Correspondence.

The Dangers of Methyl Alcohol.

To the Editor of the SCIENTIFIC AMERICAN:

In view of certain literature which is being sent out by manufacturers of methyl alcohol, setting forth arguments in favor of its use, and claiming it to be non-injurious to the human being, except when taken internally, does it not seem criminal that such statements should be allowed to go out and mislead the laity?

A number of well-authenticated cases have been recorded from time to time, of persons who have lost their eye-sight from the mere inhaling of the vapors of wood alcohol, as well as from its use externally in liniments. Painters are specially subjected to the dangerous effects of this poison, and some of the cases referred to were those engaged in using shellac varnish, who had by continued absorption impaired their eye-sight and finally become totally blind.

One concern has quite recently mailed the writer a pamphlet entitled, "What Every Pharmacist Should Know About Methyl Alcohol." One of the "things" they should know is captioned on the margin "The Real Cause of the Trouble," and reads thus: "Methyl alcohol when taken internally does not act as a primary poison; the digestive juices decompose it within the body and change it into formic acid, which is the poison that causes blindness and death." The fact that it is poisonous is not in any way controverted by such logic as this! Would it not be a good plan if this firm could arrange to have the human being so constructed as to prevent this undesirable condition from existing further; have it so that the digestive juices would not be guilty of converting methyl alcohol into formic acid. Their product would then no doubt come into great demand as a beverage.

That methyl alcohol is poisonous externally as well as internally is no longer a debatable subject, and too much publicity of the facts cannot be given, especially in view of the fact that denatured spirit will soon be a reality, and presumably denatured with methyl alcohol, imparting its poisonous principles to the new commodity.

The chemists of the country are gradually coming to realize the full import of the wood alcohol makers' advertising campaigns, and the possibilities which may ensue if these said advertisers are allowed to go ahead unnoticed.

From a purely human standpoint, I hope that the SCIENTIFIC AMERICAN will not fail to use its influence to the end that more publicity of the facts shall be given from this time on, for there is no doubt that much harm will come from circulars of the kind above referred to, if the truth is not known by those who read them. D. STROBE JEFFERIS, Ph.G.

Philadelphia, Pa., August 9, 1906.

Aeronautic Terminology.

To the Editor of the SCIENTIFIC AMERICAN:

Owing to the wide circulation of the SCIENTIFIC AMERICAN and its consequent power for good in the interests of science and truth, the writer is prompted to call your attention to an error which crept into a column of the correspondence page of your issue of August 18, under the heading "Aeronautic Notes," and request that this correction be given publicity, for the purpose of righting what would otherwise create a wrong impression in the minds of your many readers who would doubtless appreciate being informed of the facts regarding the subject in question.

The error occurs wherein your correspondent states that a French aeronautic commission defined "aerostat" as being a "balloon *or airship* using a gas bag."

In the year 1889 (*not* a French commission, but) an international aeronautic congress was held at Paris. This congress composed an aeronautic phraseology, so to speak, intended to become universal. Among others established were three terms or classifications covering every known aeronautic apparatus.

"Aerostat," being one of these classifications, applies merely to the ordinary balloon.

The congress coined another term—"aeronat;" this applies to a dirigible balloon or airship.

Your correspondent was correct in his use of the third term, "aeronef," under which he grouped the helicopter, aeroplane, and orthopter; the definition of "aeronef" being: A purely mechanical flying machine, or aeronautic apparatus heavier than air.

In concise form, the classifications and their definitions, as established by the International Aeronautic Congress in 1889, are as follows:

Aeronef—Flying-machine.

Aerostat—Balloon.

Aeronat—Dirigible balloon (airship).

These terms have been generally adopted in Europe, and, it is to be hoped, will soon obtain in this country. As it is, we find our daily papers referring to a balloon as an airship; the latter term is also frequently applied to aeroplanes and other "aeronefs," and the term flying-machine is often applied to all classes of aeronautic apparatus indiscriminately.

The writer is trying, in so far as his limitations permit, to popularize the science of aeronautics, and, for the purpose of lucidity in writing and conveying one's idea with the certainty of being understood, hopes that such popular and influential papers as the SCIENTIFIC AMERICAN will adopt the classifications as specified, when speaking of aeronautic apparatus. The writer believes if this were done they would be widely quoted, and the great American press would take example, to the end that the general public would soon become acquainted with and retain the knowledge of the terms in question and what they define.

JOS. A. BLONDIN,
Member the Aero Club of America.

Albuquerque, N. M., August 20, 1906.

The Vacuum Process of Preserving.

To the Editor of the SCIENTIFIC AMERICAN:

For the past few years we have been interested in the pure food proposition, and have been working out various things that would help in this field from our end of the line. We have been working to get a perfectly sanitary package and seal to displace tin cans and jars, that are unsanitary for a number of reasons.

The old-fashioned Mason fruit jars have been a large factor in household canning, and there is no jar made and used to-day so difficult to seal and so unclean. A great number of these jars are used year after year, and in the course of time the fruit juices and particles of fruit work up behind the porcelain liners, and in time become very unpleasant. This can be ascertained by removing the liner from a cap that has been in use two or three times.

Packages covered with tin caps are dangerous because the tin is affected by the contents of the jar, particularly when products containing a large amount of acid are preserved. Also in jars where rubber is used, the contents are often tainted with the rubber. The list of objectionable features is almost unlimited when discussing old methods of sealing food products.

We want to put packages on the market that are not only sanitary in all particulars, but are perfectly pure and impervious to the action of any acids or alkalies found in food products. We have been able to secure this result, but in developing this seal we have found that the old method of sealing jars or tumblers does not answer in all cases, and have come to the conclusion that the only method of handling certain products so that they will conform to the pure food laws is to seal them under vacuum.

We have been more or less in touch with the vacuum canning business as it is handled to-day for the past ten years, but until we began experimenting ourselves, never took an active interest in it. Naturally being a new subject to us, after seeing how the process was handled and hearing what people said they got, we began to ask questions, and the more we asked the less we found out, and were forced to the conclusion that the people who were using this process did not really know what they got or why they got it, and could not tell us the effect a vacuum had on products.

We were also told that the amount of vacuum secured in a receptacle, hermetically sealed, depended on the condition of the atmosphere, and that it was only possible to get a vacuum of within 1 inch to 2 inches of mercurial barometer reading. In our own experiments we demonstrated that this was false, as we secured a vacuum greater than number of inches shown on barometer, and proved to our own satisfaction that there was no direct connection between the two.

We tried various vacuum pumps and machines and were not satisfied with them, and went to work to build some of our own and use our own ideas, with the result that we have been able to get within 0.3 inch of perfect vacuum as it is spoken of; 30 inches has been considered this perfect vacuum, and we have secured 29.7 inches.

Our experiments have brought a number of things up for discussion, and we have been unable to answer our own questions, and cannot find any books that will enlighten us, or get any satisfactory information from doctors, university professors, or bacteriologists.

We are, therefore, taking the liberty of writing you, and submitting a list of questions we would like to get answers to, in order to enable us to go on with our work.

QUESTIONS ON VACUUM PROCESS.

1. Are anaerobic bacteria common in fruits and general food products commonly put up by packers?

2. What vacuum pressure will destroy them, and is a high pressure more effective than a low one?

3. If vacuum alone will not destroy these germs, what degree of heat, and how long applied, will be necessary if sterilized in the open air, and what if in vacuum?

4. If food products are sterilized and put in a sterilized jar in which a vacuum is created, is it necessary to sterilize the jar and contents after the vacuum is made? If so, what is the lowest temperature Fahr. that will do the work?

5. Is there enough oxygen or air in a jar sealed under vacuum within 2 inches of a perfect vacuum to preserve life in aerobic germs?

6. If anaerobic germs do not require oxygen, would they thrive in the same vacuum?

7. What is the source of life to these germs? Do they require nitrogen to live, or what furnishes them with life outside of what they eat or absorb?

8. What class of germs exist in bacon, beef, ham, tongue, fish, tomatoes, peas, beans, corn, catsup, cane syrup, and sorghum?

9. If any of the above goods are put under vacuum to within one to one and one-half inches of perfect vacuum, what germs or percentage of germs will be destroyed, and what further operation, if any, will be required to kill the balance, provided of course that all of the above articles have been cooked or cured before sealing under vacuum, meats to be sealed cold and vegetables hot?

10. When the statement is made that water boils at 85 to 90 deg. Fahr. when sealed under vacuum, are we to understand that where it is boiled in the open air at 212 deg. Fahr. (which heat is supposed to kill all germs) the same result is obtained by cooking at 90 deg. Fahr. under vacuum?

11. Also if it requires say two hours' solid boiling at 212 deg. Fahr. of some fruits or vegetables to kill all germ life, how long and at what temperature will it be necessary to cook the same article under vacuum?

12. What is an absolute vacuum, and is it possible, with a sufficiently large pump or any pump used commercially, to secure a perfect vacuum? Why?

13. In your opinion what is the greatest degree of vacuum possible to be obtained, and why?

14. What would be the result to or condition of goods sealed if it were possible to obtain a perfect vacuum?

15. Is it possible to seal raw fruits, meats, or vegetables under vacuum and preserve them in perfect condition, in other words, keep them from decomposing or fermenting without sterilizing, and at what vacuum pressure?

16. Is germ life destroyed by vacuum, or is its action simply suspended?

17. If anaerobic germs are not killed by vacuum, what keeps them alive? Is enough gas or life-giving matter obtained from the decomposition of aerobic germs in foods sealed under vacuum to give life indefinitely? J. M. BEATTY.

Columbus, Ohio, July 30, 1906.

[Some of our correspondent's questions could obviously be answered offhand, but most of them require an intimate knowledge of the canning and preserving industry. The questions are here printed with the hope that some readers of this journal may be willing to impart whatever information they may have on a matter of such sanitary importance.—ED.]

The Current Supplement.

The current SUPPLEMENT, No. 1601, opens with an article on the performance of the Franklin air-cooled automobile in crossing the continent in record time. Excellent illustrations accompany the article, showing the difficulties which had to be overcome. A thorough article is that on artificial diamonds. R. Lydekker discusses instructively some rudimentary structures, illustrating his explanations with striking pictures. The colors of the sky and the solar disk are made the subject of a very clear and scientific article by Prof. G. Sagnac. The Hon. R. J. Strutt's splendid paper on the internal heat of the earth and the thickness of the earth's crust, which attracted so much attention when it was read before the British Royal Society, is published. Prof. T. J. Pond contributes an account of the Morton memorial laboratory of chemistry of Stevens Institute of Technology. Prof. E. R. Lankester's paper on the increase of knowledge in the several branches of science is continued. In this last installment he treats of the physiology of plants and animals, psychology, and Darwinism. Robert T. Lozier, well known as a designer and builder of gas engines, writes lucidly on the "Fundamental Principles of Gas Engines and Gas Producers."

It is customary, in order to obtain a leather pliant and at the same time impermeable, to apply upon the dressed side a solution of India-rubber or gutta-percha and grease in chloroform or benzine. But this method is impractical, for the chloroform and benzine rapidly evaporate, and the brush or usage soon causes the caoutchouc to disappear. Experience has proved, on the other hand, that the efficacy of the process is perfect, if the solution of caoutchouc be applied upon the *hide* side. Not only does the solution then penetrate better into the pores of the leather, but this side of the leather (the inside of the shoe), being covered with a lining, it is not subjected to the friction of the dressed side. The application of the caoutchouc solution, however, renders the surface of the leather a little wrinkled, and it is necessary to rub this surface when dry with powdered talc, which blends with the caoutchouc, thus forming a smooth surface. If, moreover, care be taken to grease the dressed side, the leather thus treated is absolutely impermeable.