The scientific value of the facts and conclusions makes it regrettable that more attention was not paid to the manner of their presentation. The arrangement of the subject matter is not very satisfactory and there is a noticeable tendency to diffuseness and repetition. There is evidence on every page of hasty writing or of inadequate editing and proof-reading. The want of precision in statement frequently leads to ambiguity.

These faults of style detract from the pleasure which the reader would otherwise derive from the interesting subject matter. In this respect the present paper is not peculiar, however, scientific writings being all too frequently deficient in literary form. The effectiveness of much good work in science is diminished through lack of care in its preparation for publication.

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British Antarctic "Terra Nova" Expedition, 1910. Zoology, Vol. 1, No. 1. Fishes by C. TATE REGAN, M.A. 4°. Pp. 54. Pl. I.–XIII. British Museum, Nat. Hist., June 27, 1914.

This is the first of the reports on the Natural History of the expedition conducted by the late Capt. Scott, R.N. The Antarctic fishes obtained comprise twenty-five species, of which four are new generic types and twelve species are new to science. Nearly all are from rather deep water. Most of the species belong to the Nototheniiformes. A new genus of the Bathydraconidæ resembles the northern Cottoid *Icelus* in its armature of bony spinose plates and the discovery of an Antarctic species of *Paraliparis* is interesting.

For the first time according to the author, the knowledge of the coast fishes of the Antarctic continent is sufficiently complete to make it worth while to attempt to delimit an antarctic zone and to divide it into districts. South of the tropical zone the distribution of coast fishes is thus classified by him. (1) South Temperate zone with seven districts: Chile, Argentina, Tristran d'Acunha, Cape of Good Hope, St. Paul Island, Australia and New Zealand. (2) Subantarctic zone, with the districts of Magellan and Antipodes, the latter including the island near and south of New Zealand. (3) Antarctic zone with the Glacial and Kerguelen districts. The Antarctic zone is characterized by the complete absence of South Temperate types and Bovichthydæ, and the great development of the other Nototheniiformes. The facts point to the conclusion that Antarctica may have been long isolated and that its coasts may have been washed by a cold sea probably throughout the entire Tertiary period. The author rejects the idea that it may have been connected with South America during recent geological time, as supposed by Dollo in the "Belgica" report. There has also been issued Vol. 11, Pt. 1, containing a twelve-page list of stations where collections were made, with full data, and four maps upon which the positions are indicated.

WM. H. DALL

SPECIAL ARTICLES

THE FAILURE OF EQUALIZING OPPORTUNITY TO REDUCE INDIVIDUAL DIFFERENCES

SEVENTY-TWO students in an undergraduate course in psychology did the experiment described in the note below.[1] Although this was primarily a test for fatigue there was, as is usually the case, an improvement with the

[1] Do experiment 36 at home and record the results. Follow the directions absolutely.

EXPERIMENT 36

Arrange to be undisturbed through a morning or an afternoon or evening. Provide yourself with a watch that records seconds. Multiply mentally, using the examples printed on this page, writing absolutely nothing until you have the entire answer to an example. Then write it and proceed at once to the next. Record the time at which you begin, and record the time at which you have finished each row. Do not stop at all except to record these times until you have finished all the examples or worked at least two hours. Do absolutely the best work you can throughout.

	653	537	927	847	286	728
A.	926	453	384	265	757	487

Nine similar rows were provided.

TABLE I

The Relation of Initial Ability in Mental Multiplication to Improvement: 76 College Students

	Average Score for First Row of Six Examples		Average Score for Final Row of Six Examples Done after Approximately 75 Minutes of Practise		Average Amount of Time Spent in Practise from Mid-point of First Row to Mid-point of Final Row	Gains	
	Amount per Minute	Percentage of Figures of Answers Correct	Amount per Minute	Percentage of Figures of Answers Correct		In Amt. per Minute	In Percentage Correct
Group I. 18 highest scoring...	.61	.86	.68	.87	72	7	1
Group II. 18 next highest.....	.36	.80	.39	.80	81	3	0
Group III. 18 next lowest.....	.24	.80	.32	.83	74	8	3
Group IV. 10 lowest scoring....	.143	.76	.175	.78	71	3.2	2

exercise of the function. We may then compare the improvement made in the course of approximately 75 minutes of practise (I count from the mid-point of the first row's time to the mid-point of the time of the row such as makes this time from mid-point to mid-point as near to 75 minutes as possible), by those of initially high and those of initially low scores.

Doing this, we find the facts of Table I., (I.) for 18 individuals whose average score for the first row was at the rate of .61 examples per minute, (II.) for 18 individuals whose average score for the first row was at a rate of .36 examples per minute, (III.) for 18 whose average score for the first row was at the rate of .24 examples per minute, and (IV.) for 18 whose average initial rate was at the rate of .14 examples per minute. As the table shows, the initially high-scoring individuals made an equal gain in speed and somewhat less gain in accuracy, the net results being that they made about as much improvement as the others.

The same result appears in the case of addition where data from some 670 individuals give the facts of Table II.

These experiments add one more corroboration of the general result, so far uniformly attained, that equalizing opportunity does not reduce individual differences. Such experiments furnish a very strong argument against referring individual differences of unknown causation to differences in training, and in favor of referring them to original inherited characteristics in cases where they follow family relationships. We are unable experimentally to equalize training in such gross complexes as scientific achievement, literary fame, or reputation as a monarch. But we can easily do so with various minor capacities

TABLE II

Improvement Made in 1,800 Seconds of Practise at Adding Columns, Each of Ten Digits

Early refers to the ability estimated for the mid-point of the first day. *Late* refers to the ability shown after 1,800 seconds of practise, counting from the mid-point of the first day.

Time Required on Day 1	Number of Individuals in the Group	Number of Additions per 100 Seconds (Counting the Time of Writing the Answers Equal to One Addition's Time)			Approximate Number of Errors per 1,000 Additions, *i. e.*, Wrong Answers per 100 Ten-digit Additions		
		Early	Late	Change	Early	Late	Change
Under 400 seconds.....	65	150	162	12	7.0	3.8	3.2
400 to 499 "	108	108	120	12	9.1	6.5	2.6
500 to 599 "	86	88	99	11	10.3	6.7	3.6
600 to 699 "	115	75	87	12	12.0	8.3	3.7
700 to 799 "	109	64	75	11	12.7	9.0	3.7
800 to 899 "	103	55	66	11	12.6	9.3	3.3
950 to 1,199 "	65	46	58	12	14.4	10.5	3.9
1,200 to 1,599 seconds.....	20	37	46	9	17.5	14.4	3.1

such as the ones described here, and can do so without great difficulty with various school abilities.

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PHOSPHATE DEPOSITS IN THE MISSISSIPPIAN ROCKS OF NORTHERN UTAH

SINCE 1908 extensive work has been done both by private individuals and the U. S. Geological Survey to determine the amount and character of the rock phosphate in the Rocky Mountain region. The principal work of the investigation of the deposits, however, has been confined to the well-known horizon in the rocks of upper Pennsylvania of Permian age. It is now known that phosphate exists in the Mississippian rocks in a zone more than 2,000 feet stratigraphically below the phosphate horizon that has heretofore been given so much study.

The zone containing the phosphate is more than 100 feet thick and consists of layers of phosphate and black and brown shale with interstratified layers of sandy limestone. In extent it is known to outcrop in a north-south direction for more than forty miles, and sections studied show it to have an area of more than one hundred square miles. It has been reported as far south as Ogden Canyon[1] but no detailed section has been measured in that locality.

On the east side of Cache Valley the phosphate rocks have been prospected for coal and this exposure has given the best opportunity for detailed study. The face of the mountains which form the eastern boundary of the valley is a weathered fault scarp which terminates the western limb of a syncline. The ledges on the face of the mountain are exceptionally well exposed, the rock being principally bluish gray limestones with thin beds of shale and quartzite. Here the geologic section is well exposed and shows Silurian rocks at the base and Pennsylvanian at the top of the succession. Only the lower members of the Pennsylvanian or Permian are present in this locality.

1 Blackwelder, U. S. Geol. Survey Bull., 430.

Observations on the face of the mountains, which extend more than 4,000 feet above the valley, show that the rocks strike N. 10° to 14° E., and dip eastward from 20° to 30°. The beds flatten to the eastward and about six miles east of the face they rise again, the strata on the eastern limb of the syncline dipping as much as 10° to the west. Erosion has clearly exposed the higher beds on the eastern limb of the syncline.[2] The phosphate rock is exposed on both the east and west limbs of the syncline which lies near the top of the range.

The Logan River has cut through the range from east to west, and has made a good exposure of all the strata included in the upper part of the synclinal fold. The phosphate zone, therefore, lies in two separate areas, one to the north and one to the south of the river. The Mississippian rocks are well up on the western side of the mountains forming the eastern boundary of Cache Valley and even in the lowest part of the fold in the canyon they are more than 1,000 feet above the river.

The zone containing the phosphate is exposed in a cliff of very compact bluish gray limestone which is usually more than a hundred feet thick and contains an abundance of cup corals. At the base of this cliff there is a lean phosphatic zone from five to seven feet thick of shale containing a few bands of chert. The shale also contains several thin layers of oolitic rock phosphate ranging from one half to one inch in thickness. One sample taken from all of these layers yielded only 7.21 per cent. tricalcium phosphate. This zone is probably of no economic value. It has been prospected in a number of places for coal.

The thicker and richer phosphate zone lies just above the thick ledge of limestone. The phosphate rocks are less resistant to erosion than the underlying and overlying limestone ledges and the latter stand out more prominently than the included softer beds. The rocks in the phosphate zone which are generally dark colored contain thin bands of non-phosphatic limestone with shale and some

2 See Geological Map—parts of western Wyoming, southeastern Idaho and northeastern Utah—Hayden survey, 1877.