

larger than the number of stars in the sky! So there is plenty of room for individuality in protein structure.

Differences in the structures of different proteins are reflected in their properties and these, in their turn, are reflected in their functions. Some are insoluble and form tough, mechanically strong structures such as skin, horn, nails, feathers, and the armour plating of tortoises. At the other extreme there are very soluble proteins which have no significant mechanical properties but form food for young animals, for example egg-white and the proteins of milk. Others, again, form the matrix of the cell contents within which take place the metabolic events upon which the life of the cell depends. Some possess special and peculiar properties, like the contractile protein, actomyosin, which is the chief constituent of muscle. In fact the contraction of muscle is due to the summation of the contractions of its actomyosin molecules. As I have said, many proteins possess catalytic properties, and these are of special importance in metabolism since they are, in fact, enzymes.

The Nucleoproteins

This evident functional diversity is due primarily to the almost infinite variety of ways in which the mere handful of amino-acids can be strung together in their hundreds; but, over and above this, new variations can be produced by adding on to the protein some constituent or constituents other than amino-acids. The substances formed in this way are called conjugated proteins.

In recent years a great deal of interest has centred on one particular group of these conjugated proteins, the nucleoproteins. Here the structure of rather complex additional material is still being worked out, but the structure of the protein component is certainly different from one species to the next. These nucleoproteins are remarkably versatile and fascinating substances. For instance, viruses which cause many plant and animal diseases prove to be nucleoproteins and one of their remarkable properties is that, although in many ways they behave like living things, they can be prepared and stored more or less indefinitely as crystals, like the crystals of Epsom salts. Again, the chromosomes, which are the material basis of heredity, are composed largely and perhaps entirely of nucleoprotein material. But apart from these special facets of their behaviour, nucleoproteins are universally present in living cells; in the nuclei and other cellular inclusions, and in other parts of the cells. Moreover, they are involved in some way in the synthesis of proteins generally, and although we do not know exactly what they do and how they do it, there is no doubt that they play an important part in the formation of the structural, metabolic, and catalytic proteins of cells and tissues.

Among the more remarkable discoveries of biochemistry in recent times has been the fact that many important metabolic processes do not proceed in a straightforward chain of successive reactions, but take place in a cyclical manner. So important and widespread are these cyclical reactions that it would seem almost as if the Book of Ezekiel was written by a prophetic biochemist: 'I looked and beheld, the wheels had one likeness and their appearance was, as it were, a wheel within a wheel. Whithersoever the spirit was to go they went, for the spirit of the living creatures was in the wheels'.

We see an example of this cyclical activity in the final stages of

food breakdown. All foods (carbohydrates, fats, and proteins) eventually produce, as a common product, a highly reactive derivative of acetic acid. Acetic acid contains two carbon atoms which are eventually expelled from the body in the form of two molecules of carbon dioxide, but this final breakdown does not consist of the acetate derivative simply splitting into the two separate molecules of carbon dioxide. It is, rather, a cyclical process. The acetic derivative, with its two carbon atoms, combines with another substance containing four carbon atoms. Thus a six-carbon compound, citric acid, is formed. This then undergoes a series of chemical changes, losing first one and then a second carbon atom in the form of carbon dioxide. The residual four-carbon substance returns then to the point at which it entered the cycle and reacts with a second molecule of the two-carbon derivative, and the whole process is repeated, acetic acid going in and carbon dioxide coming out with each turn of the wheel. This essentially cyclical process is the main energy generator of most kinds of living cells and tissues: it exemplifies the numerous cyclical processes which play such an important part in the total metabolic organisation that underlies the livingness of living things.

Just as classical biology has developed along many different lines—botany, zoology, protozoology, and the rest—so, too, there are many branches of biochemistry. But the further research goes and the wider is the range of living materials investigated, the more evident it becomes that, in spite of millions of years of divergent evolution, and despite the vast differences in size, structure, and function that exist between different living organisms today, many common features appear throughout the living world. There seems, in fact, to be a common, fundamental metabolic ground-plan to which, apparently, living systems of almost every kind conform. Superimposed on this fundamental basic pattern there are many secondary adaptive features. In the words of my former teacher, the late Sir Frederick Gowland Hopkins, one of the future tasks of biochemistry 'is to decide on what, from the chemical viewpoint, is essential for life's manifestations, as distinct from what is secondary and adaptive'.

Handsome Contribution of Biochemistry

Biochemistry has already contributed handsomely to human affairs in both clinical and economic spheres alike. In at least one university school in this country it has found its way into chemical engineering and seems to have a bright future before it. Its applications to clinical and veterinary medicine have been very great indeed; in diagnosis, for example, and, also, through the discovery of the vitamins, in nutrition. Again, through the large part that biochemical work and skill has played in the discovery and isolation of such potent antibiotics as penicillin, streptomycin, and many more, biochemistry has played a major part in the eternal fight against disease.

Considered academically as an independent branch of biological science, biochemistry has a high place to fill and fundamental contributions to make to knowledge. Above all, it bids fair to offer to all the numerous branches of contemporary biology a unification and a community of interest that may do much to destroy what might so easily have destroyed biology itself, the very departmentalism that its own materials have in the past created.—*Third Programme*

Does Oxford Moral Philosophy Corrupt Youth?

By G. E. M. ANSCOMBE

A REVIEW in the periodical called *Mind* once reported that there are people who think that moral philosophy in one of its current fashions 'corrupts the youth'. The moral philosophy in question is the one connected with linguistic analysis, which has various exponents in the English-speaking world. They might not like being lumped together, but their work looks roughly alike from the outside, and none of it stands above and apart from the rest, marked out as original with the others as derivations. Some forms of it are current at Oxford, and it is especially up-to-date Oxford moral philosophy that I have been asked to consider here.

I will say straight away that I do not think the accusation is correct. I will explain why later. First, however, I will note a remark by that

same reviewer, who was discussing a book by Mr. Hare, that no one could think him a corrupter in view of his obvious moral earnestness. This does not seem good evidence. There was an Archbishop of our time—Archbishop Temple*—who was always saying such things as that Christian business men and politicians must 'compromise' with their ideals because otherwise they would be driven out of their fields, which would then be left to people who had no ideals; 'the actual purification of commerce depends on the continuance in business of those who have ideals'. This, he explained, means sinning—'all is sin that falls short of the glory of God'. And his moral earnestness was unsurpassed. If you really wanted to corrupt people by direct teaching of ideas, moral earnestness would, in fact, be an important

* In *Christian Faith and the Common Life*, pages 58-60.—G.E.M.A.

item of equipment. But I should also suspect that direct teaching of ideas is not, nowadays, the best way of setting about changing people: public action is much more effective. A good deal was done, for example, by arranging trials of war criminals on the bad side with judges from the good and victorious side making up their law as they went along; this educated people out of old-fashioned over-legalistic conceptions of justice. There is a moral law above any positive enactments, and it was an inspiring thing that horrible sinners against it should be brought before its bar—so I have had it explained to me by young men at Oxford who, I felt, had learned more definite, new, moral theory from this than from any teaching of moral philosophy.

However, as I have said, if you want to corrupt people by direct propagation of ideas, moral earnestness is pretty well indispensable. Another important thing is to keep away from facts other than ones which it is standard practice to mention—unlike, for instance, that communist witness before a Royal Commission on the armaments trade who read out a list of the holdings in armaments shares of members of the commission. The irrelevance of facts (stressed on this occasion by the chairman of the commission) might be agreed to in a certain sense by moral philosophers with whom it is a regular dogma that no fact can entail an ethical proposition, and that people might agree on all the facts (and, I suppose, on their mention) and still disagree in ethics. I suppose they might, but the situation is an ideal one; a logical model, as people say. A third point of method which I would recommend to the corrupter would be this: concentrate on examples which are either banal: you have promised to return a book, but . . . and so on; or fantastic: what you ought to do if you had to move forward, and stepping with your right foot meant killing twenty-five fine young men while stepping with your left foot would kill fifty drooling old ones. (Obviously the right thing to do would be to jump and polish off the lot.)

An Unfair Accusation

But it is in my opinion an entirely unfair and absurd accusation that such moral philosophy as is now dominant at Oxford corrupts the youth; I am surprised to learn that such a charge has been made, and it is my purpose to rebut it. In order to show that a certain teaching corrupts people, you must obviously show that they have (or would have come to have) better ideas without this teaching. One way of doing this would be to say you knew of examples: I know of none, which is at least negative evidence, for what that is worth. But another way is to look at the ideas which are specially characteristic of our society—ones, that is, which are both fairly standard and pretty much in the van—and compare them with the teaching of up-to-date university teachers. For they are presumably what most of the youth would be absorbing without the aid of those teachers; and if they are better than the teachers' ideas, and these are really influential, then they are corrupting the youth; but if they are about equal, or not so good, then no such accusation is fair.

It seems to me evident that there is no difference at all: Oxford moral philosophy is perfectly in tune with the highest and best ideals of the country at large, and this can be demonstrated in a few instances. It is a matter of a dead level, no more and no less.

First, there is what I may call an anti-Platonic view of justice—anti-Platonic, I mean, in one detail. Plato seems to have thought that a just society would be one in which the people were just. But this, you can learn at Oxford, may conceal a fallacy; it is not at once clear whether 'just' is a term like 'healthy' (you could not call a community healthy unless its members were individually healthy) or rather a term like 'well-arranged', which obviously does not apply to the individual. I should think that Plato was not analysing—and therefore possibly fallacious; but maintaining a thesis—and therefore possibly wrong. But is not this teaching, as to the fallacy that may lie concealed here, very much in line with one of the most important insights of modern times: that injustice may be nobody's fault, and that what is required is good arrangement? With this goes preference for policy—which is an effort to calculate and promote the general good over archaic and metaphysical conceptions of justice. One can cite the unquestionably correct decisions of courts that, for example, certain tribunals need take no account of what is called 'natural justice' in their decisions; and that local authorities' proceedings in certain matters are not challengeable on grounds of fraud and bad faith on their part.

Then, again, there is a high conception of responsibility which is certainly imparted at Oxford and which is also in tune with the time. If something seems in itself a bad sort of action, but you calculate that

if you do not do it then the total situation (some say the total state of the world) will be worse than if you do it—then you must do it; you are answerable for the future if you can affect it for the better. This is familiarly echoed outside the university: for example, it was right to massacre the Japanese because it was (or at least was thought to be) productive of a better total state of affairs than not doing so would have been. Of course, it takes a don to give one formulation of the idea that I have heard, namely: if, unless you do A someone else will do B, then if you do not do A, you can yourself be said to do B (you bring it about that B is done, for the other man would not have done it if you had done A). It sounds a bit odd in the case of adultery, but the general idea is a common one.

Limitless Responsibility

There is, further, a gentle, tolerant, and civilised idea of responsibility for things done, which in fact goes with the high one I have mentioned. Responsibility is causality; for to hold someone in good standing responsible for what he did is to ascribe the whole causality of it as an event to him—and that is unfair; you must not make him a scapegoat for something that obviously had all sorts of causes. Thus I must face the future with a recognition of limitless responsibility; no letting myself off this; I cannot, for example, take the easy way out by saying that certain courses of action are excluded by their badness; but towards the past I need feel only that degree of responsibility indicated by my share in bringing about whatever situation was brought about. With this also goes the merciful and humane attitude towards criminals characteristic of the best liberal minds. For an agent is himself the victim of causality, so it is better to treat and train him than to blame and punish him. *Bien entendu*, treatment may take longer than punishment. That may even be the only difference, as in the case of 'corrective training'.

Thus, both in the university and outside, people are surely getting rid of the merely legalistic and unphilosophical notion of the 'nature and quality of an act'. It survives in our older laws and hence in the minds of our judiciary, but newer laws are putting this right so far as concerns the essential business of calculating the improvement of the general state of affairs, as is shown by the correct legal decisions that I have cited; and that this is the correct procedure in making moral decisions is constantly taught in the university. A frequent occurrence that is much in the same spirit is the removal by authority of elderly widows from their dwellings, which anyone can see they are not keeping in accordance with the standards of hygiene which are desirable for their own and general welfare. How remote and alien—and indeed totally irrelevant—sounds the remark of Solomon 'The tender mercies of the wicked are cruel'.

Another instance can be found in the intense feeling for cruelty and suffering. This is *the* topic on which there is an automatic pressure of general moral opinion in Oxford discussions. If anyone should try saying that some kind of action was bad, a case (however fantastic) is at once imagined in which a consequence of doing that action is that some horrible suffering is averted, and that settles the question. Is not this feeling for suffering a common feature of our time: one of the strongest standard things to appeal to in common talk and in newspapers, outside the university too? Think how strongly we feel about the need for preventive measures in regard to cruelty to children (very widely interpreted). I do not know if any vulgar minds ever have the thought: Preventive measures means they want to go into people's homes and push them around, not because they have done anything, but just in case they do. But, if so, they would be wise to keep this sentiment to themselves. With this too goes the idea that what is dreadful in war is purely the 'use of force', aggression, the amount of suffering; who, for example, is made the object of attack, with what justification, does not make much difference.

Choosing Your Way of Life

There is also the realisation in moral philosophy that what you have to do is to choose your way of life and act in the way that fits in with this. *De finibus non est disputandum*. In discussion common standards are assumed—our standards, shown by 'what we say' in judging others. These are tacitly assumed to be good, and indeed the general picture conjured up is one of people free of crime, behaving nicely (they always tell lies to avoid betraying friends, for example), and also looking for improvement, both of the state of the world and of standards

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themselves—in the direction towards which they already point. 'Way of life' talk is not a university invention; it is the staple of our time (no one, obviously, is going to persuade us to give up anything, like contraception, which goes with our way of life). It universally carries with it these connotations both of satisfactoriness and arbitrariness; nor does it lack the upward-looking glance.

Finally, there is the immensely serious question of the upbringing of children. Everybody knows that we have long since discarded the hideous conception of parental authority. The business of parents is to do their best for their children, whom they therefore confront fearfully. The disservice of imposing their own standards, which may become

outmoded, is evident. In a changing world, with changing conditions, standards must change; and you must cut your morals according to your purposes and the conditions, so that your actions will promote the effects you choose to pursue. (For your actions show what your morals are, no matter what you say.) Clearly, all we can do is to equip our children as thinking human beings, capable of forming and indefinitely improving their own standards of action without impediment. Is not this the general, as well as the university, opinion?

I hope that I have said enough to show that the famous imputation of 'corrupting the youth' is undeserved. This philosophy is conceived perfectly in the spirit of the time and might be called the philosophy of the flattery of that spirit.—*Third Programme*

Bringing Copyright Up to Date

A QUEEN'S COUNSEL on the new Copyright Act

FOR many months I followed the progress through Parliament of the Copyright Bill, now passed into law as the Copyright Act, 1956, which it is reasonable to suppose will be brought into operation within the next few months. We have not had a new Copyright Act in this country for forty-five years. It was therefore a very different world in which the last Act, the Act of 1911, was passed. True, the talking machine became known some eighty years ago, but the cinematograph film was only just in its infancy and broadcasting had not even been invented. So this new Act is a matter of national importance: it will bring copyright into line with present-day conditions. It is a matter also of international importance, because soon we shall see its effect in various parts of the world. In particular we shall see a striking change in the United States, where, after what has been called 'a century of copyright isolationism', the new Act will be a necessary means of removing barriers which have long stood in the way of British authors.

A Right with No National Boundaries

For over a century this country has sought to uphold the principle that the protection of copyright—the right to copy—should know no national boundaries. We are one of the original members of the Berne Union for the protection of the rights of authors over their literary and artistic works. We have, in fact, consistently signed each of the revised texts of the Berne Convention. The last was revised at Brussels in 1948, and one of the objects of the new Act is to enable us to ratify it. But the United States has never been a member of the Berne Union, and thus it was in a position to impose its own copyright conditions. They were indeed onerous, and there can be no doubt that they caused resentment on the part of British authors. For a work in the English language to secure copyright in the United States it was necessary that it should be printed in the United States from type set up there. Further, registration of copyright was required.

Observe the sharp contrast between the law of copyright as it existed in the United States and the law of copyright in our own country. Here there are no formalities. The requirement as to registration was swept away when the Act of 1911 came into force. The law has operated automatically in regard to a work entitled to copyright whether published or unpublished. A letter may be protected just as effectively as a novel or a photograph or an oil painting. But consider the change which will come about shortly in the international field. Another Convention was signed in 1952. It is the Universal Copyright Convention which was prepared under the auspices of Unesco and was signed at Geneva by some forty countries, including the United Kingdom and the United States. Indeed, the United States has already ratified it, and it was actually brought into operation there on September 16, 1955. We have not yet ratified it, but we shall do so as soon as the necessary preliminaries have been completed.

The position, then, will be simple. To secure copyright in a state which is a party to the Universal Copyright Convention, like the United States, it will be merely necessary that from the time of first publication all copies of a work shall bear a prescribed symbol—the letter C within a circle, accompanied by the name of the copyright proprietor and the year of first publication, so placed as to give

reasonable notice of claim of copyright. Where that is done, all formalities imposed under the domestic law of any state will be regarded as satisfied. Already American publishers are using the prescribed symbol, and it was fittingly conspicuous on the cover of a book dealing with copyright in the United States which came into my possession recently.

To enable us to ratify these two Conventions—the Brussels Convention, as it is called, and the Universal Copyright Convention—it was necessary to amend the Act of 1911. For instance, the term of protection granted by the Brussels Convention is for the life of the author and fifty years after his death, and countries of the Union are no longer excused by their domestic laws, as they formerly were, from applying this provision.

There is a provision in the Act of 1911 which gives a publisher a 'licence of right' to reproduce a published work at any time after the expiration of twenty-five years from the death of the author, on giving the prescribed notice and paying the prescribed royalty of 10 per cent. This provision may well have been intended to facilitate the issue of cheap editions; but it has had to go, to enable us to ratify the Brussels Convention. In truth its disappearance does not seem to be a matter of any real importance. The Copyright Committee, who reported in October, 1952, and upon whose work the new Act is largely founded, said they had received evidence, which they saw no reason to challenge, that as a matter of general practice publishers did not wait for twenty-five years from the date of publication, let alone for twenty-five years after the death of the author, before they issued a cheap edition of works in popular demand.

But it may well seem strange that, while we have discarded one system of 'licence of right', we should have retained another. I refer to the re-enactment of a provision of the Act of 1911 to the effect that if the owner of the copyright in a musical work has agreed to one manufacturer making records of it for sale, other manufacturers are entitled to make similar records, provided they give notice of intention and pay the appropriate royalty. I am bound to say that this is in accordance with the Brussels Convention which, while giving composers the exclusive right of authorising the recording of their works, leaves reservations and conditions to be determined by legislation in each country of the Union.

Distinguished Opposers

This 'licence of right' led to controversy both inside and outside Parliament during the progress of the Copyright Bill. It was opposed by many distinguished composers and authors, and they maintained their opposition to the bitter end. In fact, when the Bill reached the report stage in the House of Commons—having already passed through the House of Lords—a petition was presented from 594 British composers and authors asking that the relevant provision should be deleted. They included Sir Arthur Bliss, Sir Alan Herbert, Sir Compton Mackenzie, Mr. Benjamin Britten, and Mr. Henry Hall. 'Your petitioners', ran the petition, 'look with faith and hope to Parliament itself for protection of liberties hardly won and vigilantly cherished'. The petition was ordered 'to lie upon the Table'.

The Government sought to solve the problem in two ways: first by seeking to differentiate between (a) serious and non-serious music and