NOTICES OF THE PROCEEDINGS

OF

THE SOUTH AFRICAN INSTITUTION.

September 15, 1830.—Dr. Smith having announced his approaching departure for the Frontier, requested that an acting Secretary might be elected to supply his place.

October 27.—Lieutenant-Colonel Wade was unanimously elected a Member of the Institution.—There were laid on the table the following works, by G. F. Jaeger, viz.: "Ichthyosauri sine Proteosauri," and his "Public Oration"; presented by Mr. Von Ludwig. Also, a Copy of the Observations with an invariable Pendulum at the Royal Observatory, Cape of Good Hope; presented by the Rev. F. Fallows, Astronomer Royal; and a MS. copy of the Annual Report of the Natural History Society of Mauritius, communicated by Mr. Telfair, President of the Society.

It was, according to a recommendation of the Council, resolved—That all Ordinary Members of the Natural History Society of Mauritius, visiting this Colony, be entitled to the privileges of Corresponding Members of the South African Institution, while they are resident in Cape Town.

There was read "Remarks on the Eastern Coast of Africa from the Cape of Good Hope to Point Natal," by the late Mr. King; in which the author described the precautions proper for sailing, anchoring, &c. on various parts of the coast; and narrated the circumstances attending his being ship-wrecked at the mouth of Port Natal.—The Secretary gave an epitome of a Paper, by Mr Grisbrook, containing Remarks tending to elucidate Horse-Sickness, which he had collected; and recommending that the circumstances attending that malady in this Colony should be compared with those which he commented on.

December 1.—The Honorable Captain Stockenstrom was elected a Member of the Institution.—There was read: The Annual Report of the Natural History Society of Mauritius, of which an Abstract appears in this Number; and a Paper by Mr. Faraguet, being an account of a Comet seen on the 16th of March 1830. This Comet was first observed between the Chamelion and the larger of Magellan's Nedelae, and disappeared towards the end of May, near to the eastern wing of the Swan. The length of its tail never exceeded 5 degrees. By a great number of observations of its distance from several stars, Mr. Faraguet obtained the following elements:

Passage of Perihelion, mean time,	
At Port Louis......................April.	11 d. 21 h.
Perihelion distance	0.897.
Place of Perihelion......................	7 s. 28° 13'
Inclination of Orbit	49° 46'
Longitude of Ascending Node	7 s. 18° 31'
Movement..............................	direct.

December 29.—Mr. Edward Verreaux was elected a Member of the Institution.—Readings were deferred on account of the small number present.

February 19, 1831.—There was this day held in the Institution Rooms, a show of Fruit, &c; and a competition for Premiums formerly advertized. The following Medals were awarded:

1 to Mr. P. van Breda, for Figs.
1 to Mr. J. Cloete, for Peaches.
1 to Mr. Cloete, Leweuhoff, for the best specimen of Grapes.
1 to Mr. Bergh, Buitenbant, for the greatest variety of good sorts of Grapes.
1 to Mr. P. van Breda, for the best Cabbages.
1 to the Gardener of the Rev. A. Faure, for Mangold Wortel.
1 to Mr. M. van Breda, for Bananas.
1 to Mr. M. van Breda, for the greatest variety of good Vegetables.

April 5.—There were presented to the Council, specimens of the Gilloorie of India, from Madame de la Coudrie, and a collection of Birds, sent by Dr. Smith.—There was read a letter from Mr. Bowie, of date 1st Dec. 1830, declining for the present to accede to the arrangement proposed to him, regarding a Botanical Establishment in the Government Gardens.

May 25.—Mr. Chase, a Correspondent of the Institution, was elected a Member.—There were presented from the Rev. Mr. Halbeck, Superintendent of the Moravian Institution at Genadendal, the Skull of a Hippopotamus, and Specimens of Fossil Wood.—There were read, 1. An account of Plants recently imported into the Colony by Mr. Von Ludwig; and,

2. A narrative of the death of Mr. Cowie and Mr. Green, by Mr. Chase. (Both are printed in this Number.)

June 13.—This day the Annual General Meeting was held. His Excellency the Governor, Patron of the Institution, in the Chair. A Report of the Proceedings of the Institution, during the past year, was read and approved: the Members then proceeded to the election of Office-Bearers for the ensuing year, and the Scrutineers reported the following as chosen by majority of votes, viz.: President, The Honorable Lieut.-Colonel Bell, C.B. &c.; Vice-Presidents, Mr. Joubert, Dr. Murray, Mr. Stoll, Mr. Von Ludwig; Councillors, Mr. Makrill, Major Michell, Mr. D. Cloete, Rev. A. Faure, Major Cloete, Mr. Hertzog; Treasurer, Mr. Watermeyer; Secretaries, Dr. Dyce and the Rev. Dr. Adamson; and the following having been presented as the Junior Members of last year, viz. Mr. M. van Breda, Mr. G. Thompson, Mr. Reid, the above were declared to compose the Council for the ensuing year.—There were elected unanimously, to be Honorary Members of the Institution, Lieut. Colonel Colebroke, Professor G. Vrolik, senior, of Amsterdam; Dr. Ruys van der Hoeven, of Leyden; Dr. Somerville, Inspector General of Hospitals; Professor Hockstacter, of Esslingen in Wurtemburg; Dr. Steudel, do; Professor C. G. C. Reinwardt, of Leyden; — Van Roser, Councillor of Legation, Stuttgart; Dr. Jaeger, Stuttgart; Dr. van Keilmeyer, Councillor of State, Wurtemburg; Professor Ferdinand von Gmelin, of Tubingen; Professor Christian Gmelin, do.; Eduard Ruppel, Franckfort on Mayne; Dr. P. F. Kretzschmar, do.; Dr. Burke, Inspector General of Hospitals.

The Gold Medals awarded in 1830, to Mr. Bowie and to Mr. Naude, and the Silver Medals awarded by Resolution of 19th February 1831, were presented by His Excellency. There was then read a letter from Mr. Justice Menzies, inclosing an extract of a letter from Lieut.-Colonel Colebroke, and recommending that the Institution should open a correspondence with the Royal Asiatic Society, according to the example of the Literary and Agricultural Society of Ceylon, the Prospectus and Regulations of which accompanied this communication. The Council was instructed to give early attention to this proposal.

July 6.—There were presented some models of Anchors, transmitted by Capt. Evatt of Port Elizabeth; and also a model of an instrument for reaping grain.—It was resolved, that according to the recommendation of the Council, premiums be offered for Vegetables, &c. and for the best specimen of Cape Brandy; and it was announced, that Mr. Von Ludwig renewed his offer of a premium of Rds. 50, for the best specimen of Cape grown Leaf Tobacco: the two latter to be awarded at the Annual General Meeting in June.—There was read a paper by Mr. Reid, Member of the Institution, on the Salts of Mercury, and some of their combinations, used in Pharmacy, (printed in this Number of the Journal). Dr. Adamson, Secretary, exhibited and described a Thermometer, intended to register the variations of temperature at all times. This consisted of a Thermometer of a peculiar construction, suspended so as to vibrate like a balance upon an axis, and mark the variations of temperature by tracing a line upon a surface. The object was effected by the following arrangements:—a sufficient degree of varying preponderance must be given to one extremity of the tube, to overcome the friction with which the tracing point has to contend; which cannot be attained by filling the thermometer with mercury or alcohol alone, because the quantity by which mercury expands for one degree, is too small to affect sufficiently the friction of the instrument, even when suspended in the most delicate manner, and the weight of a column of alcohol is too little to produce the requisite power by its greater expansion. We must, therefore, employ the expansion of the lighter fluid, combined with the weight of the heavier one. The instrument exhibited, consisted of a tube having a diameter of about one sixteenth of an inch, with a bulb at each end. The larger bulb was filled with transparent alcohol, which by its expansion moved a column of mercury, filling the whole of the tube connecting the bulbs. The smaller bulb serves simply as a reservoir into which the mercury may be driven. The shifting of the centre of gravity of this column of mercury, affords the preponderance which we want, and the power of the instrument, in this respect, will depend on the length and weight of the column, and on the size of the bulb filled with alcohol. The materials must be so disposed that neither the alcohol at one end nor the air at the other, have any opportunity of rising through the mercury, in the different inclinations of the instrument. It is, on this account, requisite to have a piece of the tube adjoining to the bulbs, at each end, turned upwards, and so to balance the instrument, that the tube when quite filled with the mercury shall be horizontal. It would be advantageous for the above-mentioned purposes, that the tube should be of smaller bore, and that the mercury should partly fill the lower parts of both bulbs; but in this case the graduation of the instrument could be effected only by comparison with another. It is evident that the same method of producing preponderance may be attained very readily in the sympiezometer, so as to indicate the variations of barometric pressure.

The friction at the axis may be rendered almost insensible, by suspending the instrument on a single point.

The registering part of the instrument exhibited, consisted of a light vertical arm attached to the tube at the axis of motion. At its lower extremity was attached a delicate glass tube, being one of those used for containing the leads supplied along with Mordan's pencils; inside of the tube there was a light-pointed spine or bristle, so as to move freely up and down, and rest upon a surface beneath the tube. This surface was a thin and long moveable plate of transparent mica. The preponderance in the thermometer makes the point move across this plate. On the underside of it, lines are to be drawn perpendicular to the direction of the point's movement, and at intervals corresponding to the divisions of the thermometric scale. Thus the movement of the point across this plate indicates the temperature. The plate itself is made to move lengthways, under the marking point, by means of a watch or timepiece. And across the thermometric divisions, on its under side, are drawn other lines, marking the divisions of time. When the instrument is set to work, the smooth upper surface of the plate of mica is blackened in the smoke of a lamp, and properly disposed under the marking point, which, by resting upon it, will, under the influence of its own movement from variations of temperature, and the movement of the plate by the watch, trace a distinct waving line on the blackened surface; the intersections of which, with the divisions on the under-side, point out the rate and period of the variations of temperature. The plate of mica was bent to a cylindric surface, so as to accommodate the circular movement of the marking point. It was shown that the traces could be advantageously received upon a concave spheric conoid, kept in continued revolution. The advantages of using mica in delicate measurements, or for scales of instruments, was also illustrated.

Aug. 31.—There was announced as presented by Mr. Ebden, a specimen of the Macacou or *Madagascar Cat.*—Capt. Bance presented a report respecting the models of Anchors, sent by Captain Evalt of Port Elizabeth; in which he showed, that the contrivance proposed as a modification of the common anchor, would prevent it from keeping so fast a hold of the ground, in consequence of the shank being jointed, or moving in the plane of the arms, upon an axis at the crown. There was presented a copy of a Memoir on Steam-boats, by Captain Pole of His Majesty's ship Maidstone, with remarks thereupon, by Monsr. Faraguet of the College at Port Louis. This memoir contains the description of a revolving paddle proposed by Capt. Pole, to be applied to steam-ships. It was accompanied by additional observations from Capt. Pole, in which he proposed and described a species of paddle acting by direct impact, to be employed for the same purpose. Dr. Adamson elucidated this subject by remarks of the following tenor; being chiefly an outline of a paper on the subject, prepared by him about 10 years ago.

Before being able to investigate theoretically the effects of different kinds of machinery, we must derive from our experience some measure according to which the power we seek to create may be estimated. This measure is attained with accuracy sufficient for practical purposes, in the case of the steam-boat, by assuming the stream of water driven off from the vessel as a representative of the force by which it is propelled. We thus simplify the problems offered us, by identifying them, with the determination of the effect of streams of given sections and velocities. We may assume the resistance of the vessel to be constant, or that the different kinds of machinery proposed are applied to the same vessel: and we have to consider what are the conditions under which they will communicate to it a given velocity. The stream or efflux required for this end, may have different characters; as being either of a large section and small velocity, or of smaller section and great velocity: and if we fix on a determined speed to be given to the vessel, it is easy to assign theoretically, the most advantageous velocity of the stream, or of the propeller which creates it. There can be little doubt that this velocity has hitherto been rated too low; and that with the common external machinery the velocity might be advantageously increased, and the section of the stream or size of the propelling parts diminished. The present established relations between these elements, seem to arise, not so much from the erroneous theories which have propagated on the subject, as from the difficulty of increasing the velocity to its requisite value, without producing the greater disadvantage of adding complexity to the internal machinery. The experiments necessary for the proper elucidation of these matters could be easily made, and would afford important results. We can notwithstanding, guided by our present experience, employ the measure proposed, as affording without the chance of great error, an easy and beneficial method of comparing the effects of different modes of action in known or proposed machinery. We may assume the following case as determined by practice: that, if the striking surface of the propellers be 15 square feet, and the velocity of their centre of reaction, or of the stream which they create be 10 nautical miles per hour, this will produce a velocity of 7 miles per hour, in vessels of an advantageous shape, measuring about 300 tons. In all cases where a stream of the same section and velocity, or of the same dynamic effect when these vary, can be produced, we may decide that the effect will be the same. Representing the moving power in this case by the number 1600, we may estimate the effect of any machinery as of the same amount, when the section of its stream multiplied by the square of the effective velocity of the striking part, produces this number.

In determining the value of different kinds of propelling machinery, we have only to ascertain the greater or less amount of power in the internal machinery, which will be required, when the contrivance works under such conditions as to produce the result above-mentioned.

All kinds of propelling machinery may be divided into two classes, according as the movement is rotatory or rectilineal and each division is susceptible of two subdivisions, according as the striking surface meets the water directly or obliquely. There are therefore four varieties:

1. The first, viz. when the movement is rotatory and the pressure direct includes the oar and the common paddle wheel. The latter is in principle the same as the former, deprived of its back stroke, or reciprocating movement. So great are the advantages of the common paddle wheel, on account of its slight friction, its simplicity, and its regularity of movement, that it will probably never be superseded in its application to ordinary purposes. The simplest form of it has hitherto retained its superiority over the complex contrivances proposed for rendering its action more advantageous. In fighting ships or batteries moved by steam, it has occasionally been placed internally, as affording greater security to it. It might in such a case be secured beneath the surface of the sea, by being placed horizontally; the water being supplied from forwards, so as to be led in at the centre of the wheel; but propelled backwards from its circumference, as happens to the air in certain blowing machines. The power required to produce a given effect, would in this case be much increased.

2. The second variety, which is when the movement is rotatory and the impact oblique, offers the construction proposed in the first memoir by Captain Pole, and by many others, in several different forms. A patent seems to have been got for it, about thirty years ago. It may be described as identical with the arms and vanes of a windmill or smoke-jack, revolving under water. On account of the obliquity of its surface, the vane must move about twice as fast as the stream it produces

This velocity could be attained only by giving the propellers very long and cumbrous arms, or else very great rapidity at their axles. The construction is evidently therefore not suitable to the purposes of ordinary navigation. But as the apparatus may be put entirely under water, it may be found efficient enough, to give a secure but slow movement, to a steam-ship armed to defend a harbour.

3. The third variety is when both the movement and the impact are direct, as is the case with the piston of a pump, or a vertical surface drawn or driven in the direction of a vessel's progress. A contrivance of this kind is proposed by Captain Pole, in his second memoir. It may be remarked in general, that when a flat surface is propelled against the water outside of a vessel, the friction of the spindles or rods which carry the surfaces or flaps, and the resistance to the return of these surfaces, when their effective stroke is made, must be so great as to render such constructions quite inefficient for any but very slow movements. A modification of this variety of propeller was among the earliest contrivances proposed for moving ships. It was suggested by Bernonetti, and afterwards by Dr. Franklin. It consists of a pump inside the vessel, drawing water in at the bow, and ejecting it at the stern. Though never yet successfully put in practice, it seems to be the most promising of those methods which admit of the machinery being entirely under water. The old engine of Savary, without a piston, or with a quantity of oil in place of one, might be employed; or the piston of the pump might be attached to that of the steam cylinder; in either case we should have a machine of the simplest and most convenient form conceivable, especially if in the latter instance it were so disposed as to work horizontally. A patent for a contrivance on this principle was taken out in 1820. The details in the Edinburgh Philosophical Journal, vol. v. seem to show a misconception of the scale on which an effective apparatus of the kind must be constructed. This principle possess the advantage of allowing the velocity of the striking or pressing surface, to bear any ratio whatever to that of the stream it generates The velocity of the steam piston ought not to be so much as two miles per hour, and if, for the purpose of attaining the effect of 1600 mentioned above, we retain the same section and velocity in the stream, each stroke of the pump would need to expell more than would fill five times the length of the stroke of the steam piston, in a channel having a section of 16 square feet. This could be effected by means of boxes inclosing a series of pistons attached to the same piston rod, but only by the sacrifice of a very great space inside the vessel. If, however, we re-

duce the section or aperture to *one* square foot, the velocity of efflux must be 40 miles; and if it were *four* square feet, the velocity would be 20 miles. In this last case, the pump must discharge at each stroke, as much as would fill a channel of 4 square feet, to the height of ten times the steam piston's stroke. Even in this case the machinery will occupy much room; nor does the principle seem applicable to any case but that formerly alluded to, when it may be required to produce a small velocity by means of machinery defended against that.

4. The fourth variety of propellers, is that in which the movement is rectilineal, but the impact is oblique. Several proposals of machinery of this kind have been offered. They promise little advantage. The propellers may work on a plane perpendicular to the vessel's course, either vertically or horizontally, and be completely under water; and the return stroke produces the same effect as the other directed outwards; but there is here the disadvantage of oblique impact already mentioned, that the velocity of the striking surface must be double that of the stream which it generates. The machinery would be cumbrous, and easily disarranged.

It will be ovious from this analysis, that the ordinary revolving paddle-wheel is superior to other contrivances for common navigation by vessels of burden.

Where so great an extent of cooling surface could be so readily procured, the proposal to employ alcohol, or brandy, in place of water, to produce an expensive vapour, is worthy of attention. What we know of the specific heat of these substances encourages the experiment. The waste of material might, from the circumstance above-mentioned, be almost entirely prevented.

The easiest and most effective method of producing a slow movement, in some cases, may be found in the employment of an explosive mixture, such as crushed gunpowder. Its power might be applied directly to the water in a tube passing through the vessel, or to water contained in a strong cylinder rising from such a tube; presenting a machine of very simple structure. This would be the moving power of the rocket more advantageously employed. The effect may be understood by conceiving the coil of a long gun fired underwater. A small proportion of the powder spent in firing the broadside of a ship, might in this way produce a decisive effect upon her position.

October 10.—A collection of specimens sent by Dr. Smith, was presented, consisting of 828 articles, of which 119 were ordered to be added to the Museum.

January 13, 1832.—The Committee appointed for attending the show of Vegetables and Competition, reported that no more than one specimen had been sent fulfilling the conditions proposed. It was agreed, that such be in the mean time postponed.—The following works were presented as donations to the Institution, viz.; Illustrations of Ornithology, by Sir Wm. Jardine, Bart.; and J. P. Selby, Esq. 6 Numbers, from Sir Wm. Jardine; and the Edinburgh Geographical Journal, 3 Numbers, from H. H. Cheek, Esq. There were also presented, the Skin of a spotted Hyæna, procured by Dr. Smith; and a collection of dried Plants, as a donation from Mr. Bojer of Mauritius.

Jan. 23.—At a meeting of Council Mr. Verreaux presented as a donation to the Museum, three Cape Moles and a Guinea Fowl, mounted.—It was agreed to take a lease of the house in the Looyers'-plein, called Machtenburg, as a Depository for the Museum, &c.

Jan. 27.—There were presented, as a donation to the Institution, a package of preserved Ferns, &c. from Mr. Bojer of the College at Port Louis.