pig that acquitted itself creditably in practically the same rôle. Doubtless, if the report were true, the porker had swallowed an equal amount of learning.

The collie was without doubt a good, clever one. As member of the Irish Collie Club I have for years past taken a fancier's interest in this particular breed, and I have observed every degree of intelligence, from the brute that could scarcely be taught to bark at a cow—oftenest with a pedigree as long as your arm—to the affectionate animal that could guess almost your thoughts and your passing temper, and was always in perfect sympathy with your moods. The best of these, however, falls far short of a good Irish water spaniel. From my experience, I may be allowed to say in passing that no breed is so teachable—has such brain-power, if you like—as the latter, once he has reached the age of nine or ten months. As puppies I found them rather stupid.

Performances similar to that of the Royal Aquarium collie are not very rare. There are, indeed, some other ingenious stage devices by which a dog can be taught to spell—every word in the dictionary if you are so foolish as to let it be known—and to converse, so to speak, in Russian as readily as in English, but the devices are rather worked out.

Usually such show dogs modestly protest before the audience (through their trainers) their inability to do more with certainty than spell correctly words of three letters, and when pushed they get perplexed and make mistakes. This, for them, is sound policy. It is only when they grow too bold and set up as "thinkers" that they are found out. My American trainer, with Yankee shrewdness, used to claim for his dark bay charge that when he had totted up a row of figures he should be reminded of the number to be carried on to the next column. This was fair enough. It, too, served to baffle the over-canny. That the arithmetician's education could never overstep that was just the puzzle they fastened on and worried over. I wonder what the German professors, good, easy men, would have said had they seen, as I did, Mahomet figure out a sum with his tail to the board!

I may be permitted to add that about the same time I interviewed the ape famous for counting, "Sally" by name, in the London Zoological Gardens, and I was in no way impressed by her intelligence. After what I have written it is not hard to suggest two or three ways by which the oracle could have been worked. I saw her count her straws for the keeper alone, and that gentleman appeared to me none too tolerant of questions or of interference.

I am prepared for believing, however, that counting is not beyond the scope of an animal's powers. It is said that Scotch shepherds count their flocks of sheep in this wise: they drive them through a gap, and the faithful collie ticks off by a bark every score as it passes through.

It is not of late alone that clever horses have come to the front. I happen to possess a MS. diary written by a co. Leitrim man in 1658 and 1659. In the first of these years the writer, James Reynolds, accompanied to London his uncle, Sir James Ware, Auditor-General of Ireland, and famous as an antiquary. Among the sights of the metropolis he records that he saw a "Nagg" which could count, answer questions, and fire off a small cannon.

There are undoubtedly degrees of intelligence within limits in all mere animals. They are particularly observable in the dog and horse—the most highly developed in this respect of all our animal friends. As every jarvey knows, each horse has a character of its own and mental powers all its own. The same is true of our canine subordinates. A neighbour of mine has a cat which climbs up the door-post and opens the latch with her paw when she wants to enter the house. This for a cat is, I think, more wonderful than are all the performances of the Berlin "thinking horse" for a steed. It is a trick, indeed, I have seen taught two or three dogs. But the cat has had no training. She owes her cleverness solely, I am assured, to her own powers of observation.

I am open to conviction, but I am greatly afraid the "German representative committee," including the "professor of the Physiological Institute of the Berlin University," that have reported, according to the daily Press, on "Clever Hans" have written themselves down as at least not unguillible.

JOSEPH MEEHAN.

Creevelea, co. Leitrim.

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Misuse of Words and Phrases.

IN your issue of October 13 attention was directed in the letter column to the misuse of language by English scientific writers. Since the subject of the indictment is one of importance, and since the criticism is in my opinion well founded, I am writing to support it.

There seems to be a tendency growing among writers on scientific subjects, both in pure and applied science, to modify the English language to such an extent as to give rise to no small anxiety with respect to its future state in scientific literature.

Even if language is plastic, its plasticity is limited.

Since science is based upon accuracy, the communication of scientific thought should be accurate. Yet in a large percentage of scientific publications in the English language sentences that are grammatically ambiguous occur frequently, and not seldom such as have no meaning. The sense intended may be, indeed, derived from them, either through study of the context, or through exertion of one's scientific instinct; but it is surely just to demand that the unnecessary labour of a cryptographic research be not inflicted on the reader. Viewed in its crudest aspect, such misuse of language is an act of discourtesy to the reader; so legitimate resentment should provoke no surprise in the author.

It is common in a certain class of publications to meet files of nouns marching through the paragraphs. Although this may at times indicate a well grounded derivation of adjectives, yet it is frequently unnecessary, either since a suitable adjective exists, or since a prepositional or adverbial phrase conveys the meaning exactly.

Various other parts of speech are frequently misused.

There is no need for fine style in scientific literature; but good style is obligatory, because it is an essential concomitant of the accurate expression of clear thought.

October 17.

F. ESCOMBE.

SCIENCE IN SPORT.¹

THE late Prof. Tait was probably the first to bring scientific principles and methods of experiment to bear upon the mystery of the flight of a golf ball. Newton, in a pregnant note on the deflection of a tennis ball in air, gave the foundation principle, which curiously enough both Euler and Poisson rejected as of no account. Robins and (later) Magnus experimented on the effect, but it was left to Tait to work out the problem in detail. His papers on the rotating spherical projectile virtually form a new chapter in the dynamics of rotation. In these papers, and elsewhere in more popular form (e.g. in *NATURE*, vol. xlii. p. 420, 1890), he lays down clearly the conditions which must be fulfilled if a man is to drive a far and straight ball. Slicing, pulling, topping, are all completely explained along the lines of Newton's remark, numerical tests are supplied, and various possible curves of flight are calculated out and drawn.

Tait showed how the ball must be started if it is to finish aright. The difficulty the ordinary golfer experiences is to give the proper start. This is his problem; and the mode of solution is as varied as the temperament of the player. There is, in fact, a continuous gradation of style and effort from the simple minded golfer whose one aim is to hit the ball to the nervous and pathetically anxious one who looks to every detail of grip and stance as a *sine qua non* to perfection. There must, however, be a best way for every individual, and in discovering this the aspirant no doubt should be guided by scientific principles.

This is, perhaps, the most important practical standpoint from which to view Mr. George W. Beldam's interesting and beautiful book, "Great Golfers. Their

¹ "Great Golfers. Their Methods at a Glance." By George W. Beldam. Pp. xxiv+481. (London: Macmillan and Co., Ltd., 1904.) Price 12s. 6d. net.

"The Art of Putting." By Walter J. Travis and Jack White. Edited and Illustrated by G. W. Beldam. Pp. 32. (London: Macmillan and Co., Ltd.) Price 1s. net.