

because the cataract is really removed from the interior of the eyeball, the same as a pea from the peapod. It is a common mistake among the laity that a cataract is "taken off" the eye, as if it was on the outside; a cataract is simply the natural, clear, crystalline lens (which belongs in all eyes) becoming opaque, and closing up the window of the eye. The operator removes the opaque obstruction and the patient sees. In former years the cataract was thrown from its upright position behind the pupil downward, and left in the eye. This operation was called couching; it was abandoned, as it produced serious inflammation.

In extracting the lens, or cataract, we first, after properly cleansing the parts with aseptic fluids, and applying the cocaine solution, fix the lids open by means of a spring, then hold the eyeball firmly with a delicate pair of forceps in one hand, and in the other take a beautifully delicate and very sharp knife, about one and one-quarter inches long and only one-eighth of an inch in width; this is thrust, point forward, into the eye, at the junction of the white with the clear cornea; the knife then passes behind the cornea and in front of the iris the width of the front of the eye, and the point of the knife is made to pass out, so that in this position the knife has transfixed the eyeball, and can be clearly seen by a to and fro motion of the hand the knife is made to complete the cut, which is fully half an inch in length, but so nicely done as to fall in the line of the upper junction of the white with the clear cornea. This, of course, takes much less time to do than to describe. Next a small piece of the iris, or colored curtain of the eye, is removed upward by forceps, leaving a keyhole-shaped pupil; then a delicate instrument is introduced, and the front part of the membrane that holds the cataract is lacerated by making a T-shaped incision: this allows the cataract to come forward. All being in readiness now, the lens or cataract is extracted by making gentle pressure by means of a spoon-shaped instrument upon the outside of the eyeball below the center; this makes the wound made above to bulge, and, by the continued pressure, the cataract is extruded from within the eye. The parts are gently bathed with warm boracic acid solution, and a bandage applied; both eyes are covered for a week, and then smoked glasses are worn for two or more weeks, when glasses for reading and distance are given, and the patient has vision as good as ever. To-day I gave glasses to a patient upon whom this operation had been performed two weeks ago, and handed him the Bible, and he read the third verse of the first chapter of Genesis: "And God said, Let there be light, and there was light." "How appropriate," he remarked: "for this is the first time in five years I have been able to read." As we are so dependent without correct sight, nothing appeals so to the patient as this restoration of vision.

Soft cataract, or that form coming in the young, is treated in an entirely different way; and the operation is known as needling, because a delicate needle is thrust through the cornea and then through the capsule of the lens directly into the opaque mass. The consistency of a soft cataract is similar to boiled starch. The rent made in the envelope of the cataract allows of the entrance of the fluids of the eyeball, thus causing the cataract to swell and absorption to take place. After several such operations, an interval of several weeks elapsing, the whole cataract will be carried away by absorption, leaving a clear pupil through which to see. Children born with cataract have them treated in this manner and may be operated upon as early as three months old.

Artificial pupil, or iridectomy, is another of the interesting operations done upon the eye. In any affection of the eye where the pupil is closed, or where an opacity is situated on the front of the eye over the pupil, an artificial pupil is necessary. It simply consists in removing a portion of the colored curtain and leaving a pupil in the direction of the incision made; for in order to remove the portion of iris a wound has to be made in the cornea, and this is usually done with a trowel-shaped knife, which is pushed in at the junction of the white with the cornea; and then a pair of delicate forceps are introduced into the anterior chamber, and the iris grasped, pulled out and cut off by fine scissors, making thus a new pupil. This operation has a wide range of application and is the one resorted to successfully for the cure of that dread disease, glaucoma.

Foreign bodies that enter the cavity of the eye are a source of great danger to sight, and have to be extracted as quickly as possible; where the substance is iron or steel we introduce an electro-magnet and extract it by attraction; when some other substance, it is removed by forceps by enlarging the wound of entry. For foreign bodies on the outside of the eye, such as particles of coal, scales of iron and the like, where, after cocaine has been used, they cannot be wiped away by cotton on a small stick, we must resort to a fine steel instrument and pick it off. It is a good thing when by accident a particle enters the eye to refrain from rubbing or in any way touching the eye; the gush of tears will usually flush the eye and float out the offending intruder; but if vigorous rubbing is indulged in, the particle is pretty sure to become fixed and need special assistance for its removal.

Tattooing of a white scar on the front of the eye is one of the novel things done, and is useful, not only in improving the appearance, but also the vision. The operation is performed in the same way as upon the skin with India ink and the use of needles.

Another odd operation is the transplanting of the conjunctiva of the rabbit on the human eye, to supply tissue destroyed as the result of severe burns; this operation is successfully performed. It is a very delicate operation and requires much patience. The whole rabbit's eyeball has been transplanted and placed in the human orbit, and adhesions have formed between the living and the transplanted tissue. Of course, the object in this operation is for cosmetic rather than visual effect. Thus far this operation is in an experimental stage, and will probably never be of practical value.

Besides these operations mentioned above on the globe of the eye, we have to correct deformities of the eyelids and remove growths therefrom.

Gross eyes or deviations of the eyes from the median line are corrected by the operation of tenotomy, which means the cutting of the muscle having the greatest power.

Tenotomy may be performed on any of the external muscles of the eye, but is most commonly done on the internal straight muscle for the correction of convergent squint and next most frequently on the external straight muscle for outward turning of the eyeball. The operation is simple and should be resorted to more frequently, as it is not only a deformity, but causes failure of sight in the squinting eye.

Parents do a great injury to their children by not having the tenotomy done early; as soon as four years of age will answer. The longer the strabismus or squint lasts the more difficult is it to correct. We have seen many cases of deformity due to the neglect of the parents. The operation can be done with scarcely any pain by the use of cocaine; only in the very young should ether be used. The lids being held open by a spring and the eyeball fixed, the operator grasps the covering of the eye over the site of the muscle to be cut, and then, making a small buttonhole in it, a small blunt hook is inserted through it and passed under the muscle; this is then drawn upward and the insertion of the muscle to the globe severed. The opposite muscle pulls the eye in its direction and the eye becomes straight. The wound is so small and carefully made that no scar or mark is usually seen; the popular idea that the eye is "laid out on the cheek" and operated on, is, of course, not true; probably the spring-like instrument used to keep the eyelids open has given this impression, as the eyeball looks very prominent when it is in position.

Enucleation of the eye or the entire removal of the organ is one of the most distressing operations we have to perform, for afterward there is no hope of vision. The popular idea that the eyeball can be removed and then returned to its former position is, of course, absurd, and no thoughtful person would for a moment think restoration possible. After the removal of the eyeball the defect is corrected by the insertion of an artificial eye, which can be so artistically made and arranged that it is very difficult to detect.

Operations are made on the tear ducts to relieve conditions of watery eye by probing the canals and in some instances by the incision of one or other of them, thus giving free drainage to the nose.

To sum up, the surgery of the eye is difficult only in its minute detail and requires special technic. The antiseptic precautions used in other surgical procedures are practiced here, and the only anesthetic usually required is the preparation of cocaine already mentioned.

From the above facts it behooves us so to treat our eyes that we shall not be "presented with a universal blank of Nature's works," or "wisdom at one entrance quite shut out."

New York City.

THE TREATMENT OF FEVERS WITHOUT FOOD, ANTIPYRETICS OR ALCOHOL—WITH RECORDS OF VARIOUS CASES.

By A. MONAE LESSER, M.D., New York, Surgeon for Abdominal Diseases to the Red Cross Hospital; Member of the Academy of Medicine, Etc.

IN 1886 I began to treat all fevers, medical and surgical, without food, antipyretics, or alcohol. Instead I used large quantities of water and a few simple remedies which I shall describe in detail later on. At first, my results were far better than they had been when I still adhered to the older and yet recognized plan of feeding and stimulation.

There is scarcely anything new in my method, which, in a primitive way, was practiced by the ancients. Thus I do not come as the herald of an entirely new and startling discovery. Researches into the physiology and pathology of the subject have taught me that in all forms of fever, medical or surgical, the exanthematous, typhoid, or the traumato-septic varieties, we invariably find changes in the gastro-intestinal mucous membranes. In some instances these changes are anatomical, while in the acute and more simple varieties they are chemico-mechanical in character; yet in both the physiological function of the membranes is changed and impaired.

It may not be out of place in this connection, before touching the question of treatment, to refer briefly to the observations of distinguished physiologists who have enlightened us on this point. Beginning with the saliva, Uffelmann* says: "The secretion of the saliva becomes diminished by fever, and in high temperature no saliva is secreted at all. In the lower ranges of temperature—he evidently refers to acute conditions—the saliva—normally alkaline—becomes turbid, thick, and sour, and with the increase of the fever the power of the saliva to convert starch into diastase is materially diminished."

Passing over the function of the muscular action of the stomach indigestion, Beaumont† records, as the result of his experiments, that in cases of fever the gastric juice is only sparsely secreted, and the mucous membrane is soft and irritable.

Hoppe-Seyler‡ examined the gastric juice of a patient with typhoid fever and found no free hydrochloric acid. This was also the case in other instances where the gastric juice was taken from subjects in whom there was an elevation of temperature. He found it utterly inadequate to carry on digestion artificially even after the addition of hydrochloric acid. The same author expresses the opinion that under these conditions the gastric juice has a tendency to become neutral in reaction, and stomach digestion can no longer go on. Instead, we get lactic and butyric acid fermentation and the formation of gases, and with them we find the sarcinae ventriculæ and other micro-organisms, first observed and described by Goodsir§ and Manassein|| who also proved that the observations of Hoppe-Seyler were correct.

Gluzinski, of Cracow, records that he found neither hydrochloric acid nor peptones in the gastric juice during the entire stages of typhoid fever.

Explaining the cause of dyspepsia in fever, Landois¶

says: "The secretion of a peptone-forming fluid is arrested when the fever begins very violently, when there is great weakness, or when high temperature long continues." This author also emphasizes the fact that the gastric juice is diminished in all cases of fever.

It is well known that in acute febrile conditions, notwithstanding that the bile is diminished in quantity, it is more watery and poorer in specific ingredients. That similar changes occur in the pancreatic and intestinal juices is shown by Stolnikow,* who says: "On high ranges of temperature the pancreatic juice is diminished. Examination shows fat in the form of drops and bundles of crystals which may be isolated from the stools." He also found that fluids are quickly absorbed in persons with elevated temperature, whereas the absorption of peptones is much diminished. This is also established by Beaumont and others.

In the face of these facts it became a question to me whether it was justifiable to introduce into the animal economy food that cannot be disposed of and utilized, and that can at best only act as a foreign body, undergo putrefaction, and give rise to ptomaines, that in themselves must tend to elevate temperature.

My experiments and observations at the bedside have in every way borne out my reasoning. At the meeting of the Academy of Medicine, last March, in discussing a paper on the treatment of typhoid fever,† I said: "I have in times gone by employed the milk diet in typhoid fever. One patient refused it and I gave her only water, and she was able to live upon it for twenty-one days."

"From that time on I began to investigate how much or how little food my typhoid fever cases needed. While I do not yet presume to generally recommend the method so new, still what little I have to say upon the subject of allowing typhoid fever patients no nourishment whatever, save water, is based upon my results in eight cases, all of which made a good recovery without relapses, and in which from five to fourteen days I permitted the patients to take nothing but water ad libitum, only administering diluted milk at the expiration of that time, or rather when the patient expressed a desire for some nourishment. In these cases I had no occasion to use alcohol or antipyretics, although the range of temperature was such that according to the recognized methods of treating typhoid fever I would have been justified in administering them. I have since adopted this plan in all fevers in which the temperature is over 102° F."

My method of procedure is as follows: First of all the bowels are flushed well with a high enema of lukewarm saline water. If the tongue of the patient is pale, covered with a white or grayish coating, I prescribe two hourly doses of a teaspoonful of a solution of sodium sulphite, 4.00 to 60.00 of water, while, if the tongue has a red base, clean, or is covered with a dark brown or grayish coating, I administer dil. muriatic acid 1.00 to 100.00 water in the same doses at the same intervals.

Should the stomach be in a highly irritable condition, nothing has given me greater satisfaction than a two hourly teaspoonful dose of a mixture of carbolic acid, 1.00 suspended in a solution made of 30.00 of mucilage to 125.00 of peppermint water. If the disease be a painful one or involve serous membranes, doses of 0.6 sodium salicylate in 100.00 of water are repeated every two hours until all pain has subsided; I have found this remedy to be most serviceable and far preferable to the opiates.

There are occasions in which the stomach may be found to contain a large quantity of food. In such instances I freely lavage, or if the case is suitable, begin with an emetic before administering any other drug. I have seen cases watched by careful nurses where large quantities of undigested milk coagula were returned in the lavage. I recall a case in which washing revealed an unusually large quantity of milk coagula taken nineteen hours before, and another which returned a partly putrefied oyster which the patient had swallowed whole twenty-three hours previous.

It is from experiences like these that I have made it an absolute rule to empty the stomach in cases where I suspect the presence of food. The results which have followed this apparently heroic commencement of treatment were such that I did not find it necessary to continue medication in large doses for any length of time. The pulse improves and very soon the patient begins to be more comfortable, the headache, malaise, and other annoying symptoms gradually diminishing in severity.

Be it understood, however, that I do not claim to lessen the duration of any disease of certain course.

I also have the patient sponged frequently with water three degrees lower than the prevailing temperature. If this be above 104° F., under no circumstances do I permit any nourishment to be taken. However, when the pyrexia is lower than this, and the patient craves for something, I give clear broths, containing, as I believe, the salts of the meat only; rice and barley water with a pinch of salt, but never do I attempt to induce the patient to partake of food. Simultaneous with the lowering of the temperature I have observed that the patients become desirous for nourishment, while on the other hand their aversion to it increases as the temperature rises.

I now continue with whatever medication is indicated. I have altogether discarded the internal administration of antipyretics, as I think they diminish the tone of the heart, thereby deluding us into the belief that our patient has improved simply because the temperature is so many degrees lower, when in reality his vital powers are much weakened and he has less resistance to combat his disease. This fact Cantani‡ has so beautifully made clear to us. The bacillus also can thrive and propagate much better in lower than in higher temperature.

As to medication, I employ aconite in 0.6 to 250.00 of water, of which I gave teaspoonful doses every hour, not to diminish the temperature or lessen the frequency of the pulse, for aconite in these doses, in my opinion, acts as a heart tonic, in that it relieves the pressure upon the capillaries and so equalizes the circulation.

I administer aconite at the onset of the disease if the pulse is frequent and weak, the extremities cold, while

* Mank and Uffelmann: Die Ernährung des gesunden und kranken Menschen. Berlin, 1887.

† Beaumont, Leipzig, 1834.

‡ Die Verdauung und Resorption der Nahrungsmittel, p. 241. Berlin, 1878.

§ Biological Memoir. Edinburgh, 1868.

|| Archiv für path. Anat., Band 55, 1872.

¶ Physiologie des Menschen, p. 351. Leipzig, 1885.

* Pfleger: Archiv d. Physiologie.

† Medical Record, May 26, 1894, p. 671.

‡ Transactions of the International Medical Congress, Berlin, 1890, vol. I.

I prefer veratrum viride in the same doses and same intervals as the aconite when the pulse is rapid and full.

It is astonishing to see how rapidly the small doses of these two drugs act. I have not yet had occasion to have recourse to alcohol in any of my cases. If heart tonics are needed, I rely upon caffeine, provided the heart sounds are weak, and upon nitroglycerin when its beats are rapid or intermittent.

The dose of caffeine I employ, repeated as required, is 0.15, and of nitroglycerin 0.0003 every three, four, or five hours, as the case may require. Strychnine in 0.0005 doses I give in addition to either of these drugs, principally when I use nitroglycerin, always, however, giving these drugs uncombined, and most frequently hypodermatically.

In all these cases water with a trace of sodium chloride, not sufficient to affect its taste, is given ad libitum. The quantity taken in twelve hours varies from 1,000.00 to 1,300.00. It is remarkable to observe how readily it is retained by the most sensitive stomach, provided that the organ is free from other food. It is readily absorbed, restoring to the blood the fluids which the intense febrile condition robs from it, and thereby keeping the cells in the different tissues in a mild but constant state of activity; it increases the action of the liver, as also the action of the kidneys, lessening their work by secreting bile and urine of lower specific gravity, and holding the specific elements in higher solution.

Of its effect on the intestinal tract it may be said that the juices, although changed in character, become less irritating in their local action, when thus highly diluted, and excessive diarrhoea therefore does not become a complication of the disease—on the contrary, I have found it has a tendency to enhance easy stools from the very beginning.

Thus, in every instance I flush the bowels daily, and have often observed that its returns contained quantities of undigested matter, including coagulated milk, increased in intestinal secretions, even eighteen days after the patient had partaken of any food.

This method of treatment has given me abundant proof of its efficacy, and it is reasonable to assume that when nothing offensive is carried through the digestive tract, nothing deleterious can be carried into the blood and nothing additional brought into the system to support the micro-organism of the disease; while at the same time a constant washing of every portion of the less affected parts of the body is continually going on, until the hungry state of the tissues requires nourishment, as is evidenced by the patient's demand for food.

That this will ease and lessen the danger of febrile disease more than the feeding or stuffing methods, I beg to illustrate in a case of croup, treated in February of last year, and which was seen in daily consultation by Dr. O'Dwyer.

When first I suggested the advisability of administering no food, save water, Dr. O'Dwyer dissented, and for two days we gave milk at regular intervals. We observed that within half an hour after the administration of the milk, the patient was seized with paroxysms that were associated with a rise of temperature and general indisposition. After forty-eight hours of this state of affairs, Dr. O'Dwyer agreed to continue the treatment without nourishment, on water alone. We pursued this course for three days, during which time the temperature gradually dropped, and the paroxysms became less frequent and the patient's general condition materially improved, until at the end of the third day the temperature had fallen to 100° F., and the favorable outcome of the case was assured. We then resorted to milk feeding with well diluted milk, and in one week our case was fully recovered without any sequelæ. The usual remedies, including fumigation, were used, but intubation was not resorted to.

Knowing, as we do, that it requires a certain time to digest milk, even with normal secretions, and considering, as Bouchard* has shown, that milk increases the temperature when administered in any febrile state, and especially in view of the fact that peptones cannot be absorbed under such conditions, does it not speak loudly against the giving of nourishment, as is so frequently practiced, with digestive secretions abnormal, deficient, or altogether absent?

I have observed that, contrary to what we might expect, patients kept on water alone lose less weight than those fed upon a mild and easily digested diet, which leads me to believe that water maintains the patient's vitality better than food—that is a food in the truest sense of the term.

It is almost obvious that where the intestinal glands are affected, and the stomach secretions changed on account of an elevated temperature, and with blood containing excrementitious matter, we cannot hope for the utilization of anything that has been taken in for absorption.

Since first I made known my views upon this manner of treating fevers, I find that others have also made clinical observations in line with mine. Among the papers recently published, that will repay perusal, are those of Dr. Licorish,† Dr. Page, of Boston,‡ and Dr. A. P. Henry.§

I trust that the method of treating fevers as I have described it above from careful notes from my case book will prove worthy of further investigation, and I hope my colleagues, especially those who are fortunate enough to possess hospital facilities, will give it honest consideration, and report their results at an early day.

72 East Sixty-first Street. —Medical Record.

THE PHYSIOLOGICAL ACTION OF ACETYLENE.

By Dr. W. H. BIRCHMORE.

THE introduction of ethine as a commercial article and the proposition to use it as a means of lighting for domestic and other plants, especially for portable lamps, brings into prominence its possible influence on the human subject, and on animal life in general.

* Auto-intoxication in Disease, p. 217. Philadelphia, 1894.

† Medical Record, June 2, 1894, p. 706.

‡ Ibid., February 24, 1894, p. 230.

§ Ibid., May 25, 1895, p. 646.

The chemistry books have for years set forth that ethine had poisonous influence on life, but the extent and kind of influence exerted has never been discussed at length or in detail by any person in connection with its commercial use. Indeed, beyond the statements in the books referred to, the fact of its physiological action has hardly been questioned at all.

During the month of May last past it was my good fortune to be so situated that a daily study of some of its effects was possible, and although the narrative of the observations would have an interest of their own in connection with the action of gases on the blood, they are not in order here. Certain general conclusions were possible, and as they have a relation to the commercial use of the gas, they are given for what they are worth.

"The amount of the gas that can be diffused in the air of a room without perception by the senses."

It is a well known fact that under pressure the amount of a gas that can be forced through water by the process of diffusion is a function of the pressure and also of a coefficient that varies with each gas investigated. In the case in question it is very high. The published experiments of various authorities place the amount that may be dissolved in water at 60° F. as more or less exactly the bulk of the water; and it is a curious fact that this holds true of the watery vapor evaporated from a pan holding the water in which the gas has been dissolved. Carefully arranged experiments extended over a number of days showed that if the gas was under a pressure greater than that of the atmosphere in one part of the pan, the rate of loss was decidedly greater than the rate of evaporation of the water, in the other part; consequently, while the loss from the pan under the pressure of the atmosphere was the same as the decrease in the water from evaporation, under the pressure that might arise in a gas meter, the passage by the "transfer from next to nearest molecule" under a pressure of two inches of water could reach to twice this under the conditions of ordinary use. To decide this question in another way, an absorption apparatus was run from noon on Saturday to noon on Monday in the room in which was standing a holder that contained the gas under a pressure of two water inches. The space about the holder was in effect a quarter of a square foot. There was some ethine in the air of the room when the experiment was commenced, as shown by the formation of the copper compound by passing the air through the test solution, but as the air in the room was known by measure to be changed once in every hour, evidently if there should be shown to be a continued presence of the gas, it must come by diffusion from the holder. An apparatus was rigged that would pump air slowly through the test solution during the time of the experiment, and during the 48 hours under examination the amount of gas present was sensibly the same as at other times. This shows that the amount present came from the holder by continuous diffusion. This amount, which was about 10 c. cm. per hour for each square foot of exposed surface under a pressure of 2 inches of water, was quite imperceptible to the sense of smell.

"The amount of gas required to produce headache."

Twice in the course of my studies the opportunity occurred to measure the amount that diffused in the air of the room would produce distinct headache in the course of a short time, and it was found to be rather unexpectedly large as compared with the product of the imperfect combustion of the ordinary illuminating gases. As stated, the air in the room was known to be changed once in an hour. The cubic contents of the room was about 5,000 feet if a proper allowance is made for the space occupied by properties. The amount of gas diffused was $2\frac{1}{2}$ cubic feet, or one in 10,000. Within 20 minutes a decided headache was noticed, with a sense of dizziness, that was a sufficient warning to get into fresh air. The second time the experiment was made of remaining until the sight was slightly affected; this proved very foolish, for in the course of an hour after leaving the room respiratory difficulty appeared, and in the course of a few hours nausea, and a prostration and sense of the impossibility of exertion that forced me to remain in bed all the next day. The effects were not those of sleep, but the exact counterparts of the subjective effects of the ether narcosis, hallucination and all. Three days afterward the heart respiration ratio was so sensitive that an attempt to walk rapidly across the Brooklyn Bridge produced such a feeling of exhaustion as to compel rest.

The important fact in this connection is that a man well acquainted with the smell of acetylene was twice in the room in the course of this experiment, and on question afterward said that he did not notice anything peculiar about it, and certainly had not noticed the "smell of the acetylene." It is possible that the very familiarity with this smell may have blunted his perception, but at the same time it may be urged that he would have been doubly sensitive knowing the danger involved in breathing it. It is therefore safe to say that as much as one part in ten thousand may be diffused in the air of a room without being detected by the sense of smell in some persons, and that this amount can produce dangerous effects.

"Can this dose of 1 in 10,000 be considered fatal, and if so, how long a time is required to produce this effect?"

Up to date there is no record of any attempt at "Suicide with Acetylene for the Sake of Science," but an experiment on a guinea pig gave the following:

Alarmed at my own experience, it seemed a good thing to know if a reasonable limit could be set to this sort of thing; so a large healthy guinea pig was confined in a tight box, containing 216 cubic feet. Experiment showed that confinement in this box under ordinary conditions for a period of 48 hours had no effect on his health, appetite, or spirits, although the air must have been much deprived of its oxygen, by the measure it sank below the proper respiratory limit for human beings; therefore I judged that any error that might get in would be on the safe side. At ten o'clock in the forenoon I drew out 35 cubic inches of air, and substituted ethine; in about ten minutes my prisoner was evidently uneasy, and in half an hour was hid away under the straw, the usual habit of guinea pigs when in distress. They do not run about as do some animals, and when at four o'clock I opened the box my pig was dead and his blood had lost the

power of absorbing oxygen almost as if killed by cyanogen. As the guinea pig is a rather hardy little beast under this sort of treatment usually, it seems certain that a man would or could be fatally injured by breathing a mixture of 1 in 10,000 of ethine for 6 hours.—Electrical Engineer.

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CATALOGUES.

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