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To Advertisers.

The circulation of the SCIENTIFIC AMERICAN is from 25,000 to 30,000 copies per week larger than any other journal of the same class in the world. Indeed, there are but few papers whose weekly circulation equals that of the SCIENTIFIC AMERICAN, which establishes the fact now generally well known, that this journal is one of the very best advertising mediums in the country.

THE MANAGEMENT OF RAILWAYS.

It has often been said that it is easy to discover that a man is sick, but not so easy to tell what will cure him. It is easy to see that our railroad system is giving birth to enormous monopolies, but it is not easy to say how this can be helped now. Yet we find editors who think themselves able at a single sitting to concoct a plan which shall meet all the exigencies of the case. We confess we are unable to do this. The subject appears to us beset with difficulties; difficulties only to be discovered by long and able thinking, and which render the application of the proper remedies a task only to be accomplished by experienced and careful legislators.

We have been led to these remarks by the perusal of an editorial in *Hunt's Merchants' Magazine*, wherein the evils of the present system are pointed out and a remedy, which the author confidently pronounces adequate, is suggested.

That journal says justly: "The temptations to fraud on the part of railway directors are now enormous, and the checks upon them are trifling. For instance, a secret compact is made between the boards of two competing or connecting roads, by which one is sold or leased to the other at an enormous price; the directors and their friends at once buy up the one stock, and perhaps sell immensely of the other, and then publish the contract which changes the value of the stocks, and close their speculations in the market with large profits. Or, a secret arrangement is made for an unusual stock dividend out of profits which have been carefully concealed from the public, and even denied on oath by the officers of the road, and the stock bought at low prices by the 'ring' is, after the dividend, sold at a vast advance to the public. In many such instances the value of their own property has been depressed by the secret compacts of the directors who hold it in trust, or immense issues of new shares have been privately sold to an unsuspecting public; and when the exposure was made, the stock has suddenly fallen, and the conspirators, by their breach of trust, have enriched themselves with the spoils of those they pretended to represent."

This picture is not in the least overdrawn, but the question is, what are we going to do about it?

The author of the article referred to, says: "The one condition of success in such intrigues is secrecy. Secure to the public at large the opportunity of knowing all that a director can know of the value and prospects of his own stock, and the occupation of the 'speculative director' is gone."

To meet these difficulties he proposes that railway companies shall be compelled to publish all their financial statistics in a clear and intelligible form as soon as they can make them up. But how compel them? Surely this must be done by legislation, and we have seen in this State how extremely easy it is to legislate power into the hands of these corporations, but how hard it is to get the power away from them.

Is not the fault somewhat further back than corporations? and is it not rather in our own vicious system of legislation upon private interests? Limit the power of the legislature to bills of an entirely public character, and open the way to free competition, and would not the corporations find themselves powerless to injure public interests?

As to the stockholders, each man knew or ought to have known, when he bought his stock, the conditions under which he holds such property, and expected, or ought to have expected, that the larger stock-holders would control their own shares as well as those of the smaller. Therefore they who

thus willingly or ignorantly entered into such a copartnership cannot complain if its terms are carried out to their full extent.

The writer referred to also suggests the prohibition of "every form of railway sale or consolidation by the companies," and thinks that only by this means can swindling be prevented. How this suggestion is to be carried out he does not tell us. It certainly seems to us not only impracticable, but contrary to all the fundamental principles upon which property is now held under the control of its legal possessors. Once let it be granted that those who own property may be legislated out of the power to control or sell it, and where will the end be? Clearly in the setting of limits beyond which neither individuals nor associations can acquire and hold property. For to lose the power to control and sell is, in effect, to cease ownership.

The solution of this question, if it ever reach a solution, will never be arrived at by any such loose and ill-considered propositions as this.

Monopolies can hardly endanger the right of the public so long as they encounter free competition. We do not pretend to set forth any plan by which this free competition can be secured, we leave that for those who are more competent to deal with it.

RECENT PROGRESS IN CHEMISTRY.

The past year has witnessed the introduction of a large number of new compounds into daily use, and the consequent increase of our knowledge of the best methods of manufacture, and the properties of bodies about which we could hitherto obtain very little information, even in the most complete works on chemistry. A recent bulletin, published by the extensive chemical manufactory of E. Schering, in Berlin, affords matter not to be found in any books, and hence we propose to condense the information for the benefit of our readers.

The hydrate of bromal, to which the formula of $C_2Br_3HO + 2H_2O$ is given, crystallizes in white needles, or by slow crystallization in the same form as blue vitriol, though colorless. It has a similar taste and smell to the hydrate of chloral, and is easily soluble in water and alcohol. Salts of silver ought not to produce a precipitate with these solutions.

The hydrate of bromal has hitherto been confined to scientific investigations, as experiments upon animals have shown that its effects are more anæsthetic than hypnotic. Chloral, originally discovered by Liebig nearly forty years ago, was not fully studied until recently. It is a perfectly colorless liquid, having the same boiling point as water, with a specific gravity of 1.5, and a sharp, biting taste, and undergoes spontaneous decomposition, so that it cannot be kept for any length of time. If one equivalent of water be added to it, it forms a dry crystalline mass known as the hydrate of chloral, and one equivalent of alcohol produces similar crystals of an alcoholate of chloral; the chloral has at present merely a scientific interest.

The alcoholate of chloral yields white, transparent, hygroscopic crystals, closely resembling the hydrate of chloral in taste and smell, but less soluble than the latter in water—a reaction that will enable chemists to detect a mixture of the two compounds. If we heat the alcoholate of chloral in twice its volume of water, it melts without dissolving and immediately crystallizes out under the water on cooling, while the hydrate of chloral at once goes into solution and remains dissolved. Sulphuric acid heated with the alcoholate becomes brown, but with hydrate of chloral remains colorless. Nitric acid of 1.2 specific gravity gives ruddy fumes of nitrous acid when heated with the alcoholate, but no fumes are produced under similar circumstances with the hydrate of chloral. It is of the utmost importance to know these reactions as the close resemblance between the alcoholate and hydrate may lead to serious mistakes, as the properties are unlike and the alcoholate ultimately acts like alcohol itself. The hydrate of chloral has been pretty fully described in our columns, but some practical details remain to be recorded. Its manufacture has assumed enormous dimensions, especially in England and America, but no establishment is able to make large contracts on account of the difficulties which still arise in its preparation. The workmen are so much affected by the fumes of chlorine and hydrochloric acid that they require to be constantly relieved, and this occasions delay and annoyance. It is difficult for the American manufacturer to compete with the German, owing to the high price of alcohol in this country and the revenue tax imposed upon it. The contradictory properties ascribed to the hydrate of chloral by different experimenters may be accounted for on the ground of the presence of the alcoholate in consequence of defective preparation. It is an agent not to be tampered with, and only to be trusted when coming from perfectly reliable sources. If it should be substantiated that in the hydrate of chloral we have a sure remedy for sea-sickness, as well as for the most obstinate cases of sleeplessness, it will prove one of the most important and beneficent contributions made by chemical science during the present century. In Germany the retail of this article is prohibited without the prescription of a physician.

A number of new and important compounds of carbolic acid have been discovered, which are prescribed in cases of putrid wounds for injections, and generally as disinfectants. Among those may be mentioned the sulpho-carbolate of zinc, which is inodorous, crystalline, and easily soluble in water and alcohol; the sulpho-carbolate of soda, a white crystalline powder; and the sulpho-carbolate of copper, resembling blue vitriol in color. A great objection to the employment of carbolic acid as a disinfectant is the persistent odor it has as usually sold for this purpose. This difficulty seems to be ob-

viated in the case of the compounds mentioned above, and it is to be hoped that they will come into general use. Chloræthyliden is a new anæsthetic, the properties of which have only partially been studied, but which promises to be valuable.

The above are a few of the most important of the recent contributions of chemistry to the every-day wants of man.

A few months ago they were utterly unknown, now they afford investment for a large amount of capital, and give employment to many skilled workmen, besides conferring untold blessings upon suffering humanity.

OTHER WORLDS THAN OURS.

Our readers are well aware that we do not regard mere speculation of any sort as likely to either add to man's knowledge or happiness. The question as to whatever other planets in the solar system besides our own are, or may be inhabited, is one which must be classed among fruitless and profitless speculations. We find on this earth enough of evil to surmount, enough of solid fact to discover, and enough recorded learning to acquire, to tax all our energies without wandering off to other planets in vain guesses that they are or may be inhabited.

If we grant that they are full to overflowing with all sorts of living things, and that creatures as highly organized as men are, or as angels are supposed to be, dwell thereon, what application of this assumption can be made that will better the condition of mankind in the least, or give him the slightest insight into anything it is desirable for us to know.

Wild speculations have been indulged in about the possibility of establishing communication with these suppositious inhabitants, and perhaps deriving from them knowledge beyond anything that science has yet dreamed of, or hath entered into the heart of philosopher to conceive. Nay, Emanuel Swedenborg claimed to communicate with the inhabitants of Jupiter, but so far as we know the world has never got any good from the communication.

In some respects the present is an age of strange incongruities. On the one hand we have a class of men who profess to walk solely by faith; on the other hand, there is a class who profess to walk solely by the light of demonstrated facts or logical inferences from the results of experience. Between these two classes lies another, to which we may apply the commercial term, "middle-men," who profess to be scientific yet who are willing to indulge in speculations which certainly exact as large a degree of faith, as the dogmas of those who would make faith the sole rule of action.

Mr. Richard A. Proctor, F.R.A.S., is one of this class. Having attained some reputation as an astronomer, he has of late been indulging in speculations upon the old never-to-be-settled question of the plurality of worlds, and Longmans, London, has published in a book entitled "Other Worlds than Ours," what might as well have been styled "The Visions of Proctor"—a work from his pen in which the subject is stated to have been studied (?) under the light of present scientific researches.

Our knowledge of the book is at present confined to what the English *Reviews* have said about it. These *Reviews*, so far as we have seen them, are very favorable to the work. Taking, therefore, what they have set forth as a fair index of the line of argument pursued by the author, we find that very few of the facts upon which he bases his speculations are new, and further, that all he says or can say upon the subject may be summarized thus:

It is not impossible, so far as we can ascertain the conditions which exist upon the surfaces of some of the planets, that living creatures may exist upon them, therefore it is quite probable they do exist there. It is possible that peculiarly organized beings may have a high degree of intelligence, and it is further possible that the probable beings which may exist upon—say Mars for instance—may be highly enough organized to possess a high degree of intelligence; therefore it is quite probable that some of the living beings upon that planet are highly intelligent.

This is, we think, a full and fair showing of the argument.

In the statement of facts from which the possibility of animated existence is inferred, we find very little that is new, and the claim that present astronomical science possesses facts warranting such an inference, that were not possessed fifty years since has very little to support it.

Such new and as have been obtained, and which are available for the purpose of such speculations, are confined principally to the planet Mars. There is little doubt that, on that planet, the conditions of climate and atmosphere are very analogous to that of our globe; but this admitted, the question again resolves itself into one of probabilities.

We grant the probabilities, and find that we get very little satisfaction from our liberality. We cannot send ships to Mars, and open up a commerce with its inhabitants. We do not know how they stand upon the Women's Rights question, or whether a jury of twelve intelligent sons of Mars would have convicted or acquitted McFarland. We cannot even send missionaries to convert the—in all probability—teeming population of that planet, or get up societies for the amelioration of his—it may be—oppressed multitudes.

We do not know whether all the people who dwell upon his face are suffering because the first man and woman would eat forbidden apples, or whether they are all in some huge garden of Eden, enjoying themselves in the most beatific manner.

Perhaps, however, it would be possible to get a word or two with them by making use of one of our vast prairies and adopting Dr. Dick's plan of drawing thereon huge geometrical figures.

Finding it thus possible to communicate we suggest the