SETTING WORK AFTER CASEHARDENING.

"I make," says a correspondent, "a great many quadrants similar to the links of locomotives, and I find that the casehardening process causes the links to warp and the sliding dies to swell. How can I readjust them to a proper fit? The difficulty is that the casehardening stiffens the links, and while a certain amount of strain will open or close them, but a very little more will alter them too much. Is there any way of knowing intelligently how much strain I require in any individual case?" Our correspondent has asked a very practical and somewhat interesting question which we take pleasure in answering. In the first place, such dies always swell in hardening, and it is proper to make, during the fitting process, an allowance whose quantity must be determined by the shape and size of the die, and this experience alone can determine for each particular case. In the second place, there should be placed in slot of the link several neatly fitted pieces of sheet iron, to prevent it from closing. Then the links should be so packed in the hardening box, that the weight of the upper ones will not be likely to warp the lower ones when they are red hot. The links when taken from the box should be dipped vertically, and not thrown carelessly into the water. Notwithstanding these precautions, however, there will take place a certain amount of alteration of form, and the following method of readjusting will be found to be very efficient: If the slot is too wide, the link may be closed by iron screw clamps. If it has opened at one end only, the die should be placed in the link at the other end while the open end is closed. The closing process is very easily performed by clamping, especially when a bolt and nut is used in conjunction with the die to support the slot, in those parts that do not require closing. The closing is generally made too much, because it is less difficult to open the slot true than to close it true. The amount of opening can be more freely adjusted than that of closure, the method being as follows: Make two keys, planed on the edges to an equal taper, and of such a width that the two small ends placed edgeways together and contacting a distance about equal to twice the thickness of the link, will measure from outside edge to outside edge of the two, an amount equal to the width of the slot. The length of the keys should be about two and a half to three times the thickness of the link, and the amount of the taper should be about one half inch per foot. Take one of these keys and place it with a planed edge on the face of the slot, the key laying horizontally and projecting equally through each side of the slot, the key head being, for example, on the left hand. Take a scriber and make a mark on the face of the key, which will denote how far that end of the key projects through the slot. Take the other key and oil both of its planed edges, and insert in the slot above the other key, that is to say, so that one of its edges will contact with the edge of the key already inserted, while its other edge will meet the inside of the slot, the head of one key being on one side and the head of the other key being on the other side of the link or quadrant. Now take a hammer and drive in the key last inserted as far as the judgment, and a pair of callipers applied to the slot, indicate as sufficient to open the link to the required amount. Here, however, we may remark, that the keys being inverted, and of the same taper, the outside edges are parallel and the link is therefore being opened true, which would not be ensured were a bolt and nut used instead of the keys. Furthermore, the key that is oiled is the one that is driven. The key with the scribe mark is dry on its edge and meets the face of the slot. The result is that the driven one will drive through the slot without moving the position of the other having the scribed mark, which will keep even with the link face. Having driven in the key as directed, we take a scriber and make on the face of the driven key, and even with the face of the link, a mark which will serve to show how far the key was driven in. We may now drive the oiled key out again and test if the link slot is opened sufficiently; if not, place the first key as before, with the scribe mark even with the face of the slot, then insert the oiled key driving it a little further than before, the scribed line being a guide as to how far to drive it. Before taking it out again, we scribe a new line to indicate how far it is now driven. The keys may be removed, the testing continued, and the processes continued until completed. It will be observed that the keys thus employed, form expanding parallel pieces having the power of the wedge, and that the lines marked form a gage to work by. The gage line is especially useful, for the reason that the link will spring to a considerable degree without taking a permanent set. The keys will act just as well at the ends of the slot as in the middle, and the outside of the link may be clamped at any point not requiring to be opened.

The Ape that Most Resembles Man.

Professor Garrod lately held a reception in the Monkey House at Zoölogical Gardens, and discoursed to the people about the anthropoid apes. The professor made it plain that the anthropoids are the simial aristocracy, even if we may not more accurately call them our poor human relations. As prosector of the Zoölogical Society, the professor stated that he had dissected seventy apes out of the anthropoidal class, and one of them exhibited the vermiform appendage of the cœcum, or blind gut, which is characteristic of man. But the anthropoids have it quite humanly developed. The hands and feet of an orang recently dead were exhibited along with those of a man, and exhibited the same structure. The manners and customs of gorillas were described from authentic observations, and their domestic arrangements, their sleeping hammocks, and use of stones in cracking nuts increased the impression made that this animal is very human-like, indeed. Professor Garrod showed that the structural resemblances between the anthropoid apes and man are so close that the reason for the mental and moral differences remains still an unsolved problem. Perhaps the most striking and important portion of his discussion was that in which he proved that the vocal organs of man are present also in the anthropoid ape. The ape does not converse, and yet the difference between his vocal apparatus and that of man is so infinitesimal as to defy observation. It is to this point, however, that physiological investigation must now be particularly directed.

Professor Huxley declares that, to his mind, the only thing that promises to explain the mental difference between the anthropoid ape and man is this phenomenon of language. This he said in a lecture at the Royal College of surgeons. Language implies consultation, comparison of experience—necessarily embodies itself in the written form, becomes the storehouse of facts, results in inferences, and in the wisdom which can control and modify nature where the dumb creature is controlled and modified by nature. By the power of intelligent and purposed selection and combination so secured by the ability to talk, the animal so endowed might gradually build up a better brain on the same structure as that possessed by an animal that could not talk, and so could not obtain the complete coöperation of his fellows for the work of improvement. If it should be ultimately determined by physiologists that there is absolutely no difference between the vocal organs of the anthropoid and man, refuge would have to be taken in the hypothesis that there is some point in the animal brain corresponding to the vocal power, which does not exactly rhyme with the latter in the anthropoid, but does rhyme with it in the man.—*M. D. Conway's London Letter to the Cincinnati Commercial.*

Argentiferous Mud.

In Wasco county, Oregon, there is a flat thickly studded with springs of a peculiar character, that throw out mud, which has overflowed a considerable area. Some months ago it was reported that this mud had been discovered to be argentiferous and very rich, some specimens assaying over $2,000 to the ton. An effort was made to organize a company in this city to work the mud springs, but the enterprise collapsed in consequence of a suspicion raised that the mud had been "salted," and the memorable Arizona diamond field swindle was too fresh in recollection for the successful prosecution of another fraud in the same line. Professor Thomas Price analyzed samples submitted, and reported that he had discovered unmistakable evidence of "salting," the microscope showing filings, crystals, and free gold, which he had no hesitation in declaring had been mixed in with the mud with the manifest design of instituting a great swindle. Professor H. G. Hanks also examined specimens, but while he was inclined to suspect fraud, he was unable to determine positively whether the argentiferous mud was an artificial or natural production. Professor Hanks now intimates that the flow of the Oregon mud springs is in reality heavily impregnated with silver, and this result he announced in a paper read before the California State Geological Society. The existence of springs yielding soft mud, charged with free silver, says Professor Hanks, is new to science, and scientific men, both here and at the East, who examined specimens, pronounced them fictitious without hesitation. The specimens latterly examined by Professor Hanks, he says, were very rich, and silver was discovered in a free state. By simple washing the silver could be wholly separated, and when then examined the microscope failed to reveal the source of the precious metal. Had it been filings, a single glance would have sufficed to detect the fact. Had the silver been precipitated from solution by copper it would have been crystallized. An amalgam of silver and mercury would have yielded a sublimate if strongly heated in a glass tube closed at one end. Such an amalgam introduced into the wet mud, and the whole heated sufficiently to have volatilized the mercury, would have left the substance in a hard baked state, which could not again have been reduced to the state in which it reached this city. From these conclusions, if the silver had been introduced for fraudulent purposes, the substance was very remarkable, from the fact that some process had been employed not easily understood. Professor Hanks finally obtained the address of a gentleman, Richard Hurley, residing in the vicinity of the wonderful springs in Wasco county, and applied to him for information. In reply to Professor Hanks, Mr. Hurley writes: "There is no mistake as to this mud containing silver. I have assayed over 100 samples which contained silver, some as high as $2,300 to the ton. The samples I obtained from the spring myself. I think the weather has considerable to do with the mud containing silver. I obtain the best results when the weather is warm. Sometimes in one of the larger springs, when the weather is cold, the mud will be of a yellow color, showing no silver, but when the day is warm the mud is blackish blue, at least in places, and rich in silver. The springs seem to work more actively in a warm afternoon. Some of them contain a great deal of acid, the bones of animals that fall into them being dissolved in a few months. There are old wells which assay from $5 to $1,200 to the ton. One assay I made from the flat, half a mile from any spring, assayed $1,200 to the ton. There is a great deal of salt, almost pure, all over the spring flat. There are between 100 and 200 quartz leads discovered, running in two directions close to the spring. I find silver in several of them, all the way from a few dollars to $100 to the ton. Some of these leads run through the springs, at least they point in that direction. The altitude of this place is between 4,000 and 5,000 feet."

Professor Hanks also refers in his paper to the recent discovery of a peculiar silver-bearing deposit located in Southwestern Utah. It occurs in the "Maud Mine,' six miles from Leeds. Some assays as high as $700 per ton have been made. Instead of being sandstone, as supposed, Professor Hanks found the deposit to be sedimentary, but closely resembling the Oregon mud. Under the microscope it has all the appearance of that strange substance. The Oregon mud, if allowed to dry in large quantities, would soon form a similar substance to the Utah mineral, in appearance at least. The silver is in the state of chloride, and is seen under the microscope both amorphous and in crystals. An analysis of the two minerals will be interesting, and may throw some new light on the subject. It is possible that a study of these deposits may contribute much to our knowledge of the formation of metaliferous veins.—*San Francisco Examiner.*

Trial of a New Brake.

The express train, the "Flying Scotchman," which leaves King's Cross, London, for Newcastle, 4:05 P.M., was lately fitted up for the first time with a continuous vacuum brake. The apparatus which has been fitted on the "Flying Scotchman" is Smith's vacuum brake, the general construction of which is simple. The vacuum is obtained by a steam ejector. The steam jet is annular, 2 inches in diameter, and $\frac{1}{16}$ of an inch wide. India rubber hosepipes connect the brakes from end to end of the train with the ejector. Under each carriage is placed an apparatus variously known as a sack, an accordion, a melodion, and a bellows. It is really a canvas bag, protected by an india rubber covering, about 15 inches diameter and 18 inches long, cylindrical in cross section, fitted with iron heads, and prevented from collapsing by iron rings of round section, about $\frac{1}{2}$ inch in diameter, "cured" in the thickness of the rubber; one end or head of this bag is secured to the framing, and the other to a simple system of bars connected with the brake blocks. When the steam passes through the ejector a partial vacuum of 14 to 18 inches of mercury is formed in the bags, and they tend to collapse under the pressure of the atmosphere. But the motion is prevented, by the rings just referred to, in any direction but one, and the sacks shut up like a concertina, and in doing so apply the brakes. With the exception of the leading wheels of the engine and the wheels of the royal mail van, the train throughout was fitted with Smith's brake, each wheel having double brake blocks attached.

How Poisons are Spread.

Mr. G. Owen Rees, Consulting Physician to Guy's Hospital, London, has called public attention to some unexpected sources of arsenical poisoning. The green calico lining of bed curtains has been found to have produced, for months, severe symptoms, which were treated as those of natural disease, without benefit to the patients. When the curtains were removed the patients at once recovered their health. The beautiful pale-green muslin, largely used for ladies' dresses, has been found to contain not less than 60 grains of the arsenical compound known as Scheele's green in every square yard. He suggests that, in order to prevent much of the nausea, vomiting, headache, inflammation of the eyes, etc., from which so many suffer, there be a prohibition of the manufacture of such deleterious fabrics. Red, scarlet, and mauve-colored fabrics are not always free from arsenic. He adds that the agitation of skirts in dancing discharges arsenical poison, which probably causes some of the pallor and languor almost always wholly attributed to ill-ventilated and crowded rooms, and to bad champagne.

A Sandstorm in Rome.

June 22, a curious shower of sand and mud, coming from the south, fell in Rome, which seems to be regarded as due to sand brought in a dust-storm from the great desert in Africa, being mixed with the pollen of some vegetable, and held in solution by the cloud which carried it. An artist, writing to the *Times*, says that yellow spots, of about a twentieth of an inch in diameter, were made on the paper on which he was sketching, and also—though the color varied from yellow to white—fine drops of the same diameter fell all about the neighborhood of Rome. The cloud which brought it, though giving out little or no rain, turned the sun at 4 P. M. into the semblance of "a pale moon of greenish tint." Similar phenomena were no doubt mistaken for a rain of blood by the Romans, and regarded as prodigies, ominous of coming evil.—*Mayfair.*

Carbonic Oxide in Tobacco Smoke.

M. P. Guyot calls attention in *Science pour tous* to a recent note of M. Grehaut, in which the author states that tobacco smoke contains carbonic oxide, in such quantities that a dog after being compelled by a special apparatus to smoke four cigars, was killed by the poisonous gas. M. Guyot gives a number of analyses in support of the above statement, and shows that in 100 volumes of smoke there exists 165 volumes of carbonic oxide. If a pipe be used having a smoke chamber this proportion increases to 18 volume, and if it has a smoke filter made of cotton impregnated with an alkali, the proportion is still further augmented to 1·695 per cent.