombardment of the alpha-particles produces about half a million neutrons per second, most of which pass through the tube." And on page 38 Rutherford quotes his own prediction that a particle with neutral electric charge "may be impossible to retain in a sealed vessel."

Thus this neutral matter—we are assuming that when the electrons of an atom have coalesced with the nucleus, the result whatever it is, particle, wave or mathematical equation, is neutral—is able to pass through our ordinary matter.

This throws a suggestive light upon which appear to entail the passage the occult phenomenon of apports, of matter through matter.

(A further study on the Nature of Matter, entitled "Atomic Evolution", by Mr. D. M. Wilson, a member of the Science Group of the Theosophical Research Centre, London, will appear in a later issue of THE THEOSOPHIST. We regret that we were not able to include it in these pages.—ASSOC. ED.)

THE ANCIENTS KNEW

Tell Science that even in those days of the decline of the Roman Empire, when the tattooed Britisher used to offer to the Emperor Claudius his *Nazzur* of "electron" in the shape of a string of amber beads—that even then, there were yet men remaining aloof from the immoral masses, who knew more of electricity and magnetism than they the men of science do now.—*The Mahatma Letters*, p. 164.

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Biology and Reincarnation

BY H. W. MUIRSON BLAKE

A study in emergent evolution, linking reincarnation and germinal continuity, and opening an entrancing window on the subject of heredity.

THE fact that modern Theosophy was designed to offset the more materialistic implications of the theory of Evolution makes the development of that theory of constant interest to the Theosophist. How entirely the scene has changed since these teachings—Evolution and Theosophy—reappeared during the latter half of the last century!

Consideration of these changes makes clearer to us the fundamental importance of never confusing the eternal verities with those periodical formulations of it which arise to suit particular times and places. Whether we agree with Bertrand Russell¹ or not, that Einstein and Copernicus are alike in that each brought a revolution in man's intellectual world, and that pre-relativity and geocentric thinking equally belong to an outworn past, we must yet be aware that Theosophy in its formulations will change to meet the intellectual needs of the moment.

Occult Teaching as to the Organism

A fundamental difference between the scientific and the occult interpretation of the organism lies in the fact that while science is limited to the physical expression,

¹ *The A B C of Relativity*, by Bertrand Russell, p. 10.

the occultist deals more specifically with its superphysical counterparts. In the case of mineral forms for example, the occultist considers an etheric (super-gaseous) double; in the typical vegetable forms there is also an astral or emotional form as well, while the animal possesses, besides these, a mental body. In the case of Man the counterpart extends right up into the spiritual (higher mental) sphere, which constitutes him a "living soul," a spiritual individual, in contradistinction to the lower kingdoms, out of which he has gradually risen. Furthermore, and what is so important from the point of view of the evolution of the organism, the purpose, the driving force, the urge towards an ever fuller expression comes from these invisible levels of being, the forces of which, tapped and channelled by these counterparts, flow downwards through them into the outside world.

The nervous system is the ultimate expression and channel of these forces, and the ever increasing complexity and sensitivity of this mechanism in the evolving series of forms is primarily due to the constant flow and, as evolution proceeds, the increase in these forces. As the real living centre (the Group Soul, or the Ego in the causal body) moves slowly upwards

so enthusiastically sponsored it, it yet remains today substantially acknowledged, and has probably withstood the passage of the years better than most biological teaching of the last century.

Occult Implications

Turning immediately from Recapitulation to the Theosophical teaching of Cycles, here also we at once perceive two fundamental cycles. There is, first, the great universal cycle through which all living things have to pass, the cycle of the Life Wave, beginning as the 1st Elemental Kingdom at the atomic level in the higher mental, and passing gradually downwards by three stages to the physical, when we recognize it as a mineral kingdom. Having thus reached the bottom of the cycle, spirit having fully descended into matter, it now commences to pass back again upwards, when the undifferentiated sheaths of matter, appropriated on the arc of descent, are to be worked up into functioning instruments of consciousness as it successively manifests as a vegetable, an animal and finally a human kingdom, passing approximately a Chain Period at each of these stages. Within the inconceivably vast sweep of this cycle is comprised all manifestation, visible and invisible, in the lower worlds, but it is significant that the spiritual kingdoms of super-human development are above it, and for this reason do not ordinarily come within human ken.

The second cycle has to do with the individual, and is clearly the recapitulation by the separate organism of that portion of the great cycle, outlined above, which its

source (the Group Soul or Ego in the causal body) has already completed. In the case of the plant or animal, it is that impulse from the Group Soul that eventuates at the physical level in the living creature, and, after the physical dissolution, its gradual return through the various sub-planes that separate the group soul from the physical level. In the case of man, of course, it is the familiar process of incarnation, commencing with the descent of consciousness from the causal body at its particular level in the higher mental, the drawing round the permanent atoms of clouds of matter from their respective planes, as these units begin to thrill in response to the renewed flow of life—these clouds of matter will later be organized into an astral and a lower mental body—and the return of the personal consciousness after the physical life is finished, back again through the purgatorial and devachanic levels to the Ego.

Once again we must consider the intimate and causal relationship that exists between these two cycles, the universal and the individual. Memory, which is a fundamental property of life, is the link between the two, and the record of this universal descent and ascent of the Life Wave remains for ever indelibly impressed upon the myriads of contained triads, becoming so much a part of them that whenever and wherever the opportunity to manifest comes to them they automatically and unconsciously reproduce, within their tiny sphere, this fundamental process of descent and ascent. The impulse to follow this law remains irresistible right through the human stage until the Ego,

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into still more highly vitalized levels of being, as it is always tending to do, the flow downwards of these forces is still further increased, a pressure is exerted towards a still more sensitive and differentiated instrument, and development takes another stage forward.

The development of all these counterparts proceeds *pari passu* with the physical organism: the mental with the cerebro-spinal system, the astral with the sympathetic, while the etheric operates in the physical body through the secretions of the ductless glands and the other "growth-promoting" substances. It is possibly yet another sign of the race consciousness entering more and more into the etheric that the function and chemical constitution of these secretions has been a very important, if not the most important, object of research in this field during the past few years.

Scientific Theories of Growth

Thirty years ago the view was put forward that the development of the various parts of a plant, such as flowers or roots, was due to the action of certain chemical substances, a foreshadowing of the much later discovery of growth-promoting substances secreted in the animal body by definite internal glands. For example, the growing tips of young oats can be cut off and the ends pressed on gelatine, when a substance will be exuded which will promote growth on other oat stems. Further than this, not merely the growth but also the general health and vigour of the animal body are dependent upon the action of these substances, generally known as hormones.

It is also probably characteristic of this increasingly dynamic view of growth and maintenance that substances hitherto supposed to have merely a static part to play in cell structure are now, on the contrary, found to possess active function. For example, the important group of the *Sterols*, which are a constituent of the cell,¹ and which are known to be closely associated with its reactions, have been identified as a family of substances whose molecule primarily consists of three six-carbon rings in association with one five-carbon ring, and it is now known that a number of physiologically active substances, certain vitamins and sex hormones, are all related to this fundamental group.

Along with this has proceeded a rapid growth in the knowledge of the chemical nature of vitamins, which has long been delayed owing to the minute quantities in which they occur.² Of the six or seven vitamins known, each of which exerts its specific influence on the animal body, the molecular structure of two of these, vitamins A and C, is accurately known, and commercial synthesis, based on this, is actually proceeding, while knowledge of the others is growing and will shortly be completed. It is also of interest that the differences in molecular structure can now be related, both in vitamins and in hormones, with their specific influences on the organism.

¹ *The March of Science*. Art., "Biochemistry," p. 148.

² *The March of Science*. Art., "Biochemistry," p. 149.

Genetics

The pushing of inquiry back into the etheric is also evidenced lately by the research carried out in Genetics on the function of the chromosomes. These microscopic bodies are the active agents in nuclear division, and their number and shape appear to be constant in any species. To explain their function, certain invisible, but measurable, entities called "genes" are posited as existing within them. The connection between these genes, their actual distribution along the chromosomes, and some hereditary factor such as colour of leaf or shortness of stem, have been proven, and the variable factors in certain stems can be attributed to certain corresponding arrangements of the "genes" along the chromosomes. Diagrams of these have been actually prepared, which are called "chromosome maps."

Experimental proof has been obtained that the variations by which, together with selection, evolution is supposed to proceed, are associated with the recombination of already existing genes into new gene-complexes. Following this idea further, of the organism being made up of a number of separate entities, the fact that the fertilized egg can be cut up into various parts and the development of these separated portions observed, has resulted in the view that the organism cannot be regarded as a "whole," but a sort of composite of "tissue cultures" or a collection of self-differentiating organs and parts.

Cycles

Further, the teaching as to super-physical counterparts already re-

ferred to is that their activity and development proceed by cycles. One of the most important theories in biological science is that known as Recapitulation. Haeckel showed us that the organic world presents two great series of forms: the first of these is the ancestral (phylogeny), beginning supposedly millions of years ago with the single cell, passing through simple multicellular forms to the fishes, then to the amphibia, from which arose the reptiles and later the mammals, and ultimately the most highly evolved mammal—man.

The second great series of forms is that presented by the individual in his growth (ontogeny), which, also beginning with the unicellular, the fertilized ovum at conception, passes through a series of forms, many of which may be quite different from the mature form they are eventually to become. The intuition of that otherwise so intensely materialistically inclined mind of Ernst Haeckel seized upon these ideas and poured out all its brilliant powers in adducing evidence to prove that ontogeny (the development of the individual) is a recapitulation and is causally connected with phylogeny (the ancestral development of the Race).

Another writer put it briefly that the animal in its development "climbs up its own ancestral tree," and so we find that the human individual in his nine months of foetal growth briefly recapitulates his long ancestral history.

Before leaving the theory of Recapitulation to consider its occult implications, it is well to note that although this theory has received considerable criticism since Haeckel

so enthusiastically sponsored it, it yet remains today substantially acknowledged, and has probably withstood the passage of the years better than most biological teaching of the last century.

Occult Implications

Turning immediately from Recapitulation to the Theosophical teaching of Cycles, here also we at once perceive two fundamental cycles. There is, first, the great universal cycle through which all living things have to pass, the cycle of the Life Wave, beginning as the 1st Elemental Kingdom at the atomic level in the higher mental, and passing gradually downwards by three stages to the physical, when we recognize it as a mineral kingdom. Having thus reached the bottom of the cycle, spirit having fully descended into matter, it now commences to pass back again upwards, when the undifferentiated sheaths of matter, appropriated on the arc of descent, are to be worked up into functioning instruments of consciousness as it successively manifests as a vegetable, an animal and finally a human kingdom, passing approximately a Chain Period at each of these stages. Within the inconceivably vast sweep of this cycle is comprised all manifestation, visible and invisible, in the lower worlds, but it is significant that the spiritual kingdoms of super-human development are above it, and for this reason do not ordinarily come within human ken.

The second cycle has to do with the individual, and is clearly the recapitulation by the separate organism of that portion of the great cycle, outlined above, which its

source (the Group Soul or Ego in the causal body) has already completed. In the case of the plant or animal, it is that impulse from the Group Soul that eventuates at the physical level in the living creature, and, after the physical dissolution, its gradual return through the various sub-planes that separate the group soul from the physical level. In the case of man, of course, it is the familiar process of incarnation, commencing with the descent of consciousness from the causal body at its particular level in the higher mental, the drawing round the permanent atoms of clouds of matter from their respective planes, as these units begin to thrill in response to the renewed flow of life—these clouds of matter will later be organized into an astral and a lower mental body—and the return of the personal consciousness after the physical life is finished, back again through the purgatorial and devachanic levels to the Ego.

Once again we must consider the intimate and causal relationship that exists between these two cycles, the universal and the individual. Memory, which is a fundamental property of life, is the link between the two, and the record of this universal descent and ascent of the Life Wave remains for ever indelibly impressed upon the myriads of contained triads, becoming so much a part of them that whenever and wherever the opportunity to manifest comes to them they automatically and unconsciously reproduce, within their tiny sphere, this fundamental process of descent and ascent. The impulse to follow this law remains irresistible right through the human stage until the Ego,

having reached the very threshold of the next higher world, the Buddhic, and so in himself completed the great cycle, becomes freed from the domination of the wheel of Birth and Death to which he has been bound for so many ages.

Ancestry

When we consider reincarnation in this manner, as the recapitulation by the individual of the great Life Wave cycle by which he comes into manifestation on the lower planes, we are dealing here with identically the same process, the recapitulation by the individual of his own ancestral past, as we did just now in the purely biological theory of Recapitulation. This compels us to consider the whole subject of Ancestry, on which so many religions have been based, in a new way, for our ancestry is the history of our own group reproduced karmically in our individual bodies in the present.

To the Reincarnationist the theory of Germinal Continuity, on which this teaching is based, must ever be profoundly interesting. That the child is as old as his parents has been pointed out many times. The idea that each succeeding generation is, as it were, but the prolongation of the racial organism, so that our bodies are as old as the race itself, when supplemented by the teaching that the individual is continually appearing and disappearing upon the surface of this continuum like the coloured threads in the pattern of a carpet, opens an entrancing new world to us on the subject of evolution and heredity.

The occult teaching of cycles, however, presents us with many

more recapitulatory systems than the two already outlined, and it is the overlapping of these which may often confuse us. Then there is also that very mysterious principle by which man, instead of being the evolutionary product of the lower kingdoms, on the other hand appears as the originating source of its present forms during the first three Rounds in any Chain period, and this relation will reappear in the opening three phases of all the smaller cycles contained within it.¹ Hence there is great interest in the theory that instead of the ape and the chimpanzee being merely man's primitive ancestors, these animal forms, on the contrary, represent the partial expressions of elements which are present in the human body but do not attain full development there. Man is thus said to be a less perfect animal than the monkey. His erect posture leads to many mechanical troubles such as hernia, and a narrowing of the pelvis which makes childbirth both painful and dangerous. Furthermore, we see in adult man elements which are present in the animal embryo, but which it later grows out of.

These views, which are rather obscure and difficult, are given in *Embryology and Evolution* by de Beer, Oxford 1929, and they are of interest to us as possible evidence of man's occult relationship with the lower kingdoms, as well as an example of one kind of cycle being superimposed upon another, for the general principle still remains intact, that life passes from lower

¹ See *The Web of the Universe*, by E. L. Gardner; also the article in this issue by E. W. Preston on "Man's Family Tree."

forms to higher as unfoldment proceeds.

Group Soul Evolution

Of the highly important subject of the evolution of the Group Souls we know, at present, next to nothing. We read of division and subdivision taking place, presumably when successful variations of the dominant species arise, and simultaneously with this the gradual rising of the Group through the sub-planes along with its general development. The idea of this gradual rising of the Group Soul through the sub-planes is one of Theosophy's most useful contributions to modern thought on evolution,¹ for it explains that hitherto incomprehensible mystery of "Emergence." The entry of the Group Soul into a higher sub-plane signifies the tapping and utilization of the more highly vitalized forces of that level, and the possibility of the inclusion of these dynamic elements in its processes.

For example, the emergence of "function" in the simplest form of cell is primarily due to the entry of the Group Soul into the astral world and the bringing of the forces of desire into the cell life as function (desire for food, for growth, for propagation), while the real difference between Man and the animal world out of which he arises is not only the final separation of the Group Soul into its ultimate triads at individualization, but also the entry of the Ego into the next higher world (higher mental) and the bringing of spiritual possibilities within the field of endeavour.

¹ See p. 226.

These are, of course, outstanding examples of the sudden emergence of new qualities within the evolving series, but we must understand that it operates, although in a more limited sense, throughout the whole. It is this process of the continual tapping of ever finer and more highly vitalized levels of consciousness—implied in this gradual rising of the Group Soul through the sub-planes—which is the real mechanism of emergence, and which also supplies the constant driving force towards ever greater sensitivity and perfection in the organism.

The significance of Egoic and Group Soul evolution remains a mystery to us all, and this is why all efforts of biologists to picture the origin of a new species out of an old established one have so far been in vain. Natural Selection and Adaptation, when put to the test of experiment and observation, have never been proven, yet still the tantalizing picture of continuity and blood relationship throughout the entire organic world remains, challenging our limited powers of interpretation and comprehension.

The transmission of variation through use or disuse in the case of sterile species of ants and bees—which discredits Lamarckism when the possibility of transmission is limited to the physical germ alone—is quite understandable when the Group Soul is recognized as the real continuum behind the passing generation of creatures.

Orthodox biology in all its dealings with the problems of transmission—upon which, after all, the whole structure of the evolution hypothesis ultimately rests—labours

under the great disadvantage of perceiving the germ cell, and only the germ cell, as the soul transmitting instrument throughout the series of evolving forms. The view that we have put forward associates with the fecundated cell the permanent atoms and the Group Soul in the work of transmission. It is the association of these three together that transmits the organic forces from one generation to the next, that records with photographic exactitude every experience and modification undergone by the stem, and finally decides what measure of these shall be expressed through the new organism as variation.

Racial History and the Group Soul

During late years the history of a number of species has been laboriously collected, and this, as a rule, does not make good reading. A study of these histories shows that degeneration is a commoner occurrence than progress, that for every one species of plant or animal that thrusts up into a new and successful type, a host of others have either remained stationary or passed into extinction. Also there is the study of Parasitism, which shows groups whose ancestors were free-moving creatures with limbs or wings, but who, taking up bad habits, have lost the power of locomotion and rapidly degenerated.

For these reasons the view is generally accepted that there does not appear to be any general tendency in a species to progress. This concept would probably come into line with the Theosophical view that the Group Soul is the real evolving entity, and only indirectly

is the species of plant or animal its expression in the outer worlds. Also of interest to the occultist is what he can learn from these facts of science about the Group Souls. For example, the phenomenon of parasitism suggests that just like a human life, the Group Soul life can similarly "go wrong," and it would be most instructive if we could trace the later history of the Group Souls of some parasitic species and see them learning their lessons by having to start again in some very primitive organism.

We can also ask ourselves such questions as these: Do the Group Souls take, as it were, an incarnation in the first appearance, the development, and finally the going into extinction of a particular species, and then withdraw for a period of rest and assimilation, just as the individual man is pictured as doing on the inner planes after physical dissolution? Or can we imagine that when some successful variation does arise out of some old established type which it gradually, by survival, supplants, the Group Soul behind the parent species merely deflects the flow of its life from the old type of organism to the new, and so remains continuously in incarnation and outer activity?

The fact that this establishing of a new species out of the successful variation of an old one has never been witnessed and is simply conjectural, rather throws the evidence against continuous incarnations, and brings us back once more to the problem as to how we are to picture the evolution of the Group Soul and also the human Ego as proceeding.

We do know something about egoic development. First, we must divest ourselves of everything that we think of as growth in the physical sense. Egoic development, we read, takes place by means of various initiations, which is the more or less sudden raising of the life from some lower level where it has long been at work, on to a higher level where sustained effort must be continued amidst a new set of values.

That this saltatory, discontinuous method of unfoldment is general in the inner worlds is evidenced by the teaching that in a series of Chain Periods, the evolving Life Waves are moved from one kingdom to the next higher one, more or less as units during the close of one period and the opening of the next. We might

therefore perhaps consider a related series of species as the successive incarnations of one Group Soul, between the appearance of each of which species probably immensely long periods of time elapsed, when the particular type has been practically extinct and the Group out of incarnation, to be followed in turn by a fresh period of renewed activity when some new and generally more effective type arose to carry on the family history.

These views are at best tentative, and await the attention of the clairvoyant scientist of the future. Meanwhile, there is much that we can do, as we hope may have been so imperfectly indicated in these pages, towards establishing the theory of Reincarnation as a definite biological teaching.

THE RECONCILER

“While the Western Sciences make confusion still more confused our Science explains all the seeming discrepancies and reconciles the wildest theories.”—*The Mahatma Letters*, p. 244.

Problems of Anthropology

BY E. W. PRESTON

I. MAN'S FAMILY TREE

The problem of the evolution of the physical body of man, and especially his relation with the apes.¹ Subsequent articles will deal with "Modern Races and Their Distribution" and "The Problem of Population."

Scientific Evidence

THOUGH the discoveries of the last half century have shown beyond doubt that man's body is the product of evolution, yet it has recently been admitted by scientists that the processes of this evolution are more complex than they at first supposed.

Commenting on a paper by Mr. Douglas Dewar, the Editor of *Nature* says:

"Mr. Dewar correctly sums up the position when he states that 'Science can truthfully say that it knows not when, where or how man originated,' but he understates the truth when he says that this is all

¹ These articles form part of work undertaken by the Science Group of the Theosophical Research Centre, London, in the course of a study of the great Plan of Evolution.

I wish to express my indebtedness to many of my fellow-members, and especially to Mr. G. Reilly, who used the material for a film-slide lecture delivered to the European Congress at Copenhagen in July 1937. I also have to thank Mr. Webster, Mr. Hammond and Miss Patricchio for assistance with the diagrams.—E.W.P.

that Science knows, for although there is 'no conclusive evidence that any Primate genus has been transformed into any other genus,' there are resemblances in detail and gradings which require much explanation if transformism is to be rejected."²

Until the present century, modern man was considered to be derived from primitive Neanderthal man, and primitive Neanderthal man from the anthropoid apes.

Such a simple relationship has had, however, to be abandoned by science, for so far the links in the chain have not been discovered. Indeed, the evidence available points to the fact that even Neanderthal man was not a stage in the development of the modern European, although he represents an ancestral type.

Concerning this relation of modern and Neanderthal man, Sir Arthur Keith writes:

"We know that the evolution of man took place in Europe by the 'indirect' method—evolution by replacement of one race by another."

² *Nature*, 15 June 1935, p. 937.

And he adds :

"We must suppose that a disaster of a catastrophic nature overtook the entire population of Europe during the last phase of what has come to be called the Ice Age.¹ Neanderthal man and his culture—the Mousterian culture—came to an end; modern man appeared, bringing with it the Aurignacian culture. Where and how the species called modern man first appeared we have yet to discover."

Discussing the problem of the origin of very early man, Sir Arthur draws, somewhat tentatively, "the conclusion that at the beginning of the Pleistocene² the *ancestors* of the Mongol, the Australian and the Negro were already in occupation of the continental areas now inhabited by their descendants, and that after their separation each race underwent a series of parallel evolutionary changes."³

Prof. H. J. Fleure imagines not one single pair of ancestors, but: "We should picture groups of beings on the threshold of a full human status, with probable differences within the group as well as between groups, scattered over a wide area as more or less mobile collective hunting societies forming a sort of human network over a wide area of the Old World, stretching at least through North Africa and South-West Asia."

In like manner the evidence appears to indicate that the Anthropoids are not the direct ancestors of Neanderthal man, but that they

diverged from the family tree at some still earlier period.

Writing on "Man in the Making," Sir J. Arthur Thomson states: "The scientific conclusion clearly indicated is, that men in the making split off very long ago in the Miocene period, from a stock common to them and the large apes of today. No one believes that tentative man sprang from any *existing* apes or monkeys."⁴

Prof. W. E. Le Gros Clarke, of Oxford, argues that the human stem might already have become segregated at a much earlier stage in evolution than is generally supposed. . . recent discovery has established that the modern apes were fully differentiated by the beginning of the Miocene period.⁵

The date of the beginning of the Miocene period is given by Urry as seventeen million years ago.⁶ Other authorities give a little earlier, perhaps twenty million years ago.

Recently, with the increasing agreement among geologists concerning the duration of the various eras and periods, it has become possible not only to construct a family tree, but to place it approximately in time. Disregarding divergence as to details, the present

⁴ *Modern Science*, Sir J. A. Thomson, p. 158.

⁵ *Nature*, 11 August 1934, p. 222. Since the above was written an excellent article has appeared in THE THEOSOPHIST (August 1937) dealing briefly with some of these problems. In it "Janaki" reports the findings of a recent Congress of Anthropologists in U. S. A. The article gives further evidence of the above views and their relation to Theosophic teaching.—E.W.P.

⁶ *Nature*, 20 February 1937.

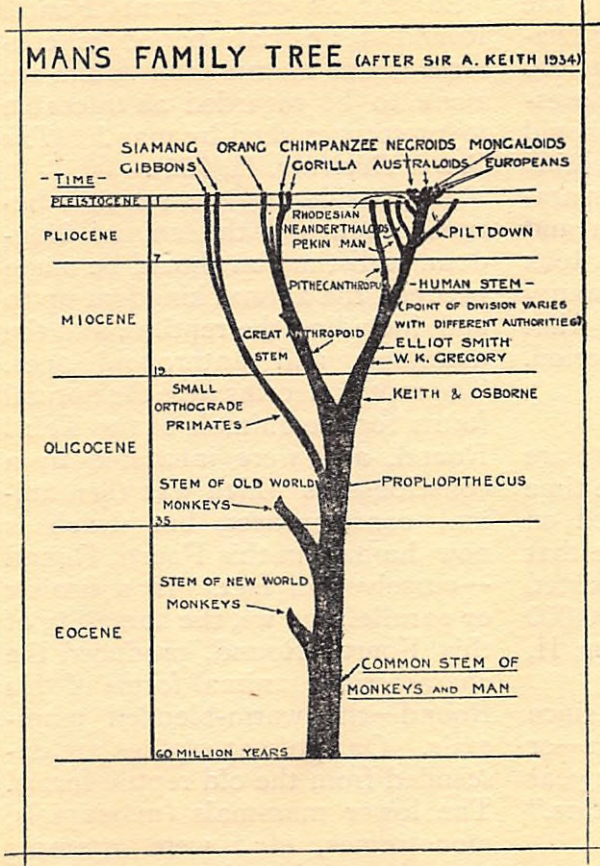
¹ About 100,000 years ago, according to a table given in *Nature*, 20 June 1936.

² About 500,000 years ago.

³ *Nature*, 1 August 1936.

DIAGRAM 1

Man's Family Tree—
The Scientific Presentation.



view of science seems to be well illustrated by diagrams by Sir Arthur Keith and Prof. W. K. Gregory. Sir Arthur Keith says:

"All are agreed that anthropoid and man have a common ancestry; it is merely the degree of relationship that is in dispute."¹

The whole subject has been dealt with by Sir Arthur Keith in *Man's Family Tree* and in *The Search for Man's Ancestors* by Sir Elliot Smith. Some details are also given in a recently published monograph on *The Races of Man* by R. B. Bean.

Diagram 1 is based on diagrams by Keith, Gregory and Elliot Smith.

¹ *Nature*, 15 June 1935.

In regard to these diagrams, Sir Arthur Keith says:

"Dr. W. K. Gregory made a family tree of man and ape. It was constructed quite independently, being based on an altogether different mass of data from mine. He also brought the human stem from the anthropoid at the beginning of the Miocene—practically the same date of emergence that I have given. On the Osborne scale of reckoning, he and I give the human stem an antiquity of about 20,000,000 years."²

Prof. Elliot Smith shows the true human family as separating from

² *Man's Family Tree*, p. 20.

the common stem at about the middle of the Miocene.¹ Our Diagram 1 illustrates these various points, and gives the scientific presentation of the problem. It should be noted that all the scientific authorities agree that the separation from the common stem and the appearance of true man took place at a period after about twenty million years ago, and during what is now called the Miocene period.

Occult Statements

In *The Secret Doctrine* there are at least ten references to the time when true man first appeared on the Earth. All of these agree that "Physical Humanity has existed upon it for the last 18,000,000 years." (*The Secret Doctrine*, II, 158). For example :

"The number that elapsed since the Vaivasvata Manvantara—or the *Human* period—up to the year 1887, is just 18,618,728 years." (*The Secret Doctrine*, II, 72).

It will be seen that the agreement between this date of 18 million years ago for the appearance of true man and that given by science is very striking.

Madame Blavatsky states that of the four races before our present Aryan Race, the first two were astral, but we should note that where she used the word "astral" she often meant what we now understand by "etheric." The Third Race was the first to become definitely densely physical.

Madame Blavatsky states further, that all forms which now people the earth are variations of basic types thrown off by man in the Third and Fourth Rounds, but :

¹ *Man's Family Tree*, p. 30.

"So far as our present Fourth Round terrestrial period is concerned, the mammalian fauna are alone to be regarded as traceable to prototypes shed by man." (*The Secret Doctrine*, II, 722).

In considering the relation between man and the animal kingdom, a distinction should be made between the animal kingdom up to and including the reptiles, and the mammals and anthropoid apes. The reptilian forms were the normal forms for the animals of the Third Round, and were inhabited by a consciousness which was then animal consciousness, but which is now human in this Fourth Round—ourselves in fact. In a similar or parallel way we, the humanity of this Fourth Round, produced the characteristic animal forms of this Round—the warm-blooded mammals. Our present reptiles are descended from the old reptile forms. The lower mammals (marsupials, monotremes, etc.) were attempts to make a bridge between reptiles and mammals, and were the work of our humanity under the guidance of a more advanced humanity at the end of the Third Round.

(For a further discussion of this part of the subject, the student should consult *The Web of the Universe* by E. L. Gardner. In this article we are dealing especially with the relation between man and the apes.)

Our Diagram 2 is taken from *The Secret Doctrine* (II, 727) and gives "The Pedigree of the Apes" according to the occult teaching.

Three things may be noted in connection with Diagram 2.

First: The mammalian prototypes, the lower mammals and

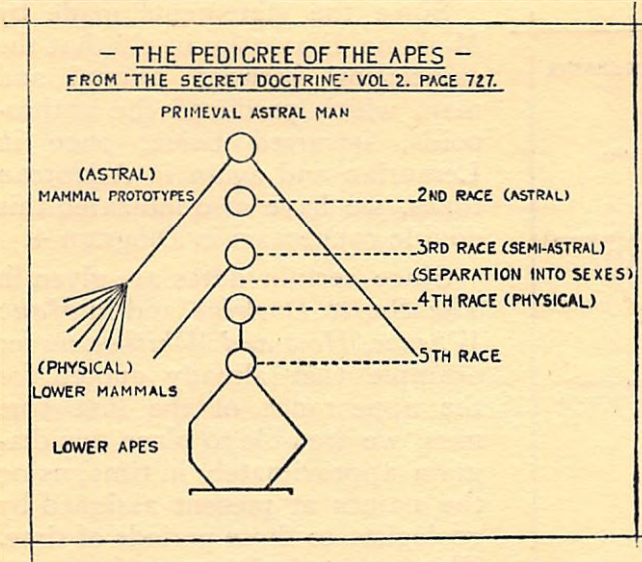


DIAGRAM 2

The Pedigree of the Apes.

(The Secret Doctrine, II, 727)

lower apes are all shown as separate from evolving humanity and are therefore separated from the main evolutionary urge, and so, although they continue their existence in time as the various species of apes or animals, they make comparatively little further progress in change of form.

Second: There is no connecting line between the circles representing the Races until after the separation of the sexes. This may indicate that while the lines show biological continuity in the animal kingdom, and between the Fifth Race and its predecessors, there was no such continuity in the earlier races. This would naturally be expected if the human consciousness inhabited etheric forms. There would be continuity of consciousness but not biological continuity of bodies.

Third: The special relation between the anthropoids and man is indicated by the line at the bottom of Diagram 2, connecting the lower

apes on the one hand with the Fourth Root Race on the other. Of these anthropoids, Madame Blavatsky writes:

“The pithecoïds, the orang outang, the gorilla, and the chimpanzee, *can* and, as the Occult Sciences teach, *do* descend from the animalized Fourth human Root-Race, being the product of man and an extinct species of mammal—whose remote ancestors were themselves the product of Lemurian bestiality.” (*The Secret Doctrine*, II, 721).

“Let us remember in this connection the Esoteric Teaching which tells that Man in the Third Round was possessed of a gigantic ape-like form on the astral plane. And similarly at the close of the Third Race in this Round. Thus it accounts for the *human* features of the apes, especially of the later anthropoids—apart from the fact that these latter preserve by heredity a resemblance to their Atlanto-Lemurian sires.” (*The Secret Doctrine*, II, 727).

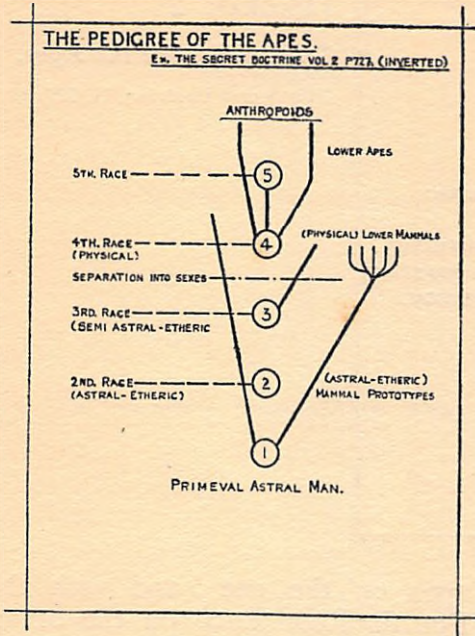


DIAGRAM 3

The Pedigree of the Apes

(Diagram 2 inverted)

In order to compare this diagram given in the occult teaching with modern science, we have, in accordance with usual scientific practice, inverted it so that the latest *time* comes at the top. If this is done, we are able to see at once the suggestion of a tree such as that in Diagram 1.

This resemblance to the tree given by science becomes clearer if we make certain modifications without altering the essentials. In the diagram as it stands, the anthropoids would appear to be the crown of the evolutionary process. Hence we have ventured to substitute Diagram 4, in which the anthropoids are shown more correctly, as a side branch from the main stem of evolution.

Since the statements made by Madame Blavatsky imply that the association between animal and man, which produced the anthropoids, occurred twice, once in Lemurian and again in Atlantean times, we have also indicated this double connection in Diagram 4.

Since certain dates are given in *The Secret Doctrine* and in *Man: Whence, How and Whither*, as for example that already quoted for the appearance of the first true men, we are able to place this diagram approximately in time, using the names at present assigned by geologists to those periods of time. This is done in Diagram 5.

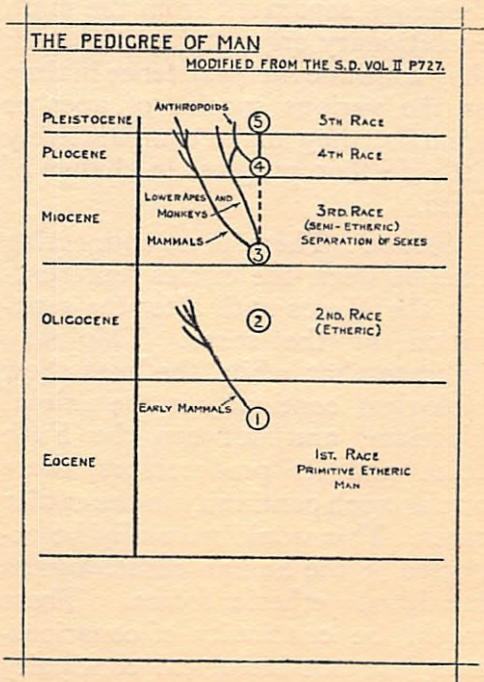


DIAGRAM 4

The Pedigree of the Apes

(Diagram 3 slightly modified)

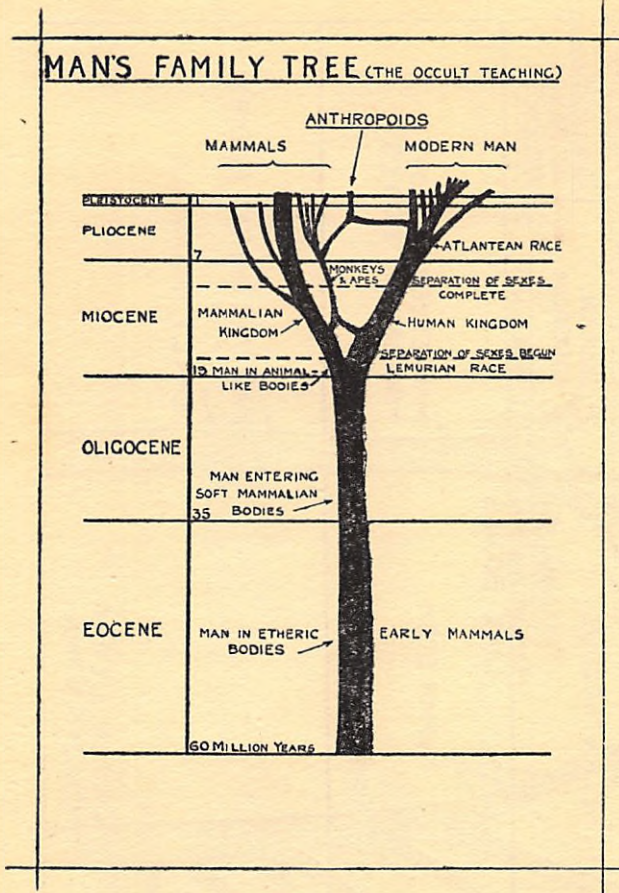


DIAGRAM 5

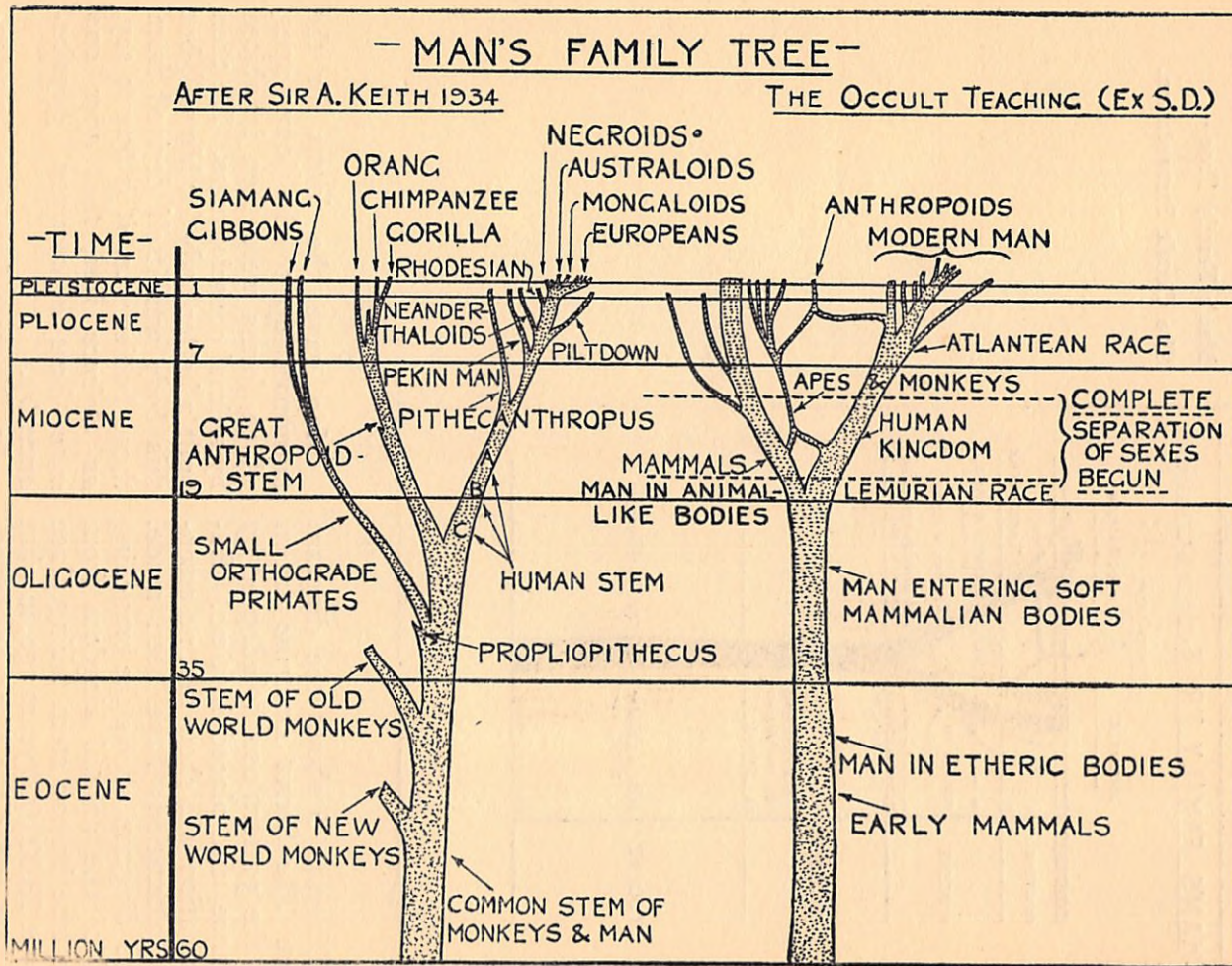
Man's Family Tree—
The Occult Presentation.

Diagram 5 shows the diagram from *The Secret Doctrine* drawn on the pattern usually adopted by science, and placed in time. Examination will show that no essential alterations have been made. The diagram shows the branching off of the animal kingdom from the true human stem taking place about 18,000,000 years ago, in what is now called the Miocene Period, the truly human form being finally produced after the separation of the sexes, and the human consciousness entering this form. This occurred during the Lemurian Race. The Fourth Race arose after this change was completed.

Man gave the forms for the mammals up to the lower apes, which forms were then inhabited by animal consciousness. He then built a better body for himself, but this *body* was itself derived from those bodies; i.e. *it is true to say, as Science does, that apes and man have a common physical ancestry.*

In Diagram 6 we give the scientific and occult presentations side by side, drawn on the same scale to facilitate comparison. Without suggesting that all the details are exact, we cannot but admit the similarity between the two statements.

DIAGRAM 6
The Scientific
and Occult
Presentations
Compared



NOTE. The point of division of the Human Stem varies with different authorities :

(A) Elliot Smith,
(B) W. K. Gregory,
(C) Keith and Osborne.

Thus, in answer to our problem of anthropology—the problem of what used to be known as “the missing link”—we see that the difference between the older and the more modern theory is this: on the older theory, the anthropoids represented a definite stage of descent *between* the apes and man, and on the later theory there is a common mammalian ancestor, so far as form is concerned, but man diverged from the apes at an early date.

The latest statement on this subject is in *The March of Science*, where Dr. A. C. Haddon discusses the relations between man and ape from the point of view that has been opened up through the study of blood groups. He states: “It is unknown how these differences within the groups of apes and men arose or what is their significance.” But, he continues:

“Dr. S. Zuckerman points out that, as Osborne has emphasized, the descendants of a common ancestor would tend to develop along parallel lines if they were subjected to similar types of environment, since they began their evolutionary journey with similar potentialities. Consequently, structural similarities might denote nothing more than a descent from a common ancestor which may be quite remote.”¹

Truly, science is very near to the solution of this problem, and the solution could be found at once if the existence and evolution of consciousness apart from body—a concept so strongly emphasized in Theosophy—were more fully realized and accepted.

¹ *The March of Science*, published under the authority of the British Association, 1937, p. 72.

From KOOT HOOMI LAL SING to A. O. HUME (1881)

“The Hindu mind is pre-eminently open to the quick and clear perception of the most transcendental, the most abstruse metaphysical truths. Some of the most unlettered ones will seize at a glance that which would escape the best Western metaphysician. You may be, and most assuredly are our superiors in every branch of physical knowledge; in spiritual sciences we were, are and always will be your—*Masters*.”

The Mahatma Letters, p. 213.

The Future of Science

BY E. LESTER SMITH

A survey of contemporary science, indicating that a bridge is being built between Theosophy and Science, and that the revelations of the occultists are stimulating and directing research.

A New Spirit in Science

OF all the people who attempt to prophesy the future, the Theosophist may do so with the greatest confidence in the light of his faith in "The Plan." There are several ways of formulating the Plan, and perhaps the most useful for our purpose is that of the psychology of levels. This was expounded very clearly by Prof. Marcault in the 1927 Blavatsky lecture entitled *The Psychology of Intuition*, and in *The Evolution of Man* (1937).

The fundamental conception is that of a diaphragm or plane of reflection marking the level to which an individual's faculties have been objectivized; those above the diaphragm remain subjective, and contact with these subjective levels constitutes intuition. Each individual in the years between birth and adulthood recapitulates the experience of the race and objectivizes successively the intuitions of activity, emotion, concrete thought, and finally the social sense, corresponding to the higher mental level, the fifth principle, the especial concern of the Fifth Race. Since the evolutionary scheme is to the Theosophist primarily a scheme of unfoldment of consciousness and only secondarily of growth and change

of external forms, the peculiar appropriateness of this system is clear.

Thus the plan for a race, as for an individual, can be stated briefly as the effort to raise the diaphragm from level to level. Each race recapitulates the past, though it adds something to the achievements of its predecessors at each stage, and then breaks fresh ground, objectivizing a new faculty. This process has been reviewed in particular application to the history of science by Miss E. W. Preston and Miss Corona Trew in their *Studies in Evolutionary Psychology*, where they explain that their aim is "to examine the progressive expression of the consciousness of the scientist, rather than the increase of his knowledge."

Advanced egos are already pushing the diaphragm towards the buddhic level, and although the Cosmic Intuition will not be fully objectivized by the Fifth Race, it is bound to show forth increasingly. For a time this new wine must be put into the old bottles of higher mind terminology, until it bursts forth and creates for itself a new language.

The Cosmic Sense

What is the effect of this new urge on present-day science? If

we were required to characterize the Cosmic Sense in a few words, we might express it as a merging of self-consciousness in the flux of Universal Life. So in science we note a trend towards universality, towards seeing things whole. The individual sciences, which at one time could be studied separately, now merge and overlap. Today we recognize Science rather than the sciences, and to study any branch adequately necessitates some knowledge of several of the others.

Thus mathematics invades physics, while both invade astronomy. The study of atomic structure is neither physics nor chemistry as we used to know them, and has called to its aid a new branch of mathematics. In other fields too, chemistry and physics overlap, indeed physical chemistry is now a recognized branch of science. Chemistry again is increasingly concerned with the changes occurring in living organisms, and biological chemistry now covers as big a field as did chemistry itself at, say, the opening of the century. Biologists express much of their knowledge in chemical and physical terms.

On the other hand, physiology tends to overlap into the realm of psychology. The psychologist, in the urge to apply his knowledge to human ills, must needs delve into ethics and philosophy, and philosophy is hardly to be distinguished from modern conceptions of religion, even though it looks to physics for its fundamentals. Finally, there is scarcely a single branch of science that healers of one kind or another do not call to their aid.

Science is stretching its boundaries: outwards to the spiral nebulae and the consideration of the Universe itself as a unit; inwards to the incredibly fine cosmic radiation, to the constituents of the atom, and to the properties of matter at, probably, etheric levels. The pressure of the new intuition causes effort to be directed along new lines, and problems are being tackled today that would have seemed too difficult or unimportant only a few years ago.

Research is more intensive also; no longer are we content to describe phenomena and explore their superficial mechanism, we inquire more deeply into underlying causes, into the why of things. And in every field, as we probe more and more deeply, there stand revealed co-ordination, co-operation, purpose, design, unity—the One Life, the Great Mind of the Universe.

This is not a Theosophist's prediction of the future, it is a fact that is with us today; our greatest thinkers are being impelled by their own discoveries, and not, so far as we know, by any revealed knowledge, to speak in terms such as those quoted above. The coldly mental approach is waning, and the modern scientist, with awakening Cosmic Intuition, is fast becoming one of the "seers of the essence of things."

Approach to Theosophy

Let us seek the play of the Cosmic Sense in the various branches of science and essay some prophecies of the next steps, or at least try to suggest what steps would lead to the quickest progress if it should prove possible to take them.

In astronomy the most significant event is surely the recognition of the Universe itself as a living organism. This idea is to be found of course in Eastern scriptures and Theosophical text-books, but lately three books¹ have appeared on this theme that attempt to support with scientific evidence their authors' conviction of its truth derived from occult knowledge.

These books are, however, hardly convincing to the orthodox scientist, in that the intuition, some would say the imagination, is used too freely, without the support of adequate logical deductions from experimental data. Even though the identical criticism may be valid, it is less likely to be made by his colleagues when these ideas are propounded by a scientist of standing.

It is therefore with especial interest that we read the pronouncements of men like Jeans and Aitken. For example, Dr. Aitken's contribution to *The Great Design* includes the following passage: ". . . for all its gigantic dimensions, all the bewildering complexities of its structure and motions, all the endless variety of its contents, our great stellar system, our universe so far as it has come within our range of observation, is an organic whole, exhibiting an underlying structural symmetry, built up throughout of the same basic elements, and governed by the same great laws."

¹ *The New Astronomy*, by G. E. Sutcliffe. (Rider, London); *Ether and the Living Universe*, by W. G. Hooper. (C. W. Daniel & Co. London 1935); *The Living Universe*, by Sir Francis Younghusband. (John Murray, London, 1933).

"That the mind of man has been able to reach these great generalizations and through them to attain the power of prediction is proof of order and rationality in the universe. It is a universe, in my belief, with thought and more than thought within it; a universe that is the expression of the thought of an immanent infinite Spirit."²

In such passages we see a surprising approach to the Theosophical teaching. We wonder whether Kepler's "Planetary Spirits" will some day be revived in a new guise, and science discover the Logoi. Astrologers will be quick to notice in this work some recognition of the basis of their art. They should note also that already sunspots are held to affect the weather and radio reception, while the journal *Nature* is prepared to give its valuable space to a letter dealing with the keeping qualities of timber cut during different phases of the moon.

Physics is probably the most boldly progressive branch of science today. Indeed it is difficult to know where experimental physics gives place to speculative philosophy. The spirit of the new race certainly has our foremost physicists in its grip. The new physics has dethroned even those time-honoured absolutes, space and time—these are now recognized as human concepts, and therefore only relative. Physics seeks to transcend them, to find some universal system, some new absolute, for man cannot face the realization that his system of thought floats anchorless in a sea of relatives.

² *The Great Design*, pp. 17-18.

Enter Einstein

Einstein came to the rescue with his Theory of Relativity, which provides a fast anchor called the Velocity of Light. Einstein said in effect: Let us assume that the velocity of light (which in our relative units is about 186,000 miles per second) is absolutely fixed and constant, even when the observer moves relatively to the source of light. Taking this as our axiom, let us see what it leads to. And it led, by means no more experimental than the writing of mathematical symbols, to curved space-time and a finite yet boundless Universe. This was of course a stupendous piece of abstract reasoning, and it is matter for regret that many scientists regard Einstein's choice of an absolute as entirely arbitrary and without foundation, which brings all the rest to the ground.

Of the three experimental "proofs" of the theory that are cited, the Michelson-Morley experiment does not in fact give the negative result required by the theory, and can be more satisfactorily interpreted by the occult teaching that the earth carries with it its own domestic luminiferous ether; the other "proofs" are also susceptible of alternative explanations.¹ Which-

¹ For the three sides of this controversy, pro and anti-relativist, and occult, see: *The Theory of Relativity*, by A. Einstein. (Methuen 1920); *The Case Against Einstein*, by A. Lynch (Philip Allan 1932); *Einstein's Theory*, pamphlet by G. E. Sutcliffe (Reprint from *Times of India*, 1922). For an attempt to resolve the differences between the first two views, in a truly Sixth Race spirit, see Prof. H. Dingle's *Science and the Unobservable* (Supplement to *Nature*, 1 January 1938).

ever way the controversy is finally settled, Einstein has without doubt rendered signal service through the prominence given to the *principle* of relativity, and the effect this has had in shattering too rigid systems of scientific thought. Intuitions will not flow into a mind already made up.

From Physics to Metaphysics

There is another sense in which physics has taken away the firm ground from under our feet, and that is by destroying the comfortable idea of a solid, material, universe. For many decades we have accepted the resolution of solid matter into a conglomeration of atoms, and more recently have entertained the idea of these atoms being rather loose airy systems of very much tinier particles. Now comes the more fundamental step of realizing that these ultimate particles are probably not "matter" at all, but energy packets.

What then is matter? A form of energy. We know already that many forms of energy are more or less completely interconvertible, and probably all would be if we knew how to make the appropriate machines. So it is now scientifically correct to regard all forms of energy—heat, light, electricity, etc.—*and* matter, as differentiations of the One Energy, which we might as well call Fohat, for want of a better name. Thus incidentally is justified H. P. Blavatsky's rather contemptuous throwing together of matter and energy as one of the manifestations of Fohat.

The mass of people have not yet assimilated these ideas, but when they do, the materialism that

H. P. Blavatsky fought so strenuously should be well on the way to final overthrow. Thus is the way cleared for the guidance of thought by the intuition towards inner realities. In this direction the increasing use of mathematical formulæ to express physical laws might be quoted as an urge towards universality, and perhaps towards the formless worlds.

An example of this change in the scientific picture of the units of matter is to be found in the following description of the electron. It occurs in Professor Allan Ferguson's article on "Physics" in *The March of Science*, page 164: "The concept of the electron as a definite entity at a definite point in space is replaced by a probability pattern which, very dense in a certain locality, rapidly thins as we move away from that locality. Most of us may be content to use the concept of an electron in almost our accustomed manner, realizing that it has become rather fuzzy at the edges."

Occult Chemistry

In their work on radiation and atomic disintegration it seems very likely that physicists are already touching the matter of the higher planes, or at least the physical ethers. I have already tried with two colleagues to get some guidance on this point from *Occult Chemistry*, but without very definite success.¹ It may well be, however, that the recognition of the four physical ethers is near at hand. Such an important advance cannot be very

¹ *The Field of Occult Chemistry*, by E. Lester Smith, V. W. Slater and Gerard Reilly.

long delayed if the present rapid progress in physics is to be maintained.

In chemistry the "laws" which a decade ago were regarded as inviolable are now interpreted less rigidly. We no longer seek to force Nature into the rigid mould of a general law, we are content to let Nature speak for herself. For example, the belief in the constancy of the atomic weight of each element received its death-blow with the discovery of isotopes, and the atomic weight is now regarded as a statistical average liable to vary under special circumstances. Many compounds are known that do not obey the "law of multiple proportions," but contain other than integral ratios of their constituents. This does not trouble us, for we know that Nature works this way to fit the atoms nicely into a crystal lattice. Nature in fact is given more credit for the exercise of ingenuity and design, and the chemist stands humbled in the light of his increased knowledge.

Interest has passed from the old chemistry of classifications, like the periodic table, mainly in two directions. Chemistry has joined hands with physics to build up a new branch, subatomic chemistry, devoted to the study of atomic structure and the industrious carrying out of transmutations on a scale so small that there is hardly ever enough of the element produced for chemical recognition. On the other hand chemistry and biology have created a very flourishing branch—biochemistry—to study the chemistry of living plants and animals. Its growth may be judged from the fact that its British organ,

the *Biochemical Journal*, has doubled its size within ten years. Here again, the more we know, the more our respect for Nature increases.

The living cell builds up incredibly complex compounds from simple sources, working at ordinary temperatures with the aid of groups of enzymes. Some of these marvellous life processes are just beginning to be unravelled; soon we shall see springing up groups of workers who scorn to use the current methods of synthetic organic chemistry, involving high temperatures and drastic reagents, but who insist on trying to imitate the methods which Nature uses; let us in advance christen this new branch "cold chemistry" from the fact that elevated temperatures will not be used, and wish it the success so difficult a venture merits.

In biology, vitalism, as it used to be called, has in effect emerged triumphant. Increasing knowledge has overthrown completely the old mechanistic theories, and no well informed biologist will be found today so rash as his predecessors who confidently prophesied the synthesis of living cells. There is universal recognition of a life-principle powerful to organize and direct chemical changes in a living cell, that can only be transmitted by a cell to its offspring, and can in no way be induced in external matter. Hence, in this field, as also in that of evolution, there is growing recognition of design and purpose.

The way this purpose is carried into effect needs to be studied, but probably not much progress can be made until etheric sight becomes more common, for it is the hier-

archy of helping intelligences on the inner planes, and finally the nature-spirits, who make this work possible. Nevertheless hints of this inner design have already been given by Ruskin in the matter of crystal-building,¹ and I doubt if he was merely playfully imaginative; also quite recently Metcalfe has championed a similar idea.

A New Science—Yoga

It is in psychology, one of the youngest branches of science, that the occultist can confidently prophesy the greatest progress. He may think that orthodox psychology has thus far made a little progress, and that some of its exponents are working along wrong lines; but increasing knowledge is bound to reveal the mistakes and broaden the outlook of workers in this field—a field in which the Ancient Wisdom can guide science most directly and helpfully. In psychology, the gulf between orthodox and occult is surely at its narrowest, and the bridge is being built rapidly. Some leading Theosophists are already recognized as workers in the psychological field, while the doctrines of the five-fold nature of man² and the psychology of levels have gained some footing in scientific psychology.

Psychology is of great importance in its direct practical application to human problems and human development. Though this is already partly realized, the applications have so far been made mainly in the sphere of the personal self. The advertisement columns of our

¹ See *Ethics of the Dust*.

² *Yoga and Western Psychology*, Geraldine Coster (Oxford Univ. Press, 1934).

periodicals are full of psychological methods for the gaining of memory, personality, even sex appeal. The need of the psychologists is a deeper understanding of man's spiritual purpose; they will then join hands with the educationist and the occultist in founding a new branch of science, Western Yoga, which will be more suitable for the Western races than the available Eastern methods.

The Intuition

Naturally it is the psychologists who should be the first to recognize the dawning sixth principle, and by making deliberate experiments with the intuitive faculty work out a technique for its conscious use as an instrument of research. A beginning has been made on these lines by Spearman, Aveling and others; see also Mrs. Gardner's article in *THE THEOSOPHIST* of September 1937. Anyone who produces really original scientific work will admit the receipt of "hunches," "brain-waves," or whatever he may call them; he will probably also admit that they usually come when he is taking a bath, shaving, or running for the train, in fact any time when he is *not* actively thinking about his work; such is the capriciousness of intuitional research today. After all, these indispensable brain-waves represent only the "buddhi of manas," which should become a normal faculty of the sixth sub-race; hence its objectivization does not lie so far ahead that we cannot expect to encourage its development in budding geniuses today.

It is not only the use of the intuition by the individual that we

should learn to foster, but its use by groups. Collaboration in research grows increasingly common, and the Sixth Race will surely develop a technique of group consciousness. This will involve not merely the pooling of ideas expressed in words (as happens now) but a merging of the contents of the mental envelopes of the group members (multilateral telepathy) and a joint invocation of the intuition to illumine the work. These things sometimes happen today, though usually not of set purpose; a number of great discoveries have been made simultaneously by independent workers; often the writer and a colleague will simultaneously voice the same idea concerning a problem under investigation.

A Step Further

There must come a time—it has come already in some fields—when further direct investigation of a subject, say atomic structure, is barred by the impossibility of designing suitable instruments; highly indirect methods must then be used, with the result that the interpretation to be put upon the data is not always certain. The cure for this state of affairs is obvious to the Theosophist. It is the use by the investigator of his own latent faculties of cognition, of which, as E. L. Gardner tells us in *The Web of the Universe*, our present scientific instruments are the foreshadowings. Already some small beginning is being made by the scientific study of "Extra-Sensory Perception" by J. B. Rhine at Duke University. Scientists of the future will doubtless be more concerned with the consciousness than with

the form side of things, and the inner faculties will become almost essential for their work. The Sixth Race scientists should be able to achieve a unification of consciousness with the life of the object of study that will bring understanding of its nature and purpose, even if they cannot use objective clairvoyance.

What the Future Holds

The day surely cannot be far distant when a scientist may take up psychic research without any risk of being branded by his colleagues as mentally unbalanced. In this field the psychologist should be able to render splendid service in collaboration with the more scientifically-minded Spiritualists. Only a little more first-rate work in this field should suffice, one would think, to demonstrate to any unbiassed observer the possibility of consciousness functioning in non-physical states, and the persistence of the ego after death and indeed before birth. Then perhaps some future President of the British Association might announce to an astonished audience his conviction that there was enough evidence to support reincarnation as a scientific theory! The national Press would blazon forth the new discovery, and because it had authoritative scientific backing, the public would soon accept the theory as a proven fact.

A note as to the place which revealed knowledge will occupy in the science of the future seems necessary in conclusion. Theosophists are apt to be impatient of scientists because they will not study and accept statements alleged to emanate from the Masters, or

made on the basis of clairvoyant research. Any who thus feel should call to mind the historical background of science. In the past centuries it has fought a hard battle against dogmatic religion and speculative philosophy, for the right to build up a system of thought based solely upon experiment and observation. Science relies exclusively on the evidence of the five senses, preferably that of sight, and the ability of the intellect to interpret the observations rightly. It has sanctioned the use of increasingly complicated instruments, but in the last analysis they are nearly all designed to render some effect *visible*.

Now science has too recently emerged triumphant from its battles to look otherwise than with hesitation at data derived in any other way.¹ Theosophists claim in effect that the data they offer are obtained through the use of senses and faculties not normally operative in humanity. Until the testimony of such senses and faculties is more widely recognized as having equal validity with that of the normal senses, occult knowledge can hardly claim "scientific" status. For the present, this position must be accepted as right and inevitable; at any rate it shows us where we Theosophists stand and the nature of the task before us. Recognition can come only when many scientists have themselves awakened their latent powers, or when an overwhelming body of revealed knowledge receives confirmation by orthodox

¹ Note the recent discussion in *Nature* (Jan. 1938) on "Science and the Unobservable" by Prof. H. Dingle and others.

research. Science must tread its own path to truth, but in the meantime there is no reason why the revelations of the occultists should not serve as pointers to stimulate and direct research along fruitful lines.

The bridge between Science and Theosophy will be built mainly from the scientific end. Those of us who are dedicated to the work of building this bridge can probably help best from this end, if only because our work may then be published in recognized scientific journals, and

thus reach the audience for which it is primarily intended. It should first be our aim, I think, to become well grounded in the scientific tradition, and to establish our right by virtue of original work, or the position we have won, to be heard in scientific circles. Then we should seek opportunity either to carry out practical research, or perhaps more usefully to attempt the reinterpretation of existing data, in the light of the deeper understanding of nature that Theosophy should have given us.

THE "HEAVY ELECTRON": IS THIS THE ULTIMATE PHYSICAL ATOM?

Students of Occult Chemistry have long recognized the fact that the weight of the electron, as determined by ordinary scientific experiments, namely $\frac{1}{1800}$ of a Hydrogen atom, is much less than the weight of an Ultimate Atom, as implied by statements in Occult Chemistry. Since it requires only 18 Ultimate Atoms to make up a Hydrogen atom, it would appear, unless we make some other assumption regarding the nature and basis of weight, that the *Ultimate Atom is 100 times as heavy as an electron.*

During the year 1937, workers in different countries have obtained evidence for the existence of what they call "heavy electrons," occurring in cosmic rays. Workers in Japan have estimated the weight of these particles to be about 100 times that of the electron. The most recent statement is made in *Nature*, 16th April 1938, by Dr E. J. Williams and E. Pickup from the Holt Physics Laboratory, University of Liverpool. They describe curved tracks obtained in a Wilson chamber using magnetic fields. The tracks indicate that the *mass of the new particle is nearly 200 times the electronic mass.*

It is too soon to attempt any conclusion as to the relationship of this heavy electron with the particles and groups of particles described in Occult Chemistry. We merely note the rapid and continuous advance of physical science in the sub-atomic world.—E.W.P.

Problems of Evolutionary Science

BY C. G. TREW

“By evolution we understand that integration and combination of originally homogeneous atoms which has produced our world and its contents.”—J.S.G., *Nature*, Vol. 140, p. 912.

The Subjective Universe

WE are living in an age that has seen more reversals and revolutions in thought than any before it in the history of mankind, so far as that history is available. One of the most striking of these concerns the direction in which mankind looks for its guidance and illumination—what we might call the “gods” in which men put their trust. Since the scientific revolution of the nineteenth century, almost unlimited faith has been placed in the discoveries of science, and more particularly in those experimental discoveries which have had such a marked influence upon our physical environment. Physical science for long became the model upon which the ordinary man moulded his thought, with the result that the last century saw the great attempt to build up an entirely objective, rational and mechanistic picture to explain everything in terms that the human intellect could tabulate and comprehend.

We are now passing into a new age when this objective conception is seen to be inadequate, and it is probably fair to say that for the western world the newer “gods” are those of the human psyche and spirit. Psychology, sociology, the

study of human relationships, are the fashionable sciences, and psychological values must now be invoked in any explanation of the universe. Yet there are still those who hold to the older view, and distrust anything which they consider in the remotest degree subjective. For instance, Sir Arthur Eddington has said that the scientific mind tends to be suspicious even of such facts as that human consciousness has a kind of “back-door entry” to the concept of time, our appreciation of time being in part subjective.

One of our contributions as Theosophists to the thought of our time is to make some link or fusion between the objective proved values of the intellect, and the more subtle, often subjective, values of the human spirit. It is to include and investigate the link that exists between ourselves as human spirits and the outer universe in which we gain experience that science must now be extended, and it is in this field that the Theosophical student has much to offer.

Before investigating the way in which this shift in values, this broader view, will affect our concepts of the problem of evolution, it may be useful first to define to

some extent the viewpoint from which the Theosophical student approaches western science. William James, the great psychologist, once suggested that philosophical thinkers might be divided into two groups, those who were "tough-minded," and those who were "tender-minded." The former are characteristically empiricists, devotees of facts, naturalistic, pessimistic, irreligious, fatalistic and sceptical; the latter are devoted to abstract principles, idealistic, optimistic, religious, free-willist and dogmatic. We may see in this characterization the two types usually termed the realist and the idealist; those who will accept only a fully objective real universe, and those who include within that universe all the subjective and vital values of consciousness and thought.

The Theosophical student, philosophically, takes up the position of the vitalist, and sees the manifested world as a growth or precipitation from within, its complexities of form following upon the organization and awakening of interior vital currents and forces of which the manifested form is only a crystallized expression. The evolution of form through mineral, plant, animal and human types is to him a secondary product—the resultant—of the increasing awareness and potency of the vital qualities, for which the form serves merely as an instrument of expression. The average scientific exponent of evolution, unless of the vitalistic type, tends to take a more materialistic viewpoint and see the problem from the outside, finding within the form in the outer manifested world all that is needed to explain its own

development. To such thinkers scientific materialism is its own philosophy, and there is no need to seek for origins and causes other than in the form and the physical environment in which it is placed. It must be admitted that they often need to push their study into regions of chemical forces and mathematical laws well behind the actual objective form. The fundamental position, however, remains the same. The visible concrete universe and all it contains is thought of as existing in its own right, and given the original simple forms—whose origin is either evaded or seen as the result of a fortuitous happening—all other forms are a "becoming" from these by virtue of the inherent properties and powers possessed by the matter itself.

The Theosophical Picture

Briefly the above statement sums up the two opposing positions represented in scientific thought on evolution today. We may probably give up at once the attempt to convert the confirmed materialist to any vitalistic view, merely noting that probably the very trend of his own discoveries, leading him deeply within the matter he is investigating, must ultimately result in his awaking one day to find himself in the unfamiliar world of his old enemy the vitalist. It is as vitalists that we Theosophists view the problem of evolution; and as vitalists we may see where the Theosophical picture of the evolution of life and form can usefully be applied to a modern study of evolution.

Probably our most important contribution is that not only do

we, like Sir Francis Younghusband, Prof. Lloyd Morgan, General Smuts, and other vitalists, regard the universe as a whole—almost a growing organism—in which every part has its place and function interrelated and interdependent, but we have a well established Theosophical science, which has already mapped out much of the material which has yet to be established as fact by western physical science. We are rather in the position of an inventor who has discovered the laws and relationships of some new discovery, but has not yet put these into concrete effect. Our contribution to evolutionary theory seems to be twofold—to express those broad outline principles which Theosophy sees as governing the process, and to indicate in detail where particular special points may be applied to the research problems with which science is occupied today—the one is general, the other specific and detailed.

From the more general aspect then, we see the “wholeness” of the universe, and visualize the need to express evolution in a single science of life. A comprehensive evolutionary science must include all manifestations of life from mineral form to highest consciousness. It must not leave outside the picture, at the lower end mineral forms, and at the upper end the manifestations of the human spirit which we know as life or consciousness values. As Professor Joad has recently expressed it, a philosophy of evolution to be complete must see matter, life and value (i.e., aesthetics, ethics, significance and the more subtle so-called subjective experiences of consciousness) as

manifestations of a single science of life, or, to use a more mystical terminology, we need to resolve the eternal opposites of life and form into a higher unity which sees them both as expressions of a living spirit in whom and through whom we, as well as all the forms of manifestation, live and move and have our being.

The World as a Unity

In viewing the problem of evolution as a unity, we need to see it not in historical perspective, but as an event that is happening here and now. While the historical aspect is important, it has perhaps been overstressed. An individual may be considered in terms of a long series of incarnations, and the clairvoyant may make a study of the detailed incarnations in a historical perspective, yet it is equally true that the individual here and now represents a living expression or synthesis of all those past experiences, and a complete study of all his characteristics would serve to illumine all this past. So evolution has in the past been considered from a historical viewpoint, and forms today are studied in terms of their past history in the geological records of the rocks. It appears that an equally valid study can be made of forms as they are today, seeing them as expressions at various stages of the inner life forces—simple forms representing a lesser expression, more complex forms a further development of capacities and qualities. The historical method is at best a device to enable one to disentangle the relationships of the various forms and to see the living evolution in its right perspective.

In considering, then, the problem of evolution rather as a single event that is happening here and now, and of which all forms represent stages in the unfoldment of an inner living entity—an unfoldment that is creatively going on today and is not merely an event of a historical past—we are tempted to see in recent developments in physical theory, what we might term a mathematical necessity for a world picture that is a unity. Without claiming, as some have done, that modern mathematical and physical theory *implies* a recognition of spiritual, aesthetic or mystical values, such as freedom of the human will, a spiritual direction of the universe, etc., it is at least significant that physical theory has been able to resolve the problem of the "inter-relatedness" of the properties of extended space-time with those of the individual discrete units within that space-time. In other words, the continuous and the discrete, the whole physical universe and the atom, are interrelated parts of a whole, and are coexistent each in its own right; conjugated to each other as two sides of a shield, or the mirror image to its object.¹

If, then, physical theory must deal with the individual unit of matter in its relation to the whole of extended space, the theory of "holism," or "wholeness," postulated as a philosophy by Gen. Smuts, assumes a mathematical foundation which necessitates a similar extension to other problems of parts and wholes. In viewing evolu-

tion as a whole, we may see the need for a universal scheme—all forms as the manifestation of a vast cosmic living being or entity, an entity that includes the units which we see evolving in space and time as specialized aspects that are an integral part of the whole. The mathematical structure of space-time with its energy content necessitates the atoms; so universal, vital and life forces necessitate organisms. Just as the behaviour of the atom of matter cannot be explained without introducing the whole of space, so we may claim the interior forces which mould living organisms as an integral part of the organism itself. Conversely, as it is a philosophical absurdity to conceive of a macroscopic space-time continuum without individual units of matter as its inhabitants, so without the organism or form as a unit at any level, life transcendent is meaningless in any terms we can at present comprehend.

Did the Universe "Begin" ?

Within this general scheme we may pass to special points, those aspects of evolutionary science where the Theosophical view may illumine our knowledge of today. We meet at the outset perhaps the most difficult point—the origin or beginning of things. Must we postulate a beginning? Can we say that evolution had a beginning? If we view it historically, we have either to suppose a beginning, a creation of the universe when everything was started, when the machine might be said to have been wound up, or we must consider an infinite evolution stretching back for ever into the past.

¹ See *Relativity Theory of Protons and Electrons*, by Sir Arthur Eddington (Camb. Univ. Press), and "World Structure," by Schrödinger, *Nature*, Vol. 140, p. 742.

Both alternatives raise many difficult points, and this affords further support to the idea that the whole historical approach is limited, is but a way of looking at something that is very different in its real aspect. The problem raises the whole question of the objectivity or otherwise of time. Is the whole idea we have of time as an objective phenomenon incorrect? Is it merely a subjective expression of our consciousness?

This question has been discussed very fully by Sir Arthur Eddington in *The Nature of the Physical World*, in which he concludes that the objective factor in time is the concept of "becoming." The sequence of effects following causes is a fact of experience, of which the converse is meaningless. A shuffled pack of cards is disorganized after, not before the process of sorting; in terms of energy, an organized universe with its energy sorted to a maximum degree is undergoing a gradual disorganization so far as the energy in it is concerned, resulting in the distribution of that energy. There is direction in the universe, a direction indicated by what has been termed "the arrow of time." Time is included with space as one of the dimensions of the universe, and although absolute time may be an illusion, space-time is a reality at its own level.

In this connection the Theosophical view of the relation of past, present and future in the problem of time as expressed in *The Secret Doctrine* (I, 79) should be recalled, for it might have been taken from a modern textbook on relativity, and treats the problem from the

unified vitalistic view towards which modern science is at last trending.

Time is only an illusion produced by the succession of our states of consciousness as we travel through Eternal Duration, and it does not exist where no consciousness exists in which the illusion can be produced, but "lies asleep."

Both occultly and scientifically, time as we know it represents the process of the "becoming" of our universe, and so is inherently linked with the consciousness that is "becoming." In limiting the problem to the "becoming" of our particular system, we may again see the parallel to a living organism which starts from a dormant seed containing vast potentialities, and then begins to unfold those potentialities into powers. We need no longer consider an absolute origin with all the philosophical difficulties such a course produces, but may limit ourselves to the process of the becoming of that particular system of which we are a part.

One of the major problems of evolutionary theory concerns this origin of our universe, and at what period in time the system may be said to have had a beginning. Scientifically the question is still open, since various lines of evidence afford conflicting results. Briefly, certain evidence demands a period of millions of millions of years for the age of the universe, while other evidence just as valid seems to indicate a duration of only a few thousand million years.¹

¹ See "The Evolution of the Universe," British Association Centenary Meeting, *Nature*, 1932, and *The March of Science*, p. 8, for details.

Further, scientific observation on the behaviour of the great spiral nebulae affords evidence for the idea that the universe is rapidly expanding, and one of the most fascinating problems of the day concerns this expansion. Either the universe has expanded from a central fixed point, or the present expansion may have been preceded by a contraction, or even more striking—as the late Prof. de Sitter of Leyden has suggested—the universe may undergo alternate rhythmical periods of expansion and contraction, somewhat in the nature of the human heart and lungs. This problem, together with the discrepancy in the two time-scales concerning the age of the universe, is strikingly resolved by the Theosophical view expressed in *The Secret Doctrine* that the universe does indeed pass through rhythmic periods of expansion and contraction as suggested by Prof. de Sitter.

Father-Mother spin a Web, whose upper end is fastened to Spirit, the Light of the One Darkness, and the lower one to its shadowy end, Matter; and this Web is the Universe, spun out of the two Substances made in One . . . It expands when the Breath of Fire is upon it; it contracts when the Breath of the Mother touches it.¹

Such is the answer to the problem of the origin of the universe given in the *Stanzas of Dzyan*, the oldest book in the world, and the basis of all occult evolutionary theory. The alternating, rhythmic beat of the universe, the expansion and contraction of the breath of Brahma, confirms Prof. de Sitter's brilliant intuition of the alternate expansion and contraction.

¹ *The Stanzas of Dzyan*, III, 10, 11.

Furthermore, the longer period of time for the duration of the universe corresponds with the occult period of the Year of Brahma given as three million million years in *The Secret Doctrine*, while the shorter period of a single expansion represents the Day of Brahma—4,000 million years—and the corresponding contraction of the same length of time, the Night of Brahma, the latter being but shorter rhythmic periods or breaths in the life of the living universe.

The above represents a point of research in which occult theory quite unmistakably indicates which of several possible scientific hypotheses is the most likely to be correct. We may again note the striking indication that the evolving universe as a whole appears to have the characteristics of a living being, since it undergoes alternate periods of expansion and contraction, rhythmically changing in a manner that we are accustomed to associate with the behaviour of living organisms.

The Destiny of the Universe

Another problem of crucial import to the vitalistic philosopher is that of the ultimate destiny and end of the universal scheme. As astronomical time progresses, stars and planets, by continual loss of energy through radiation, gradually cool down from their initial high temperatures, and must, unless some other cosmical event intervenes, finally reach the state of the "dwarf black stars," non-radiating masses of matter, very dense and solid and so cold as to be incapable of supporting life. What, then, is the end of organic

evolution? Plant, animal and human forms, those we know as living organisms, cannot exist outside a small range of temperatures, and any great fluctuation from the mean temperature of the earth would undoubtedly mean the end of organized forms of life. Many have seen in this the logical overthrow of the vitalistic hypothesis of evolution, but again we find vitalists such as Gen. Smuts taking a "whole" view of the problem which aligns it with the occult teaching.

The physical universe may be, probably is, now proceeding along a line of evolution from a state of maximum to lesser organization if looked at from the side of physical form. On the other side we see the biological evolution of life proceeding in exactly the reverse order, starting from uniformity and lack of organization, building up into more complex forms, more highly organized, that consciousness and mind can ultimately manifest through them. As the form becomes more organized, the life-force can play through it more effectively, until finally with the human organism we reach a delicately balanced instrument capable of recording the activities of feeling and mind, and in its highest form, the more subtle values of aesthetics, morals and spiritual power.

Cycles of Manifestation

On the one side there is a running down—on the other a building up. Were it not for the occult teaching, the evolutionary purpose of organized life might seem doomed to frustration through its

dependence on the physical form and the limitation of the environment in which it finds itself.

The Secret Doctrine affords the key that this dependence of life on the limiting conditions of form is only for an age. The great cycle of involution has as its aim the involving of life within the deepest matter, and in the cyclic theory of chains, rounds and races, we see that the epoch in which we are living, and have lived for some thousands of millions of years, is only a temporary phase in the evolution of the whole. Dependence of life on matter is the condition of the lowest dip down into the cycle of manifestation, and it is not surprising that all our scientific evidence points to this, for it is in this condition that we find ourselves today.

In the Fifth Race of the Fourth Round of the Fourth Chain, we are only slightly beyond the half-way point in evolution, that point characterized by the maximum dependence of life upon matter, and small wonder that we are afraid of the future if this were the only condition possible. The cyclic law which has brought about involution, has already started the reverse process of the return—strictly the true evolution in the literal sense of the word.

Those who, like Gen. Smuts, see the increasing expression of life in form as forms become more organized, as the key to the mystery, have glimpsed the truth that up to the point of inversion on the involutionary arc, physical forms must be built up as necessary for life to play through to attain stability and that clarity of definition from which

self-consciousness is born. As this is acquired, life becomes ever freer in the form it uses, even though the form becomes more vulnerable to the physical conditions in which it is maintained. This increasing freedom of expression of life must ultimately result in the physical universe gradually running down as it becomes no longer needed, until the time will come on the evolutionary arc when life-consciousness, mind-spirit, will have mastered its physical environment and will function elsewhere in the universe freely at will, while the physical universe sinks back into the condition it was in in the beginning, when "darkness brooded over the face of the waters, and time was not"; mula-prakriti unilluminated by the spirit of the divine creative will.

Geometric Patterns

Passing to the actual evolution of mineral forms in the light of the vitalistic view, a recent suggestion by Sir James Jeans that the earth may be regarded as a huge molecule is of interest. The concept of a unity of structure is inclined to suggest to us a unity of function, and we may see here support for the occult view that the earth itself is indeed an entity—a unified organism, through which is expressed the consciousness of a spirit of the earth, to whom this large molecule serves as a physical vehicle.

Another problem in the same field upon which occult theory throws a vast flood of light is the discovery of modern chemistry that not only salts, but all mineral forms are based on certain recurrent patterns, so that we find cubes, tetrads

and octahedra as the basic three dimensional patterns of which solid matter is built up. If, as is indicated in the *Stanzas of Dzyan*, and more fully worked out in *The Web of the Universe* by Mr. E. L. Gardner, the underlying substance of the universe is of a three dimensional mesh-like character, then this will form the lines of force upon which the mineral patterns are formed.

Anyone who has watched the growth of crystals in solution, or observed the diffraction patterns produced by the atoms of matter, cannot but have a firm conviction of the reality of these inner lines of force amounting almost to a visual perception of them. This is especially so in the case of crystal formation at the moment just before precipitation of the actual crystal form takes place. These directive forces between the regularly spaced atoms can all be seen as acting along a three-dimensional mesh to build the tetrahedral, cubic or octahedral axes that give the basic units of the physical universe, which in this way is built upon number and geometry in a pattern of right relationship.

When we remember the importance assigned to the cube, tetrad and octahedron in the platonic tradition, as three of the basic units from which the universe is built, and the stress laid upon these in *The Secret Doctrine*, it is interesting to see that the most recent trends of modern chemical research are continually affording evidence for these as the structural units upon which physical matter is built. Ordered patterns indicate throughout the whole range of the material

universe those axes and lines of force at a more subtle level which are the mould or matrix for the precipitated physical form, rather as sound-waves generated by a musical instrument create patterns in a previously disorganized mass of grains of sand.

Variation and Heredity

Passing to biological evolution, we meet the problem of the relative parts played by structure, function and environment as determining factors of the course of evolution. Some have seen the development of function under pressure of environment as adequate to explain all possible differences in structure, i.e., that natural selection is adequate to bring about organic evolution, and calls out of the form those variations which enable it to adapt to its environmental conditions. Heredity, residing in the chromosomes and their constituent genes, which are passed on in the germ-plasm, makes for continuity, and affords the mechanism of transmission of common characteristics from one generation to the next. Environment may call forth variations, and sudden mutations may appear, due to changes in the orientation and arrangement of the genes within the chromosomes. Modern research has shown that the genes contain all possible characteristics within them, but the manifestation of one or another quality or character depends on the relative orientation and arrangement of the genes. In other words it is order and arrangement—right relationships—which determine manifestation in this field, in a way similar to that

we have seen to hold in the mineral kingdom.

The divergences between occult and scientific teachings here lie not so much in the realm of fact as in the stress that is placed upon those facts. Orthodox science is content to see the *explanation* of variation and heredity in the chromosomes and genes, and to see the sudden happening of mutations as due to a chance variation, possibly produced by the impact of a stray cosmic radiation upon the material of the nucleus. It has so far found no explanation for the fortuitous appearance of sudden mutations as a kind of spontaneous happening, and furthermore considers normal variation fully explained as a modification of form to meet changing conditions of surroundings, i.e., natural selection is the accepted mechanism of evolutionary change.

The limitations of this position are, however, being realized by some of the foremost scientific thinkers today. The Editor of *Nature* pointed out in a recent review (*Nature*, September 1937) that natural selection is probably only one of the means determining evolution, and there are undoubtedly many others, so that much work remains to be done before the causes of evolution are fully determined. He furthermore put forward the suggestion, which is in line with occult theory, that the organism may itself be the real sponsor for its own fate and future, and sudden mutations may quite reasonably be explained as due to the organism striking out on determinate lines of its own. Experimental proof, he considered, might be obtained to support this view.

This suggestion is very near to the occult view, which sees the whole biological evolution as a mechanism of change by which vital living influences create forms suitable to express certain qualities, and sees modification in form as due to the changing needs of the living entity that has created the form. Environment at any level undoubtedly plays a very large part in stimulating or temporarily inhibiting the growth and expansion of life.

Yet there is something more to it than this—the biological form is rather more a doorway into something greater behind than just a mere separated unit cut off from the rest of the universe and capable only of change if pressed by environment alone, or through sudden unexplained chances. Orthodox theory, if rigidly followed, must result in determinism, and the view that the individual organism is in the end entirely conditioned by his surroundings.

Occultly, in the mechanism of biological evolution, we have one of the most wonderful systems for the expression of living qualities that might possibly be conceived. The whole evolutionary journey is a triumph of life over successive self-imposed privations—transcended one by one, so that in the process of transcending, life unfolds latent powers to become fully self-aware and with all its potencies expressed. The individual form at any level, be it plant, animal or human, is limited by the capacities which the life inhabiting it has already evolved, and may be, often is, severely moulded by the environment in which it is placed, so that

further development of power may ultimately result. The resilience and self-reproductive capacities, the faculty for endurance of adverse circumstances, are among some of the most wonderful characteristics that are possessed by life—all called out by its restriction in the form.

The germ-plasm, continuously transmitted from one generation to the next, guarded carefully from any but profound and penetrating influences, as for example the cosmic radiation, is a perfect material containing within itself the possibility of all change. It is the *organization* of the units of which it is constituted which affords the mechanism for the expression of varying characteristics and qualities. Potencies are inherent within it, and these may be called forth by re-orientation of its constituent parts.

Thus the mechanism affords the possibility for individual variations—the individual changing in response to changed environment, and undergoing mutations on a larger scale as further living qualities require to be expressed. Mutations need to be seen as due not to chance, but as self-generated from within the organism, be it unconsciously as in plant or animal, or consciously as it may become with the human being when he takes up his share in the evolutionary process.

The Next Advance

Not only does the student of occult science from his vitalistic view see variation in forms as predominately due to the needs of an interior moulding life, but he views the whole problem of the building and sustaining of the biological form

from the same interior view. In the higher kingdoms of nature, the cell—not the atom or molecule—is the unit of form, and the living qualities of birth, death, growth and decay are its special characteristics.

The crystalline structure, that is definite orientation upon spatially directed patterns of many of the constituents of living cells, as for example proteins, nerve fibres, etc., shows that here again the interior mould or matrix forms the patterns for the cell. Such constituents which formed the whole units for the mineral world now serve as parts, components of the larger whole that is the cell, and in the behaviour of the cell as an individual life-unit we have one of the most fascinating problems of modern biology, and one that is likely to see the next advance in evolutionary theory.

If the form of the living organism is generated by a vital force—that is, if it is the creation of the vital activities of life, there must be some central controlling point for the inflow of that life. The obvious point is within the cell nucleus, that vital spot which sustains the activities of the cell, and biological research has recently isolated within it certain chemical substances, whose function is to control the activities of the cell. Some of these, known as growth hormones, regulate the growth of the cell and hence of the organism as a whole; others, known as organizers, control the passage of exterior substances into the interior, so that a living cell in which they are active may regulate its own interior, and protect itself to some ex-

tent from exterior influences that may cause it harm.

These substances act as regulators or supervisors over the activities of the cell or organ as a whole, and their discovery has led some of the vitalist school of biologists to the hypothesis that the real activity of an organism is directed from a level interior to the physical—a biological level from which originates a field of influence controlling the life of the cell. The real causes of organic evolution and the forces governing cell behaviour lie at this biological level. The organic vitality of the organism as a whole, and the interaction of this with the external environment must be considered as factors in biological evolution.

To the student of Theosophy, this level will be recognized as the astro-etheric, whence is gradually built up the vital group soul of plant and animal forms. It is through the organized group-soul that plant and animal consciousness reacts into the physical form, and it seems likely that biological research in its discovery of fields of influence controlling cell activities, together with specific substances as the agents through which vital forces play into the organism, is beginning to discover the astro-etheric body which creates and sustains all vital forms.

An understanding of the structure and organization of this subtle counterpart is the next advance that is needed to explain many unsolved problems of the behaviour of living organisms, such as animal memory and instinct—the amazing migration and homing behaviour of certain birds, and many apparently

psychic and super-intelligent feats that have been observed in certain animals—all phenomena which have so far received no satisfactory explanation. In this super-physical realm lies much research for the Theosophical student—he has a hypothesis that goes far to explain many of these extraordinary phenomena.

The above represent only a few of the problems of evolutionary

thought in which the occult view of evolution can usefully be applied. View the universe as a whole, a vast being whose outward form at all levels is sustained from subtler levels within, the whole moving through a process of continuous self-change and creation towards some vast perfected archetypal pattern, and much that formerly appeared difficult to explain fits adequately into the pattern of the whole.

THE NEXT STEP FOR SCIENCE

The next step for Science is to make alive the spirit of the mechanism of its apparatus. The next thing that a scientist is going to do is to look at his apparatus, whether simple or complicated, to enter into the spirit of it and evoke that spirit in himself, so that he himself becomes an apparatus, a laboratory. Then he is going to get beyond the domination of apparatus and instruments of all kinds. Suppose there is a special instrument which he has fashioned for the bombarding of the atom. What is the essence, the spirit, the life of it? It is inside, of course. If he can bring it outside, he too will be able to bombard. Bishop Leadbeater was outstanding as a scientist, constantly a walking laboratory.—GEORGE S. ARUNDALE.

Science and Society

A NOTE BY E. W. P.

ANY review of the progress of science during the past few years would be incomplete without some reference to the great advance that has taken place in the relation between Science and Society. We say advisedly *has* taken place, for the change has already been objectivized, as is shown in the editorial in *Nature*, 5th March 1938, on "The Shifting Focus of Science." Using terms very similar to those made familiar to us by Prof. J. E. Marcault in his *Evolutionary Psychology*,¹ the writer in *Nature* points out that "the changing face of science falls into clearly defined stages," and "while it is true that the creative thinking of an individual must play its part in the making of science—yet no man of science can do other than concern himself with the problems characteristic of his period." He continues:

"Today we are witnessing just such a shift. It began tentatively in the early days of this century with a scrutiny of the logic of mathematics and a study of the methodology of science. It passed to a series of startling attempts to evaluate the philosophical implications of more recent scientific knowledge, implications that sought to deny the certainty of science and strove to lead it back to mys-

¹ See *The Evolution of Man*, by J. E. Marcault and I. A. Hawliczek, 1937. New edition.

ticism. The significant feature of this phase was that these pronouncements were couched in popularized writings, a concession to a sense of social responsibility. Now at last a serious attempt is being made to probe further back to the social origins and social consequences of scientific discovery. The alertness shown in the columns of *Nature* to the social possibilities of science, to its destructive as well as its constructive features, to the travesties of truth that are used to bolster up national doctrines, and generally to the distortion and prostitution of science to ignoble ends, is itself a significant feature of this same analysis. Scientific history, like ordinary history, is at last beginning to be seen in its social context; and the shifting focus of science is part of its history."²

A striking feature of the change, too, is what we might call the corporate recognition by scientists of their responsibility to mankind. Individual scientists, such as Faraday, long ago recognized this duty and relationship, and during last century scientific inventions and discoveries contributed widely to industry, public health, and to social amenities of all kinds. It is only during the last ten years, however, that we have seen the scientists accepting responsibility as a body for the use made of their

² Editorial by H.L. in *Nature*, 5th March 1938.

discoveries, and recognizing themselves not as a race apart but as integral parts of human society. This corporate thinking in relation to society is exemplified in the facts that the British Association meeting in 1937 discussed the impact of science on society, that investigations are being carried out on the care of the human material engaged in factories, that realistic social studies are to be undertaken in the new "Institute of Economic and Social Research" under the direction of Sir Josiah Stamp and Prof. N. F. Hall, and that the National Institute of Industrial Psychology is discussing the psychology of international relations.

A further striking evidence of the development of this cosmic sense among scientists comes from America. On 30th December 1937 the Indianapolis meeting of the American Association for the Advancement of Science unanimously accepted a resolution on intellectual freedom proposed by Professors Millikan and H. N. Russell, and made an even more significant declaration as follows :

Whereas, science and its applications are not only transforming the physical and mental environment of men, but are adding greatly to the com-

plexities of the social, economic and political relations among them; and

Whereas, science is wholly independent of national boundaries and races and creeds and can flourish permanently only where there is peace and intellectual freedom; now

Therefore, Be it resolved by the council on this thirtieth day of December 1937, that the American Association for the Advancement of Science makes as one of its objectives an examination of the profound effects of science upon society; and that the Association extends to its prototype, the British Association for the Advancement of Science, and to all other scientific organizations with similar aims throughout the world, an invitation to co-operate, not only in advancing the interests of science, but also in promoting peace among nations and intellectual freedom in order that science may continue to advance and spread more abundantly its benefits to all mankind.¹

Here is a vision of the solidarity of man independent of nation, race or creed. In 1662 the charter of intellectual freedom was promulgated by The Royal Society of England. In 1937 scientists in the Sixth Race continent proclaim not only intellectual freedom but universal brotherhood.

¹ *Nature*, 22 Jan. 1938.

How "The Secret Doctrine" Was Written

COMPILED BY JOSEPHINE RANSOM

Published simultaneously with the Adyar Edition of *The Secret Doctrine*, this monograph (commenced in our May issue) proves beyond question the authenticity of the Third Volume, and the integrity of the Third Edition. It records a strenuous episode in the dramatic history of The Theosophical Society.

1887. Writing on 4 January, to Col. Olcott, H. P. Blavatsky said she was glad he liked the Proem, but it was only a preliminary volume, and the genuine doctrine was to follow. She mentions a young Englishman, E. D. Fawcett, who had helped her in Wurzburg, and in Ostend, and afterwards in England, specially in those parts in the Second Volume dealing with the evolutionary hypothesis. "He suggested, corrected, and wrote, and several pages of his MSS. were incorporated by H. P. B. into her work." "He supplied many of the quotations from scientific works, as well as many confirmations of the occult doctrines derived from similar sources."¹

A "Miraculous" Recovery

H. P. B. again asked that Subba Row should see the MS., and do what he liked with it: "I give him *carte blanche*. I trust in his wisdom far more than in mine, for I may have misunderstood in many a point both Master and the Old Gentleman. They give me facts

¹ *Reminiscences*, pp. 94, 97.

only and rarely dictate in succession. . . I know that my facts are all original and new. . . ."²

In January she wrote to Mr. Sinnett that she had sent him the Archaic Doctrine before it was really ready, for she was "Rewriting it, posting and reposting, scratching out and replacing with notes from my AUTHORITIES."³ It had been shown to Prof. W. Crookes. H. P. B. wrote to Mr. Sinnett later that *The Secret Doctrine* "grows, grows and grows."⁴

In Ostend the same patient labour went on, but H. P. B. fell ill and came near to death, and "she thought the Master would let her be free at last." She was "very anxious about *The Secret Doctrine*," and told the Countess she must be "most careful of her manuscripts and hand all over to Col. Olcott with directions to have them printed."⁵ But H.P.B. was "miraculously" cured once more. She

² *Reproduced in THE THEOSOPHIST*, Aug. 1931, p. 683.

³ *Letters of H.P.B. and A.P.S.*, pp. 226-7.

⁴ *Ibid.*, p. 242.

⁵ *Reminiscences*, p. 73.

said: "Master has been here; He gave me my choice, that I might die and be free if I would, or I might live and finish *The Secret Doctrine* . . . when I thought of those students to whom I shall be permitted to teach a few things, and of the Theosophical Society in general, to which I have already given my heart's blood, I accepted the sacrifice. . . ."¹

Dr. A. Keightley found H. P. B. living at Ostend, hard at work. He says: "I was handed a part of the MS.² with a request to emendate, excise, alter the English, in fact to treat it as my own . . . The MS.² was then in detached sections, similar to those included under the heads of 'Symbolism' and 'Appendices' in the published volumes. What I saw was a mass of MS.² with no definite arrangement, much of which had been patiently and industriously copied by the Countess Wachtmeister. The idea then was to keep one copy in Europe, while the other went to India for correction by various native collaborators. The greater part did go at a later date, but some cause prevented the collaboration.

"What struck me most in the part I was able to read . . . was the enormous number of quotations from various authors. I knew that there was no library to consult and I could see that H.P.B.'s books did not amount to thirty in all, of which several were dictionaries and several works counted two or more volumes. At this time I did not see the *Stanzas of Dzyan*, though there were several pieces of the

Occult Catechism included in the MS."³

The Plan of the Book

In the spring H.P.B. was urged by several English members of The Theosophical Society to go to London, where she could be more carefully looked after. She removed with all her manuscripts on 1 May. All through the summer both Keightleys were engaged in reading, re-reading, copying and correcting the MS. of which there was a pile three ft. high. After a few months in Norwood H.P.B. settled in September at 17 Lansdowne Road. She gave the two able and devoted young men—Dr. A. Keightley and his nephew, Bertram Keightley—the mass of MS. to sort out and make suggestions upon, for by this time it had neither plan nor consecutiveness. They finally recommended that the book should be divided into four volumes dealing with: 1. The Evolution of the Cosmos; 2. The Evolution of Man; 3. The Lives of some great Occultists; 4. Practical Occultism. And that each volume should be divided into three parts: 1. The Stanzas and Commentaries; 2. Symbolism; 3. Science. This was duly sanctioned by H.P.B.

"The next step was to read the MSS. through again and make a general rearrangement of the matter pertaining to the subjects coming under the heads of Cosmogony and Anthropology, which were to form the first two volumes of the work. When this had been completed, H.P.B. duly consulted, and her approval of what had been done

¹ *Reminiscences*, p. 75.

² MSS. in the original.

³ *Reminiscences*, pp. 96-7.

obtained, the whole of the MSS. thus arranged was typewritten out by professional hands, then re-read, corrected, compared with the original MSS., and all Greek, Hebrew, and Sanskrit quotations inserted by us. It then appeared that the whole of the Commentary on the Stanzas did not amount to more than twenty pages of the present work, as H.P.B. had not stuck closely to her text in writing. So we seriously interviewed her, and suggested that she should write a proper commentary, as in her opening words she had promised her readers to do. . . ."¹

The solution of this problem was: "Each Shloka of the Stanzas was written (or cut out from the typewritten copy) and pasted at the head of a sheet of paper, and then on a loose sheet pinned thereto were written all the questions we could find time to devise on that Shloka . . . H.P.B. struck out large numbers of them, made us write fuller explanations, or our own ideas . . . of what her readers expected her to say, wrote more herself, incorporated the little she had already written on that particular shloka, and so the work was done. . . ."¹

Phenomena

Bertram Keightley wrote: "Of phenomena in connection with *The Secret Doctrine*, I have very little to say. Quotations with full references, from books which were never in the house—quotations verified after hours of search, some-

times at the British Museum for a rare book—of such I saw and verified not a few. In verifying them I found occasionally the curious fact that the numerical references were reversed, e.g., p. 321 for p. 123, illustrating the reversal of objects when seen in the astral light . . ."² Otherwise they were "accurate in the minutest degree."³

In *THE THEOSOPHIST*⁴ Col. Olcott wrote: "It is gratifying to learn that 'the Secret Doctrine' is steadily growing. Mr. Sinnett writes that as much as would make about one volume of 'Isis' is already written . . . Though the Manager long ago offered to return the money to the registered subscribers [about Rs. 3,000], scarcely any availed themselves of it." In his Annual Address in December, Col. Olcott says H.P.B. had sent him "the MSS. of four out of the probable five volumes of *The Secret Doctrine* for examination, and it is expected that the first volume will be issued at London during the coming spring season."⁵

1888. Early in this year H.P.B. again offered to send the MSS. to Subba Row, but with the same result. In February she advised Col. Olcott that Tookaram Tatya had written that Subba Row was ready to help and to correct "my S.D. *provided* I took out from it every reference to the Masters . . . Does he mean to say that I should deny the Masters or that I do not understand them and garble the facts given me. . . It is I who

¹ *Reminiscences*, pp. 92-3. See also *THE THEOSOPHIST*, Sep. 1931, p. 708; *Reminiscences of H. P. B.*, by Bertram Keightley.

² *Ibid.*, p. 94.

³ *THE THEOSOPHIST*, July 1889, p. 598.

⁴ *Ibid.*, Oct. 1887, p. 62.

⁵ *General Report*, 1887, p. 9.

brought in . . . the evidence of our Masters to the world and the T.S. I did it because they sent me to do the work as a fresh experiment in this XIX century and I have done it, the best I know how. . . ."¹

Subba Row's repeated refusals to help had become known. A group in America, headed by Mr. Judge, wrote to H.P.B. saying they had heard she was asked to withdraw *The Secret Doctrine* from publication, on the grounds that it might antagonize some Indian pundits, and be attacked or ridiculed by them. They begged H.P.B. to pay no heed but to bring out *The Secret Doctrine* at the earliest possible time.² A group of Indians, headed by N. D. Khandalavala and Tookaram Tatya, took exception to these remarks, and said that had H.P.B. been in India, the book would long ago have seen the light. They thought H. P. B. had not been properly informed of the suggestions to make the book more exact in its allusions to Hindu literature, and that a few sympathetic friends could easily arrange to have the work revised.³

Publication

Bertram Keightley wrote from London that the publication of *The Secret Doctrine* had commenced, and as soon as the magnitude and cost of the work could be definitely calculated the price to subscribers would be fixed, and a circular sent them giving the option of taking it or receiving back their money, which had been lying in

the bank untouched ever since they paid it. "The 'Secret' Doctrine is so vast a theme and ramifies into so many directions, that its treatment involves enormous labour, with no possibility of fixing in advance the number or size of the volumes required."⁴

" When the MSS. of this work had not yet left my writing table," wrote H. P. B., "and the *Secret Doctrine* was utterly unknown to the world, it was already being denounced as a product of my brain and no more. These are the flattering terms in which the *Evening Telegraph* (of America) referred to this still unpublished work in its issue of June 30 . . . 'Among the fascinating books for July reading is Madame Blavatsky's new book on Theosophy . . . ! THE SECRET DOCTRINE? But because she can soar back into the Brahmin ignorance . . . (!?) . . . is no proof that everything she says is true.'"⁵

The Master Dictates

When Col. Olcott was travelling to England in August, he received in his cabin a letter in which the Master K. H. said: "I have also noted your thoughts about the 'Secret Doctrine.' Be assured that what she has not *annotated* from scientific and other works, we have given or *suggested* to her. Every mistake and erroneous notion, corrected and explained by her from the works of other Theosophists, *was corrected by me, or*

¹ From a letter in the Archives dated 24 Feb. 1888.

² *The Path*, Feb. 1888, pp. 354-5.

³ *Ibid.*, June 1888, pp. 97-8.

⁴ THE THEOSOPHIST, May 1888, Supplement, p. xxxvii.

⁵ *The Secret Doctrine*, Vol. II., 1888 edition, p. 441; 1893 edition, p. 460 footnote.

under my instruction. It is a more valuable work than its predecessor, an epitome of occult truths that will make it a source of information and instruction for the earnest student for long years to come."¹

On arrival in London Col. Olcott found H. P. B. working at her desk from morning to night, preparing "copy" and reading proofs for *The Secret Doctrine*. Both volumes were to appear this month (August). Clustering around her were devoted Theosophists who had advanced £1,500 to bring out *The Secret Doctrine* and other publications. "Even for the *Secret Doctrine* there are about half a dozen Theosophists who have been busy in editing it, who have helped me to arrange the matter, correct the imperfect English and prepare it for print. But that which none of them will ever claim from first to last, is the fundamental doctrine, the philosophical conclusions and teachings. Nothing of that have I invented, but simply given it out as I have been taught."²

During this time H. P. B. was overwhelmed with work, and failing in health. It was a wearisome task to rise so early and to work so late. . . . The estimates of the printer were examined. Certain requirements as to size of page and margin were particular points with H. P. B., as also were the thickness and quality of paper. . . . These points decided, the book began to go to press . . . it went through three or four other hands besides H.P.B.'s in galley proofs, two sets as well

as in revise. She was her own most severe corrector, and was liable to treat revise as MS., with alarming results in the correction item in the bill. Then came the writing of the Preface, and finally the book was out,³ "an unequalled treasure of occult wisdom."⁴

"H.P.B. was happy that day."⁵

In the "Introductory," Vol. I, she wrote: "To my judges, past and future. . . I have nothing to say. . . But to the public in general and the readers of THE SECRET DOCTRINE I may repeat what I have stated all along, and which I now clothe in the words of Montaigne: 'Gentlemen, I have made only a nosegay of culled flowers, and have brought nothing of my own but the string that ties them'."⁶

An Instant Success

In October the long awaited first two volumes of *The Secret Doctrine* were "published, simultaneously in London and New York. . . The first English Edition of 500 was exhausted before the day of publication and a second is preparing."⁷ This Second Edition was out before the end of the year.

The whole edition was printed by The H. P. B. Press, Printers to the Theosophical Society; and the English edition was entered at Stationers' Hall, while the American simultaneous edition was "Entered according to Act of Congress in the year 1888, by H. P. Blavatsky in the office of the

³ *Reminiscences*, p. 94.

⁴ THE THEOSOPHIST, Nov. 1888 p. 69.,

⁵ *Reminiscences*, p. 85.

⁶ 1888 edition, p. xlvi; 1893 edition, p. 29.

⁷ THE THEOSOPHIST, Dec. 1888, Supplement, p. xxxa.

¹ Printed in *Letters from the Masters of the Wisdom*, compiled by C. Jinarajadasa, p. 54. (1919).

² H.P.B. in "My Books," *Lucifer*, May 1891, p. 246.

Librarian of Congress at Washington, D. C."

The newspapers did not give *The Secret Doctrine* much notice, but the demand for it was continuous. "This is curious," remarked the *London Star*, "considering that the book is of a more occult and difficult character than any that has preceded it."¹

In her Preface H.P.B. apologized for the long delay in the appearance of this work, occasioned by ill-health and the magnitude of the undertaking.

She wrote: "Even the two volumes now issued do not complete the scheme, and these do not treat exhaustively of the subjects dealt with in them. . . . Should the present volumes meet with a favourable reception, no effort will be spared to carry out the scheme of the work in its entirety. The third volume is entirely ready; the fourth almost so."²

"This scheme, it must be added, was not in contemplation when the preparation of the work was first announced." H.P.B. then refers to the original intention to make this work a revision of *Isis Unveiled*; but owing to the difference of treatment required "the present volumes do not contain in all, twenty pages extracted from 'Isis Unveiled'."

Referring to the volumes still to come, she said: "In Volume III of this work (the said volume and the IVth being almost ready) a brief history of all the great adepts

known to the ancients and the moderns in their chronological order will be given, as also a bird's-eye view of the *Mysteries*, their birth, growth, decay, and final death—in Europe. This could not find room in the present work. Volume IV will be almost entirely devoted to *Occult Teachings*."³

Referring to the erroneous speculations of Orientalists with respect to "the Dhyâni-Buddhas and their earthly correspondences, the Mânushi-Buddhas," H. P. B. said that "the real tenet is hinted at in a subsequent Volume (see 'The Mystery about Buddha'), and will be more fully explained in its proper place."⁴ This no doubt refers to "The Mystery of Buddha."⁵ It is probable that this was what she meant when she said, about 1886: "The triple Mystery is given out."⁶

Her concluding words in *The Secret Doctrine*, 1888, were: "A commencement has been made to fell and uproot the deadly upas trees of superstition, prejudice, and conceited ignorance, so that these two volumes should form for the student a fitting prelude for Volumes III and IV. Until the rubbish of the ages is cleared away from the minds of the Theosophists to whom these volumes are dedicated, it is impossible that the more practical teaching contained in the Third Volume should be understood. Consequently, it entirely depends upon the reception with which Volumes I and II will meet at the hands of Theosophists and Mystics,

¹ Quoted in *Lucifer*, December 1889, p. 346.

² Vol. I. p. vii. In the 1893 edition this last sentence is omitted, p. xix; see also p. 369, 1888 ed., and p. 386, 1893 ed., for a further reference to Vol. III.

³ Vol. II, p. 437, 1888 edition.

⁴ Vol. I, p. 52, 1888 edition. See Vol. III, 1893, p. 376 *et seq.*

⁵ Vol. III, p. 359 *et seq.*

⁶ *Reminiscences*, p. 68.

whether these last two volumes will ever be published, though they are *almost* completed."¹

Comparison of these statements with fact shows that they tally; i.e., pages 1-432 of Vol. III give outlines of the histories of some of the world's great Adepts; and pages 433-594 give the Practical Occultism which H.P.B. taught to her pupils, and "originally circulated privately among a large body of students . . . The papers . . . were now made public and thus exhausted all the literary remains of H.P.B."²

1890. H.P.B., writing in *Lucifer*,³ said the demand for "mystic information" had become so great that it was difficult to supply the demand. "Even the 'Secret Doctrine,' the most abstruse of our publications—notwithstanding its forbidding price, the conspiracy of silence, and the nasty contemptuous flings at it by some daily papers—has proved financially a success."

A Revised Edition

1891. By the close of 1891 the Second Edition of *The Secret Doctrine* was exhausted. Mr. G. R. S. Mead and Mrs. Annie Besant undertook to bring out a new edition. Mr. Mead had been H.P.B.'s private secretary for some years and claimed to have edited, in one form or another, almost all that H.P.B. had written in English . . .⁴ He was the chief person concerned with the new edition and exercised

his fine scholarship and his knowledge of H.P.B.'s wishes to amend the grammatical and other errors in the text. A notice was published in the leading Theosophical journals as follows:

IMPORTANT NOTICE

A Revised Edition of *The Secret Doctrine*. The second edition of H.P.B.'s masterpiece being exhausted, a third edition has to be put in hand immediately. Every effort is being made to thoroughly revise the new edition, and the editors earnestly request all students who may read this notice to send in as full lists of ERRATA as possible. Verification of references and quotations, mis-spelling, errors of indexing, indication of obscure passages, etc., etc., will be most thankfully received. It is important that the ERRATA of the first part of Volume I should be sent in IMMEDIATELY.

ANNIE BESANT,
G. R. S. MEAD.⁵

1895. "The revised edition was a work of much labour, and every effort was made by the editors to verify every quotation they could and correct the many errors of form in the earlier issues. The errors of substance the editors had no right to amend . . ."⁶

The Index to the First and Second editions was not very adequate. Mr. A. J. Faulding had devoted himself to preparing a new and copious Index, which was bound

¹ Vol. II, pp. 797-8. 1888 edition.

² G. R. S. Mead in *Lucifer*, July 1897, p. 353.

³ March 1890, p. 7.

⁴ G. R. S. Mead in *Lucifer*, July 1897, p. 354.

⁵ See *The Vahan*, Dec. 1891., p. 8; *THE THEOSOPHIST*, Dec. Supplement, p. xxxii; and *The Path*, Dec. 1891, p. 296.

⁶ G. R. S. Mead in *Lucifer*, July 1897, p. 353.

separately. "For this great labour we, and all students, are his debtors . . ."¹ This Index has ever since proved satisfactory. Some additions have been made in the Adyar Edition, where the Indexes of all Volumes are combined in one.

1896. There were, of course, portions of H.P.B.'s MSS. left over. These Mrs. Besant took in hand and prepared for publication. In the course of this preparation a few manuscripts were found which seemed to form no part of *The Secret Doctrine* itself. These were published in *Lucifer*; 1. Spirits of Various Kinds;² 2. Buddhism, Christianity and Phallicism;³ 3. Fragments: Idolatry; Avatâras; Initiations; On Cycles, and Modern Fallacies.⁴

The Third Volume

1897. Punctually and simultaneously on 14 June, the Third Volume was for sale both in Chicago and London. It was eagerly greeted and had a constant sale . . .⁵

When Mr. Jinarajadasa was searching through the Archives and gathering together scattered material, he found a solitary page of yet a different draft, in H.P.B.'s own handwriting, of Commentary and notes on Stanza I. A facsimile of this is printed in THE THEOSOPHIST.⁶ Mrs. Besant said

¹ Preface to the Third and Revised Edition, 1893.

² *Lucifer*, June 1896, p. 273.

³ *Ibid.*, July 1896, p. 361.

⁴ *Ibid.*, August 1896, p. 449 *et seq.*

⁵ See THE THEOSOPHIST, Sept. 1897, p. 756.

⁶ *Ibid.*, August 1931, p. 560.

concerning the writing of *The Secret Doctrine*: "H.P.B. wrote and re-wrote, correcting even when the final proof-pages were ready to be struck off . . . The verbal changes, omissions and rearrangement of her material by H.P.B. are of very great fascination to students. A wild theory has just been started in the U.S.A. that the second edition of *The Secret Doctrine*, brought out by the London T.P.H. after H.P.B.'s death was not as H.P.B. wanted it. The insinuation is made that H.P.B. was 'edited' by those in charge of the second edition. The trustees to whom she left the safeguarding of her printed books and unpublished manuscripts were all her own pupils, who had lived with her for years, and they made only such changes as she had herself directed, which consist mainly in the correction of verbal and grammatical errors, and in the arrangement of the material of Vol. III."⁷

Answer to Charges

The charge that the text of *The Secret Doctrine* was tampered with in the third edition is refuted by Mr. J. M. Pryse, who was in charge of The Theosophical Publishing Company Ltd., which published *The Secret Doctrine* and other literature. Mr. Pryse writes in *The Canadian Theosophist*:⁸

"In justice to Mr. Mead and Mrs. Besant, I wish to state, from my personal knowledge, that the oft-repeated charges that they, or either of them, made unwarranted

⁷ THE THEOSOPHIST, March 1922, p. 534.

⁸ *The Canadian Theosophist*, Sept. 1926, pp. 140-1.

changes in the revised (third) edition of the S.D., tampered with the manuscript of the third volume, and suppressed the fourth volume, are wholly false, with no foundation whatever in fact . . . as I was for four years in the London headquarters, had charge of the printing office, and printed the revised S.D., I naturally had every opportunity to know the facts. . . .

"The first printing of the S.D. was divided into two 'editions,' which are therefore identical save for the words 'second edition' on the title-page. The printing was done from the type, but stereotype matrices were made in case another should be called for. When that time came, however, we found that the matrices had been accidentally destroyed; and I, for one, was decidedly pleased at their loss, since it made opportune a much needed revision of the text, which arduous labour was undertaken by Mr. Mead and Mrs. Besant . . . As Mrs. Besant could spare but little time from her other Theosophical activities, the work of revision was mostly done by Mr. Mead, who was assisted by other members of the staff in verifying quotations and references. . . .

"In revising the first edition of the S.D. he did precisely the work which he had formerly done on [her] manuscripts—only that, and nothing more. For it was obvious to anyone familiar with the literary and mechanical details of book-publishing that the manuscript of the S.D. had not been properly prepared for the printer, and that the proof-reading had been so carelessly done that even glaring grammatical errors, inadvertently made

by the author, had been allowed to stand. No changes were made by Mr. Mead or by Mrs. Besant except such as should have been made in the original manuscript before printing.

"For his scholarly and conscientious work in making the revision Mr. Mead deserves the gratitude of all discriminating readers of the S.D., as does Mrs. Besant also for her share in the arduous task.

"When I had finished printing Vols. I and II Mrs. Besant placed the manuscript of Vol. III in my hands . . . H. P. B. had rewritten some of the pages several times, with erasures and changes, but with nothing to indicate which copy was the final revision; Mrs. Besant had to decide that as best she might.

"As it contained far less matter than either of the other volumes, Mrs. Besant told me that she would pad it out by adding the E. S. T. Instructions, since H. P. B. had told her she might do so. These Instructions, it will be noticed, cover the very ground of the proposed Vol. IV, of which only a few pages were found, merely enough to mark where H. P. B. had discontinued writing. I am inclined to believe that she intended to incorporate these Instructions in Vol. IV, and that she had this in mind when she wrote, too optimistically, that the last two volumes were 'almost completed.' A big pile of manuscript was also found after H. P. B.'s death, but it proved to be only the old manuscript of Vols. I and II, returned by the printer. . . ."

Mrs. Besant wrote in *Lucifer*¹:
"The value of *The Secret Doctrine*

¹ *Lucifer*, May 1895, pp. 179-81.

does not lie in the separate materials, but in the building of them into a connected whole, as the value of an architect's plan is not lessened because the building is made of bricks wrought by other hands. . . . H. P. B. was very loose in her literary methods, and used any quotations that substantiated her arguments from any source, physical or astral, with very small regard to the use of inverted commas. Have not Mr. Mead and I suffered much from this, in editing the last edition of *The Secret Doctrine* . . . ? Brothers mine in all lands, who

have learned from H. P. B. profound truths that have made the spiritual life a reality, let us stand steadily in her defence, not claiming for her infallibility, not demanding acceptance of her as an 'authority'—but maintaining the reality of her knowledge, the fact of her connection with the Masters, the splendid self-sacrifice of her life, the inestimable service that she did to the cause of spirituality in the world. When all these attacks are forgotten, these deathless titles to the gratitude of posterity will remain."

FORESHADOWED

The *Secret Doctrine* will explain many things, set to right more than one perplexed student.—THE MASTER K. H. (1884).

Occult Investigations

BY C. JINARAJADASA

Remarkable methods of investigation are described by Mr. Jinarajadasa in this concluding article: How Bishop Leadbeater, doing research at Adyar, clairvoyantly examined chemicals in Europe; how Sir William Crookes is working in a laboratory on the astral plane; how the Adepts protect mankind from the exploitation of the unscrupulous. The author predicts that the work of Dr. Besant and Bishop Leadbeater on Occult Chemistry will remain "a wonder for centuries to come."

Filling in Gaps

AN interesting series of three elements is a fourth inter-periodic group. According to Mendeléeff's arrangement of the Periodic Law, there are three groups of inter-periodics: (1) Iron, Cobalt, Nickel; (2) Ruthenium, Rhodium, Paladium; (3) Osmium, Iridium, Platinum. As one looks at the arrangement, there is a gap where properly speaking another inter-periodic group should exist, between the 2nd and 3rd groups mentioned above. It is strange that this discrepancy in the Periodic Law has not been noted and emphasized. But such omissions of observation happen now and then, even among the most careful observers in scientific investigations. We know that, as a matter of fact, even as long ago as 1785 Cavendish had noted a residuary gas in Nitrogen. He recorded the details of his experiments, and concluded that the residuum was something other than Nitrogen. Subsequent investigators knew that Nitrogen from the air was heavier than Nitrogen libera-

ted from compounds; but nobody particularly thought it worth while to follow up the matter till 1894, when Lord Rayleigh and Professor Ramsay took it up. Then it was found that the heavy residuum was not Nitrogen but a new gas, Argon.

In the same kind of way, one of these days, when the curious gap in the Periodic Law is recognized, possibly a special hunt will be made for the new interperiodic group. The difficulty lies in that they come among the "rare earths," of which there is so little to be obtained for experimental purposes.

However, when I had completed the diagrams for the three inter-periodic groups—(1) Iron, Cobalt, Nickel; (2) Ruthenium, Rhodium, Paladium; (3) Osmium, Iridium, Platinum—it occurred to me after a close study of the diagrams that surely another inter-periodic group of three elements must exist between the second and third groups. I worked out a theory of their construction, and sent my theoretical diagrams, with weights according to my calculations, calling the

elements X, Y, Z. My calculations were :

X "anu "	2590	weight	143.3
Y "	2618	"	145.4
Z "	2646	"	147

I stated then that probably they came among the rare earths. In the rare earth material which I sent from the United States of America, Bishop Leadbeater did find the three new inter-periodics.

It was interesting that the diagrams which I suggested were nearly accurate, and my inaccuracies were due to the fact that whenever the human mind conceives, the Mind of the Third Logos has something more ingenious still. Out of the three weights which I suggested, the last was accurate, so that while I calculated that the numbers of ultimate physical atoms in the three were 2590, 2618 and 2646, they were in reality 2646, 2674 and 2702.

As mentioned above, these three inter-periodics have yet to be discovered, but when they are found, the rhythmic periodicity of the Law will be complete. On the other hand, these three elements, with Adyarium, Occultum, Canadium (which is really not an isotope of Platinum) and "Kalon" necessitate a new formulation of Moseley's law of atomic numbers. There are 99 elements, not counting isotopes, according to Occult Chemistry. Chemistry is positive that there can be only 92.

In Crookes' lecture at the Royal Institution in 1887, he presented a model of the Periodic Law with two lemniscates slowly descending. It occurred to me to construct a new model with four lemniscates.

I made this model, which was a large one, and for several years it was in my office, and for a while in the Adyar Library. It gave far more beautifully than the model of Crookes the idea of the Periodic Law. But very few seemed to be interested in it, and as the model was in the way, I have taken it to pieces and put it away in a box-room to await more propitious days.

Examining Elements at a Distance

Bishop Leadbeater soon found that it was not necessary to have an element before him for investigation, provided he knew where that element was to be located. Thus, in connection with the investigations at Adyar in 1933, one element we hunted for was Masurium. It seemed likely that this new element might be found among Rubidium salts, but at the moment of investigation I could not procure any Rubidium salts in Madras, not even in the laboratory of the chief college in Madras. It was therefore necessary to look for it elsewhere. I had with me several chemicals procured from Hilger & Co. Their address was on the samples, namely Rochester Place, Camden Road, London. Bishop Leadbeater could find this street easily, and from Adyar he located the laboratories of Hilger & Co. Then he saw where all the chemicals were stored in bottles on shelves. The next thing was to find out where were the bottles containing Rubidium salts, and for this he had to tap the mind of one of the assistants who was working among the bottles; then he located the salts, but Masurium

was not among them. He promised to take up the investigation at night during sleep, and to see if he could locate Masurium among the chemicals at the Dresden Museum, which he had visited in 1907.

However, I went down immediately to the library of the Madras University and searched in various volumes, and finally found a volume, *Chemical Abstract*, which referred to the original German paper recording the first investigation into Masurium. Fortunately the library had the German volume also, and there I found that Masurium was discovered in certain oxides. These oxides were among the rare earths which I had procured from Hilger & Co.

Another instance of the way in which an examination may be carried on at a distance was in respect of the Radium emanations. Of course we had no Radium, but we knew that there was some kept in the Madras Hospital. Bishop Leadbeater did not feel up to the task of wandering about the various corridors of the Hospital to find the place where Radium was kept, nor was it necessary, provided I went. I procured the necessary introduction, and saw the needles of Radium in the lead cabinet. When I got back, the picture in my mind of the room and the cabinet was sufficient, and he then watched the Radium emanations. For various causes, this particular investigation into Radium went no further.

Investigations into Compounds

As I have noted above, the Occult Chemistry investigators to the end of 1909 had examined 86

elements. Soon after this period, both the investigators became absorbed in many duties, and I myself was not with them, as my work was then in the United States. Again I was with them at the end of 1911, but at that time there was much anxiety concerning the welfare of Krishnaji and his brother, owing to the hostile attitude of their father. Furthermore, in February 1912 Dr. Besant put the two boys in my charge, and I was away in England with them till the end of 1913, when again I returned to India. At this time Dr. Besant became absorbed in her political work, and two months after I took up residence in Adyar, Bishop Leadbeater left for Java and Australia.

In the development of events after the war, by which time I had become Vice-President of The Theosophical Society, I had to go to Australia in 1919. Bishop Leadbeater was then residing in Sydney; he was affected with diabetes, and was an invalid with a weak heart, which kept him much of each day in bed. However, I knew that he was always keen on Occult Chemistry, and so made my preparations to use any opportunity that might arise to ask him to investigate.

Not knowing how many years he might live, my plan was not to complete the remaining elements of the Periodic Table, but rather to ask for investigations into compounds. No compound had been examined in the investigations; while Hydrogen and Oxygen had been described, there was no mapping out of the molecule of water. As chemistry was not a subject I had taken up for any examination, though I had done some physics, I

arranged for a very rapid course on theoretical chemistry with a teacher of Sydney University, so as to prepare myself for the next stage in the investigations. I began to collect various compounds to offer to Bishop Leadbeater.

I recall an exciting afternoon in Sydney, when he telephoned over to me to say that he had made models of water and of salt. The model for the first was made with a candle through which several lady's hat pins were stuck, and similarly the model of salt had as its centre an apple through which the pins were skewered. In the investigations that followed in Australia, in 1920 and 1922, wherever possible I arranged for Bishop Leadbeater's secretary, Miss V. K. Maddox, to take down verbatim the conversation between him and myself, as we discussed operations. I have published in *THE THEOSOPHIST*¹ many diagrams of various compounds, though still there remain a good many which are only in the stage of rough diagrams. One that interests me greatly is Indigo, whose formula is $C_{16}H_{10}N_2O_2$. I have long waited to make the model.

Geometrical Wonders

This work of Occult Chemistry has always been to me one of intensest fascination, because every element and compound investigated revealed the inspiring quality of that divine work in which the Platonists declared that "God geometrizes." I was always impregnated with a sense of beauty as I watched these diagrams being

¹ The references are at the end of the article.

drawn one by one. For not only is the Mind of the Third Logos wonderfully exquisite in ingenuity, but it possesses a quality of beautiful building which thrills me. The sense of beauty is something like what one has when watching the Woolworth Building in New York from a distance. As it rises from story to story, there is glimpsed a combined majesty and a beauty. In the same way, as one takes the elements of a family one after another, and notes their structure, from the lightest of the family to the heaviest, one feels like singing a psalm in glorification of the work of the wonderful Divine Mind.

An instance of this beautiful building is the structure of benzene. Its structure is still one of the disputed points amongst chemists. In 1895 the structure of Hydrogen was described, and that of Carbon in 1907; benzene is composed of 6 Carbon atoms in a "ring," and to each of them a Hydrogen atom is linked. When benzene, as seen by clairvoyance, was described in 1922, one saw in it the wonder of the Divine Thought, which combined the 6 Carbon and 6 Hydrogen atoms. The sense of wonder increased with naphthalene, the second of the ring series. The mode of structure of the "benzene ring" is so clear that I built then a model of anthracene, the third member of the series, and its beauty of structure is most impressive. So, too, but to a lesser degree of exquisiteness, is the building of the aliphatic or open-chain series.

An event of excitement was the building of the molecule of diamond. Bishop Leadbeater put on to the task of making 594 paper

octohedra the group of young people who were then living at The Manor, Sydney. All these octohedra were stuck to make the diamond model, which was then despatched to me. A box arrived at Adyar with the model inside. The diagrams describing the diamond, including one plate in colour, appeared duly in *THE THEOSOPHIST*.² Of course the model was most interesting, but it was something of a white elephant, for I could only hang it from the ceiling. In a couple of years the dampness of the climate of Adyar slowly made the model fall into pieces.

An Astral Laboratory

Another interesting incident in connection with these investigations was the help which Sir William Crookes gave. He knew in 1907 of the work begun of clairvoyant investigation. In 1933 at Adyar, there was the need to find some compound which would contain the element Radon. This is one of the inert gases, and the next of the family after "Kalon." As there seemed to be no way of finding any substance with the element, it finally occurred to Bishop Leadbeater to ask Sir William Crookes, who is still on the astral plane continuing his old work of research, and has a laboratory of his own. He has all the radio-active elements kept in special strong receptacles of etheric matter. Sir William Crookes knew what was wanted, and he had just one single atom of the element. It seems to be so rare that in all the seas of Tuscarora Deep, he found only this single specimen. Whether the Radon—which is a product of Ra-

dium emanation, and what might be termed an alchemical product—is a "star" of the inert gases group, was not investigated, for want of a specimen.

A Synthetic Atom

Bishop Leadbeater could investigate at any time, provided his brain was not tired. Several of the investigations in 1933 took place in the evening while he was lying on a sofa and a masseur was working upon his legs and feet. This did not interfere with his clairvoyant observations. One particular evening while the old masseur was pounding him, we were trying to locate Erbium. In 1909 Gadolinium had been mapped out. Erbium is of the same family, but heavier. Though we could not get at any substance at the moment which contained Erbium, Bishop Leadbeater thought he would make an experiment, and so the parts that appeared in the central rod of Gadolinium were put together, this time three of them and not two, to see if they would cohere. They would not; but when the connecting rod of Silver of 19 was placed in the middle of the three, there was not only perfect cohesion but also a very great vitality. Then the funnels of Gadolinium were stuck on; everything held. This seemed to show that the experiment was a success, and that what was put together was really an atom of Erbium.

Help of Nature Spirits

But obviously this was not enough, and so the search was continued. What was to be done next? We knew that Iodine exists in the

sea. Immediately—and while he was being massaged—it occurred to him to look into the sea for Erbium, which is of the same family as Iodine and Gadolinium. Having constructed Erbium alchemically, he got into touch with a sea nature-spirit, a triton, whom he knew lived in the sea near Adyar beach. He asked the triton if he knew anything of the kind in the sea, and showed him the alchemical Erbium. The creature answered, "Yes, we will bring it," and quickly brought a handful of Erbium. The particles were like spiculae, or small pencils held in the hand. The triton was curious to know why Bishop Leadbeater should want to see them, but of course could not understand for what reason he was asked to produce what to him were little toys.

Another instance in which nature-spirit scouts were used by Bishop Leadbeater was when he investigated Polonium in August 1933. We found in the *Encyclopedia Britannica* that Polonium exists in pitchblende. I had sent some pitchblende in 1909 from U.S.A., and there were still a few bits of powder left. But the Polonium that existed in it had departed from the powder when it was examined in 1933. The *Encyclopedia* states that pitchblende exists in some mines in Ceylon, in the district of Sabaragamuwa. Bishop Leadbeater had been in that province in the early years of his work in Ceylon; so that night, while asleep, he went to Ceylon and located the mines. But to find an atom in a mine is like trying to locate some small star in the Milky Way. However, he arranged for some

nature spirits to act as scouts and look for the element. Of course it was a kind of game to the creatures. At last, in all the mines in that region, he found only three Polonium atoms.

The Ways of the Adepts

One incident in all this touches me personally, as it shows that owing to some curious dullness on my part I lost a striking opportunity. The element Masurium was discovered spectroscopically; and when it was found in certain minerals, the announcement was duly made. So we knew that it existed in oxides of columbite, gadolinite and tantalite. The investigation was then easy, as I already had with me these minerals, among the rare earths procured from Hilger & Co. Bishop Leadbeater investigated and gave me the diagram 5th September 1932.

Ten days later I discovered that Masurium, though not under that name, had not only been noted but the diagram drawn for it in 1909. Among the mass of papers in the Occult Chemistry box, I found a slip with diagrams of three elements, and one was marked "unknown element." When the diagram for Masurium was made in 1932, it was exactly the same as this forgotten diagram which was drawn in 1909. Had that diagram been then published, our Theosophical investigators could have claimed priority of discovery, as the actual chemical weight of the then unknown element was given, as also its place in the Periodic Table.

In a similar manner, through my want of careful study, I failed to note that Illinium was discovered,

mapped out and its place and weight announced, in July 1909.

These blunders lead us to the strange fact that whenever we might have given an instance of proof, with regard to occult facts, without any possible challenge, always something happened to prevent the finality in the proof. It is well known that, in the early days of Spiritualism, many striking objects were transported from distances, showing that the spirits were able to use extraordinary powers. But in each instance, there was just one final link in the chain missing. Similarly, in the phenomena done by the Adepts in connection with Madame Blavatsky's work at Simla, it would have been the easiest thing for Them to transport the London *Times* of the day to Simla, as was once suggested. But in all cases of phenomena, there was the omission through oversight, or for some other reason, of some important evidential fact.

When the Adepts were interrogated, we were informed that They purposely prevented any phenomenon which would be absolutely "water-tight" in the matter of proof. It is Their plan that while humanity is at its present stage, where a large number of powerful minds lack an adequate moral development, no opportunity shall be given to these to have a *full* trust in the existence of occult powers. So long as there is scepticism on the matter, mankind is protected from exploitation by the unscrupulous. We know already how mankind has been exploited economically and industrially by selfish minds controlling the resources of nature. How great a

calamity might occur if these selfish minds were to use occult powers also for exploitation, it is not difficult for anyone with imagination to conceive.

Difficulties of Experiment

A great handicap was encountered wherever the investigations took place, because there was no chemical laboratory, nor a chemist who could perform the necessary experiments. For instance, none of us had ever been in a laboratory where the mass spectroscope was being used, and so Bishop Leadbeater could not get into touch with that work. There were, however, three instances when an actual experiment was made. The first experiment was to watch what happens in catalysis. Chemistry as yet gives no explanation of this phenomenon. It was done in Sydney, when I heated potassium chlorate and mixed it with manganese dioxide. It was then noted that a totally new force, not hitherto noticed in any previous observation, was present to make catalysis. The second experiment was in Adyar, when Mr. Y. Prasad, who was a science master, performed the experiment of making water from hydrogen and oxygen in the presence of spongy platinum.

A third interesting experiment was to discover the nature of Heavy Hydrogen or Deuterium. Mr. K. Zuurman, Superintendent of the Adyar Electrical Department, arranged a simple apparatus to dissociate the water into its constituents of Hydrogen and Oxygen, using the house current. In the process it was found that the curious "double Hydrogen" was formed

now and then, while Hydrogen was given off from the kathode terminal. During a period of some two or three minutes, only three double Hydrogen or Deuterium were formed. The reason for the existence of Deuterium is that there are two varieties of Hydrogen, which we have labelled A and B, and one of them is slightly more positive than the other. So one combines with the other to make a new body.

The last investigation was on the 13th October 1933. Once again Mr. Zuurman assisted, and he brought his radio receiving set, for I wanted to see if it was possible to find out what was the electron after all. For it is not our ultimate physical atom, but might possibly be an astral atom. The thermionic valve, which is supposed to be throwing off streams of electrons, was examined. A stenographic report was made at the time.

Just as this work was suspended, Bishop Leadbeater thought that he had a glimpse of what lay at the back of the nature of positive and negative in electricity. It seemed as if this distinction went as far back as the nature of the "bubble" itself in Koilon. For the first time it seemed as if we might hit upon the greatest of all principles of knowledge, as to what after all is positive and what negative. But he was tired, and next day I left for Brazil.

The last words of the stenographic report are what I said as the work was suspended: "We will now adjourn till next year." But in March 1934 Bishop Leadbeater passed away at the age of eighty-seven, and so there was no "next year."

"Occult Chemistry"

I have mentioned that the second edition of *Occult Chemistry* under the editorship of Mr. Sinnett was nothing more than a reprint of the first, and did not incorporate the material that had accumulated between the two editions. Since that second edition, there have been many important researches. I have given in THE THEOSOPHIST of July 1933 a summary of the work done.

The material for the third edition is ready. The problem will require at least a year's close attention, and I am waiting for the time when I can be freed from other and more urgent work. The book will be quarto size, quite different in format from the two previous editions. The size can be seen by consulting the large diagram already published in THE THEOSOPHIST, October 1932. I am hoping for the assistance of others to supervise several sections of the work, as the new material is somewhat bulky. When the third edition is published, it should contain about three times the material published in the other editions.

As I was the organizer and recorder, my aim was to arrange for the investigations to cover as wide a field as possible, so as to leave material for study for future generations. I am certainly profoundly glad that all the elements have been mapped out, and that the Periodic Table is complete; but when the research was resumed in Australia in 1920, I put aside the completion of the work upon the elements, and directed the investigations into compounds. I was also anxious to have a few crystals mapped out. All this work is of course only like

scratching one small corner of a large field. But it is a new kind of study of Nature, and my aim, in which my two leaders heartily co-operated, was to draw, as it were, the outlines of a great continent, and leave the lands to be filled in by succeeding generations.

A Magnificent Work

Often the question is asked: What corroboration is there from present-day chemistry of these investigations? We know that at the moment much work is being done on the nucleus of the atom. But there is no bridge as yet between the work of the clairvoyant investigators and that done by the chemists and physicists with the mass spectroscopy. The two groups of investigators are working from two different standpoints. The clairvoyant investigator watches the atom as it is *in its normal condition*, not in any way affected by electrical or other forces. The laboratory investigator throws into the atom currents of high voltage, and produces results from which he deduces the nature of the atom. Since all atoms behave alike under electricity according to certain laws, the description of the atom from the laboratory is a correct indication of its nature, but of the atom under exceptional circumstances. It is as if some scientist from Mars, desiring to know the behaviour of human beings, were to come in an airship and drop bombs on London at stated intervals. He would discover that the inhabitants lived in tunnels, which are the "tube" stations; and if they were being periodically bombed, that they were living all

the time under the earth. But his scientific observations would not describe the life of London. It was Professor Whittaker who gave an accurate commentary on the work done in the laboratory when he said, "Something unknown is doing we do not know what; that is what the theory amounts to."

I would not like in any way to imply that the work done by the scientists is not accurate or valuable. I think it is a most wonderful testimony to what the scientific imagination is capable of, under rigorous scientific training. But the two kinds of research, through clairvoyance and through the spectroscopy, are very much like the work done in tunnelling a mountain for a railway. The work is done from both sides of the mountain, and slowly the two groups of tunnellers come nearer and nearer, and at last meet. As the situation stands now, the occult investigators and the laboratory investigators are not likely to meet for several generations.

I would like, since Dr. Besant and Bishop Leadbeater are no longer with us, to explain on their behalf and for myself our motives in all this work. None of us ever dreamed of any kind of "kudos" accruing to us from these researches. We have never planned for recognition. Always our aim was to know just a little more of the way the Divine Mind manifests in Nature. There was never any thought of proving the truth of these researches to anybody. The investigators, with all the accuracy at their command, recorded what they saw. They left it at that. Whether anyone disbelieved or scoffed never counted with them, for they were

first and foremost Theosophists who knew the significance of the phrase "the Divine Wisdom." They had already received so much inspiration for noble living and service from what they knew of Theosophy, that they desired to know more of the Wisdom. It might well be said that their motto was: "To the glory of the Grand Geometrician of the Universe, and for the perfecting of Humanity."

I, however, who have been so inspired and broadened in my outlook by this work, and have also followed the work of scientists, know that the investigations into

Occult Chemistry will be the most lasting contribution to knowledge which the Theosophists of these generations will have made. For as the generations pass, our main Theosophical ideas will be accepted by the whole world. But there will always remain, as a wonder for centuries to come, this magnificent work, which lifts just a tiny corner of the veil which hides from man the Grand Geometrician.

REFERENCES

¹ THE THEOSOPHIST, from March 1924 to August 1933, in various issues.

² THE THEOSOPHIST, September 1925.

THE WONDER OF LIFE

Facing everyday things in the world of life, around which our scientific fingers will not meet, what can we do but repeat what is carved on the lintel of the biology buildings of one of the youngest and strongest of American universities: "Open Thou mine eyes that I may behold wondrous things out of The Law."

SIR J. ARTHUR THOMSON

A Theosophical Forum

REINCARNATION AND MORALITY

QUESTION: *Is it correct to think that the knowledge of the Laws of Karma and Reincarnation forms the only basis for true morality, since it makes us responsible to ourselves for our actions? Or is it correct to think that a true morality can be established on the basis of devotion also?*

ANSWER: The actual *knowledge* of the laws of Karma and Reincarnation does not appear to be necessary until two of the Great Initiations have been passed; but a very high standard of morality is essential even before entering on the Probationary Path.

If by "true morality" we mean the art of living in harmonious relationship with all living beings, it seems evident that different types of entity will attain morality in different ways.

Whosoever really believes in the fatherhood of God and the brotherhood of Man has surely a sound basis for morality, as also has any entity whose feelings are so spiritual that they function as sympathy

with all that lives, or any in whom the will to good—even though actually attained through experiences in past lives which are not remembered—is so strong as to cause instinctive action.

But the present age—that of the fifth sub-race of the Fifth Root-Race—is mainly intellectual; and hence, although not an absolute necessity, an *understanding* of the laws of Karma and Reincarnation, or of what is known of them, is likely to be very beneficial to a large number of persons, provided that they can accept these laws as a sound theory whereby to regulate their mode of life.

Such an attitude may itself be regarded as a moral attainment in that it involves recognition of responsibility for every effort of whatever description, though such responsibility actually existed irrespective of the recognition of it.

If the word "only" were deleted from the question, the insight inherent in it would shine more brightly, for the two ideas suggested would be shown to be not alternative, but rather complementary in character.

A. B. CROW

BROTHERHOOD IN PRACTICE

Our work as Theosophists is to betake ourselves to the solution of the great problems of evolution, to try to see as far as we can where Brotherhood can be put into practice.—ANNIE BESANT.

Notes and Comments

CIVILIZATION AND ECONOMICS

YOUR remarks about those things that deny civilization in the March "Watch-Tower" made me ponder, and ponder especially about the things that deny that which you call civilization in Britain. Here comfort and luxury *are* suffered to fatten on poverty and despair. Our 1,800,000 unemployed and the tragic fate of our distressed areas are a constant reminder of that denial. Here, too, are helplessness and ignorance that are exploited day in, day out, in so many ways.

Alfred Russel Wallace once said a very true and pointed thing. *In relation to our possibilities and claims*, he argued in an essay on social questions that the conditions we have around us are as bad as any in our history. It is not, he said in effect, that these horrible conditions are no better in an absolute sense, but that relative to what we can and ought to be able to make them, they are no improvement on what has been.

There is a challenge to our complacency in Alfred Russel Wallace's suggestion. I want to suggest that we should look at modern conditions in the light of both what is possible and what is now achievable. If we have some imagination we shall see how far we fall short. In regard to economic and social conditions, I would suggest a reading of Sidney and Beatrice Webb's

Soviet Communism: A New Civilization? in order to find out what might be done along right and humane lines in an atmosphere of freedom and true democracy.

There is no need to apologize for the very mention of Soviet Russia. That is not one of the seven deadly sins, though some, even of our F.T.S., may appear to think it is. I need hardly say that we heartily deplore the appalling cruelty, despotism and terror that are so rife in Russia. After all, the sin and shame of the world, including that of Russia, are our sin and shame. There is no need to hesitate to condemn outright the vast horrors and unspeakable travesties in Russia. At the same time, we should not be blind to the enormous economic and social achievements of that country, which is almost one-sixth of the earth's area.

Instead of implicitly denying the value of Russia as an economic experiment, may I suggest that, as an experiment, it has obvious lessons. Are we prepared to profit even by the myriad mistakes and tragedies that have taken place in Russia? Are we prepared to profit even from the wrong methods by ourselves experimenting along right lines and by using right methods? No one can deny that Russia has succeeded in making a leap in economic production and social construction that amazes those who know the quantitative results. An effort by the great industrial democracies comparable to that made

by Russia would easily out-distance Russia in a shorter time, and the qualitative results would be far beyond comparison.

This excursion into a very unpopular field of modern economic history will perhaps serve to illustrate the remark made by Alfred Russel Wallace as to what is and what might be. At the moment, our economic possibilities are, in that expressive Americanism, "stalled." Can we get out of the rut? Can we release the productive machines?

We can, if we are morally strong enough, if we are sufficiently imbued with idealism and altruism to care to do it. This is not quite what our friends in Social Credit circles will say, I fully appreciate. But our Social Credit friends, not unlike modern exponents of injection theories, would like to help us to dodge the results of wrong economic living while at the same time letting us continue to follow our wrong and unethical ways in economic production and distribution! Here comes in a relation of the "spiritual unfoldment of the soul"—mentioned by Mr. Jinarajadasa in the March THEOSOPHIST—and the "economic world"—though I shall adapt the sense and application of his remark to another purpose. The very juxtaposition of "soul" and "economics" is interesting. Is the "soul" of the present-day individual or of the community going to assert itself in the economic world in any decisive fashion, and, if so, in what directions? I hope that assertion of soul will be wholly in the direction of a civilization that refuses to allow poverty, despair, ignorance and

ugliness, to exist as we know them today.

JEFFREY WILLIAMS

"SON OF ENGLAND"

Miss Isabelle M. Pagan writes in defence of William Shakespeare as the author of the plays and in protest against Miss Veale's story under the title "Son of England" appearing in THE THEOSOPHIST. Miss Pagan quotes from contemporary writers as to the high qualities of Shakespeare, she appeals to tradition also, and of her own research says deliberately: "I believe Shakespeare to have been one of the most lovable men that ever lived—a man that any one might be proud to know." Hence her surprise, in fact "a most unpleasant shock" to read Miss Veale's references to Shakespeare in THE THEOSOPHIST for February and March. Miss Pagan writes: "I would like to protest against the belief of many Theosophists that anything and everything said by Baconians has been 'proved' and that this whole Bacon-Shakespeare question has been properly and psychically investigated by our leaders. I assure them that they are not *bound* to believe that Queen Elizabeth sentenced her own son to death, and urged her cousin, Mary Queen of Scots, to marry the Earl of Leicester at a time when he was actually her own husband and the father of her children! These tales are—thank goodness—absolutely without any historical backing; and while keeping as balanced a judgment as possible, we may safely and happily reject them."

Who's Who In This Issue

The following contributors are all members of the Science Group of the Theosophical Research Centre, London :

H. MUIRSON BLAKE, B.Sc. : Well known lecturer on Theosophy in England ; worked for education in India, and is an active worker in the British Legion.

G. N. DRINKWATER, B.Sc. : Assistant Curator of Museum ; Author of *Corroboration of Occult Archaeology*.

E. W. PRESTON, M.Sc. (Miss) : Senior Science Mistress of the James Allen School, London. Author of *The Earth and Its Cycles*. Secretary of the Science Group of the Theosophical Research Centre, London.

W. T. PUGH : Theosophist and business man of Cardiff, Wales, interested in Science and its relation to Theosophy.

GERARD REILLY, B. Sc. : Engaged on chemical research ; F.T.S. of long stand-

ing ; Chairman of the Science Group, Theosophical Research Centre, London, which he represented at the Copenhagen Congress 1937.

E. LESTER SMITH, D.Sc. (Lond.), F.I.C. : Is engaged in research on extraction and synthesis of vitamins, and working to perfect methods not dependent on the use of animals. Although still in the early thirties, has published some twenty research papers on physics and biochemistry.

C. G. TREW, B.Sc., Ph.D. (Miss) : Lecturer in Chemistry at Bedford College, London University. Author (with E. W. Preston) of *Studies in Evolutionary Psychology*.

THE THEOSOPHIST: JULY ISSUE

Will be a Scottish Number coinciding with the Empire Exhibition at Glasgow. Special articles will appear : Who are the Scots?—Iona, and the Scottish Kings—Scottish Nationalism—Highland Second Sight—Occultism in Sir Walter Scott—A Visit to a Scottish Druid Circle—Brotherhood as Taught by Burns—The Clarsach : The Celtic Harp—A Stronghold of Theosophy.

Among the contributors are Christopher Gale, A. G. Pape, Isabelle M. Pagan, Annie Macdonald Clark, C. Nelson Stewart, Arthur L. Henry.

OUTSTANDING ARTICLES IN RECENT ISSUES

APRIL

THE WILL OF THE HIERARCHY IN THE WORLD. George S. Arundale.
CHINA CHANGES. A. F. Knudsen.
HOW THE MANU USED JAPAN. Annie Besant.
H. P. BLAVATSKY DEVELOPS HER WILL. Josephine Ransom.
REFLECTIONS ON THE SECRET DOCTRINE. George S. Arundale.
THE FAITH OF THE ARTIST. J. H. Cousins.
THE WORLD'S DIRE NEED FOR A SCIENTIST MANIFESTO. Bhagavan Das.

MAY

ADEPT INFLUENCES IN AMERICA
A Mystery of the American Flag.
The Unknown Speaker.
George Washington's Vision.
A CLAIRVOYANT VIEW OF THE CORONATION, Phoebe Payne.
H. P. BLAVATSKY. C. W. Leadbeater.
INDUSTRIAL UNREST IN THE UNITED STATES. J. D. Houser.
THE SCIENTIFIC SPIRIT IN THEOSOPHY. Uno Saarnio.

SPECIAL NOTICES

THE CORONATION OF KING GEORGE VII

Through inadvertence only we failed to attribute the article in our May issue on "The Coronation of King George VI" to Miss Phoebe Payne. No *amende honorable* can make full amends for such an omission. Fortunately her name was given in the list of contents and on the front cover.

"SON OF ENGLAND"

Miss Veale's article, "Son of England," the penultimate chapter of the story, is unavoidably held over from this issue.

THE THEOSOPHICAL SOCIETY

THE THEOSOPHICAL SOCIETY is a world-wide international organization formed at New York on November 17th, 1875, and incorporated later in India with its Headquarters at Adyar, Madras.

It is an unsectarian body of seekers after Truth promoting Brotherhood and striving to serve humanity. Its three declared Objects are :

First—To form a nucleus of the Universal Brotherhood of Humanity, without distinction of race, creed, sex, caste or colour.

Second—To encourage the study of comparative Religion, Philosophy and Science.

Third—To investigate unexplained laws of Nature and the powers latent in man.

The Theosophical Society is composed of men and women who are united by their approval of the above Objects, by their determination to promote Brotherhood, to remove religious, racial and other antagonisms, and who wish to draw together all persons of goodwill whatsoever their opinions.

Their bond of union is a common search and aspiration for Truth. They hold that Truth should be sought by study, by reflection, by service, by purity of life and by devotion to high ideals. They hold that Truth should be striven for, not imposed by authority as a dogma. They consider that belief should be the result of individual study or of intuition, and not its antecedent, and should rest on knowledge, not on assertion. They see every Religion as an expression of the Divine Wisdom and prefer its study to its condemnation, and its practice to proselytism. Peace is their watchword, as Truth is their aim.

Theosophy offers a philosophy which renders life intelligible, and demonstrates the inviolable nature of the laws which govern its evolution. It puts death in its rightful place as a recurring incident in an endless life, opening the gateway to a fuller and more radiant existence. It restores to the world the Science of the Spirit, teaching

man to know the Spirit as himself, and the mind and body as his servants. It illuminates the scriptures and doctrines of religions by unveiling their hidden meanings, thus justifying them at the bar of intelligence as, in their original purity, they are ever justified in the eyes of intuition. The Society claims no monopoly of Theosophy, as the Divine Wisdom cannot be limited; but its Fellows seek to understand it in ever-increasing measure. All in sympathy with the Objects of The Theosophical Society are welcomed as members, and it rests with the member to become a true Theosophist.

FREEDOM OF THOUGHT

As The Theosophical Society has spread far and wide over the civilized world, and as members of all religions have become members of it without surrendering the special dogmas, teachings and beliefs of their respective faiths, it is thought desirable to emphasize the fact that there is no doctrine, no opinion, by whomsoever taught or held, that is in any way binding on any member of The Society, none which any member is not free to accept or reject. Approval of its three Objects is the sole condition of membership. No teacher nor writer, from H. P. Blavatsky downwards, has any authority to impose his teachings or opinions on members. Every member has an equal right to attach himself to any teacher or to any school of thought which he may choose, but has no right to force his choice on any other. Neither a candidate for any office, nor any voter, can be rendered ineligible to stand or to vote, because of any opinion he may hold, or because of membership in any school of thought to which he may belong. Opinions or beliefs neither bestow privileges nor inflict penalties. The Members of the General Council earnestly request every member of The Theosophical Society to maintain, defend and act upon these fundamental principles of The Society, and also fearlessly to exercise his own right of liberty of thought and of expression thereof, within the limits of courtesy and consideration for others

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- Central America:** Señora Lydia Fernandez Jimenez—P. O. Box 797, San José, Costa Rica, *Virya*.
- Ceylon:** Dr. T. Nallainathan—81 Madampitya, Road, Mutwal, Colombo, *The Ceylon Theosophical News*.
- Chile:** Señor Armando Hamel—Casilla 3603, Santiago.
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- Iceland:** Herr Gretar Fells—Ingólfstr. 22, Reykjavik, *Gangleri*.
- India:** Mr. G. N. Gokhale—The Theosophical Society, Benares City, *The Indian Theosophist*.
- Ireland:** Mr. T. Kennedy—14 South Frederick Street, Dublin, *Theosophy in Ireland*.
- Italy:** Avv. Tullio Castellani—Cas. Post 1019, Genoa, Italy, *Il Bollettino*.
- Mexico:** Dr. David R. Cervera—28A Calle Iturbide, Mexico, D.F., *El Mexico Teosofico*.
- Netherlands:** Den Heer J. Kruisheer—156 Tolstraat, Amsterdam, *Theosophia*.
- Netherlands Indies:** Den Heer A. J. H. van Leeuwen—Kweekschool Goenoeng Sarié, Lembang, Bandoeng, Java. *Theosofie in Ned.-Indie*.
- New Zealand:** Mr. William Crawford—371 Queen Street, Auckland, *Theosophy in New Zealand*.
- Norway:** Fru Dagny Zadig—Bakkegt. 2311, inng. Munkedamsven, Oslo, *Norsk Teosofisk Tidsskrift*.
- Philippine Islands:** Mr. José M. Espina—P. O. Box 3012, Manila, P.I., *The Lotus*.
- Poland:** Madame Stefanja Siewierska—Krucza 23, m. 11, Warsaw, *Z Zycia Towarzystwa Teozoficznego*.
- Portugal:** Madame J. S. Lefèvre—Rua Passos Manuel, 20, Lisbon, *Osiris*.
- Puerto Rico:** Señor A. J. Plard—P.O. Box 3, San Juan, *Heraldo Teosofico*.
- Rumania:** Madame Eugenia Vasilescu—Bd. Elisabeta 91 bis, Bucharest I, *Buletinul Teosofic*.
- Russia:** Dr. Anna Kamensky—2 Rue Cherbuliez, Geneva, *Vestnik*. (The Lodges are outside Russia).
- Scotland:** Mrs. Jean Allan,—28 Great King Street, Edinburgh, *Theosophical News and Notes*.
- South Africa:** Dr. W. A. Humphrey, Markham's Buildings, Capetown, *The Link*. (Editor, Miss Turner, Box 47, Pretoria.)
- Spain:** Señor L. Garcia Lorenzana—Avenida de la Libertad, Conquero, Huelva, *Boletin Mensual*.
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- Switzerland:** Monsieur Georges Tripet—1 Avenue Théodore Flournoy, Eaux Vives, Geneva, *Bulletin Théosophique Suisse*.
- United States of America:** Mr. Sidney A. Cook—Olcott, Wheaton, Illinois, *The American Theosophist*.
- Uruguay:** Sra. Julia de La Gamma—Casilla Correo 595, Montevideo, *Boletin de la Sociedad Teosofica en el Uruguay*.
- Wales:** Mr. Peter Freeman—3 Rectory Road, Penarth, *Theosophical News and Notes*.
- Yugoslavia:** Gospojica Jelisava Vavra—Mesnicka Ulica 7/III 1, Zagreb, *Teosofija*.

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