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dent that the neuronie endowment of a human being was far in excess of anything that he could possibly utilize in a lifetime. It was quite obvious why that must be. The majority of them not possessed of musical talent could, nevertheless, by patient instruction, be taught to perform passably, if not inspiringly, upon any musical instrument. The majority of them never acquired that skill, which involved an elaborate co-operation and co-ordination between the nerve-cells controlling the movements of the hand and arm and those related to the processes of hearing and of interpreting the sounds when heard. All the constellation of neurones that would have been called into activity by this form of education had been allowed to remain dormant. The plasticity of the human brain originated, therefore, in its enormous provision of neurones, far in excess of the needs of any given individual, the larger proportion of which must of necessity in any single life remain unused. This fact conferred upon the brain a capacity for improvement far greater than that possessed by any other of the physical endowments of man. And, unlike the improvements which exercise might bring about in any other tissue in the body, which could not be conveyed to their descendants, improvements achieved by the individual in the training of his neurones to ordered activity were communicable to others, and particularly to his descendants, through the medium of language. Thus man, first among all the animals, had acquired the power of transmitting self-improvement to others. The part that this must have played in the mental evolution of man in the past, and must still play in the present and in the future, was incalculable in its magnitude.

**The Inheritance of Language.**

It must surely have occurred to many that language and tradition constituted a form of inheritance in which acquired characters could be handed down from generation to generation. Man was born with very few and simple instincts of a general and indefinite character, not specifically shaped to fit his environment with any degree of exactitude. The young of man was a most singularly helpless being, for the very reason that the greater part of the control which his nervous system was capable of exercising over his actions was not inherent, not born with him, but acquired as a cumulative reaction to experience. Moreover, his period of immaturity was enormously prolonged in comparison with that of the majority of animals. It was through the parents that the external inheritance of the race was first transmitted to the individual—through the parents primarily, and through collective society secondarily. The power of speech enabled them to store up ideas in an extraordinarily concentrated form, so that, as Carr-Saunders put it, "When a child learns his native language, in a few years he acquires the products of the thinking of untold generations from whom he is descended." But in addition to the storage of ideas in language, they had accomplished a similar storage in customs, folk-lore, institutions, tools, laws—all of which represented accumulated effects of inheritance of the fruits of experience of ancestors whose existence was merely a shadow and a legend to them. How different was the situation in the case of an organism in which the nervous system was stereotyped, limited, the neurones precisely adapted to the needs of existence, the experience of the race merely a multiple of identical units which were the experiences of its constituent individuals? The insects, for example, emerged from the egg, or from the pupa, fully equipped with all the reflexes and instinctive reactions which they would need in the environment into which they were liberated. The infant wasp was a far more competent creature than the infant man, but his potentialities were exhausted simultaneously with his arrival in his world, and all the potentialities of man had never yet been, and possibly never would be, realised.

**Tradition the Medium.**

Tradition constituted the normal medium whereby the accumulated externalised inheritance of man was transmitted from one generation to another. Among primitive peoples tradition was a stereotyped and crystallised product of their communal and ancestral experience. It admitted of no violation. It tended to become perfectly adapted to the needs of the particular community in which it arose. It ceased to be plastic. It ensured the continuance of that race and its success under the usual conditions which surrounded it. Let new and unforeseen conditions arise, as when the white man arrived in Australia and revolutionised the environment of the aboriginal, and the tradition-shackled man betrayed his inadequacy and his lack of adaptability. Instead of one tradition the child of modern civilisation received a multiplicity of traditions. Those of its parents naturally had the greatest weight, and reached the child at the most impressionable age, when rules of action were accepted on hearsay, and unreasoning prejudices, which would endure for a lifetime, were formed and crystallised. But at the same time the child was assailed from without by the traditions of countless other people, conveyed to it by the spoken and the written word. The mutual clash of those traditions annulled the authority of tradition itself, and there arose in its stead a competition among conflicting ideas, some of which were suc-

cessful and adapted to the environment, others ill-adapted and conducting to disaster. Thus there came about a natural selection of ideas and of those traditions which would be handed on to the succeeding generation, a natural selection among a multiplicity of possibilities which did not concern their physical inheritance in the least. From a survey of what natural selection had done to improve the physical inheritance of animals and plants in the past, they might perhaps attain to an inadequate conception of what it might achieve in the future towards improving the mental external inheritance of mankind; so that when tradition decayed, humanity entered upon its period of greatest hope, but also its period of greatest suffering. For they might regard tradition as an instrument for conserving and perpetuating the happiness and the stupidity of mankind. (Applause.)

**REG. 16/12/26. UNIVERSITY OF ADELAIDE.**

**PUBLIC EXAMINATIONS BOARD. LEAVING HONOURS EXAMINATION 1926.**

**A. HONOUR LISTS.**  
The following lists show the order of merit for candidates who have distinguished themselves, and who were under 19 years of age on December 31, 1926.

- GENERAL HONOUR LIST.**  
The following is the order of merit of candidates who have distinguished themselves in the whole examination:—1, O'Connor, R. J., St. Peter's Collegiate School; 2, Corpe, J. W., St. Peter's Collegiate School; 3, Beech, E. R., St. Peter's Collegiate School; 4, Gallagher, W. E., Christian Brothers' College; 5, Doyle, L. J., Christian Brothers' College; 6, McLean, L. A., Adelaide High School; 7, Close, R. W., Adelaide High School; 8, Gray, J. H., St. Peter's Collegiate School; 9, Campbell, J., Methodist Ladies' College; 10, Strehlow, T. G. H., Immanuel College; 11, Wilkinson, H. C., equal, St. Peter's Collegiate School; 12, Cox, O. I., St. Peter's Collegiate School; 13, Dorsch, W. B., Prince Alfred College; 14, Brooke, W. C. R., Adelaide High School; 15, Thompson, G. A., Methodist Ladies' College; 16, Hunt, M. A., Adelaide High School; 17, Dunstan, B. E. M., Adelaide High School.

**SPECIAL HONOUR LISTS.**

- English Literature.**  
1, Doyle, L. J. (Tennyson Medal), Christian Brothers' College; 2, Thompson, G. A. (Methodist Ladies' College); 3, Dorsch, W. B., Prince Alfred College, and Dunstan, B. E. M., Adelaide High School, equal; 5, Campbell, J., Methodist Ladies' College.
- Greek.**  
1, Strehlow, T. G. H., Immanuel College; 2, Elliott, R. D., St. Peter's Collegiate School.
- Latin.**  
1, Beech, E. R., St. Peter's Collegiate School; 2, Strehlow, T. G. H., Immanuel College; 3, Dorsch, W. B., Prince Alfred College; 4, Bevan, M. L. W., Adelaide High School; 5, Thompson, G. A., Methodist Ladies' College.
- French.**  
1, Thompson, G. A., Methodist Ladies' College; 2, Graham, M. T., Adelaide High School; 3, Campbell, J., Methodist Ladies' College; 4, Giles, J. P., Adelaide High School; 5, Dorsch, W. B., Prince Alfred College, and Elliott, R. D., St. Peter's Collegiate School; 7, Abotomey, O. W., Norwood High School; Beech, E. R., St. Peter's Collegiate School; Gray, J. H., St. Peter's Collegiate School; Juetz, C. M., Woodville High School (equal).
- German.**  
1, Strehlow, T. G. H., Immanuel College.
- Ancient History.**  
1, Wilcher, L. C., St. Peter's Collegiate School.
- Modern History.**  
1, Dunstan, B. E. M., Adelaide High School; 2, Wilcher, L. C., St. Peter's Collegiate School; 3, Doyle, L. J., Christian Brothers' College.
- Economics.**  
1, Blinman, J. F., Unley High School; 2, Lillywhite, M., Unley High School; 3, Brown, G., Unley High School.
- Mathematics.**  
1, O'Connor, R. J., St. Peter's Collegiate School; 2, Corpe, J. W., St. Peter's Collegiate School; 3, Wilkinson, H. C., St. Peter's Collegiate School.
- Physics.**  
1, O'Connor, R. J., St. Peter's Collegiate School; 2, Gallagher, W. E., Christian Brothers' College; 3, Brooke, W. C. R., Adelaide High School; 4, Close, R. W., Adelaide High School; 5, McLean, L. A., Adelaide High School.
- Chemistry.**  
1, O'Connor, R. J., St. Peter's Collegiate School; 2, Canaway, J. O., Scotch College; Cox, C. I., St. Peter's Collegiate School, Gallagher, W. E., Christian Brothers' College (equal).  
3, Corpe, J. W., St. Peter's Collegiate School, and McLean, L. A., Adelaide High School (equal).  
7, Close, R. W., Adelaide High School.  
8, Doyle, L. J., Christian Brothers' College, and Hannon, T. D., Christian Brothers' College (equal).  
10, Gray, J. H., St. Peter's Collegiate School, and Cooke, P. T., St. Peter's Collegiate School (equal).  
12, Brooke, W. C. R., Adelaide High School, Fletcher, M. W., Scotch College, and Strahan, A. W., Adelaide High School (equal).  
15, Hunt, M. A., Adelaide High School.
- Geology.**  
1, Turner, E. M., Methodist Ladies' College.
- B PASS LIST.**  
English literature (Eg), Greek (Gk), Latin (L), French (F), French, including oral (Ft), German, including oral (Gnt), ancient history (Ah), modern history (Mh), economics (Ec), geography (Gg), mathematics, two subjects (Ma), physics, (Pc), chemistry (C), geology (G), botany (Bt), physiology (Pl). A asterisk (X), denotes a credit.  
I. List of candidates who have passed in a least four subjects, and who receive the leaving honours certificate provided they hold or are entitled to the leaving certificate or the leaving commercial certificate:—  
Beech, Ernest Robert, Lx, Fxt, Ah, Mh, Pc, St. Peter's Collegiate School; Bevan, Medhurst Llewelyn Willett, Eg, Lx, Mh, Ec, Pc, Adelaide High School; Bonnin, Noel James, Ft, Ma, Pc, C, St. Peter's Collegiate School; Bowen Arthur Geoffrey, Eg, Ma, Pc, C, Prince Alfred College; Brooke, William Charles Robert, Ft, Ma, Pc, Cx, Adelaide High School; Burdett Apley Carman, Eg, F, Mh, Ec, Pl, St. Peter's Collegiate School; Campbell, Jessie, Eg, Gk, L, Fxt, Pc, Methodist Ladies' College;

- Canaway, John Oliver, Ma, Pc, Cx, Scotch College; Close, Ronald Wilkinson, F, Ma, Pc, Cx, Adelaide High School; Cole, Marjory Barnsdale, Eg, F, Ec, Bt, Unley High School; Collins, Leslie William Nettell, Eg, Ma, Pc, C, Prince Alfred College; Cooke, Peter Terment, Ma, Pc, Cx, St. Peter's Collegiate School; Corpe, John Wood, Ft, Max, Pc, Cx, St. Peter's Collegiate School; Cox, Carlton Ingham, F, Ma, Pc, Cx, St. Peter's Collegiate School; Dorsch, Wilhelm Bernhard, Eg, Lx, Fxt, Pc, C, Prince Alfred College; Doyle, Leo James, Eg, L, Mhx, Pc, Cx, Christian Brothers' College; Dunstan, Beryl Elvira Mercia, Eg, L, F, Mhx, Ec, Adelaide High School; Elliott, Ronald Donovan, Eg, Gk, L, Fxt, St. Peter's Collegiate School; Fisher, Tryphena Ellen, Eg, L, Ft, Ma, Adelaide High School; Fletcher, Malcolm Wed, Ft, Ma, Pc, Cx, Scotch College; Gallagher, William Edward, Eg, L, Mh, Pc, Cx, Christian Brothers' College; Giles, James Palmer, Eg, L, Fxt, Ma, Adelaide High School; Graham, Mary Theresa, L, Fxt, Mh, Ec, Adelaide High School; Gray, James Hugo, Fxt, Ma, Pc, Cx, St. Peter's Collegiate School; Gregory, Cedric Errol, L, Ft, Ma, Pc, Adelaide High School; Hannon, Thomas Dennis, Eg, Ah, Mh, Pc, Cx, Christian Brothers' College; Hayward, John Lionel, Ma, Pc, C, St. Peter's Collegiate School; Hunt, Max Aubrey, Ft, Ma, Pc, Cx, Adelaide High School; Juetz, Christina Margaret, Eg, L, Fxt, Mh, Woodville High School; Lillywhite, Lucy Grace, Eg, L, Ft, Mh, Ec, Methodist Ladies' College; Lillywhite, Margaret, Eg, Ft, Ec, Bt, Unley High School; McLean, Leonard Allan, Ft, Ma, Pc, Cx, Adelaide High School; Menries, Eleanor Catherine, Eg, L, Ft, Mh, Woodlands Church of England Girls' Grammar School; Muecke, Roy Le Page Sunter, F, Ma, C, St. Peter's Collegiate School; O'Connor, Richard, Joseph, Ft, Max, Pc, Cx, St. Peter's Collegiate School; Pank, Gadywa Ruth, Eg, Ft, Ma, Pl, St. Peter's Collegiate School; Sawley, Darrell Frederick, Eg, Mh, Pc, C, Kadina High School; Sharley, Elma May, Eg, L, Ft, Mh, Woodville High School; Smith, Mary, Eg, Ft, Ma, Adelaide High School; Strahan, Anthony William, Eg, L, Ma, Cx, Adelaide High School; Stratumann, Paul Franz, Eg, Ft, Gn, Pc, Prince Alfred College; Strehlow, Theodor Georg Heinrich, Gkx, Lx, Gntx, Ah, Immanuel College; Taylor, Trevor Ray, Ft, Ma, Pc, C, Scotch College; Thomas, Phillis Mary, Eg, L, Mh, Cg, Adelaide High School; Thompson, Gweneth Amy, Eg, Lx, Fxt, Mh, Bt, Methodist Ladies' College; Warren, Geoffrey Boyd, Ft, Ma, Pc, C, St. Peter's Collegiate School; Wilcher, Lewis Charles, Eg, Ahx, Mhx, Ec, St. Peter's Collegiate School; Wilkinson, Harold Callan, Ft, Max, Pc, C, St. Peter's Collegiate School; Yates, Colin, Ma, Pc, C, St. Peter's Collegiate School.
- II.—List of candidates who have passed in less than four subjects:—Abotomey, Olive Wanda, Fx; Atkins, Hastings Ulrich, Eg; Ball, Percy Melville, Ec; Bell, Edith Bevilacqua, F; Bentley, Majorie Elizabeth, Eg, L, Mh; Blinman, John Fenwick, Ec; Brown, Cyril Maitland Ash, F; Brown, Gwenllian, Ec; Gg; Cahalan, Mauria Frances, Mh; Catchpole, John Henry Richard Freeth, Pc; Coulthard, Clyde Ronald, Ec; Cowan, Margaret Jean, Eg, Ec; Cromer, Charlestra Lillian, Bt; Dunstan, Mabel Alison Day, F; Edwards, Colin Arthur, Ec; Fletcher, Anne Weld, Ft; Frith, Ernest Eyward, C; Funder, Brian Patrick, Eg, Pc, Cx; Golding, Edmund William, Eg; Green, John Goodrick, C; Hastings, Isobel Helen, Ec; Hebart, Siegfried Paul, Gk, Gnt, Ah; Hitchcock, Ruth Violet, Eg; Hocking, Frank Maxwell, Mh, Pc, C; Hocking, Lancelot James, Mh, Pc, C; Jackson, Grace Barbara, Eg, Ft, Ec; Jones, Harold, Eg; Kildea, Mary Francis, F; Lewis, Gwenyth Elizabeth, Ma, Pl; Lambert, Melville Louis, Ma, Pc; Lobe, Wilhelm Hermann, Gk, Gnt, Mh; McLachlan, Ian, Ec; McLean, Margaret Jean, Eg, Ec; Magarey, Ashley Henderson, L, Ft, Ah; Mead, Auriel Doris, Eg, L, F; Miller, Ralph Edward John, Ah; Norman, Jacob, Ec; Owen, Myra Elizabeth, Mh; Padman, William Donald, Eg, Ma; Pascoe, Vera Kathleen, Gg; Pavia, Kathleen Emma, Ec; Peers, Dorothy, Mh; Pellow, Janie Christobel, Eg, Ft; Pellow, Leonard James Ternouth, Ft, Pc, C; Pick, Norohty, Ft; Rieken, Trevor Desmond Michael, Mh; Rilely, Eric Harold Gordon, Pc; Ross, Jean Elizabeth, Bt; Ross, Laurence Victor, Gnt; Semple, Kenneth Hugh, Ec; Senior Lionel Rupert, C; Smith, Marjorie Florence, Ec; Strelan, Theodore Feargod, Gntx; Taylor, Patricia Scott, Mh, Ec, G; Thomas, David Austin Grenfell, Eg, Ft; Thomas, Walter Stanley, Eg, L, F; Turner, Emily Marian, Glx, Bt; Vincent, Mary, Eg; Walters, Basil Gordon, C; Waters, Robert Archie, Ft, C; Willis, John Joseph, Pc, C.  
15th December, 1926.

**REG 16/12/26. MAN'S INHERITANCE.**

**Language and Tradition.**

**University Address.**

The annual address at the commemoration of the University of Adelaide on Wednesday was delivered by Professor T. Brailsford Robertson, Ph.D., D.Sc., Professor of Bio-Chemistry and General Physiology. His subject was "The external inheritance of man."  
Inheritance of Characteristics.  
It was an essential doctrine of modern biology, he said, that acquired characteristics were not inherited. From that generalization it had been hastily inferred by many laymen that, since acquired physical improvements could not be inherited any more than acquired physical defects, the outlook for humanity must be hopeless, because they could by no effort of their own improve the lot of their descendants, or by altering their own environment bring about the evolution of a more ideal race. It was his purpose to show that in the particulars which were most important that interpretation of biological law was a mistaken one. So far from entailing a pesai-

mistic view of the future of man, a firm conviction of the truth of the doctrine of the non-inheritability of acquired characteristics was perfectly compatible with an optimistic attitude towards the efforts of man to improve himself. Many biologists, even before Darwin, had observed a sequence of forms among the animals and plants now living and extinct, which suggested the possibility that the more complex forms of living beings might have arisen from the simpler types by evolution. One of the most zilted of these, Lamarck, towards the end of the eighteenth century, proposed a simple explanation, an example of which was afforded by the giraffe, whose remote ancestors, by their endeavours to browse upon leaves which lay somewhat beyond their reach, had, it was contended, elongated their necks, and transmitted the elongation to their offspring. Many races had practised mutilation on their offspring for countless generations, and yet these mutilations had never once been observed to have been transmitted. Domestic animals had, since time immemorial, been subjected to certain mutilations in response to the utilitarian needs or the caprices of their owners. There had been two or three cases in which inheritance of an acquired character had apparently been observed by investigators of experience and distinction.

During the last 20 years the most enthusiastic upholder of the supposition that acquired characteristics might be inherited had been Professor Kammerer, of Vienna, who had reported inheritable changes in colour and minor details of structure as the result of exposing frogs to variations of temperature, light, and other conditions. Those results had at length been ascertained to have been based upon misapprehension, and but a few weeks ago the realization of this fact led Professor Kammerer to the tragic decision that terminated his life. Another alleged example of inheritance of acquired characteristics had lately been brought forward by Professor Pawlow, of Petrograd. He stated that he had educated mice to respond to the sound of a bell as the signal for feeding. Nevertheless, as one who had had experience of many years in handling the animals with which Professor Pawlow experimented, he (the speaker) found himself compelled to assume that the results were based upon misapprehension. He had never been able to perceive the slightest educability in the white mouse. In every direction, therefore, it appeared that the results of attempts to show that acquired characteristics were inherited were negative, and that when they had appeared for some time to have been positive, the results had been shown to be fallacious. At the present moment he did not think there existed a single unchallenged experiment to demonstrate inheritance of acquired characters. Present knowledge of the mechanisms of inheritance was totally inconsistent with the view that acquired characteristics might be inherited.

**Intellectual Inheritance.**  
Physically man's dependence upon the laws of inheritance was absolute. What physical endowment he started with he might improve; but he could not transmit that improvement to his offspring. His improvement remained an individual and not a racial gain. Intellectually the situation was otherwise. They found in man, in comparison with the lower animals, an enormous development of the central nervous system, and particularly of the higher part of the brain, the cerebral cortex. That immense mass of nervous tissue was built up, as nervous centres in all animals were built up, of a number of units, so many in man as to be well-nigh innumerable. Those units were the individual nerve cells, or neurones, of which the immensely elongated processes stretched to regions far from their origin, constituting the nerve fibres of the body. The arrangement of these neurones in the central nervous system was not haphazard; those designed to govern or facilitate particular activities of the body were localized in particular regions of the cerebral cortex; so that they could map out the surface of the brain where the nerve-cells reside into regions, to many of which they could assign the particular activities which they controlled. It had been shown by Donaldson that the number of neurones in the brain reached a maximum at an age very near to that of birth, and thereafter diminished progressively throughout the life of the individual. Although the infant had much to acquire of mental aptitude, the machinery with which he was to acquire them was already provided; his potentialities would never improve, but rather depreciate, with age. Like the rest of his physical organization and endowment, it was stamped upon his being by his chromosomal inheritance. In the cerebral cortex of any adult individual there was a very large proportion of undeveloped neurones, which formed part of his original cerebral endowment—a heritage into the possession of which he had never entered. The larger proportion of neurones in almost every part of the cerebral cortex remained permanently undeveloped. They remained as they were in the infant, or but little larger.  
**The Process of Education.**  
The process of education, in fact, consisted in learning to utilize neurones hitherto dormant. The difference between the learned and the unlettered was merely a difference in degree of realization of the potentialities with which their chromosomal inheritance had endowed them. But it was, furthermore, evident that the neuronie endowment of a human being was far in excess of anything that he can possibly utilize in a lifetime. If the whole of life were regarded as one