

THE SCIENTIFIC POINT OF VIEW

J.B. S. Haldane

JOHN BURDON SANDERSON HALDANE (1892 -1964) was a versatile genius. He studied Greek and Latin at Oxford and then went to London to do research in Zoology. He was interested in a variety of subjects and at different times held such posts as Reader in Biochemistry in Cambridge, Professor of Genetics in London University, Professor of Physiology at the Royal Institute and Professor of Statistics at the Indian Statistical Institute in Calcutta. In an autobiographical sketch, he once said that he knew eleven languages. Haldane was a Marxist and used to contribute articles to the *Marxist Daily Worker* on scientific topics, written in a style which even a person with average education could understand. His works include *Daedalus or Science and the Future*, *Possible World*, *Science and Ethics* and *The Inequality of Man* from which the present essay is taken. In this essay, Haldane explains why it is important for mankind to adopt the scientific standpoints. He writes in an informative and thought-provoking style.



A. Work in small groups and discuss the following questions:

1. The people of older generation or the rural people cover their head with a towel when they have to walk in the scorching sun. Why?
2. What do you understand by science? What are the basic tools of science?
3. What is scientific point of view? Is science different from scientific point of view? How?

THE SCIENTIFIC POINT OF VIEW

1. Science affects the **average** man and woman in two ways already. He or she **benefits** by its applications, driving in a motor-car or **omnibus** instead of a horse-drawn vehicle, being treated for disease by a doctor or surgeon rather than a **witch**, and being killed with an **automatic pistol** or a **shell** in place of a dagger or a battle-axe. It also affects his or her opinions. Almost everyone believes that the earth is round, and **the heavens nearly empty**, instead of solid. And we are beginning to believe in our animal ancestry and the possibility of vast improvements in human nature by biological methods.
2. But science can do something far bigger for the human mind than the substitution of one set of beliefs for another, or the **inculcation** of **scepticism** regarding accepted opinions. It can gradually spread among humanity as a whole the point of view that prevails among research workers, and has enabled a few thousand men and a few dozen women to create the science on which modern civilization rests. For if we are to control our own and one another's actions as we are learning to control nature, the scientific point of view must come out of the laboratory and be applied to the events of daily life. It is foolish to think that the outlook which has already revolutionized industry, agriculture, war and medicine will prove useless when applied to the family, the nation, or the human race.
3. Unfortunately, the growing realization of this fact is opening the door to innumerable **false prophets** who are advertising their own pet theories in sociology as scientific. Science is continually telling us through their mouths that we are doomed unless we give up smoking, adopt - or **abolish** - birth control, and so forth. Now it is not my object to support any scientific theory, but merely the scientific standpoint. What are the characteristics of that standpoint? In the first place, it attempts to be truthful and, therefore, impartial. And it carries impartiality a great deal further than does the legal point of view. A good judge will try to be impartial between Mr John Smith and Mr Chang Sing. A good scientist will be impartial between Mr Smith, a tapeworm, and the solar system. He will leave behind him his natural repulsion of the tapeworm,

which would lead him to throw it away instead of studying it as carefully as a statue or a **symphony**, and his awe for the solar system, which led his predecessors either to worship its constituents, or at least to regard them as **inscrutable** servants of the Almighty, too exalted for human comprehension.

4. Such an attitude leads the scientist to a curious mixture of pride and **humility**. The solar system turns out to be a group of bodies rather small in comparison with many of their neighbours, and executing their movements according to simple and easily intelligible laws. But he himself is a rather **aberrant** member of the same order as the monkeys, while his mind is at the mercy of a number of chemical processes in his body which he can understand but little and control hardly at all.

5. In so far as it places all **phenomena** on the same emotional level, the scientific point of view may be called the **God's eye-view**. But it differs **profoundly** from that which religions have attributed to the Almighty in being **ethically neutral**. Science cannot determine what is right and wrong, and should not try to. It can work out the consequences of various actions, but it cannot pass judgement on them. The **bacteriologist** can merely point out that pollution of public water supply is likely to cause as many deaths as letting off a bomb in the public street. But he is no better equipped than anyone else in possession of the knowledge he has gained, for determining whether these two acts are equally wrong. The enemies of science alternately abuse its **exponents** for being deaf to moral considerations and for interfering in ethical problems which do not concern them. Both of these criticisms cannot be right.

B.1.1. Complete the following sentences:

- (i) Driving in a motor car is the example of the benefitsin daily life.
- (ii) An example of the impact of science on our opinions is.....
- (iii) The object of the author in this essay is to
- (iv) The best utilisation of science is to
- (v) The two charges against science are..... and.....

B.1. 2. Answer the following questions briefly :

1. Name two ways in which science affects average man and woman.
2. What do you understand by scientific point of view? Can it help us in our daily life?
3. What does 'impartiality' mean in connection with scientific standpoints?
4. How is impartiality in scientific point of view different from legal point of view?
5. What leads the scientists to pride and humility?
6. What makes it difficult for the scientist to understand his mind?
7. What do you understand by 'God's eye-view'? When or how may scientific point of view be called God's eye-view?
8. Can science determine what is right or wrong?

6. Now the tendency of the average man has always been to **dwell on** the emotional and ethical side of a case rather than on facts of the somewhat dull kind which interest the scientist. Let me take two examples, the problem of the American Negro and the problem of disease. A large number of Americans hold that the Negro is definitely inferior to the white man, and should, as far as possible, be **segregated** from him. Others believe that he should enjoy the same rights. The biologist cannot decide between them. He can point out that the Negro's skull is more ape-like than the white's, but his hairless skin less so, and so forth. But he cannot note the results of the two **divergent** political views as to the Negro. In the country districts of the Southern States the birth-rate of the Negro population exceeds the death-rate. In the southern towns, and all through the north, more Negroes die than are born. Their high death-rates are due to the fact that, in an environment suitable to a white man, they die of **consumption** and other diseases, just as the white man dies on the West Coast of Africa, the Negro's original home.
7. So if you keep the Negro out of cars, factories, and so forth, or frighten him away from contact with whites by an occasional **lynching**, you drive him back to the cotton fields where he lives healthily and breeds rapidly, thus creating a Negro problem for future generations. But if you extend the hand of friendship to him you also infect him with your **maladies**, besides establishing in your midst a **reservoir of disease germs**.

8. These results are quite typical of those obtained when our action is guided either by raw emotion of the political **dogma** rather than scientific thought. The main biological effect of the **American Civil War** was to raise the Negroes' death-rate and lower their birth-rate so enormously that it was only between 1910 and 1920 that the number of Negroes in the United States increased as much as it had done in the decade before the Civil War. The number of Negroes thus killed was far greater than the casualty list of the Civil War. If tomorrow the coloured population of the Southern States, but not the white, were given free access to cheap whisky and methods of birth control, the number of Negroes would probably begin to fall off! I believe that there are many other political questions, both national and international, whose **sting** would be removed by a similar consideration of biological facts.
9. Our approach to the problem of disease is even less rational. I am not thinking of **Christian Scientists** or spiritual healers, but of the average man or woman who has a certain belief in the results of modern medicine, and even of a part of the medical profession itself. Serious illness in ourselves or our friends always rouses a good deal of emotion. Now, when we are emotional about a subject we feel a need to believe something about it, and we do not care very much whether our beliefs are rational. The pre-Christian attitude to disease was that it was a punishment from some **deity** for a sin either of the sick person, his family, or the whole community. Jesus did not take this view. When asked concerning a man born blind, '**Who did sin, this man, or his parents, that he was born blind? ...**' he replied, '**Neither hath this man sinned, nor his parents: but that the works of God should be made manifest in him.**' This is not so unlike the attitude of the scientist who regards a case of disease as a manifestation of a natural law, which can only be cured or prevented when research has revealed the working of the law in question.
10. But many religious people still hold to the views which Jesus **combated**, and those who believe themselves to be more **enlightened** are often in no better case. Many believe that diseases could be prevented by a return to nature. I suppose that the first step in a return to nature would be the discarding

of clothes, which would at once increase the **mortality** from **pneumonia** about a hundred fold. Of course, the phrase 'Live according to nature' is quite meaningless. Civilized and savage man, health and sickness, are equally parts of nature. Some features of civilization are bad for health, but for all that, such statistics as are available show that civilized men live longer than uncivilized.

B.2.1. Complete the following sentences:

- a. The average man dwells on
- b. The scientists are interested in.....
- c. Negroes are not inferior to Americans because
- d. The death-rate of the Negroes exceeds the birth-rate in
- e. The Negroes' original home is
- f. The birth-rate of the Negroes exceeds the death rate in
- g. The Negroes live healthily and breed rapidly in
- h. We do not care whether our beliefs are rational when
- i. According to the pre-Christian attitude, a case of disease is
- j. According to the scientists, a case disease is
- k. The first step in return to nature would be to
- l. In comparison to the savage men, the life expectancy of the uncivilized men is

B.2.2. Answer the following questions briefly :

1. How is the tendency of the average man different from that of the scientists?
2. Does environment affect the death rate? Give examples from the text as well as from your surroundings.
3. What does the author mean by 'reservoir of disease germs'?
4. How did the American Civil War affect the Negroes?
5. Jesus Christ's attitude to disease is close to the attitude of the scientists. How can you say this?
6. How will the discarding of clothes affect mankind?

11. The greatest causes of this have been the **abolition of water-borne diseases** such as cholera, and the general prosperity which has nearly banished under-feeding as a cause of ill-health. Today medical science is still advancing, but it is becoming harder and harder to apply its results in practice.
12. The worst sufferers from **diabetes** can regain full health and keep it indefinitely by two or three daily injections. But they cannot be got to realize this fact, because they have never been taught that their bodies are systems

obeying quite definite laws, and a diabetic will no more work without **insulin** than a motor car without lubricating oil. A medical friend recently had to deal with two women brought in dying of diabetes to the hospital where he worked. Both had been treated before, and taught to inject themselves twice daily with insulin. But one had broken her **syringe** and had not troubled to replace it at once, while the other had neglected her injections for two days because she was coming to hospital in any case for another complaint. Attitudes like this are so common that the discovery of insulin has made no appreciable difference to the mortality in England from diabetes. It has saved a few intelligent people, but that is all.

13. If a definite cure for cancer is discovered in the next few years it is unlikely that it will be a simpler or safer affair than that of diabetes. If so, it will not have much effect on the mortality for several generations. In such a case any given person can no doubt flatter himself on belonging to the intelligent minority who will be saved. But if what science arrives at is not a cure, but a means of prevention, the case is even less hopeful. Experience has shown that in this respect individual action is almost useless. In a country where typhoid fever is common it is hard always to drink beer or wine, or personally to see that one's water is boiled; and annual **inoculation** involves a day's mild illness. Typhoid infection can only be dealt with adequately by public control of the water supply, which involves no effort by individual citizens. Diphtheria, smallpox, measles, and other airborne diseases could be stamped out by a public effort, but such an effort would involve the individual assistance and self-sacrifice of sick persons and their relatives, and also international co-operation. It is impossible until people realize that **microbes are every bit as real as foreigners, and much more likely to kill one**. They will only arrive at a sane view regarding disease as the result of a general education on scientific lines. The study of medicine apart from its scientific basis creates **neurotics** rather than scientists.
14. Preventive medicine could be made into the moral equivalent of war. It is already so for a few people. A colleague of mine was recently translating a French paper on **chemotherapy** when he came upon the phrase '**tue par I'**

ennemi in reference to a **deceased pharmacologist**. 'I suppose,' he said, 'that means that he died of an accidental infection.' I **undeceived** him; the enemy in this case had been the German nation; but **his attitude was typical of medical scientists today**. 'For we wrestle not against flesh and blood, but against principalities, against powers, against the rulers of the darkness of this world.' St. Paul thought that the world was largely ruled by demons. We know better today, and we demand the general adoption of the scientific point of view because in its absence human effort is so largely devoted to conflicts with fellow men, in which one, if not both, of the **disputants** must inevitably suffer. It is only in times of disaster that the average man devotes a moment's thought to his real enemies, 'the rulers of the darkness of this world,' from **bacteria to cyclones**. Until humanity adopts the scientific point of view those enemies will not be conquered.

B.3. Answer the following questions briefly:

1. Name the important causes which help civilized men to live longer than the uncivilized?
2. Why does the author compare a human body to a system?
3. Why has the discovery of insulin not made any appreciable difference to the mortality in England?
4. Name the infection which can effectively be dealt with by public control of water supply.
5. Name any three air-borne diseases.
6. Why does the author demand the general adoption of the scientific point of view?
7. Explain the phrase 'the rulers of the darkness of this world'.

GLOSSARY AND NOTES

average (adj): common

benefits (v): gains, makes profit

omnibus (n): bus

witch (n): one practising sorcery

automatic pistol (n): a self-operative pistol, where the spent cartridge is ejected and the gun re-loaded and fired, by the action of the gas generated in firing or by the force of the recoil

shell (n): a cylindrical projectile containing an explosive in a metal container, exploded by impact, time-fuse or the container itself

the heavens nearly empty: an allusion to the scientific belief that replaced the older belief that the earth was flat, and the sky was a kind of solid mass enclosing the earth

- Inculcation (n):** implanting, fixing firmly in mind
- scepticism (n):** disbelief, attitude to doubt
- false prophets (n):** people who claim to have sure knowledge and convince others to follow them, but in reality are either mistaken or lying
- abolish (v):** bring to an end, put an end to
- symphony (n):** piece of music
- inscrutable (adj):** unfathomable, hard to make out
- humility (n):** modesty, without pride.
- Aberrant (adj):** deviant, unusual
- Phenomena (n):** natural occurrences which can be known by sense-perception rather than by thought or intuition
- God's eye-view (n):** the attitude of being completely unbiased and neutral
- profoundly (adv):** very deeply, very greatly
- ethically neutral (adj):** morally indifferent, morally unbiased.
- bacteriologist (n):** an expert on bacteria or germs
- exponents (n):** persons who put some views forward with explanation
- dwell on (v):** think about, ponder upon
- segregated (v):** separated
- divergent (adj):** different, conflicting
- consumption (n):** tuberculosis (TB)
- lynching (ger):** the word is used especially in reference to the beating up and killing of Negroes by white Americans.
- maladies (n):** diseases
- reservoir of disease germs (n):** a community in which diseases are prevalent
- dogma (n):** unreasonable belief
- American Civil War (n):** A war won by the Northern States of the USA against the Southern States which began in April 1861 and ended in April 1865, one of the major issues of this war was the abolition of slavery, supported by the north
- Sting (n):** sharp pain
- Christian Scientists (n):** a Protestant sect who believes that faith, fasting and prayer have the power to heal diseases. Christian Science, as a belief, was brought into being by an American lady, Mary Baker Eddy (1821-1910) who had once been a patient of a physician and mesmerist named P.P. Quimby, and had learnt something of the power of the mankind over matter.
- deity (n):** god or goddesses
- Who did sin Neither hath this man sinned....works of God should be made manifest in him?**
St. John, IX, 1-3. Haldane has a dig at Christian Scientists. Christ was more scientific in his attitude to disease than his followers were.
- Combated (v):** fought against ;
- enlightened (adj):** well-informed
- mortality (n):** death
- pneumonia (n):** a disease of the respiratory tract characterised by inflammation of the lungs
- the abolition of water-borne diseases:** An allusion to western countries where water-borne disease like, cholera, no longer exists, but this is not the case in developing countries
- diabetes (n):** a disease characterised by excessive presence of sugar in the urine caused by insulin deficiency

insulin (n): a hormone that maintains the level of sugar in blood

syringe (n): a cylinder fitted with a piston and a hypodermic needle

inoculation (v): vaccination

microbes are every bit as real as foreigners, and much more likely to kill one: microbes are minute organisms that carry and spread diseases. Haldane, here makes a satirical reference to the fact that we take all foreigners as potential murderers as we know little about them, but are ignorant of the existence of microbes which are real killers

neurotics (n): persons affected by nervous illness

chemotherapy (n): treatment or prevention of infection by systematic administration of chemicals.

'tue par l'ennemi' (French): literally, 'killed by enemy'

deceased (adj): dead

pharmacologist (n): an expert in the preparation, properties, use and effects of drugs

undecieved (v): corrected the error

his attitude was typical of medical scientists today: In thinking that the death of the pharmacologist was due to the action of germs (while in fact it was due to the action of Germans). An implication that scientists tend to become obsessed with their particular disciplines.

For we wrestle not : Like St. Paul, the scientists of today believe that the worst enemies of man are the powers of darkness, invisible creatures. The difference, however, is that for St. Paul they were devils; to the scientists today, they are microbes.

disputants (n): those involved in a quarrel

bacteria (n): a large class of microscopic unicellular plants lacking chlorophyll; they cause diseases

cyclone (n): a violent storm

C. 1. LONG ANSWER QUESTIONS

1. 'Science cannot determine what is right or wrong, and should not try to.' Why does the author say so? Give reasons.
2. Do you agree with the author's view that science should not try to determine what is right or wrong?
3. What do you mean by 'ethically neutral'? Who is ethically neutral? Can science be ethically neutral?
4. Why does the author feel that the discovery of drugs does not protect the people very much?
5. What are the findings of the biologist on the Negro problem in America?
6. Who are the real enemies of man and how are they to be conquered?
7. Will a return to nature help overcome diseases?
8. 'Live according to nature' is quite meaningless. Do you agree with this opinion? Give reasons.
9. 'The study of medicine apart from its scientific basis creates neurotics rather than scientists.' What does the author mean by this?

C. 2. Group Discussion

Discuss the following in **groups** or **pairs**:

- Should science be given the privilege to decide what is right or wrong? Give your own opinions.
- Is science deaf to moral consideration? How? Give examples in favour of your arguments.

C. 3. Composition

Write **a paragraph** in about 100 words on the following:

- Science and morality
- Racial discrimination or apartheid and human rights
- How far the scientific point of view has been adopted in India

D. WORD STUDY

D.1. Dictionary Use

Ex. 1. Correct the spelling of the following words:

beleif	ancestary	sceintific	skepticism
equiped	coleague	statitics	

Ex. 2. Look at the following examples:

*It is foolish to think that the **outlook** (paragraph 2)*

*.... Which has already banished **under-feeding** as a cause of **ill-health** (paragraph 11).*

You see that in the first example the word **outlook** is made of two words **out** and **look**. In the second example, the word **under-feeding** is made of **under** and **feeding** and **ill-health** of **ill** and **health**. These are called compound words. The less frequently used compound words have hyphen between the words which compound together whereas the more frequently used words can be used without any hyphen.

Pick up the compound words from the lesson and look up a dictionary to find out their meaning.

D.2. Word-formation

Look at the following examples:

***Preventive** medicine could be made into the moral equivalent of war.*

*A colleague of mine was recently **translating** a French paper.....*

You see that in the first example adjective **preventive** is derived from the verb **prevent**. In the second example, present participle **translating** is derived from the

verb **translate**. In fact, a number of words can be derived from a verb as illustrated below:

apply (v): applied (adj) application (n.) appliance (n)
 applicable (adj) applicability

Ex. Write as many words derived from the following verbs as possible, as illustrated above:

drive	begin	constitute	advertise
study	accept	comprehend	prevent

D.3. Word-meaning

Ex.1. Match the words given in **Column A** with their meanings given in **Column B**

Column A

God's eye-view
 bacteriologist
 exponents
 lynch
 dogma
 sting
 enlightened
 pneumonia
 diabetes
 inoculation
 chemotherapy
 bacteria
 witch
 laboratory

Column B

well-informed
 sharp pain
 room or building used for scientific experiments
 unreasonable belief
 a person practising sorcery
 an expert on bacteria or germs
 being completely unbiased and neutral
 beat up and kill
 vaccination
 treatment or prevention of infection by chemicals.
 a disease caused by insulin deficiency
 a microscopic unicellular plants lacking chlorophyll
 a disease of the respiratory tract
 persons who put some views forward with explanation

Ex.2. Read the lesson carefully and find out the sentences in which the following words have been used. Then make sentences using them first as nouns and then as adverbs:

benefit	place	view	pass
bomb	abuse	skin	interest

D. 4. Phrases

Ex.1. Read the lesson carefully and find out the sentences in which the following phrases have been used. Then use them in sentences of your own :

Instead of	in place of	rather than	as a whole
so far as	to pass	judgment	point of view
to let off	inferior to	for all that	in possession of
in practice	in any case	that is all	every bit

E. GRAMMAR

Ex. 1. Put the verbs in brackets into simple past or past perfect:

- Kavita (want) to know what her husband (do) last week.
- Mahesh (is) unable to tell his teacher where he (get) the money.
- My friends (ask) me what countries I (visit).
- The doctor (tell) me that he (go) to Goa for a holiday.
- My father (lose) his new shoes shortly after he (buy) them.

Ex. 2. Complete the following sentences:

- If the weather is fine, Naghaz
- If it rains in the evening, the match
- If you eat too much, you
- If Ajeet helps me, I
- If you don't hurry, you

