Indian breeds, in which stripes commonly occur. Darwin and others having regarded Lord Morton’s mare as affording very strong evidence in support of the infection hypothesis, it was considered some years ago desirable to repeat Lord Morton’s experiment as accurately as possible. The quagga having become extinct, a number of mares were put to a richly striped Burchell zebra, and subsequently bred with Arab, thorough­bred and cross-bred sires. Other mares were used for control experiments. Thirty mares put to a Burchell zebra produced seventeen hybrids, and subsequently twenty pure-bred foals. The mares used for control experiments produced ten pure­bred foals. Unlike Lord Morton’s quagga hybrids, all the zebra hybrids were richly, and sometimes very distinctly, striped, some of them having far more stripes than their zebra parent. Of the subsequent foals, three out of Highland mares presented indistinct markings at birth. But as equally dis­tinct markings occurred on two pure-bred Highland foals out ■of mares which had never seen a zebra, it was impossible to ascribe the stripes on the foals born after zebra hybrids to infection of their respective dams. Further, the subsequent foals afforded no evidence of infection, either in the mane, tail, hoofs or disposition. Of the pure-bred foals, *i.e.* the foals by pure-bred sires out of mares which had never been mated with a zebra, two were striped at birth and one acquired stripes later—they were revealed as the foal’s coat was shed. More­over, while the faint markings on the foals born after hybrids completely disappeared with the foals’ coat, the stripes on the three pure-bred colts persisted. One of the permanently striped colts, a bay, was out of a black Shetland mare by a black Shetland sire, one was by a dun Norwegian pony out of a roan-coloured Arab mare, while the third was by a Norwegian pony out of a half-bred bay Arab mare. It has been asserted by believers in telegony that evidence of infection may appear in the second though not present in the first generation. By way of testing this assumption, a bay filly, the half-sister of a richly striped hybrid, was put to a cross-bred Highland pony, and a Highland mare, while nursing her hybrid foal, was put to a colt the half-brother of a hybrid. The result was two fillies which in no single point either suggest a zebra or a zebra hybrid. Similar results having been obtained with horses and asses, there is no escape from the conclusion that the telegony tradition is not confirmed by such methodical investigations as were suggested some years ago by Professor Weismann (see Cossar Ewart, *The Penycuik Experiments,* 1899).

*Telegony in Dogs.—*Breeders of dogs are, if possible, more thoroughly convinced of the fact of telegony than breeders of horses. Nevertheless, Sir Everett Millais, a recognized authority, has boldly asserted that after nearly thirty years’ experience, during which he made all sorts of experiments, he had never seen a case of telegony. Recent experiments support Millais’s conclusion. Two of the purest breeds at the present day are the Scottish deerhound and the Dalmatian (spotted carriage-dog), A deerhound after having seven pups to a Dalmatian was put to a dog of her own breed. The result was five pups, which have grown into handsome hounds without the remotest suggestion of the previous Dalmatian mate of their dam. A similar result was obtained with a deerhound first mated with a retriever. Many accidental experiments on telegony are made annually with dogs. Two such experi­ments may be mentioned. A black-brindled Scottish terrier belonging to a famous breed had first a litter of pups to a curly-haired liver-and-white cocker-spaniel. The pups were spaniel-like in build, and of a brown-and-white colour. Sub­sequently this terrier had pups to a black-brindled terrier. All the pure-bred pups were typical terriers, and evidence of their dam having escaped infection is the fact that three of them proved noted prize-winners. The subject of the second undesigned experiment was a wire-haired fox-terrier. In this case the first sire was a white Pomeranian, the second a cross­bred Irish terrier. Having had ample opportunity of being “ corrupted,” the fox-terrier was mated with a prize dog of her own strain. The result was three pups, all in make and markings pure terriers, and one of the three was regarded as an unusually good specimen of the breed.

Experiments with cats, rabbits, mice, with sheep and cattle, with fowls and pigeons, like the experiments with horses and dogs, fail to afford any evidence that offspring inherit any of their characters from previous mates of the dam; *i.e.* they entirely fail to prove that a female animal is liable to be so influenced by her first mate that, however subsequently mated, the offspring will either in structure or disposition give some hint of the previous mate. In considering telegony it should perhaps be mentioned that some breeders not only believe the dam is liable to be “ infected ” by the sire, but also that the sire may acquire some of the characteristics of his mates. This belief seems to be especially prevalent amongst breeders of cattle; but how, for example, a long-horned Highland bull, used for crossing with black hornless Galloway cows, could subsequently get Galloway-like calves out of pure Highland heifers it is impossible to imagine.

In conclusion, it may be pointed out that it was only natural for breeders and physiologists in bygone days to account for some of their results by the “ infection ” hypothesis. Even now we know surprisingly little about the causes of variation, and not many years ago it was frequently asserted that there was no such thing as reversion or throwing back to an ancestor. But even were the laws of heredity and variation better under­stood, the fact remains that we know little of the origin of the majority of our domestic animals. On the other hand, from the experiments of Mendel and others, we now know that cross­bred animals and plants may present all the characters of one of their pure-bred parents, and we also know that the offspring of what are regarded as pure-bred parents sometimes revert to remote, it may be quite different, ancestors. The better we understand the laws of heredity and variation, and the more we learn of the history of the germ cells, the less need will there be to seek for explanations from telegony and other like doctrines. (J. C. E.)

**TELEGRAPH** (Gr. rijλe, far, and *yρaφeιv,* to write), the name given to an apparatus for the transmission of intelligence to a distance. Etymologically the word implies that the messages are written, but its earliest use was of appliances that depended on visual signals, such as the semaphore or optical telegraph of Claude Chappe. The word is still some­times employed in this sense, as of the ship’s telegraph, by means of which orders are mechanically transmitted from the navigating bridge to the engine room, but when used without qualification it usually denotes telegraphic apparatus worked by electricity, whether the signals that express the words of the message are visual, auditory or written.

Land and Submarine Telegraphy will be considered in Part I., with a section on the commercial aspects. In Part II. Wireless Telegraphy is dealt with.

Part I.—Land and Submarine Telegraphy

*Historical Sketch.—*Although the history of practical electric telegraphy does not date much further back than the middle of the 19th century, the idea of using electricity for telegraphic purposes is much older. It was suggested again and again as each new discovery in electricity and magnetism seemed to render it more feasible. Thus the discovery of Stephen Gray and of Granville Wheeler that the electrical influence of a charged Leyden jar may be conveyed to a distance by means of an insulated wire gave rise to various proposals, of which perhaps the earliest was that in an anonymous letter@@1 to the *Scots Magazine* (vol. xv. p. 73, 1753), in which the use of as many insulated conductors as there are letters in the alphabet was suggested. Each wire was to be used for the transmission of one letter only, and the message was to be sent by charging the proper wires in succession, and received by observing the

@@@1 From correspondence found among Sir David Brewster’s papers after his death it seems highly probable that the writer of this letter, which was signed “ C. Μ.,” was Charles Morrison, a surgeon and a native of Greenock, but at that time resident in Renfrew.