SUGGESTIONS.

Mr. C. E. Beddome suggested that an alteration should be made in their third rule, and that the Governor of the colony should be made the honorary president or vice-patron, and that they should elect a president annually from the Council.

The Chairman was of opinion that it was not competent to the Fellows to adopt the change proposed, as it would contravene one of the fundamental principles of the Society, which had received the royal approval when the Queen became its patron, and confirmed the annual grant. The rules can be altered at any time, but certainly not the fundamental principles and constitution, and he therefore ruled that the proposed motion could not be entertained.

Mr. Beddome also suggested that certificates should be issued to honorary and corresponding members of the Society.

The Chairman said the Council would take that into consideration if Mr. Beddome would bring it under their notice.

The Hon. Secretary, referring to the late election, as Honorary Members of the Society, of the Hon. W. Macleay, M.L.C., F.L.S., of Sydney, and E. Pierson Ramsay, Esq., F.R.S.,E., F.L.S., the curator of the Sydney Museum, said he had sent them complimentary letters referring to the fact, and that it had since been noted in the newspapers.

VOTE OF THANKS.

On the motion of Colonel Legge, seconded by Mr. C. E. Beddome, a vote of thanks was passed to the donors of exhibits and the authors of papers.

EXHIBITION OF MOSSES.

Mr. R. A. Bastow, with the aid of the microscope, exhibited a very interesting collection of specimens of Tasmanian mosses, which were greatly admired.

A vote of thanks to the chairman concluded the meeting.

JULY.

The monthly evening meeting of the Royal Society of Tasmania was held on Tuesday evening, Mr. James Barnard, Vice-president, occupying the chair. There were fifty-six Fellows in attendance, amongst those present being the Bishop of Tasmania (Dr. Sandford), the Acting-Chief Justice (Hon. W. R. Giblin), and several ladies.

Dr. A. Bingham Crowther and Mr. R. R. Rex were re-elected Fellows of the Society.

Owing to the indisposition of the Hon. Secretary, for whose absence the Chairman apologised, the Curator of the Museum brought forward the usual returns, viz.:—

1. Number of visitors to the Museum during the month of June:—Week days, 1,155 ; Sundays, 570 ; total, 1,725.

2. Number of visitors to Royal Society's Gardens during the month of June, 4,550.

Plants and seeds received at and sent from the Royal Society's Gardens during the month of June, 1885 :—

From the Agri. Horti. Societies' Gardens, Madras. Seeds of Podocurpus affinis.

To Mr. G. Brunning, Melbourne. Box cuttings.

Time of leafing, flowering, and fruiting of a few standard plants in the Royal Society's Gardens during June, 1885 :—

12th. Maelaura aurantiæa, leaves falling.
15th. Iris alata, commencing to flower.
18th. Calycanthus prœox, in full flower.
20th. Crocus vernus, commencing to flower.
22nd. Common privet, leaves falling.
30th. Black mulberry, leaves all shed.

METEOROLOGICAL RETURNS.

From the Government Observer, Captain Shortt, R.N., table of observations for June.

Additions to the library during the month of June :—

Agricultural Gazette, April 20, 27, May 4, 11.

American Agriculturist, May and June.

American Museum of Natural History. Annual report of the trustees for the year 1884-5.—From the Trustees.

Annals and Magazines of Natural History, May.

Auckland Institute and Museum. Report for 1884-5.—From the Trustees.

Athenæum, The, April.

Bulletin du Musee Royal D'Histoire Naturelle de Belgique, Tome III., IV., No. 3, 4, 1885.—From the Trustees.

Catalogue of the Fossil Mammalia in the British Museum, pt. 1, containing the orders Primates, Chiroptera, Insectivora, Carnivora, and Rodentia. By Richard Lydekker, B.A.K.

Catalogue of the Lizards in the British Museum, 2nd Edt., vol. 1, Geckonidæ, Eublepharidæ, Uroplatidæ, Pygopodidæ, Agamidæ.—From the Trustees British Museum.

Elephant Pipes in the Museum of the Academy of Natural Science, Davenport, Iowa, 1885, by Chas. Putman.—From the Trustees.

Gardener's Chronicle, April 25, May 2, 9, 16.

Geological Magazine, May.

Guide to the collection of Fossil Fishes in the Department of Geology and Palœontology, British Museum (Natural History), 1885.

Guide to the Galleries of Mammalia, Mammalian, Osteological, Cetacean, in the Department of Zoology in the British Museum, 1885.—From the Trustees.

Journal of Science, May.

Meteorological Observations, November, 1884.—From the Meteor. Office, India.

Midland Medical Miscellany, Vol. 4, No. 41.—From the Editor, Leicester, England.

Monthly Weather Report of the Meteorological Office, London, for December, 1884.—From the Meteor. Office, London.

Monthly Notices of the Royal Astronomical Society, Vol. 45, No. 6, April, 1885.—From the Society.

Nature, Vol. 31, April.

Principles of Forecasting by means of Weather Charts, by the Hon. R. Abercromby.—From the Meteorological Office, London.

Proceedings of the Canadian Institute, Toronto, 3rd Ser., Vol. III., Fas. No. 1, March 1885.—From the Society.

Proceedings of the Linnean Society of New South Wales, Vol. X., Pt. 1, June 1885.—From the Society.

Records of the Geological Survey of India, Vol. XVIII., Pt. 2.—From the Geological Survey Office.

Report of the Acting-Secretary for Mines and Water Supply, Annual, Victoria, 1884.—From the Mines Department.

Report of the Meteorological Council to the Royal Society for the year ending 31st March, 1884.—From the Meteorological Office, London.

Results of Astronomical Observations made at the Melbourne Observatory in the years 1876, 1877, 1878, 1879, 1880.—From the Government Astronomer.

Results of Rain and River Observations made in New South Wales during 1884.—From the Government Astronomer.

Scientific Transactions of the Royal Dublin Society, Vol. III., Series II., IV. Catalogue of Vertebrate Fossils, from the Siwaliks of India, in the Science and Art Museum, Dublin, by R. Lydekker, B.A. Plate and Woodcuts.

Scientific Transactions of the Royal Dublin Society, Vol. V., on the origin of Fresh Water Faunes, a Study in Evolution, by W. J. Sollas, M.A.

Scientific Transactions of the Royal Dublin Society, Vol. VI.—Memoirs on Coleoptera, of the Hawaiian Islands, by the Rev. T. Blackburn, B.A., and Dr. D. Sharpe. Plates IV. and V.

Scientific Proceedings of the Royal Dublin Society, Vol. IV., N.S., July 1884, Pt. V.; Vol. IV., N.S., January 1885, Pt. VI.—From the Royal Dublin Society.

Transactions of the Royal Historical Society.—New Series, Vol. II, Pt. IV.; 1885.—From the Society.

Transactions and Proceedings of the New Zealand Institute.—Vol. XVII., 1884.—From the Trustees.

PRESENTATIONS TO THE MUSEUM.

Mammals :

Two Grey Opossums, Phalangista vulpina; Three Black Opossums, Phalangista fuliginosus; Two Ring-tailed Opossums, Phalangista viverrina, Mr. W. Lester.

Two Tasmanian Tigers, Thylacinus cynocephalus; One Tasmanian Devil, Sarcophilus ursinus, Mr. W. Turvey.

Duck-billed Platypus, Ornithorhynchus anatinus, Mr. John Swan.

Two Ring-tailed Opossums, Phalangista viverrina, Mr. T. M. Atkinson.

Ring-tailed Opossum, Phalangista viverrina; Golden-bellied Beaver Rat, Hydromys chrysogaster, Mr. A. Brent.

Birds :

Two Musk Ducks, Biziura lobata, Mr. R. Read.

Blue Crane, Ardea novæ hollandiæ, Mr. L. Massey.

Mandarin Drake and Duck, Aix galericulata; Javanese Pheasant, Phasianus sp., Mr. E. D. Swan.

Ten species of American Birds' Eggs, Mr. Geo. Hinsby.

Fishes :

Tail of an Indian Stinging Ray, Mr. W. H. Buckland.

Crustacea :

A Hermit Crab, Pagrus sp., Mrs. John McCance.

Relics, Etc. :

A Paper, *The Saunders News Letter*, Friday, May 16, 1777, Dublin, Mr. J. F. Echlin.

Two Swedish Coins, Mr. L. O. Laroson.

WATER AND TYPHOID.

Mr. W. F. Ward, A.R.S.M., Government Analyst, read the following paper on the Impurities of Water in Relation to Typhoid Fever :—

At the request of the sanitary officer of the Launceston Corporation I have, at different times, examined 11 samples of water collected by him during his enquiries into outbreaks of typhoid fever ; to the results obtained I shall refer later on, only stating now that they show painful neglect of the simplest necessary health precautions ; some of the figures are given in the table before you, also analyses of Hobart and other waters for comparison. In dealing with my subject, the considerable outside interest, and I am sorry to have to add ignorance, which attach to it must be my excuse for repeating and emphasising many points with which you are already familiar, but the knowledge of which is not so widespread as it should be. I propose to begin with the impurities found in different classes of water, to define the conditions which a really good natural water should fulfil, and to point out some means which may be employed for the improvement of a bad or suspicious water, in cases where no other supply above suspicion is by any means obtainable.

Foreign Matters found in Waters.

Chemically speaking, no water found in nature is pure ; the impurities are very various—gaseous, liquid, and solid, organic, and inorganic—some beneficial, some harmless, some deadly in their effects when introduced into the human body ; but the word "impurity" for our present purpose may be taken to mean something objectionable either in itself, in its origin, or its excessive quantity. The gaseous constituents of natural waters are mainly oxygen, nitrogen, and carbonic acid, all present in the air, and beneficial or harmless ; small quantities of carburetted hydrogen in marsh waters, and sulphuretted hydrogen with its unmistakable smell like rotten eggs in some mineral waters. The usual mineral or inorganic constituents are lime, magnesia, potash, soda, and ammonia, with sometimes iron, manganese, or alumina, combined with chlorine, sulphuric, carbonic, and nitric acids, in some cases also nitrous, silicic, and phosphoric acids ; forming chlorides, sulphates, carbonates, nitrates, nitrites, silicates, and phosphates.

Not one of these substances is, in itself, injurious, if in small quantity; but the amounts of ammonia, nitrous and nitric acids, and chlorine are used with other results of analysis in forming an opinion as to the purity or otherwise of the water under examination, while anything more than the most minute trace of phosphoric acid is considered a certain indication of sewage contamination.

The more or less poisonous metals, arsenic, lead, copper, and zinc are sometimes found, derived either from minerals in the rocks, or from pipes and tanks. The use of zinc-coated or galvanised tanks has been discontinued in the French navy on account of the action of water in dissolving zinc. The remaining constituents found in water are various kinds of organic matter, that is, matter of animal or vegetable origin, both dissolved and in suspension ; the suspended matter is in part dead and decaying, the remainder consisting of innumerable minute living organisms of many kinds, sometimes including water-fleas and worms, and the ova of parasitic worms of men and animals, and almost always some forms of fungi, algæ, etc., or infusoria, the immense variety of the last named class being shown in Mr. Saville-Kent's wonderful manual lying before you. Amongst the fungi are classed the schizomycetes, minute, mostly colourless cells or threads, globular, in short rods, or straight or spiral filaments embracing the various species of bacterium, bacillus, spirillum, micrococcus, vibrio, etc., they include the smallest organised bodies known, and as a class may be said to measure from 1-150th to 1-15,000th of an inch, they multiply in two ways, either by the splitting up of one into two or more individuals, or by the coalescence of two organisms into one, followed by the production of spores which develop in to the parent form. Most of these species must be considered harmless, if we take into consideration their world-wide distribution, both in air and water, and the fact that they, as well as the other impurities mentioned, with the exception of the parasitic ova, associated as they too frequently are with excrementitious matters, are daily swallowed by millions of people without apparent ill effect; indeed Pasteur has suggested that they may render material aid in the vital process of digestion. Some of them act the part of scavengers, causing the putrefaction or decay of dead organic matter; others, however, are accepted as the undoubted causes of such diseases as anthrax or splenic fever in cattle, cholera in fowls, and a form of typhoid in pigs: less generally, but yet by some of the highest authorities, consumption, cholera, and typhoid fever in man are considered to have been proved at least within a measurable distance of certainty to be due in each case to the presence and multiplication in various parts of the human body of a specific bacillus; some of these specific germs, or perhaps their spores, finding a resting place in a suitable subject, and reproducing as an accompaniment of its own enormous multiplication each its special disease, and apparently no other.

The bacillus tuberculosis is pretty firmly established; the battle still rages over the "comma bacillus" of Dr. Koch, attributed by some to segments of the spirillum, while comparatively recently Dr. Gaffky has found in various organs of the human body after death from typhoid a special form of bacillus which was absent in only one case out of 28 examined.

It is also claimed that diphtheria, ague, leprosy, relapsing fever, pneumonia, small-pox, scarlet fever, etc., in fact all diseases hitherto classed as zymotic, as well as several others, are caused by the presence in the body of specific forms of these schizomycetes, derived either from air or from water, the latter being undoubtedly the chief agent in disseminating typhoid fever.

The presence in water of minute organisms, in most cases, as I before said, harmless, but occasionally deadly, may be shown by growing them in various culture or cultivation fluids in which appropriate chemical substances are dissolved, they multiply enormously in a few days, rendering the clear fluid milky, and some of them can then readily be examined microscopically. The serum of blood, the aqueous humour from the eye of an ox, slices of half boiled potato and beetroot, and other substances, have also been used, but the best method by which their presence may be rendered apparent to the naked eye is by mixing the water with melted gelatine jelly in a tube, adding a very small quantity of phosphate of soda, allowing the jelly to set, and stand protected from air germs by cotton wool for some days. Each point of life multiplies and forms round it, either a sphere of liquid, or a gas bubble, and in this way different waters may be compared, at least so far as quantity or intensity of life is concerned, and so far as our present limited knowledge goes we may assume "the fewer the better" a general rule. Strong sewer water does not show globules, but the whole mass becomes turbid, and liquifies from above downwards.

The mode of action of the disease germs has been variously supposed to be either a struggle for existence with the vital cells of the animal body, death following if the function of the parts invaded be destroyed; the formation of poisonous matter in the fermentation produced by them; or mechanical obstruction of the capillaries by millions of them blocking the circulation.

Definition of Good Water.

Water for human consumption ought to fulfil all, or at least as many as possible, of the following conditions:—It should be almost, if not entirely, free from—(*a*) Floating matter, whether finely divided earth or organic matter, either animal or vegetable living or dead and decaying. (*b*) Dissolved animal or vegetable matter, or more than a moderate quantity of dissolved mineral matter. (*c*) More or less injurious or poisonous metals in appreciable quantity, such as lead, copper, zinc, arsenic, or iron. It should have no corroding or dissolving effect on the first-named metal; and it should not contain more than two parts of iron or zinc, or one part of lead or copper, in a million parts of water. It should be free from the slightest suspicion or possibility of contamination with sewage or drainage or foul gases of any kind, from houses, cesspools, church yards, slaughter yards, tanneries, farm yards, manured fields, etc. No sediment should form on standing, and only a moderate amount on boiling. It should be moderately cool and well aerated, containing seven or eight cubic inches of dissolved gases per gallon, two cubic inches at least being oxygen. Such water will be entirely free from taste, smell, and colour; soft, clear, bright, and transparent, and entirely wholesome and palatable.

Classes of Water.

Rain-water in falling takes from the air traces of nitric acid, ammonia, mineral and organic matter, including the germs of animals and plants; and if collected from the roof of a house, will sweep into the tank much additional impurity, as the droppings of birds, dust, decayed leaves, zinc from gutters, etc. Some of these germs are the producers of fermentation, putrefaction, and sometimes, doubtless, of disease.

Springs may contain excess of mineral or vegetable matter, or poisonous metals. Lakes and ponds or water-holes will contain various impurities, according to position and the source from which they are fed, but usually yield water inferior to good river water. Rivers may receive drainage from manured land, pastures, houses, farm yards, etc., and thus contain the germs of various diseases of men and animals, and of intestinal worms and other parasites; or sheep may have been washed in them. Wells frequently receive leakage from cesspools, farm yards, etc., and may be much polluted, although the water remains perfectly clear, bright, and tasteless. Marsh water usually contains much vegetable matter, and has a "peaty" taste.

Purification.

Tanks and barrels used for storing, and filled from any of these sources, are liable, if not frequently emptied and cleaned out, to become foul from the accumulation of sediment, and the possible presence of drowned rats, mice, and insects, and the absorption of foul gases from neighbouring cesspools, pigstyes, stables, etc.; water in this condition also dissolving greater quantities of harmful metals, as lead, copper, and zinc (from galvanised iron) with which it may come in contact. In addition to frequent cleansing of store tanks and barrels, it is always advisable to use a filter, which, if efficient, will retain suspended matter and the larger organisms, including the ova of fluke, tape, and other intestinal worms, and some of the dissolved albuminous matter will be oxidised; but many of the minuter forms of life, including the dangerous ones, will pass through an ordinary filter. I mention this not to discredit filters, but to prevent too implicit reliance being placed upon them.

Boiling for some time, either without, or, better, with the addition of a very small quantity of permanganate of potash, is necessary if the quality be doubtful; but it is much safer to obtain, if possible, a supply quite free from suspicion, as it is not certain that all dangerous germs will be destroyed even by boiling, the spores of some forms bearing a still higher temperature.

Filtering, especially through a dripstone, will re-aerate the water after boiling, and so remove its insipid flavour. The dripstone should of course be out of reach of noxious gases from ill-kept yards, etc. Filters should be cleansed every two months by pouring through a quart of pure water containing 30 grains of permanganate of potash, and 10 drops of strong sulphuric acid (oil of vitroil), then two to four gallons of pure water containing a quarter to half an ounce of pure hydrochloric acid (spirits of salt), and followed by a like quantity of pure water only; the filter is then again fit for use. If the filter contain charcoal which can be taken out, this may be first boiled in water containing a little permanganate of potash, and then baked in an oven. Unless cleansing be regularly carried out, the organic matter accumulated on the filter may render the water of worse quality than it was originally.

Very hard water containing large quantities of lime and magnesia salts may be rendered more fit for drinking by boiling, with the addition of a very small quantity of carbonate of soda, it is softened, its medicinal effect destroyed, and some of the organic matter also carried down by the precipitate formed. Lime water will have a similar effect in cold water, if the hardness be due to carbonates, while recent experiments show beneficial results in organically impure waters from the addition, to each gallon, of two grains of dissolved alum. It is advisable, however, not to rest content with purified water if by any possible means an originally pure supply can be obtained.

RESULTS OF ANALYSES.

Source of Supply.	Grains per Gallon.		Parts per Million.	
	Total Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.
CRESSY.				
1. Creek supplying Cressy	6·02	0·42	0·10	0·19
2. Ditto	5·60	0·52	0·12	0·18
3. Marsh draining into Creek	6·72	0·59	0·29	0·37
4. Tank of house (fever case) .. (Filled from creek.)	10·50*	0·77	0·61	2·20
5. Barrel (next door to No. 4) (Filled from creek.)	7·70	0·35	3·20	3·14
6 Tank in neighbourhood .. (Filled from creek.)	4·06	0·77	0·69	0·27
7. Lake River	7·00	1·68	0·21	0·13
EVANDALE.				
1. South Esk River ..	6·5	1·08	0·01	0·13
2. Nile Creek (Gutteridge's)	14·5	0·46	0·10	0·13
3. Ditto (common supply)	5 5	0·46	0·07	0·09
4. Well, near graveyard..	33·0	10·80	0·08	0·26
For comparison :—				
A. Dr. Hassall's proposed Standard for greatest allowable impurity ..	14·17	—	0·05	0·10
B. London Water Supply (Thames)	18·5	1·2	0·01	0·06
C. Thames, London Bridge	—	—	1·02	0·59
D. Effluent from sewage...	—	9·9	16·20	0·90
E. Hobart supply, taken the day after heavy rain had succeeded drought	7·28	0·70	0·02	0·11
F. Cascade Brewery Reservoir	3·92	0·56	0·01	0·09
G. Ditto, Diamond Drill	65·03	23·82	Trace	Trace
H. Well, near Green Ponds	86·80	29·00	—	—
I. Well, near Emu Bay ..	6·02	1·02	0·40	0·23
K. Rain Water (tank near drain)	3·92	0·21	0·12	0·16
L. Cascades Reservoir ...	—	—	0·01	0·11
M. Tap in Laboratory ...	—	—	0·005	0·07

*Sediment, in addition to dissolved solids, 51·8 mineral matter, 11·2 organic matter.

Nitrogen as Nitric and Nitrous Acids :—Evandale. —1., 0·25 ; 2., 0·11 ; 3., 0·10 ; 4., 21·41. A., 0·90 ; B., 3·50 ; H., Traces.

EXPLANATORY NOTES TO TABLE OF ANALYSES.

Nitrogen is present in considerable quantity throughout the bodies of animals, and in smaller quantity in plants, chiefly in the fruits and seeds ; consequently the estimation of nitrogen, found in the three forms of free ammonia, nitrogenous, or albuminous organic matter, and nitrous and nitric acids, forms the most important part of the analysis of drinking water.

Free ammonia, present in larger proportion than 0·08 part per million of water, is usually due to the decomposition of urea, showing that admixture with urine has occurred. The average amount of free ammonia in river waters is 0·01 part per million, but this is subject to some variation. Albuminoid ammonia is formed in the process of analysis employed, and represents approximately ten times as much living or dead nitrogenous organic matter. A water yielding more than 0·15 part of albuminoid ammonia is considered to be unfit for drinking purposes. Imperfectly filtered water yielding 0·10 - 0·29 part per million is stated to frequently produce diarrhœa. Nitrous and nitric acids are formed by the oxidation of nitrogenous matter, and have been described as the "Skeleton of Sewage," and as representing "previous sewage contamination;" but the term "old organic matter" seems more appropriate, the nitrogen not being of necessity originally derived from sewage, but possibly from other contaminating matter. The admixture of sewage, etc., may, however, have been quite recent. A good water will contain no nitrous acid. In ordinary cases the total solids consist chiefly of dissolved mineral matter, which in small proportion is unobjectionable ; but in some spring and well waters are found excessive quantities of lime, magnesia, and soda salts (chlorides and sulphates), which render them wholly unfit for every-day use. Water containing more than eight grains per gallon of lime and magnesia salts is stated to be injurious to many persons, but in limestone districts a much greater proportion is always present.

The proportion of chlorine in natural waters varies greatly, but as it is always found in some quantity in urine and sewage, the knowledge of the amount, considered with the other results of analysis, may be of some assistanc in forming an opinion as to purity.

NOTES ON SAMPLES EXAMINED.

Cressy.

Samples 1 and 2, taken from creek supplying Cressy. Colour brownish, from finely divided matter in suspension ; living organisms present.

Sample 3, taken from marsh draining into creek about 100 yards above spot where Nos. 1 and 2 were taken. Milky, from the presence of much suspended matter, the quantity being sufficient to render the water opaque when seen in a layer of about 9in. in depth. A farm-yard and privy drained into the creek near the point where the marsh joins the creek.

Sample 4, taken from tank of house where typhoid fever had occurred. Water orignally taken from creek. Colour, brownish yellow, sediment amounting to 63 grains per gallon, about 52 grains being mineral, and the rest organic filth, swarming with life, including worms.

Sample 5, from tank or barrel next door to house where sample 4 was taken. Water originally from creek. Colour brownish yellow, slight turbidity, offensive smell, contained portions of insects, much organic matter, sporules, etc.

Sample 6, from tank or barrel in neighbourhood, filled from creek. Colour faintly yellow, slight sediment, and living organisms, including worms.

In the case of Nos. 4 and 5, and to a less marked extent in No. 6, water, originally impure, appears to have been from time to time added to store tanks or barrels which were never cleaned out—a filthy mixture, dangerous at all times, and especially so with disease in the vicinity, being the result.

Sample 7. It is to be regretted that the water from the Lake River should have been influentially defended in the Press in a letter from which the two following extracts are taken :—" A friend of mine from Queensland . . . laughs at the idea of it being unfit to drink after seeing the stagnant water of that colony ;" the river being just previously described as ". . . flowing through a large grazing as well as a marshy country which carries a large quantity of stock, the excrement of which is washed into the streams."

Evandale.

Samples 2 and 3, taken from Nile Creek. The results obtained show a perceptibly greater amount of impurity in No. 2 than in No. 1. The creek was fuller than usual when the samples were taken, and this probably rendered the results more favourable.

Sample 4, from well near graveyard, has probably received both sewage and the drainage from the graveyard. Its immediate closing was strongly recommended.

Very great care is necessary in making deductions from the results obtained, and no single standard for comparison has been or can be adopted, the general characters of the water of the particular districts when obtainable being the best guide.

A. This " standard " was proposed some years ago as showing the greatest allowable amounts of various impurities in drinking water, and it is of course desirable that they should fall as much below this as possible.

B. C. That portion of the London water supply which is taken from the Thames is usually considered to be more impure than is desirable, and various proposals have been made to replace it at enormous expense by water brought from places hundreds of miles distant. The river at London Bridge is proverbially impure.

D. Effluent sewage after removal of all solid matters by filtration.

E. This sample of Hobart water was coloured brown with vegetable matter, and was taken from an ordinary house-tap the day after a long-continued drought had been succeeded by heavy rain. The loss of residue on ignition amounted to 4·2 grains per gallon, which may in this case be considered to fairly represent the total organic matter, chiefly of vegetable origin, present in the water.

F. This water contained only a small quantity of vegetable matter in suspension, and the analysis was made on the unfiltered water. The total mineral matter amounted to 2·9 grains per gallon.

G. Total solids and chlorine in considerable quantity ; two-thirds of the former consisting of chloride of sodium (common salt) and chloride of potassium, the remainder chiefly of lime and magnesia salts ; very small amounts of ammonia and nitric acid, not accurately determined.

H. Chloride of magnesium and other salts of lime and magnesia present in sufficient quantity to produce medicinal effects.

I. The water of this well had evidently been polluted by surface drainage.

K. Contained various living organisms and their ova ; mineral matter 2·8 grains per gallon.

Comparative experiments made in cultivating the minute forms of life in the Hobart and Evandale waters showed them to be most numerous in the first-named and the South Esk waters, and least so in the well water. No conclusions can, however, be drawn from these or similar results at present, in the absence of knowledge as to what are dangerous or harmless forms.

CONNECTION BETWEEN IMPURE WATER SUPPLY AND SPREAD OF DISEASE.

Typhoid fever is spread by the contamination of water or air by a specific poison derived from the discharges of infected persons, and there is little doubt that this poison consists of living germs, although they have not yet been absolutely identified. The disease may be due to—

1. Percolation of liquids containing these germs, sometimes to a considerable distance, through the soil into wells and springs or underground tanks, or discharge of sewage into rivers.
2. Exhalations from ill-trapped closets, perhaps connected with house cisterns, defective sewers and privies, etc., containing germs derived from patients; water or milk stored in the immediate vicinity may in this way be rendered dangerous. When exhalations issue into the air they are stated to be immeasurably more likely to communicate disease than is the atmosphere which immediately surrounds fever patients.
3. Contamination of milk, and also possibly of spirits, by admixture with germ-polluted water; the disease is said to have been spread in one case at least by the use of bad water for washing the milk-cans. The popular belief in the absolute protective action of spirits, even in immoderate proportion, is a dangerous delusion.

The following cases of the spread of typhoid fever by water are instructive, and can scarcely be too frequently quoted:—

1. Three hundred and fifty-two persons suffered from typhoid fever, the cause being conclusively proved to be the accidental addition to the water of a small amount of excrement from a sick man who worked for a time in the deep wells supplying otherwise pure water to a large district. Such minute admixture would defy detection by chemical or any other means known at present.
2. A case of typhoid fever occurred in a cottage on the banks of a Swiss mountain stream, which below the cottage flowed for some distance underground; the water, etc., taking two to three hours to reach a village some distance lower down, the cour e and rate of flow being ascertained by throwing in opposite the cottage about a ton of salt. A still larger quantity of flour was afterwards thrown in and well mixed with the water; none of it reached the village, showing that tolerably efficient filtration, which entirely stopped the flour, allowed the germs of typhoid to pass in sufficient quantity to communicate the disease to 17 per cent. of the population.
3. The town of Croydon was supplied with water obtained from deep wells sunk inside the town; these were lined with iron cylinders for a certain distance from the surface to shut out the subsoil water which was known to communicate more or less with the sewers; water from the wells was frequently analysed, but no results pointing to defilement could be obtained until the level was lowered by pumping, and samples of the water trickling through the sides of the wells collected and examined, the movement of the subsoil water being also traced by chemical means. Undoubted sewage contamination was discovered, a sufficient reason for the fact that one person in 42 living in the Croydon water district suffered from typhoid fever, as compared with one in 809 in the district immediately outside, although in many cases the same sewers were used in common by the two districts. The well yielded 0·04 part, and three samples of the leakage 0·14, 0·26, 0·22 parts of albuminoid ammonia per million.

The cases in which this disease has been spread by wells found to be in communication with cesspools are very numerous.

Unfortunately, neither the microscopist, the physiologist, nor the chemist can give a definite answer as to the freedom from disease germs of any water, or, save outside rather wide limits, pronounce an opinion as to its probable unwholesomeness, the difficulty in the latter case being much greater if no history of the supply and its surroundings, and no knowledge of the general character of the waters of the surrounding district, be available.

The safest plan is to consider no water to be fit for human consumption into which sewage has entered, or can at any time enter; and the best test of safety to carefully trace the supply to its source and ascertain that no objectionable impurity gains access to it in its course.

Water mixed with sewage may be, and has been, usde for a long time with apparent impunity; but the greater the pollution the greater is the liability to receive sooner or later the germs of typhoid and other diseases, the nitrogenous matter furnishing material for their multiplication, and possibly also, by lowering the general health, preparing the way for their attack.

The slightest admixture of these germs with the purest water having been conclusively shown to be most dangerous, it is manifestly of the highest importance that the supply of towns should be preserved from risk of contamination by the prohibition as far as possible of all settlement on the gathering grounds, while that precaution, as in this colony, remains a comparatively easy matter. This matter has received much attention in Victoria with very beneficial results.

An originally pure supply may be fouled in the mains by leakage through defective joints when the water is turned off, or the pressure is insufficient to reach the higher ground. The partial vacuum produced in the empty pipes by continued drawing in the lower parts of the distric, would greatly facilitate the entrance of surface water.

The necessity for the utmost care in thoroughly disinfecting all discharges, etc., from a typhoid patient cannot be too frequently insisted on, and full directions as to the best means to be employed are given in the "Rules" issued by the Government; this precaution should be continued for two or three months, as it is stated that a patient is capable of communicating the disease during that period of convalescence. The burial of excreta recommended should be carried out as far as possible from wells.

Other germ diseases, notably cholera, may be spread through the medium of water; and, even in the absence of specific germs, an undue proportion of organic filth is injurious to health, and consequently predisposing to disease.

The typhoid germ finds in excreta a most suitable seed bed for its propagation, and in the words of Parkes:—

"The occurrence of typhoid fever points unequivocally to defective removal of excreta, and it is a disease altogether and easily preventible;" in other words, it is like diphtheria, a "filth" disease.

Tyndall says, on the general question of germ diseases:—

"The physician and the sanitarian have no longer to fight against phantoms, requiring only the fortuitous concourse of atoms to bring them into existence. Their enemy is revealed, and their business is to thwart him, to intercept him, and to slay him; it is not noxious gases, but organised germs, which, sown in the body, and multiplying there indefinitely at the body's expense, produce the most terrible diseases by which humanity has been scourged. Contagia are living things. Men and women have died by the million that bacteria and bacilli might live. These virulent organisms, these ferments of disease hang about the walls, the furniture, and the clothing of the sick room. How is this room to be disinfected? They are diffused in the air of our drains (hence the mystic power of sewer gas). How is that air sufficiently noxious on its own account to be prevented from entering our houses? We know how typhoid fever is generally spread. How are our water and milk to be protected from that contagion? Our hospitals, it is said, infect their neighhourhoods. Is not this preventible?"

While Pasteur says :—

"Man has it in his power to cause parasitic diseases to disappear off the surface of the globe, if, as we firmly believe, the doctrine of spontaneous generation is a chimera."

Having now done with general considerations, let us consider our own case.

The original purity of a water from such a superb gathering ground as Mount Wellington may be to some extent counteracted if the channel by which it is distributed be not carefully constructed, and a watch kept both as to settlement on this gathering ground and along these channels. I propose to indicate shortly a few points which can only be regarded as blemishes on what should be an almost perfect supply; small, perhaps, some may say fanciful, but in my opinion not desirable, either from a sentimental or a sanitary point of view.

On one side, the Fern Tree Inn and a cottage are not far removed from the covered troughing, which just below them runs through a shallow cutting in a vegetable garden, and on the upper bank of this cutting manure is heaped, possibly all the year round, while on the reservoir dam stands a house, the ground sloping down from it to the edge of the reservoir. On the other side water is brought for some distance in an open channel parallel with and below the Huon-road, from which it probably receives rain washings; from the small reservoir it flows unconfined down the hill-side, spreading over much ground covered with vegetation, until it reaches an open channel, unprotected for hundreds of yards from the drainage from steeply sloping paddocks on either side, some ploughed, others much used for pasture, all heavily manured, directly or indirecly, passing then through the busy brewery yard to an uncovered reservoir by the side of and below a much frequented road.

The effects of this treatment are shown in analyses marked L. and M. in the table, M. being a mixture of the waters from both sides; the increase of impurity, looking at the quantity only, is extremely small, but it indicates the possibility of risky contamination in the future. (Applause).

Mr. R. A. Bastow stated in reply, that they were all deeply indebted to Mr. Ward's able paper, and would like to call the attention of the Fellows to the maps and diagram on the wall, as they bear on the subjects of typhus and typhoid fever. The City of Manchester is divided into a number of registration sub-districts, and these are again divided into sanitary districts, the maps of two of their sanitary districts are there hung, and it will be at once perceived that they contain very differently arranged properties; they are two districts, and each represents one-ninety-ninth part of the city of Manchester. In 1881 there was not a single case of typhus or typhoid fever in the sanitary district tinted with green and blue, its streets are wide and straight, every house has its own earth or ash-closet and yard, and the drainage of both yards and streets is not to be excelled in any city in the world. The other map, tinted red and brown, contains old houses, with numerous courts and alleys, along these the health inspectors are continually perambulating, but notwithstanding their watchfulness, typhus and typhoid fever often there prevail to a great extent. In the year 1881 in this small district there were 20 cases of typhus and typhoid fever, resulting in five deaths; the population being only 3,955, against 10,305 in the neighbouring healthier district just alluded to. From this we conclude that, given old brick drains, ineffective stench traps, close courts, dirty rooms, and a filth-loving population, we have a pabulum favourable in a high degree to the development of typhoid and typhus fever. That an outbreak of such fever can be effectively stamped out, we need only point to the pen and ink diagrams to prove. It is drawn to the scale of 100 deaths per inch vertical, the column of greatest height respecting the deaths from typhus and typhoid fever in 1868 for the whole city, viz., 638; these gradually diminish for the subsequent years until we reach 1881, in that year only 75 deaths occurred from typhus and typhoid fever in Manchester. Glancing at the diagram, if it be asked, What made so great a change in the mortality from fever? The reply is—The removal of 16 acres of cesspool, 4ft. deep, the thorough cleansing of many miles of ill-swept streets, courts, passages, and yards, partially covered with decomposing animal and vegetable matter; the closing of burial grounds in the city; the condemnation of private slaughter houses; and the removal of emanations from drains. Nevertheless, cases of typhus and typhoid fever still occur in that well-regulated city, and will continue so to do as long as a certain grade of the population will congregate in the dark corners, and by choice be filthier than brutes. The drinking water of Manchester has been pronounced very good by eminent analytical chemists, but it is patent to all who visit the locality referred to, that the population is of the lowest stratum, and their habits are of the filthiest. The dirty, drinking, gossiping women inhabiting such a district as that shown on the brown coloured map, can, with the assistance of the milkman, sow the infection broadcast. May not the germs of typhus and typhoid fever be the bacilli or bacteria left high and dry from the sewers, or raised from that thin native noisome element by evaporation, and before they have time to be otherwise affected by the atmosphere, find a congenial hotbed for propagation in the systems of ill-fed, ill-clothed, ill-housed, and ill-washed humanity? According to their environment, do these germs develop sometimes into animal, and at other times into vegetable forms. (Hear, hear.)

Mr. R. M. Johnston said he had himself on a former occasion drawn attention to some of the supposed causes which led to the rise and fall of the death rate in Tasmania, and now Mr. Ward had brought forward another one, namely, the pollution of the waters. The care that should be exercised in regard to the state of the water they drank could not be overestimated, and should not be neglected in any respect. He had been very sorry to see that in some of the thinly populated districts there was great neglect on this point, especially in the neighbourhood of the tributaries of the great local rivers. In the bends of the river he had seen animal skins lying, and various matters connected with tanneries. In the South Esk he had seen animal matter largely carried into the river, which might, at some future time, cause very great injury to the community. Notwithstanding the value of Mr. Ward's paper, he did not think the discovery of the nature of the typhoid germ had been fully explained. There was an unknown cause, an inexplicable wave movement, which obtained much greater power at one time than it did at another, the deviation being accompanied by no apparent cause. These difficulties did not show that the conclusions come to already were of no value, but how difficult a matter it was to settle if there were something else hidden behind those conclusions. Why, for instance, should the death rate have gone up so suddenly in 1878, the year referred to by Mr. Ward; and why, again, last year with a probable increasing impurity in the water did the rate fall to a lower level? This wave action was felt while the local influences were the same. With regard to Mr. Ward's experiment, they required to know whether the germs he had developed was the typhoid germ, or whether it was harmless. He was inclined to think they were so, and that in this room bacteria germs were floating about in large quantities (—laughter)—and would develop themselves in the proper medium if it were present, so they must inquire if the germs found in the water came from the air or from the water itself originally. It was very significant that Mr. Ward had shown that the liquidity of the substance commenced from the top. It was possible, therefore, that the germs were imported from the air. So they should look and see that the germs did not fly hither and thither through the town in the air to the injury of weak persons. Mr. Johnston drew special attention to the immunity from disease, which was the rule in Tasmania, and showed by diagrams that the death rate, in its entirety, and as regarded zymotic diseases alone, was less here than in either of the other colonies.

Dr. A. B. Crowther said though he had not come to the meeting with any intention of speaking he thought it only right that as a medical man he should give the assistance to the society which lay persons could not do. Mr. Ward had already pointed out some of the evils which existed in the colony, and what Manchester, for instance, had done in order to remove abuses, and the example ought to be followed in Tasmania. When he was resident in Campbell Town some years since, an outbreak of typhoid was distinctly traceable to the way in which the waters of the Elizabeth were dammed up, and now they were made to flow freely there was no such danger. In Launceston typhoid was no doubt owing to the presence of the burial grounds within the town boundaries, draining towards the centre of it, and to the presence of cesspools, some of which had not been emptied for years. He had done his best while he resided there by lecturing and in other ways to get these things remedied, and had pointed out how much better Hobart was than Launceston in having the cemeteries outside the city. There could be no question that when they got a proper system of dry earth closets the cesspools would be done away with altogether. Year by year they found typhoid arising in the same place over and over again, showing that there were the *foci* from which the disease spread. He thought that typhoid and typhus should be placed in the general wards of the hospitals, as was the rule in the old country, and as there was no danger of subjects adjoining becoming affected. In relation to the question of the filtration of water, he would say that water ought to be filtered over gravel beds and sand. This would help to do away with many childish diseases, such as worms. They knew very little about the relation of worms to the human body as yet, but something might be done in the way he had indicated. It was very important that the public should be instructed in the use of disinfectants. Sulphate of iron was very cheap and effective in assisting to destroy the germs.

Dr. Perkins said he had not prepared any remarks for the meeting, as he was unaware of the nature of the paper to be delivered. A great deal of it was not new, but it was true, and none the less interesting. One was almost inclined to say with Lyon Playfair, that he was inclined to eat and drink everything, and ask no questions at all. It was an almost superhuman task to eradicate everything that was bad. But still Dr. Playfair had been converted, and so he hoped they might be in a similar manner. In reference to the destruction of germs, he would point out that it was now known that disinfectants would not destroy some bacilli. The bacilli of cholera, for instance resisted them, and the only way in which some of them could be disinfected was by drying them, and even then, if they were again moistened, they were re-animated. The only way to kill them was to make them perfectly dry, and keep them so. In that way they were taught not to use disinfectants indiscriminately in all cases, or to use much washing and cleaning, but to expose the clothing, etc., of cholera patients to the sun and air. They could not go on using one fixed line for everything. He would have liked to have seen the question of the origin of typhoid in the colonies gone into at this meeting. Dr. Thompson, of Melbourne, had gone into it very thoroughly. Were the germs brought to the colonies by passengers in ships, or had they been present in the world from the beginning of all creation, ranking with the first origin of all things? Was it that the germs were not noxious—things to be hated—and not merely things for the transmission of disease to man, but having their own proper rank in the scale of creation? Was the fact of the transmission of disease by them a mere accident, or the result of man's own fault? That would of course open up the question of spontaneous generation. Bacteria and bacilli were present everywhere throughout the world, and the greater part of man's immunity from their influence was due to his powers of resistance. In regard to Dr. Crowther's remarks about typhoid patients being allowed to mix with the other patients in a hospital, he would like any medical man to show him what advantage could accrue from doing so, instead of keeping them distinct, as they did here. Even allowing the disease to be neither contagious nor infectious, what advantage would be gained by putting them with the other cases? As they knew, typhoid was disseminated from the excreta, and if that was to be carried about up and down stairs, a great risk would arise from it. They would need better reasons than had been given before they changed the plan which the medical officers here thought it wise to pursue. He was quite sure there were exceptions, and in London and in Edinburgh the typhoid patients were kept apart, and for his part, he hoped they always would be. (Applause.)

Mr. Ward, in answer to Mr. Johnston as to the germs in his liquids coming in from the air instead of being developed from the water, pointed out that the wool at the mouth of the tubes would act as an effectual filter; and further, that he had treated distilled water in a similar fashion, and no germs had been developed. He had not intended by his attention to this subject to imply that there was any particular prevalence of typhoid in our midst, but rather to, if possible, reduce the quantity still lower, and to do his best to arrive at the conditions sketched by Pasteur. Their immunity in the past was not due to any particular care in guarding against evil. All they had to do in regard to food and drink was not to do as Dr. Playfair said, but to see that they got a good supply; to be careful that they got it pure, and then to think of it no more than was necessary to keep it in good order. In regard to the introduction of typhoid into the colonies, that might have occurred on board ships by carelessness in the filling of water casks, either here or on the way home. He saw a case of this description reported only the other day, where every member of a ship's crew was prostrated, owing to the bad quality of the water at the last port of call. (Applause.)

The Curator read a paper by Baron F. Von Mueller, K.C.M.G., entitled, "Notes on Jean Julien Houton Labellardiere, botanist of the search expedition sent out under Admiral D'Entrecasteaux to ascertain the fate of Count La Perouse and his crew." The paper was accompanied by a photo-lithograph of Labellardiere, a copy of which will be inserted in the proceedings of the society for the year.

NOTES AND EXHIBITS.

Mr. C. J. Atkins read some notes on the sea-worm Synapta, illustrated by Polarized Light. He said: The class Echinodermata includes the marine objects known as sea-hedgehogs, sea-urchins, and sea-eggs. The members of the group generally develop a calcareous skeleton (set with spines) as an outer covering or integument. The body is globose or cylindrical, and a ring of nerve branches issues from the mouth. The genus of this class called Synapta are cylindrical in form, the body being traversed by an alimentary canal, and the mouth is surrounded by a fringe of radiate feelers, which are the ends of the nerve system of the animal, and serve the purpose of drawing in its food. A skeleton of calcareous plates exists below the tough outer skin, and embedded in these plates are curious anchor-like appendages, which protrude through the skin, giving a rough or rasp-like appearance to the worm. The anchors are used both as an assistance to the Synapta in its movements, and for fixing itself in the mud or sand ; they are attached to the anchor-plates, and are immovable. The Synapta is common on the coast of the south of France, and on other shores of the Mediterannean, also in those of the Red Sea. Dr. Herapath mentions the species galliennii as being obtained by him at Torquay, England. (Quart J. Microscopy, 1865.) It is generally found in burrows in the sand, and is difficult to collect as a perfect specimen, owing to its dividing into separate pieces when handled. The anchor-like spiculæ and plates appear as very brilliant objects when polarised, and I have placed under the microscopes specimens of them this evening.

Mr. Saville-Kent, in reply, said : I have much pleasure, in illustration of the paper last communicated, in exhibiting to the society living examples of the genus Synapta, dealt with by Mr. Atkins, and also of a yet rarer, but closely allied form belonging to the genus Chirodota. These specimens were obtained by me a few days since when dredging between Kangaroo Point and Ralph's Bay. This locality I may refer to as being remarkably rich in representatives of the same animal class, the Echinodermata, no less than thirteen distinct species, including members of all five of the leading sections or orders of this interesting group having been secured. These embraced three members of the sea-cucumber order, or Holothuridea ; three varieties of ordinary starfishes, or Asteridea; two sorts of brittle stars, or Ophiuridea ; four species of sea urchins, or Echinidea; and several examples of feather stars, or Comatula, representing the Crinoidea, or fifth order of the class. A very remarkable feature is associated with the genus Chirodota, to which I would more particularly draw attention. This organism is an elongate worm-like animal, of a violet hue, possessing an oral tuft of retractile tentacles, as in Synapta, and, like that type, the substance of the integument is strengthened by the development within it of innumerable calcareous plates. These plates are of a very peculiar form, taking the shape of beautifully symmetrical six-spoked wheels, and having interspersed among them, at more or less distant intervals, hook-like spines, which evidently fulfil the same function as the anchor-like spicules of Synapta. The species obtained in the Derwent estuary differs from the more familiar European species (Chirodota violacea), in the minute structure of the calcareous "wheels," and in their general outline, which more nearly approaches a hexagon than a perfect circle. Writing of the European species in his book, "The Microscope and its Revelations," Dr. Carpenter has characterised Chirodota as differing from Synapta in the entire absence of anchoring spicules. This diagnosis must, however, evidently be modified with relation to the Tasmanian variety. My recent study of living examples of these two genera has shown that their method of feeding is precisely identical with what obtains in the large and more familiar representatives of the same group, known as the Sea-cucumbers or Trepangs. The manner in which these last-named animals took their food long remained a mystery, and was solved by me in connection with specimens cultivated at the Manchester Aquarium in the year 1875. A correspondence upon this subject will be found in the pages of *Nature* for the year 1884.

It was then observed that the plumose tentacles that surround the mouth are systematically swept like mops or brushes over the surface of all objects with which they came in contact, and all minute organic particles that can be detached are carried off and thrust bodily with the tentacle down the creature's throat. The tentacle is then withdrawn and extended to repeat the mopping process, all the other tentacles following suit in almost rhythmical order. This feeding process here described may be witnessed in the relatively small species of Chirodota now exhibited. Under a higher power of the microscope I also exhibit the remarkable wheel-shaped plates and hooklets that underlie the surface of the integument. Among the practical results derived from my recent examination of the Holothurians I have to record one fact which I regret to say somewhat detracts from the admiration hitherto conceded to their aspect and structure. A friend (Mr. Mackay) having suggested to me that a large assortment of the minute shells known as foraminifera might be obtained from their intestines, I dissected and examined several specimens, with the view of ascertaining what varieties they obtained for food on this coast. Foraminifera were found in abundance, comprising chiefly the genera Miliola, Rotalia, Textularia, and an arenaceous form allied to Reophax. There was also a large variety of diatoms, and the main bulk of the food material of these holothuria may therefore be said to consist of the simplest animals and plants, or protozoa and protophytes. There was a small residuum of food matter, however, that had to be relegated to a much higher organic group. This consisted of the shells of exceedingly minute bivalve molluscs, which I identified as the embryonic stages of some representative of the cockle tribe. This fact being determined, the suspicion naturally arises that in the sea cucumbers a new enemy of the oyster in the earliest stage of its development has been discovered. The habit of the animal to feed on all minute forms of organic life, including embryonic molluscs, being established, it may be logically predicated that the large sea cucumbers, more especially with their relatively powerful mop-like tentacles, would make a clean sweep of any newly-attached oyster spat that might be adhering to the stones, shells, or other objects over which they creep. How far these deductions are borne out by fact I shall hope to report to you at length on some future occasion. Mr. Saville-Kent intimated that the construction of the marine hatchery and aquarium at his residence being now completed, he would be very pleased at all times to welcome members of the society who would like to inspect it. It would be some time yet before the tanks were sufficiently seasoned to allow of the maintenance of a large stock of marine animals, but they would already, perhaps, find a few things to interest them. (Applause.)

THE MICROSCOPE.

A most interesting feature of the evening's proceedings was the microscopic exhibition which took place at its close, illustrative, to some extent, of the papers read. There were seven microscopes on the table, five of them binoculars, viz., three of Ross', one of Baker's, and one of Smith's. Mr. Atkins' very fine Ross instrument was used for the display of the various features of the Synapta suriniensis referred to in his paper, their peculiar formation and anchor-like appendages creating much wonderment. As seen in the field of the microscope, these latter have the perfect form of a ship's anchor, and the objects seen under the influence of polarized light display the most brilliant iridescent tints. Synapta and bacteria were similarly exhibited by Mr. Saville-Kent, F.L.S. Some very beautiful mounted specimens of mosses were shown by Mr. R. A. Bastow, among them Andræa petrophila, Sphagnum obtusifolium, Phascum apiculatum, and Fissedens bryoides. Mr. Bastow's paper was postponed until a future evening.

A CELEBRATED PICTURE.

On the table was exhibited an oil painting of an English salmon by S. Rolfe, the celebrated fish artist, who is familiarly known as the Landseer among fishes. In addition to his contributions to the Royal Academy, he painted many of the casts of salmon and other fish made by the late Mr. Frank Buckland, and exhibited in the South Kensington Museum. Our own museum is also the fortunate possessor of two of these artistically executed casts.

VOTE OF THANKS.

Mr. JUSTIN BROWNE, in rising to propose a vote of thanks to the authors of papers, and the donors of gifts to the Museum, said that it must be gratifying to the members of the society to note the tone of the papers, and their scientific tendency during the last two years. Previously we used to count our scientific members by ones and twos; now we seemed to be getting more science men amongst us. (Applause.) It might not be known to everyone present that the last speaker, Mr. Saville-Kent, had spent a great part of his life upon a work which had given him a great reputation. The society had this book, which would well repay any time spent in examining it. Another speaker had passed 10 years in Manchester, carrying out sanitary measures, which all civilized people now considered as essential. Such addresses as we had heard to-night would give a tone and a scientific turn to our papers which would add to the society the scientific character which it was presumed to possess under the name of the Royal Society. (Applause.)

Bishop SANDFORD, in rising to second the motion, said that he could say but very little after the able manner Mr. Browne had proposed the vote; he would, however, merely state that he was of opinion much might be done in keeping in check most of these diseases that were so fatal in many cases. (Cheers.) He was glad to see some members of Parliament present, and trusted that what they had listened to this evening would tend to encourage them to vote for strict sanitary measures. (Applause.)

Dr. H. A. PERKINS, in supporting the motion, said that no doubt the Fellows were aware that a Public Health Bill was shortly to be introduced by the Government, but he was sorry to see that the power in some cases to deal with this important matter was to be left in local hands, which, in his opinion, would not tend to work satisfactorily.

The motion was carried by acclamation.

AUGUST, 1885.

The monthly meeting of the Fellows of the Royal Society of Tasmania was held at the Museum building last evening. Mr. James Banard, Vice-President, occupied the chair, and there were also present the Bishop of Tasmania (Dr. Sandford), the President of the Legislative Council (Hon. W. A. B. Gellibrand), and about 40 other gentlemen.

NEW MEMBER.

Mr. TURNBULL was re-elected a Fellow of the Society.

RETURNS.

1. Number of visitors to the Museum during the month of July:—Week days, 2,150; Sundays, 780. Total, 2,930.

2. Number of visitors to Royal Society's Gardens during the month of June, 4,900.