

# Doorway Papers by Arthur C. Custance

*Part IV: Patterns of Education: For the Scientist and the Technologist*

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## FACTORS BRINGING CHANGE TO PATTERNS OF EDUCATION

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Two things brought about change, one of them probably always having operated in this way. The first is 'contact' with other Cultures; the second is a 'philosophy of change' which began to become really apparent when the Theory of Evolution gained general acceptance.

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Some of the factors which lead to such culture contacts are the following: change of climate leading to migration, increase in population leading to expansion into new territories, the disappearance of a source of supply (metals, food, wood, etc.), the emergence of a notable "Royal Family" and the establishment of an ambitious dynasty with plans for empire building, the desertion of an area due to plague or the increase of a pest or of wild animals, and -- most important of all -- *roads*, whether navigable rivers or easily traversed valleys, etc. Harold Innis made much of the existence of such means of communication and rightly stressed the fact that the highest early cultures were all on navigable waterways that encouraged culture contact and the exchange of goods and ideas. <sup>16</sup> This is true of Europe, the Middle East, Asia, India, and the Far East, where the earliest lines of communication on a large scale were rivers and river valleys. Such contacts inevitably lead to cultural change.

**Part IV**

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Ideas are like parents, they generate ideas in turn, and no two people even though most hostile ever come

16. Innis, Harold, "Empire and Communications," Oxford, UK, 1950, and "the Bias of Communications," University of Toronto Press, 1951.

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into contact without some exchange taking place, often, as in the case of the early centuries of our era, as a result of taking prisoners.

Sir Flinders Petrie, speaking of the Cycles of Civilization, which have so intrigued philosophers of history, says in this connection: <sup>17</sup>

We have represented the wave of Civilization as falling to a minimum, and suddenly rising again. To what is this change due? In every case in which we can examine the history sufficiently we find that there was a fresh wave coming into the country when the earlier wave was at its lowest.

In short, every civilization of a settled population tends to

incessant decay from its maximum condition; and this decay continues until it is too weak to initiate anything, when a fresh race comes in and utilizes the old stock to graft on, both in blood and culture.

This has been the case it seems in both the Old and the New World. Ernst Kretschmer arrived at the conclusion, in regard to the share that the Nordic race has had in Western Culture, that their most marked contributions were developed only in those regions where this race has been exposed to intensive mixture with other races. <sup>18</sup> And he holds it to be certain that regions inhabited by the purest Nordic breeds are relatively poor in genius and cultural activity. The most advanced European Cultures never had their spiritual centres, he argues, in Scandinavia or in the northern coasts of Germany, or in Scotland: but always where racial mixture has taken place.

The sudden emergence of high civilizations in the New World in pre-Columbian times is not so easy to account for. But the sudden upsurge in the New World since the Discovery is surely traceable to this factor of race mixture. Speaking of this, Harry L. Shapiro pointed out that while the figures are very approximate only, there are some 6,000,000 people of mixed racial origin in Europe, whereas the relative number of people of mixed racial origin in the New World is vastly greater so that, as he puts it, "we can have little hesitation in recognizing that the latter is the main centre of race mixture in modern times." <sup>19</sup>

17. Petrie, Sir Flinders, *Revolutions of Civilization*, London ,UK, Harper, 1911, p.114.

18. Kretschmer, Ernst: quoted by Franz Weidenreich, *Apes, Giants and Man*, Chicago, IL, University of Chicago Press, 1948, p.90

19. Shapiro, Harry L., "Race Mixture," in the series *The Race Question in Modern Science*, Paris, France, UNESCO, 1953, p.21.

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And in the same connection Fenton B. Turck says: <sup>20</sup>

Americans have captured the extraordinary vitality which Science has proved is typical of the first few generations of a people with mixed blood strains.

This shows to some extent why ancient high civilizations did not proceed further. Their world-view so homogenized their own particular culture that they were not willing or capable of accommodating much in the way of an exchange of values or ideas. Some exchange occurred of course, but not comparable **at** all to the phenomenon of our own age - and in primitive societies the pattern is even more concretely apparent. Indeed, such societies are in most cases so homogeneous that any disruption of the pattern practically destroys the whole structure. This has been the testimony of history ever since the White Man began to explore and exploit the World for himself- from the destruction of the Indus Valley Culture by the Aryans to the virtual destruction of American Indian Culture by ourselves.

C. G. Seligman observes the same in China. As he says: <sup>21</sup>

The Tang period, perhaps that of China's greatest brilliance was marked by the influx and acceptance of foreigners and of foreign [Western and Indian] ideas.

E. B. Reuter of the University of Iowa, published a paper on the consequences of race mixture some years ago in which he gave illustrations of the fact that both in societies and in individuals 'mixed blood' can have remarkable results so long as the culture does not degrade the so-called 'half-breed' socially. <sup>22</sup> This was at that time quite a bold statement, because much was then (1930) being made of the desirability of purity of racial origins. The argument of Kretschmer is given added weight when Reuter observes: <sup>23</sup>

20. Turck, Fenton B., "The American Explosion," *Scientific Monthly*, Sept., 1952, p.191.

21. Seligman, C.G., "The Roman Orient and the Far East," *Antiquity*, vol.11, Mar., 1937, p.10.

22. Reuter E.B., "Civilization and the Mixture of Races," *Scientific Monthly*, Nov., 1930, p.442 f.

23. Reuter E.B. , *ibid.*, p.446.

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The same general position is supported by a body of negative evidence. The population groups in the modern world with the highest approximation to racial purity are just those groups of most meager cultural accomplishment. The fragments of primitive groups still living are the purest in blood and the lowest in culture of existing populations. . . .

From all this it is evident that the exchange of ideas and techniques has a value in itself. Yet possibly we could go a step further. The exchange may take place between two cultures whose world-view is analogous, as for example two non-Indo-European or two Indo-European cultures. It may also take place between two cultures with distinctly different world-views. Which kind of contact produces the most notable results? I venture to suggest that it is clearly the latter, and that the lack of advance in early times in spite of trade and commerce is traceable to the fact that the exchange took place between people of similar 'philosophy.' It was essentially therefore an exchange of techniques and artifacts, but nothing more. It was cultural involution.

Not until the sudden expansion of Indo-European trade and commerce, with a great increase in travel and the communication of ideas, did any real Cultural Evolution take place. One wonders whether, if this should become in time 'One World,' we shall also settle down to the mediocrity of one World-View? Would that be the beginning of the end of progress?

### *The effect of Greek philosophy on attitude towards nature*

Why has this intellectual contribution of Indo-Europeans been so liberating in this way? I think partly because it opened up a new method of investigation of Nature. It is hard now to realize what the first Greek Philosophers actually undertook to do. The Ionians began asking improper questions. They exercised

unbelief in a world which was full of blind faith in the wisdom of its traditional answers. And Frankfort describes this bold step: <sup>24</sup>

24. Frankfort, H and H.A. Frankfort, *The Intellectual Adventure of Ancient Man*, Chicago University Press, 1946, p.377.

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The doctrines of the early Greek philosophers are not couched in the language of detached and systematic reflection. Their sayings sound rather like inspired oracles. And no wonder, for these men proceeded with preposterous boldness, on an entirely unproved assumption. They held that the Universe is an intelligent whole.

They presumed that a single order underlies the chaos of our perceptions, and, furthermore, that we are able to comprehend that order.

The whole-ness of the Universe had not been doubted by their predecessors. It was however whole-ness of another kind. It was the whole-ness of a Society held in check by conflicts of wills with some in power in some areas, and others in other areas. Often these powers were at loggerheads, yet like a kind of Hobbesian State, they got along with each other because it paid to do so. Such was the Babylonian view, and certainly the religious heritage of the Greeks was a pantheon of very similar deified but squabbling characters.

They somehow came to the dangerous conclusion that the order in the world which they perceived with characteristically Indo-European mind could not have resulted from such a chaotic kind of government. In one bold stroke they began to look for another kind of cause and effect.

### *Magic: not a pre-cursor of science*

Magic was never the father of Science, for the whole concept of magic is not compatible. It is a personalistic view of the forces or wills of Nature. I believe that in spite of all that has been written by such men as Malinowski <sup>25</sup> Rivers, <sup>26</sup> and Thorndike, <sup>27</sup> and many other anthropologists, they are in error in

25. Malinowski, Bronislaw, *Magic, Science, and Religion: and Other Essays*, New York, NY, Anchor Books, Doubleday, 1954, p.17-92, especially 17 and 87. However, in his article "Relations of Science and Magic," under the general heading *Culture*, in the *Encyclopedia of the Social Sciences*, (edited by Seligman and Johnson, Macmillan, 1950, vol.IV, p.621-645) he seems to distinguish Magic from Science more specifically, but even here, I feel he is confusing Science and Technology.

26. Rivers, W.H.R., *Medicine, Magic, and Religion*, New York, NY, Kegan Paul, Trench and Trubner, 1927, especially p.51 and 52. I believe Rivers has confused Logic and Science, and therefore held that primitive man was Scientific because he was Logical. This overlooks the differences in the premises, and the quite different view of the nature of cause and effect.

27. Thorndike, Lynn, *The History of Magic and Experimental Science*, New York, NY, Macmillan, 1923, especially vol.1, p.28, where he refers to "the solid beginnings of experimental and Mathematical science" as standing "unmistakably forth" in pre-Greek cultures.

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attributing to magic the status of a kind of pseudo-science. Its accidental findings may have contributed to the world's technical wealth (as for example in medicine) but its spirit is entirely alien to the scientific attitude. As religion is an attitude of I -- *Thou*, Magic is an attitude of I -- *thou* (with a small *t*), but Science is an attitude of me - *it*. This was the new Greek spirit.

Frankfort says subsequently: <sup>28</sup>

There is nowhere a precedent for the [new] type of argument [they were proposing]. It shows a twofold originality. In the first place, early Greek philosophy ignored with astonishing boldness the prescriptive sanctities of religious representation. Its second characteristic is a passionate consistency. Once a theory is adopted, it is followed up to its ultimate conclusion irrespective of conflicts with observed facts or probabilities

The absence of personification, of gods, sets it apart from mythopoeic thought.

Thus they at last escaped from the bondage of the I -- *Thou* attitude of the non-Indo-European. Their attitude became in time, truly objective. It opened the way for a re-examination of all the older theories; and it opened the way for experiment. Unbelief became a key concept. It still is. There is a curious inversion of historical processes here, for while Faith had led to Technology, unbelief carried Technology into Science. The part played by early religious beliefs in the stimulation of Technology is not popularly recognized. Lord Raglan emphasizes it. <sup>29</sup> He argues that in the earliest times, only the priestly class had means or leisure to spend time elaborating techniques. Religion called forth man's highest skill and demanded perfection of technique in building, metal work, and drama. It was the wealthy Temples that demanded record keeping and trained scribes for the task. Its priests were appropriately clothed in the finest raiment. Sacrifice led to much knowledge of anatomy, and burial customs played their part here also. Education owed its inception to the need for exact preservation of the Faith. The stars were studied for signs and omens, and the organization of community life for the undertaking of large buildings and ceremonies was greatly stimulated by religious faith, and so was the creation of literature and epic poems.

In fact it is probably true that without such a world-view, man's thinking would have been largely incoherent and fruitless. It has, moreover, been shown that those small liberal arts colleges with a Theological

28. Frankfort, H., and H. A. Frankfort, *The Intellectual Adventure of Ancient Man*, Chicago University Press, 1946, p.378, 379.

29. Raglan, Lord, *How Came Civilization?* London, UK, Methuen, 1939, p.176, 178.

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Foundation have actually produced the largest number of notable Scientists in America.<sup>30</sup> Perhaps it is because, faulty though its views may sometimes prove to be, theology still makes sense out of experience as a whole, and a man works better when he has some kind of orientation.

## *The role of philosophy in the emergence of the scientific method*

So much for Technology, then. Science, on the other hand, has progressed by doubt, by scepticism, by asking questions that challenge accepted beliefs. Recently, Maurice B. Visscher remarked: <sup>31</sup>

It has been said that the real essence of the scientific frame of mind is the "duty to doubt" as long as it is reasonably possible to do so. On the contrary, with respect to revealed religion, the "will to believe" is a cardinal virtue.

Even so, the great new venture of the Scientific Method with all its vast consequences for mankind might have been somewhat fruitless in its impact had it not been for the emergence, largely as a result of Darwin's *The Origin of Species: By Means of Natural Selection*, of a new climate of opinion which now looks upon change as being in itself and of itself a measure of advance. To change something -- anything -- is a worthwhile undertaking.

So popular has the concept become, so violently has tradition and 'the old way' been cast aside as outmoded, that we have even made a virtue out of novelty itself.

By undermining the sanctions of any kind of religious faith, and entirely divorcing the supernatural from the natural order as though it were no longer relevant, the whole tenor of educational emphasis has changed. The scientists, properly, for their purposes could ignore the spiritual element in their search for power over things. But the public, going one step further, denied entirely what the scientists had merely ignored. Then the latter followed suit.

30. Sampey, John R., "Training Leaders in Science and Religion" *Science*, vol.114, Sept, 28, 1951, p.332.

31. Visscher, Maurice, "The Duty to Doubt, and the Will to Believe," *The Bulletin of the Atomic Scientists*, "Dec., 1957, p.356.

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### *The present subtle shift: and the consequences for research*

And so education has shifted its emphasis from ends (the subject of philosophy) to means (the subject of technology), and therefore inevitably from wisdom (which belongs to experience and has a moral quality in it) to knowledge (which can be equally the possession of a saint or a knave). *Homo sapiens* becomes *Homo sciens*, and as more and more courses are devoted to 'know how' in place of 'know why,' the essential role of the philosopher is overlooked altogether.

*Yet this philosophical attitude of mind is our unique contribution as Indo-Europeans.* It is this which has brought us to the threshold of conquering even space itself. We are not greatly inventive, nor have we any superior ingenuity. We have been wonderful borrowers and our memory of the debt is short.

I think if this un-inventiveness were to need demonstration, it has unexpectedly received it both in the United States and in Great Britain in recent years. Large corporations have, with great expectations, been setting up research laboratories in ever increasing number for over a quarter of a century. The endowments of some of

the Research Centers have often been fantastic. Yet as Stafford Hatfield points out, in England at least the results have been almost as disappointing as the amount of money spent on them. <sup>32</sup> Very little has come out of it all. Evidently the Indo-European, with all the equipment in the world, is not so good at inventing things as we have imagined him to be.

And the picture in the New World is much the same. The government of the United States has laid so much emphasis upon research directed specifically to the solution of practical and immediate problems that the real scientists are becoming frightened and at times almost neurotic.

J. C. Warner, President of the Carnegie Institute of Technology, was quoted a few months ago as follows: <sup>33</sup>

Government emphasis on applied research has so disorganized University work that many scientists are living a life of intellectual chaos. Their energies have been channeled away from . . . creative research. . . .

I do not believe that any board, committee, agency, administrator, or the scholar himself can predict ahead of time the most fruitful direction a scholarly study will take. . . .

32. Hatfield, Stafford, *The Inventor and His World*, Harmondsworth, UK, Penguin., 1948, p.46-49.

33. Warner, J.C., quoted in the *Scientific American*, Feb.,1958, p.40, 41, under "Science and the Citizen."

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Government support . . . of team research . . . does not produce the new generalizations, ideas, and comprehensive theories which constitute the essence of new science.

In such situations, the scientists themselves are often the first people to admit the lack of new ideas. It is the urgency of finding answers to practical problems, a kind of glorified technological treasure hunt that is drying up the stream of inspiration at its source. *This* kind of search might far better be given to the Technologist. Let him by all means get guidance from the Scientist, but leave the Scientist free to examine the pabulum of Technology as he will, and to use the technician's skill to aid him in the quest.

The results will be far more fruitful if my thesis is in any sense a correct interpretation of history.

### *Education of a scientist and of a technologist*

Then, education-wise, the budding scientist, the individual who most clearly reflects the Indo-European turn of mind, should be educated and trained by all possible means to exercise this faculty with all his might, and to give far less attention to practical problems that currently exist. He should be a theorist, not a super-mechanic. I suspect that a good technologist will solve more practical problems more effectively and in less total time, than any one who is not by nature inventive but is the stuff out of which scientists can be made.

Somehow it should be possible to sort out these two kinds of people, (scientist

and technologist) taking as a starting point their racial origin, and using tests thereafter to refine the process of identification. Not everyone will by any means fall in either category. But there are those, the scientists, who are by nature sceptical, challenging every assertion and every traditional view.

If there is in such minds something more than merely a negative attitude towards things in general, such men could be disciplined by those who have proved themselves to be philosophically competent. The critical faculty is essential to science, but this requires training, and a high degree of objectivity which must be engendered. But this kind of training is not much help to the intensely practical mind, or to the inventive individual, the technologist. Restraints have a deadening effect on the scientist: he must somehow be allowed to believe the impossible. What he needs is encouragement, and freedom, and when he has learned how to ask the right questions, often the technologist will prove indispensable to him.

Money is needed both for Search and *Re-search*. The former could be undertaken by the non-Indo-European, the latter by the Indo-European, if we allow these classifications to stand for mental attitudes rather than a slavish insistence upon a birth certificate of proper origin. Part of the problem of specialization might find its solution here, for the scientist need not be swamped for much of his Course with practical matters, nor the Technician with theoretical ones. Each becomes qualified in his own way to be a co-worker with the other, without the presently existing unpleasantness of professional jealousy and distrust of trespassers.

### *Conclusion*

Of course, such Utopian schemes seldom work out as expected. Yet the implications of my Thesis are here in a nutshell. On the basis of a study of the history of Technology and the history of Philosophy we seem to have clear evidence, it seems to me, that there is such a thing as a Technical mind that works best in the invention of *things*, and such a thing as a Philosophical mind that works best in the invention of *ideas*. Only very exceptionally are they combined in one individual, and -- on the contrary -- many individuals have neither specifically enough to single them out. Together, they can produce wonders -- but in independence, the capacity of each proves to be remarkably limited in the long run.

It may be that such a bifurcated system of Education would require a bifurcated form of communication, too: specific and concrete and actual for the one, generalized and abstract and theoretical for the other. But then, I suppose, there would have to be a *lingua franca* to enable each group to communicate with the other!

And thus, in the end, like all such schemes, the system would prove entirely impractical. Yet -- as an Indo-European, and according to my own Thesis, it is both proper and perhaps inevitable that such impossible theories should be invented and philosophized about!



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\* End of Science & Culture \*

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