

SCIENCE.

FRIDAY, JANUARY 22, 1886.

COMMENT AND CRITICISM.

DR. PERSIFOR FRAZER of Philadelphia has recently applied composite photography to testing the genuineness of signatures. He first obtained by composite photography a standard signature, and then he compared this with the signature in dispute. In the case of the composites of the heads on coins, or of portraits, it is tacitly assumed that the variation observed is due to a difference of the subject at different times, or to the different impression which the same subject makes on different artists. In the case of handwriting, however, the will-power of the writer attempts to reproduce exactly a certain combination of symbols in the same order as that usually performed; but the accidental physical obstacles or mental influences render this impossible. *A priori*, it would seem likely that a composite of a larger number of signatures would show an individuality little less distinct than the race, family, or pathological characteristics which thus far it has been the aim of those who have used this method to portray. In point of fact it turns out to be the case; but what was not foreseen is equally true; viz., that the very variations which appear on the plate, either as very faint lines or as blurs, furnish the most valuable aid in determining whether or not two pieces of writing are by the same hand. On examining carefully each letter of a composite made from a large number of signatures, it is found that the variations in writing a letter at different times, are confined to certain of its parts, and are not distributed equally over the entire field. Thus not only is there more uniformity in letters and parts of letters which lie close to the line, but in the upper loops, dots, and crosses, the tendency in all cases thus far examined is towards variation in one, or at most two, directions; and these are restricted more than one would suppose, who regards without critical analysis the writings from which the composites were made. It would be premature at this time to say with what certainty one might tell, after an extensive experience of the use of this sort of analysis, that two writings were or were

not by the same hand. But the great gain, after all, is not altogether in the certainty which the method renders possible (though this cannot be ignored), but in the fact that it removes the judgment on affairs as delicate and often as important as the identification of handwriting from the possible bias of personal expert opinion, and allows the testimony of the photograph to be weighed by judge and jury like any other testimony. So far as Dr. Frazer has yet been able to observe, it is impossible to write naturally the signature, or even the hand, of any other person, without showing numerous discrepancies with the composite plate. The essential requisites to making the plate are of course as many signatures as possible, about which there can be no suspicion. In order to make the letters overlap as much as possible, it is sometimes found necessary to photograph them at different distances from the camera. It is a curious fact, that, when a man is obliged to restrict his whole signature to a space less than that to which he is accustomed, he will insensibly make a change, which is usually a close approximation to a reduced scale.

IN THE NUMBER of *Science* for last week we noticed the railroad running across the deserts of Asia towards Merv and Bokhara. This week we wish to call attention to the first well-developed plan for the construction of a railway connecting the interior of Africa with the Atlantic Ocean. On the 23d of December, 1885, an agreement was made at Brussels, between the independent state of Kongo, and delegates from the Kongo railway company of Manchester, granting to this company the right to construct a railway to connect the upper and lower Kongo. The delegates of the English company were Messrs. Hutton, M.P., president of Manchester chamber of commerce; Mackinnon, director of the British-Indian steam navigation company; and Stanley. The directors of the railway company are the three delegates before mentioned; and Messrs. Adamson, president of the ship-canal to connect Manchester with Liverpool; Jacob Bright; Lord Egerton; Sir James Ferguson, M.P., and former governor of Bombay; W. H. Houldsworth, M.P.; and H. M. Steinthal of Manchester. The capital

will be five million dollars, and subscriptions will be immediately opened in the capitals of the four states which signed the general act of the conference at Berlin. The railroad will be constructed within the territory of the state of Kongo, either on the south side of the river, between the frontier and Leopoldville, or in two sections, — one on the right bank of the river, and the other on the left.

LIEUTENANT TAUNT of the U. S. navy recently arrived in London from the Kongo, where he has been on a mission for the government. Mr. Tisdell's report of a visit to the lower Kongo, in which he painted so black a picture of unsuccess and sterility, will be fresh in the memory of our readers. The report which Lieutenant Taunt has to render bears a very different complexion: he did not content himself with a hurried visit to Vivi and Stanley Pool, but went as far as Stanley Falls. He describes the lower Kongo as in the main barren, but even there relieved by fertile spots. The administration of the Kongo state is severely criticised. Lieutenant Taunt finds that in the lower Kongo the officials do not retain their offices long enough: this is presumably to be credited to the extremely unhealthy climate, although no such reason is given by Lieutenant Taunt. On the upper Kongo he found the officials better contented, and the administration more satisfactory. It is understood that there is no prospect of Mr. Stanley proceeding to the Kongo in the near future; and there is a tendency to withdraw all officials not of Belgian nationality. Sir Francis de Winton has retired, and has been succeeded by N. Janssen. These changes may result in doing away with the jealousies formerly existing among the officials of different nationalities.

THE DECLINE OF CHOLERA in southern Europe has afforded ground for the hope that the epidemic had nearly ceased, or at least that the worst was over. From recent news, however, it appears that there yet exists cause for apprehension. The disease has broken out in the provinces of Cadiz and Malaga, and quarantine has been established at several seaports. It has approached the frontiers of Portugal, and it is very possible, if not probable, that it may break out with its previous intensity in the spring. Not only in Portugal, but in various provinces of Spain, evidence seems to indicate that the end of the epidemic is not yet.

ON ANOTHER PAGE will be found the proceedings of the first meeting of the Indiana academy of sciences. This society enters upon its existence under auspicious circumstances, and its future progress will be watched with interest. The list of names of the officers or participants, as given, includes not a few of men of acknowledged ability; and there certainly seems to be sufficient material among the scientific workers of Indiana to make the academy a success. Other state academies have led a feeble existence, from lack of material or proper management; may it be hoped that the future of the present one will be brighter.

THE COMPETITION OF CONVICT LABOR.

BACK of all the discussion as to the various methods of employing convicts, one of which was commented on in a recent number of this journal (*Science*, No. 153, p. 28), lies the complaint that any method whatsoever of utilizing convict labor, save in the work about the prisons, results in a competition with free labor which is unfair and injurious.

The idea that this competition really exists in an appreciable amount has taken possession of so many minds, that we offer a few statistics on the subject. It may at once be admitted, that were all the 60,000 convicts in this country employed in a single industry, under one scheme of management, the effect would be that an enormous addition would be made to the productive capacity of that industry, and consequently prices might fall, and a reduction of wages result. But this hypothesis is as far from the truth as possible.

In 1879 Col. Carroll D. Wright ('Eleventh annual report of the Massachusetts bureau of the statistics of labor,' p. 112) stated that such convicts as were employed at any kind of labor whatsoever throughout the whole United States were 40,122 in number, and were distributed among 129 penal institutions. Of this number, 23,524 — 22,288 males and 1,236 females — were employed in 108 kinds of industries requiring skilled labor; 11,668 — 11,450 males and 218 females — were employed in 25 kinds of industries requiring unskilled labor; the remaining 4,930 were employed in prison duties. These 23,524 convicts, employed in productive skilled work in the prisons of the United States, were competing (*ibid.*, p. 114) with 666,625 workmen employed in the same states upon the same kind of work, and with 1,369,240 in the whole United States engaged in the same productive industries that were carried on in the prisons: therefore the percentage of convicts to free laborers was 1.83.