Vol. III] OCTOBER 1934 [No. 4

CONTENTS.

Science and Happiness.

FROM a human standpoint, the concluding portion of Sir James Jeans' presidential address to the British Association is perhaps the most interesting. Within recent times there has been quite a volume of indiscriminate criticism about the benefits of science, and almost all the travail from which the world is suffering is attributed by a section of public opinion to the progress of scientific knowledge in its applications to the practical problems of life. Assuming that there is an element of truth in such an accusation, we are unable to discover a means of escape. Scientific knowledge has now become an integral part of modern culture, and its advancement is bound to be rapid in view of the assured provision for its encouragement, and few can control its direction and output. It is practically useless to suggest the abolition of scientific inventions or to stop scientific researches in any one country, without other countries undertaking similar obligations. Even if such a proposal were feasible, the net result would be to petrify society, but the hopes of restoring to man his happiness and peace the loss of which he is generally in the habit of laying at the door of science, would be as far from realisation as ever. Science has widened our outlook and augmented our store of knowledge; but it has also failed to enrich our moral endowment. It is equally true that scientific industrial planning will displace more labour than it can absorb, and all efforts to establish a balance between labour-saving devices and unemployment are bound to be futile.

We cannot ignore the innate tendency of man to press every kind of knowledge into his service, no matter to what branch of science and art it may belong. To acquire control over the forces of Nature or to perfect the methods of investigating the facts and phenomena of objective reality, is not in itself fatal to the well-being of man; but the end which he uses the scientific knowledge to achieve, makes a wide difference. Knowledge is neither moral nor immoral. It places in our hands the power of dignifying and saving human life; it also puts at our disposal the weapons of destroying it on a scale to which history scarcely furnishes a parallel. If in the past the Church and the State complacently permitted religious differences to lead to bloodshed,

the highly organised modern society need not be shocked when national rivalries, stress of over-population, economic competition and tariff barriers occasionally result in the outbreak of hostilities. The conditions of international relations which generally precede conflicts are the product of scientific development, and the operations on the field when it is taken, pass under scientific management. It is difficult to foresee a time when wars will be totally abolished, though in future they will be less frequent; it is equally difficult to imagine whether any economic planning will produce a permanent and equitable adjustment of labour and capital on the one hand, and, on the other, remove the causes of industrial depression, arising from over-production and from a defective scheme of distribution. The conspicuous feature of the twentieth century is the increasing readiness with which the fruits of scientific labours are utilised for sophisticating the human wants and for gratifying the fundamental appetites of man. The gifts of science have been applied to render social life artificial, and naturally its reactions to the environment must partake of the characteristics of materialism. In moments of intellectual exaltation we are apt to ignore the basic fact that life, whether it manifests itself in an amoeba or man, is under the influence of jealousy which expresses itself in organisms seeking to gratify the appetites of stomach and sex. Centuries of religious and educational progress and the creation of stern public opinion have not succeeded in repressing the imperiousness of this sinister emotion; science is not concerned with disciplining it. It is idle to talk of creating a new Heaven on earth so long as this primitive passion continues to dominate the public and private life of the individual and is a potent factor governing international relations. Science in its manifold applications rather emphasises economic jealousies between highly organised nations and by favouring mass production tends to embitter labour.

There is a great deal of truth in what Sir Alfred Ewing said two years ago as the President of the British Association, *viz.*, "Science has given man control over nature before he has gained control over himself". The function of science in any civilised community is obviously two-fold. It furnishes those who pursue its path with a picture of the physical phenomena of Nature, and the laws under which they manifest themselves, and the direction and extent of their practical service to man. A scientific mind is purely intellectual and virtually ignores the value of other types of experience. The second function of science is to provide helpful guidance to society for consolidating its forces for advancing its higher destiny. In the fulfilment of this latter aspect of its function, the efforts of science are confronted by a play of emotional complexes which form the foundation of all modern states and societies. Political and social organisations can only enjoy the benefits of science conferred indirectly through workshops and industries, but can never hope to apply scientific methods and discipline to their evolution and development. The intellect of man is different from that of child; but his emotions, though restrained more often than those of a child can be, are, however, more sinister and destructive when they break out. The intellectualism of the twentieth century has still a strong background of crude passions and, if in the next stage of the evolution of mind, this background is replaced by moral responsibility for human thoughts and actions to a tribunal not built by man, we shall be pretty near to achieving universal happiness and peace. This is a dream; but it is pleasant to dream.

Science in the pursuit of her enquiry is generally intolerant of sanctity and traditional authority, and she reorganises her statistical and comparative method as the only approach to Truth. This is permissible in respect of values which science discusses objectively, without actually experiencing. But the business of life is higher; it prescribes standards of values which it experiences in its relations towards the universe; the experience is a complex of emotions which does not obey the laws and discipline imposed by the physical sciences. For the advancement of material progress, scientific investigations are indispensable, but for certain other aspects of social life, religious approach is the more important. Human experiences, requirements and ideals can be viewed and interpreted not only from the standpoint of objective sciences but also from that of religion. Their functions are complemental, and the seeming opposition between the two modes of approach to life is due to want of mutual understanding of the deeper significance and purpose of human existence. In a lower sense civilisation is material and in building

it, scientific results lend themselves to be used as the means for accomplishing selfish gains, and for destroying and constructing the external embellishments of social life. In its higher aspects, civilisation connotes the enrichment of the moral and spiritual endowments of man, involving a radical transformation of his mental attitude towards his fellow-beings. Theology undid what religion attempted to achieve in this direction; but science in giving us a deeper insight into man's relation to his environment and knowledge of his origin and nature, may still become the friend of religion to assist in the achievement of man's highest destiny. The divorce of religion from science has delayed the process of humanising the mind and should account for the numerous woes from which man suffers. In order that religion, whose progress has been retarded by theological doctrines and ecclesiastical superstitions, might overtake science, the latter is not required to suspend its activities, but to hasten slowly. Their co-operation must result eventually in humanising the mind; and the attainment of this object offers the hope of establishing universal concord and happiness.

It is true that civilisation is a term too elastic and impalpable to be defined, but as we understand it, it is synonymous with industrial progress, expansion of trade, multiplication of wants, speedy locomotion, over-population, unemployment problems and fears of invasion. It is pertinent to ask whether this civilisation has tended to enhance our respect for the sanctity of human life and for the rights of personal property; or has it tended to enable those that can afford to provide themselves with material comforts, to enjoy them in peace and security? The gifts of science turn into blessings or curses, in proportion to the humanisation of the mind, dealing with them. The humanised mind intuitively acts upon the standard of absolute values set up by science and religion, for constantly checking the estimates of good and evil in our own nature. The impulses and motives which guide human actions in a world of material civilisation are, with honourable exceptions, dominantly personal, but under the combined influence of science and religion, they are expected to promote universal happiness. This fundamental transformation of the human mind is civilisation in its true and higher sense, and it is a consummation in the attainment of which science and religion have to co-operate for centuries.

It is pedantic to define happiness, but every one who has a healthy body and a clean and benevolent mind which are at peace with one another and with the environment, must have experienced it. Science can make life comfortable though not for all; but life yearns for happiness, now and hereafter. Universal happiness cannot exist so long as public life continues to be disfigured by folly, lust, crime, poverty and squalor, which are the concomitants of material civilisation which has no use for the absolute values of life proclaimed and taught by religion. Religion is opposed to organised ecclesiasticism and theological doctrines which have divided and embittered mankind. The Empire of religion is over the purer and finer emotions of love and joy as they spring from the undefiled heart.

In a society where comforts can be purchased by money, their enjoyment becomes obviously restricted to a few. The wealth which an industrial civilisation produces acquires an artificial power and value. Its drawbacks form the theme of economic science. Is it beyond the wit of man to invent a new type of coinage which will be sufficient for the needs of modern life, and which can neither be hoarded nor melted, possessing at the same time some measure of immunity for resisting the fluctuations to which the existing currency is periodically subject? Gold and beauty have by their rarity been the cause of the world's miseries. If we cease to attach any value to them, their possession will not elevate us and their loss will not depress us.

The new forces of the twentieth century have no relation to the noble traditions of the great historical civilisations. We assume that the multiplication of schools tends to the general refinement of mind, and the increased output of industrial products, to the promotion of happiness. We further assume that ability to invent delicate instruments for scientific research has raised the stature of scientific genius. Science has its own limitations, but in collaboration with humanism, it may some day succeed in producing a combination of circumstances favouring the appearance of new human chromosomes and genes transmitting to the successive generations, those worthy qualities which adorn life and make it happy. This is not a meditation. The

scientific humanism about which we read so frequently in current literature envisages a new civilisation, in which the arts and sciences will be studied "with a genuine devotion to the Good, the True and the Beautiful" and in which the qualitative valnes of human life and its ideals will not be distorted by industrial progress. Science and human nature are essentially reconcilable. Scientific civilisation ought to produce a change in the attitude and temper of mind radically different from what at the present moment are the dominating motives of individual and corporate action. Human nature being what it is, its transformation must occupy time not easily calculated, but in the meantime the question proposed by Sir James Jeans has to be answered. He asks, "Is it not better to press on in our efforts to secure more wealth and leisure and dignity of life for our own and future generations, even though we risk a glorious failure, rather than accept inglorious failure by perpetuating our present conditions, in which these advantages are the exception rather than the rule?" To strive to enrich the gifts of science is worthy, but to spread their beneficence for the uplift of human nature is nobler.

The Deccan Traps: Are They Cretaceous or Tertiary?

By B. Sahni, D.Sc., Sc.D.

Department of Botany, University of Lucknow.

IN the history of Science it has sometimes happened that a pioneer, working with a freer mind than it is perhaps possible to keep now-a-days with the influence of a long literature behind us, has arrived at conclusions which have ultimately proved to be sound, although they were long disputed by those who came after him. The object of the present note is to draw attention to what is probably another instance of this kind.

The older geologists Malcolmson,[1] Hislop and Hunter[2] and even T. Oldham[3] as late as 1871 regarded the Deccan Traps, on account of the fossils contained in the so-called Intertrappean beds, as early tertiary. Hislop and Hunter compared the flora, of which a large collection of fruits, seeds, etc., was then available, with the Eocene flora of the London Clay, which Bowerbank[4] had described only a few years previously. Owing to certain unfortunate circumstances, which I hope to relate elsewhere, this important direct evidence of a tertiary age was allowed to recede into obscurity and oblivion; while indirect evidence, regarded as indicative of a cretaceous age and culled from distant areas like Sind and Baluchistan[5] or from the underlying Lameta series,[6] of which the exact relations with the traps are still an open question, has in recent years held almost undisputed field. In 1893, when the second edition of the Indian Geological Survey's official manual[7] was published, the whole question was discussed in detail on the evidence then available; but the conclusion there expressed was distinctly cautious and non-committal. Today, the official view of the Survey[8] although admittedly based solely upon indirect evidence, regards the Deccan beds, almost without question, as belonging to the close of the mesozoic and not to the opening of the tertiary era. Until quite

[1] Malcolmson, *Trans. Geol. Soc., London*, 1837, **5**, 537; reprinted in Carter, *Geol. Papers on Western India*, 1857, 1-47.

[2] Hislop and Hunter, *Quart. Journ. Geol. Soc.*, 1855, **11**, 345; reprinted in Carter, *loc. cit.*, 247, *q.v.*; see also Hislop, *Journ. Bombay Asiat. Soc.*, 1853, **5**, 58-76; *Proc. Bombay Asiat. Soc.*, 1853, **5**, 148-150.

[3] Oldham, T., *Rec. Geol. Surv. Ind.*, 1871, **4**, 77.

[4] Bowerbank, *History of the Fossil Fruits and Seeds of the London Clay*, London, 1840.

[5] D'Archiac and Haime, *Descr. d. animaux foss. du groupe Nummulitique de l'Inde*, Paris, 1853; Duncan and Sladen, *Palæont. Indica*, 1871-1885, Ser. XIV, **1**, (iii. 1); Douvillé etc., *Palæont. Indica*, *N.S.*, 1927-1929, **10**, mem. 2, 3; but see also Holland, *Ind. Geol. Terminol.*, *Mem. Geol. Surv. Ind.*, 1926, **51**, 51.

[6] Matley, *Rec. Geol. Surv. Ind.*, 1921. **53**, 142-164; see also Medlicott, H. B., *Rec. Geol. Surv. Ind.*, 1872. **5**, 115-120; Oldham, T., *loc. cit.*, *supra*, 1871; Wadia, *Geol. of India*, 1926, pp. 190-191; Holland, *loc. cit.*, 1926.

[7] Oldham, R. D., *Manual of the Geology of India* (G.S.I. publication), 1893.

[8] Holland, "Indian Geological Terminology", *Mem. Geol. Surv. Ind.*, 1926, **51**, 64, 88; see also Wadia, *Geol. of India*, 1926, 200.