

facturer who either sends a salesman to take it or who has given the net price in his advertisements.

The unprecedented merchandise exports of the past fiscal year have given to the world a new and convincing proof of the power of the United States in the vast and varied field of manufacture. It will now be greatly to our advantage to understand at once, as the field of American commercial activity broadens and grows more complex and difficult, that the attainments and enterprise of the exporters and their agents must keep abreast of the new and more exacting requirements. The merchant of the present and coming generations must be like the diplomatic, the consular, or executive officer, a more highly trained and educated man than his father or grandfather had need to be.

THE REVIVAL OF AMERICAN SHIPBUILDING.

Unless the present signs are misleading, the war with Spain is likely to start, if it has not already started, that revival of American shipbuilding for which we have all looked so anxiously, and which, at the opening of the present year, appeared to be farther off than ever. The creation of an auxiliary fleet led to the purchase of a large number of the vessels engaged in our coastwise and West Indian trade. Several of these have been converted into such valuable auxiliary cruisers that the government has decided to retain them permanently in the service. As a consequence, the transportation companies have given orders for new ships to take their place, and it is very gratifying to note that, whereas many of the original vessels were built abroad, the new ships are being constructed in American yards. No better indication could be desired of the approach of the day when not only first-class liners, like the "St. Louis" and "St. Paul," but the cheaper vessels of the "tramp" class, can be constructed in American yards as cheaply as they can in Belfast or on the Clyde.

The effect of the purchase of merchant steamers by the government is seen in the fact that our leading shipyards are crowded with orders which will keep them in full swing for many months to come. Among others are four screw steamers for the American Mail Steamship Company and a twin-screw vessel for the New York and Cuba Mail Steamship Company. Two large steamers are being built at Chester, Pa., to take the place of the ships of the Old Dominion Line which were acquired by the navy and transformed into auxiliary cruisers. The great yard at Newport News, which recently witnessed the launch of the "Illinois," has on the stocks three new liners for the Morgan Line, two for the Cromwell Line, and two for the Pacific Mail. The fact that these orders are being placed at home proves that the cost of construction must have been greatly reduced of late years, and this, no doubt, is due to the great progress which we have made in the iron and steel industry. Not a little commotion was caused recently on the other side of the Atlantic by the announcement that an order had been given to an American firm to supply ship plates to an English shipyard. The cheap production of plates and frames, coupled with the lower wages that are paid for labor, and the fact that labor-saving methods and machinery enable us to turn out more work per man than is possible in foreign yards, are hastening the day when we can successfully compete with the world in the art of shipbuilding.

If history repeats itself we shall not only successfully compete with the world as shipbuilders, but actually lead it in the superiority of our productions; for in the days of our maritime prosperity, in the age of wooden shipbuilding, our sailing clippers were the most famous in the world. They not only carried more than two-thirds of our inward and outward trade, but they were successful in securing a large share of the trade of the old world. They were conspicuous in the tea trade between China and London, where their admirable sailing qualities were in great demand, and so great was their renown that several British shipowners purchased vessels that had been built in American yards.

In 1859 sixty-seven per cent of a total trade of \$695,557,592 was carried in American bottoms; but since that time there has been an almost unbroken decline, which has been attributable to the change in the materials of shipbuilding from wood to iron and steel, while in its earlier stages it was, of course, hastened by the depredations of the Confederate commerce-destroyers. The change from wood to iron came too early for our undeveloped iron industries to enable us to cope with the new problem successfully; and while the wooden clippers made a gallant fight to maintain their old prestige, they were doomed to give way before the advance of steam as a method of propulsion. At the close of the civil war the proportion of our trade carried in American ships was only 27 per cent. It rose to 35.6 per cent in 1870, since which date there has been a steady decline.

The upbuilding of our merchant marine has been handicapped by a law which forbids the registration of foreign-built ships in the United States, to protect themselves from which, American owners have em-

ployed European steamers under long time charters. A striking instance of this is the West Indian fruit trade with the United States, which, although it is in American hands and backed by American capital, is carried on in foreign bottoms and under a foreign flag.

There is no denying the fact that with an era of "free ships" and some form of bounties for home-built vessels, a large number of ships now flying a foreign flag would hoist the American colors, and a large number of orders would be given for both home and foreign built vessels. The result would be that our merchant marine would begin to assume something of its old proportions. Just how far we have sunk in the matter of over-sea commerce is shown by the following comparison: In the decade 1850 to 1860 the yearly average of shipping launched was 276,000 tons, fifty per cent of which was for deep sea service, whereas last year the total tonnage launched was only 232,000 tons, in which was included not so much as one ship for the deep sea foreign trade.

CORRELATIVE THOUGHT IN THE MONKEY AND THE ELEPHANT.

BY JAMES WEIR, JR., M.D.

It is true that the lower animals very frequently, so it seems to us, find themselves in difficulties which could be easily overcome by a slight amount of logical ratiocination, which effort of reason they seemingly fail to employ; yet in this respect are we really superior to them? Does our own ideation differ so very materially when we are placed amid kindred or like environments? I think not.

Place man amid unknown and unfamiliar surroundings, and he at once, to a certain extent, becomes lost. Many things appear to us abstruse, occult, and beyond the powers of the human mind; many situations seem difficult, inexplicable, unavoidable. And yet, when these things are explained to us and we come to understand them, we wonder at our own stupidity, so simple do they become. It is a lack of *understanding*, and not an absence of ideation, in animals which makes them appear to us to be, on certain occasions, without ratiocinative power.

Ideation, to some extent, is present in all of the lower animals, and correlative, interdependent, commutual *thought* is unquestionably present in the mental operations both of the monkey and of the elephant, as I will now endeavor to show.

Several years ago, a capuchin monkey at the Fair Grounds in St. Louis, Mo., received an injury to one of his forepaws and I was asked to dress it. While convalescing, this little creature learned to know me intimately, and would always cry out with pleasure whenever he saw me. His attendant would let him out, whereupon he would caress my face with his paws, uttering meanwhile many low-voiced ejaculations of endearment.

One day, in order to see what he would do, the keeper refused to take him from the cage. The monkey appeared completely nonplussed and sat down, seemingly in deep thought. Suddenly he uttered a loud shriek, as though in great pain, and began to pace up and down his cage. He held the hand which had been injured, but which had now been well for several weeks, in his other hand, and appeared to be examining it with great solicitude. His object was at once apparent both to the keeper and to myself: he was feigning an injury in order to be let out!

This monkey remembered that when he had hurt his hand I was called and dressed the wounded member. He thought that, if he made it appear that he was again injured, he would be placed in my hands at once. The cunning little malingerer ceased to moan as soon as he was placed in my arms, and at once began to search my pockets for the dainties which he knew were there. Beyond question of doubt in this instance there was true correlative ideation. Thought followed thought in orderly and logical sequence until the full concept was formulated.

In the same monkey house there lived an ateles which also gave unmistakable evidences of being able to think correlatively. This monkey became the proud and jealous owner of a small, round, metal-backed mirror, which she kept securely grasped in one of her hands. She seemed to regard it as a great treasure, and was immensely afraid that the other monkeys would steal it from her. Wishing to see how she would dispose of it during feeding time, I suggested to the keeper that he prepare a basin of milk and bread and place it in the cage. (The ateles conveys its food to its mouth with its hands; consequently, the monkey was handicapped by having one hand already occupied.) She made a dash for the basin, but immediately recognized the fact that with only one hand free she was no match for the other monkeys. She ran about the cage for a moment or two, then, pausing, seemed to think over the matter. Suddenly she darted to the front of the cage, thrust her hand through the bars, and pressed the precious mirror into one of the keeper's hands! Then, free and untrammelled, she rushed to the bread basin, and began to shovel food into her pouches with both hands.

In a recent issue of *La Nature* M. Paul Méguin has an interesting article on the intelligence of monkeys. The following excerpt is taken from a paraphrase of the above-mentioned paper:

"At Hagenbeck's establishment, in Hamburg, where two hundred monkeys enjoy complete liberty at play in the great rotunda, they are given multitudes of children's toys, balls, hoops, wheelbarrows, joiner's benches, etc., and learn to manage them all without anyone showing them how. In the center of the rotunda is an immense grain-hopper, from which the seeds, corn, walnuts, chestnuts, apple-quarters, etc., run into a trough when a wheel at the top is turned. The management of this hopper did not have to be explained to our friends the monkeys. While one of them turns the wheel, the others, sitting around the trough, enjoy the delicacies as they come down, till the one at the wheel, thinking his turn has come, stops, gives the signal for some one to take his place, and comes down to get his share."

Here is an instance of complex ideation. These animals know that their food is procurable only by turning a certain wheel, a mechanism wholly unknown to their ancestors, hence completely outside the realm of instinctive or inherited knowledge. They know also that, unless some one is self-denying for the time being and will turn the wheel, they will get no food. Therefore, that unselfish individual always presents himself. Furthermore, this individual, after he has labored some time for the good of the community, has only to make known his wishes to be relieved, when another will take his place. Here there is a knowledge of cause and effect in which complex correlative ideation is clearly evinced. Moreover, the factor of unselfishness which is present points to an ethical element as well.

An elephant's skin is exceedingly sensitive, notwithstanding its great thickness. Flies, gnats, mosquitoes, etc., cause it considerable annoyance, especially when it is confined to a house and cannot procure dust to sprinkle over its body as a protection against their attacks.

In 1882, while standing in the carnivora house at the St. Louis Fair Grounds, I saw an elephant which was there stabled seize a mop broom with its trunk and skillfully brush away some flies which were biting its back at a place not to be reached by its tail or proboscis. It used the broom with as much dexterity as a man would evince under like circumstances.

Romanes gives an account of an elephant which was seen to break a bamboo picket from a fence. Then, manipulating the bamboo with its trunk, it splintered it beneath one of its fore feet. Apparently not satisfied, it again broke a bamboo picket from the fence and splintered it as before. Then, holding the splinter in its proboscis, it scraped with its point between one of its forelegs and its belly. In a few moments it dislodged a large elephant-leech, which fell to the ground and which was immediately crushed into a shapeless mass beneath the horny toes of the elephant! The animal deliberately manufactured an instrument through whose agency it was enabled to rid itself of an annoying parasite. Moreover, it was not satisfied with its first scraper, but threw it away and made another, thus showing interdependent, correlative thought as well as discriminating judgment.

One winter, at St. Louis, two elephants were stabled in an outhouse near my rooms. One warm, bright day early in the spring one of these creatures was brought out into the alley behind the stable, in order that it might be given a bath. A horse attached to a loaded coal cart became frightened and ran at full speed down the alley toward the elephant. The latter heard the noise and saw the horse rushing toward him. He seemed to take in the situation at once; for, dropping to his knees, he drew in his trunk beneath his body, drew in his legs, and bowed his head. The horse, in his mad rush, ran completely over the elephant, dragging the heavy cart with him. Beyond a few slight scratches and bruises, the elephant was uninjured. Had it not been for his wise foresight and his quick formulation and adoption of his efficient method of self-protection, he might have been severely injured, perhaps killed, by impact of the maddened horse and heavy cart. In this instance there was an undoubted manifestation of correlative ideation. The immediate adoption of the only efficient means of avoiding injury clearly demonstrates the truthfulness of this assertion, especially so since there was nothing instinctive in the action of the elephant. In a state of nature, elephants are not confined in narrow alleys, neither are they charged by runaway horses.

THE United States consul-general at Berlin says that the area of carriage pavements in that city is 6,500,405 square yards. Of this area a little less than 74 per cent has stone pavements, about 25 per cent asphalt, and a fraction over 1 per cent wood pavement. The proportion of asphalt is steadily increasing. The soil consists of coarse, gritty sand, forming apparently an excellent foundation for the heavy 8-inch layer of gravel and cement, over which the 2-inch covering of asphalt is spread.