

WILLIAM DAMPIER
SEAMAN-SCIENTIST

Joseph C. Shipman

LAWRENCE, KANSAS
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Mr. Smallbone would not have described the hurricane if it had not been for a remarkable seaman-scientist named William Dampier, the first man since Columbus eager to know the natural curiosities of the Caribbean world. He was a large-nosed, lean, quiet, keen-eyed man, an excellent navigator, a careful and accurate scientist. He was also a pirate.

—MARJORY STONEMAN DOUGLAS

THE NAME OF William Dampier, when it is recognized today, evokes the romantic image of a buccaneer captain and the treasures of the Spanish Main—much as it did at the turn of the 17th century. Yet Dampier did not command a ship until late in life, and then was promptly court-martialed for his deficiencies as a ship's captain. A lifetime spent among the buccaneers brought him financial reward only twice: once, after a two-year stay among the log-cutters of Campeachy, when he found himself with sufficient means to return to England, where he took a wife and bought a small estate in Dorsetshire; and a second time, toward the end of his life, when he served as pilot to Captain Woodes Rogers on an eminently successful privateering cruise, which culminated in the capture of the famed Manila-Acapulco galleon. This expedition produced spoils amounting to £200,000, but, dogged by ill-luck as ever, Dampier died before the rewards were distributed. However, it may well be that on the strength of the promise of a substantial return from the loot Dampier obtained enough from the moneylenders to make his last years comfortable.

Dampier's name is frequently mentioned in the company of such celebrated English buccaneers as John Coxon, Sawkins, Sharp, Watling, John Cook, Swan, Townley, the great Captain Edward Davis, and Woodes Rogers—but it does not belong there. He was not, like some of them, a veteran commander nor, like others among them, a great leader. He was not even a great buccaneering personality, for few of his literate shipmates ever mentioned him until it became convenient or even profitable for them to do so after 1697.

Yet in his own time he was variously labeled as “the famous Captain Dampier” and “the terrible Captain Dampier”, and even Woodes Rogers reported that the name of Dampier was sufficient to strike terror into the hearts of all Spaniards in the West Indies. Since Rogers himself was at that time producing a fair amount of justifiable consternation with his two privateers, the *Duke* and *Duchess*, in that very part of the world, his comment sounds almost envious.

It was a book first published in 1697 which established Dampier's reputation, both real and imaginary. This was his own *A New Voyage round the World*, which became a sensational success and ran through four editions in two years. It was followed by a second volume in 1699, fulfilling the promise made by Dampier in his first work that he would “publish hereafter by itself, an Appendix,” which if included in the first volume “would have swelled it too unreasonably.” These two volumes were succeeded in 1703 and 1709 by the two parts of his *A Voyage to New-Holland*, a voyage on which he had been in command of H.M.S. *Roebuck*. Oddly enough, another work, in which Dampier had no hand—W. Fun-

nell's *A Voyage round the World* (London, 1707)—was often combined with Dampier's three books, in a set commonly described as "Dampier's Works in Four Volumes". Funnell, who claimed to be Dampier's first mate but whom Dampier maintains to have been merely his steward, wrote the only work which deals with another voyage undertaken in 1703 aboard the two privateers, the *St. George* and the *Cinque Ports*, under Captain Dampier's command. This was, to say the least, an unfriendly book, and Dampier later published a *Vindication of his Voyage* (London, 1707), in which he attempted, apparently with little success, to refute and counteract Funnell's criticisms of his character and his behavior.

Seven editions of his works appeared before 1727; the two books of voyages were soon translated into Dutch, German, and French, and reissues or facsimile editions of the original English publication appeared frequently, one as recently as 1936. Biographies and biographical sketches of Dampier continue to appear, many of them depending for their effectiveness upon long quotations from Dampier's own works. He is constantly being rediscovered, particularly by meteorologists, botanists and zoologists, who proceed to write a letter to the editor of a popular scientific journal, announcing the rediscovery, or compose a short sketch of Dampier for publication, in which they demonstrate the significance of his early observations in their particular disciplines.

That Dampier's book became an immediate best-seller upon its publication in 1697 is less significant than the fact that, because of it, members of the Royal Society sought him out and befriended him. Dampier had appropriately, though somewhat apologetically, dedicated

his first work to Charles Montague, President of the Royal Society. Montague promptly introduced him to some of the leading scientists of the day: to Sir Hans Sloane and Robert Southwell, as well as to the Earl of Orford, First Lord of the Admiralty. Within a few months he had received a sinecure in the Customs Office and was sitting for the portrait by Thomas Murray which now hangs in the National Portrait Gallery in London.

A New Voyage round the World was not essentially a book of adventures or a travel book. It was too impersonal, too objective and too lacking in the customary braggadocio and exaggeration to qualify as a popular history of buccaneering exploits. Dampier's contemporaries in the Royal Society recognized the book for what it really was: a factual, talented, and richly detailed account of people, places, things, plants, fishes, reptiles, birds and mammals: most of them strange and many of them new. At that time the *Philosophical Transactions* of the Royal Society were still filled with tales of marvels and curiosities, together with an occasional report of useful or significant observations. Dampier's book showed qualities of style, credibility and originality much above the average of these contributions. In fact no article of Dampier's ever appeared in the *Philosophical Transactions*, although some years later his fame and influence made it possible for his elder brother George to have a paper accepted, this dealing with a so-called cure for rabies.

The Royal Society had at an early period in its history established "Committees on informal questions", which, in the Baconian tradition, posed questions for which there were no available answers. (The Society still uses

this device today, albeit on a more sophisticated level.) At the time of Dampier, such questions, which could be answered only by voyagers to distant parts of the world, had been circulated among seamen and prospective travellers. Robert Boyle had also published in the *Philosophical Transactions* in 1666 three papers dealing with "General Heads for a Natural history of a country", in which he laid down the guide-lines for the intelligent and alert observer, anxious to advance the sum of human knowledge regarding the heavens, the air, the water and the earth. Dampier's book, meeting many of the criteria suggested by Boyle, also afforded a ready-made example of the type of response the Royal Society hoped to obtain, and this may explain the immediate and continuing interest which members of the Society displayed toward Dampier's work, and toward Dampier himself.

Admiral Burney in his *Chronological history of the discoveries in the South Sea* (London, 1803-7) says of Dampier and his work: "It is not easy to name another voyager or traveller who has given more useful information to the world; to whom the merchant and the mariner are so much indebted, or who has communicated his information in a more unembarrassed and intelligible manner. And this he has done in a style perfectly unassuming, equally free from affectation and from the most distant appearance of invention".

Dampier had at least two qualities which identified him with the scientists of his own day. He had an "inextinguishable curiosity," as Skelton says, and a passion for reporting the facts exactly as he saw them. For example, though he rarely mentions his boyhood on the farm near East Coker, he does stop at one point in his narrative

to tell the reader about the varieties of soils he had noted there and to say something about the special usefulness of each variety. Clearly his curiosity and his powers of observation had developed at an early age. He sailed and marched with buccaneers, as he said, "more to indulge my curiosity than to get wealth". He left Captain Davis, a commander he liked, to join the less attractive Captain Swan in order "to get more knowledge of the Northern parts of Mexico". In response to a proposal to take the long way around the Phillipines in 1687, he said he was "well enough satisfied, knowing that the further we went, the more knowledge and experience I should get, which was the main thing that I regarded. . . ."

In his preface to *A New Voyage round the World* he mentions that he had faithfully kept a journal of his daily observations from the time when he had first lived in the West Indies. He had made a bamboo holder, stoppered with two pieces of wax, in which he carried the pages of his journal, and this always went with him as his most precious possession, whether he was swimming the rivers of the Isthmus of Darien, to join in the pillage of the Spanish villages on the opposite coast, or saving himself from the sinking *Roebuck* near Ascension Island. When he ceased keeping his journal, as he did at about the time of his cruise aboard the *St. George* in 1703, he ended his career as an author, for he never carried the account of his own life and experiences beyond this point. He was a first-rate writer, with a style markedly direct, simple and sensible. He had an unerring sense for that which was new and significant in his experience, while at the same time he evidenced little interest in the sensational side of his career, nor in the often violent, drunken and de-

bauched men who were his everyday companions for so many years. However, he did not apologize for these associates, nor for the kind of life he had led, except in one instance. Interestingly enough, this passage, which amounted to a brief aside in Dampier's tale, afforded Daniel Defoe with the model for the classic searching of conscience which appears in *Robinson Crusoe*.

It was, in fact, during Dampier's command of the *St. George* and the *Cinque Ports* during the voyage of 1703, that Andrew Selkirk, Sailing Master of the *Cinque Ports* and real-life model to the fictional Robinson Crusoe, was marooned on Juan Fernandez. Dampier was navigator to Woodes Rogers when Selkirk was rescued, during Rogers' voyage in 1709, and when Selkirk heard that Dampier was aboard, he almost refused to be rescued. The whole Robinson Crusoe story revolves around this episode, even to his Man Friday, for whom Dampier provided two possible prototypes: the Moskito Indian, and the tattooed native whom Dampier brought back to England after his first circumnavigation.

But in spite of all this "it does not therefore follow that he was the incarnation of all virtues," as the *Dictionary of National Biography* puts it. He had many failings as a man and particularly as a commander of men, but these do not concern us here. The slightly hostile article in the *Dictionary of National Biography* points out, for instance, that his court-martial revealed that Dampier's conception of naval discipline was to castigate his subordinate officers regularly and frequently with such terms as "rogues, rascals, or sons of bitches". "Rogues and rascals" hardly qualify as terms of abuse today, but the last expression must certainly have been

regarded then, as it still is, as fighting words, and a valid basis for court-martial proceedings.

Dampier had already sailed from England on the *Roebuck* in 1699, when his second book, *Voyages and Descriptions*, was published in London by James Knapton. This volume was made up of three parts: "A Supplement to the Voyage round the World"; "Two Voyages to Campeachy", dealing with an episode in Dampier's career prior to the period covered in the other voyages; and perhaps the most important of all Dampier's works, "A Discourse of Trade-Winds, Breezes, Storms, Seasons of the Year, Tides and Currents of the Torrid Zone throughout the World."

The reception given to this book equalled the enthusiastic approval accorded his first work, and the "Discourse" established his reputation as a hydrographer beyond any challenge. It has been described as a classic of the pre-scientific era, and Admiral Smyth said of its author, "his sterling sense enabled him to give the character without the strict forms of science to his faithful delineation and physical suggestions; and inductive inquirers have rarely been so much indebted to any adventurer whose pursuits were so entirely remote from the subjects of their inquiry."

Dampier's essay on the subjects of winds appeared at a time when Halley, one of the giants of the Royal Society, and of English science, had also concerned himself with this subject. Both men, the scientist and the buccaneer, produced maps of the winds which have become landmarks in the early history of our scientific knowledge of the prevailing winds throughout the world, and of the more general phenomena of atmospheric circulation.

E. G. R. Taylor in *The Haven-finding Art: A History of Navigation from Odysseus to Captain Cook* (London, 1956), describes Edmund Halley's attempt at a systematic survey of the steady wind systems, published in the *Philosophical Transactions* in 1686. Taylor correctly notes that Halley's map, which accompanied the paper, omitted the greater part of the Pacific Ocean, "since its meteorology was so largely speculative." She goes on, however, to say that "this pioneer wind map was later used to illustrate William Dampier's useful *Discourse of the Winds* (1699), and appeared subsequently on many maps and globes with little alteration." A comparison of Halley's map with those in Dampier's "Discourse" indicates that there is little if any direct relationship between them. For one thing Dampier produced two maps, one of them dealing with the Pacific Ocean which Halley almost completely ignores. Halley's map is sketchy and relatively sparse in detail. Dampier's maps, engraved by Herman Moll, are fine examples of draughtsmanship, marking the prevailing winds with shaded whorls, and utilizing arrows to "shew the course of the shifting trade-winds", as well as giving abbreviations for the months of the year, to "shew the times of the year when such winds blow". Both men picture carefully the winds of the Aethiopian Sea (Dampier) or Aethiopic Ocean (Halley), and while there is some general agreement in this area there are many differences, particularly in the representation of the coastal winds, which Dampier treats in considerable detail, and Halley hardly at all. The prevailing coastal southerlies off the west coast of Africa are clearly represented in Dampier and are absent in Halley. The seasonal reversal of the Monsoons in the Arabian Sea and in the Bay of

Bengal is readily apparent in Dampier and indistinguishable in Halley's map, though Halley does discuss the phenomenon in the text of his paper.

The old buccaneer, for all his bluntness, rarely failed to give credit where credit was due, and it seems unlikely that he would have used Halley's work without proper acknowledgement. In the same "Discourse" Dampier pointedly stops his narrative to give in full a letter from a certain "Mr. Greenhill, Commissioner of His Majesty's Navy at Portsmouth." This letter is concerned with a relatively long description of the "Harmatan," a cold land-wind encountered on the coast of Guinea, with which Dampier had no first-hand acquaintance. Throughout his writings, Dampier is careful about such details to the point of punctiliousness.

In the preface to *A Voyage to New Holland* (London, 1703) he says somewhat plaintively, but nevertheless fetchingly, "Others have taxed me with borrowing from other Men's Journals; and with Insufficiency, as if I was not my self the Author of what I write, but published Things digested and drawn up by others. As to the first Part of this Objection, I assure the Reader, I have taken nothing from any Man without mentioning his Name, except some very few Relations and particular Observations received from credible Persons who desired not to be named; and these I have always expressly distinguished in my Books, from what I relate as of my own observing."

There is other indirect evidence that his maps of the winds were original. Evelyn, in his *Diary* for August 6th, 1698, speaks of dining with Mr. Pepys, "where was Captain Dampier, who had been a famous buccaneer. . . . He

seemed a more modest man than one would imagine by relation of the crew he had assorted with. He brought a map of his observations of the course of the winds in the South Seas, and assured us that the maps hitherto extant were all false as to the Pacific Sea, which he makes on the South of the line, that on the North end running by the Coast of Peru being extremely tempestuous". Pepys and Evelyn were active members of the Royal Society, as well as close acquaintances of Halley, and more likely to be familiar with the contents of the *Philosophical Transactions* than Dampier would be. The chances are good that one or both of these worthies would have noted any striking similarities between Dampier's charts and the wind map of their old colleague in the Royal Society.

Both Halley in 1686 and Dampier in 1698 had access to a large body of unorganized descriptive information regarding the winds and their world-wide peculiarities. Dampier was fully as competent an observer as Halley and was a much more experienced navigator and traveler than Halley could claim to be. While the priority for a map of the trade winds most certainly rests with Halley, it is equally certain that many more of their contemporaries read Dampier's books and studied his maps than saw Halley's earlier paper in the *Philosophical Transactions*. It seems likely, therefore, that Dampier's maps, rather than Halley's provided the prototype for the many maps and globes picturing the trade winds, which appeared throughout the 18th century with little or no alteration of the basic scheme used in these original efforts.

It must, in all fairness, be said that Halley's paper is nevertheless the more significant scientific contribution,

since it advanced the theory of world circulation of the winds, while Dampier, as always, eschewed theory and was content to enlarge the then current knowledge of wind distribution.

One of the volumes of the *Allgemeine Encyclopädie der Physik* was Ernst E. Schmid's "Lehrbuch der Meteorologie" (Leipzig, 1860). Schmid's monumental book, organized on a historical basis, makes at least 18 references to Dampier's writings. Time after time he credits the 17th century navigator with the earliest or the best available observation on a wide variety of meteorological phenomena. At several points the author comments that Dampier has written such striking yet conservative observations that little can be added to them, despite the passage of more than 125 years. Schmid also makes frequent use of quotations or paraphrases from the "Discourse". For example, in one section, dealing with the diurnal periodicity of the coastal winds, he translates into German a lengthy passage from Dampier. The original reads:

"These Sea-Breezes do commonly rise in the Morning about Nine a Clock, sometimes sooner, sometimes later; they first approach the shore so gently, as if they were afraid to come near it, and oft-times they make some faint breathings, and as if not willing to offend, they make a halt, and seem ready to retire. I have waited many a time both ashore to receive the pleasure, and at Sea to take the benefit of it.

"It comes in a fine, small, black Curle upon the Water, whenas all the Sea between it, and the shore not yet reach'd by it, is as smooth and even as Glass in Comparison; in half an Hour's time after it has reached the shore it fans pretty briskly, and so increaseth gradually till 12

a Clock, then it is commonly strongest, and lasts so till 2 or 3 a very brisk gale; about 12 at Noon it also veers off to Sea 2 or 3 Points, or more in very fair Weather. After 3 a Clock it begins to dye away again, and gradually withdraws its force till all is spent, and about 5 a Clock, sooner or later, according as the Weather is, it is lull'd asleep, and comes no more till the next Morning. . . .

"Land-Breezes are as remarkable as any Winds that I have yet treated of; they are quite contrary to the Sea-Breezes; for those blow right from the shore, but the Sea-Breez right in upon the shore; And as the Sea-Breezes do blow in the Day and rest in the Night; so on the contrary, these do blow in the Night and rest in the Day, and so they do alternately succeed each other. For when the Sea-Breezes have performed their Offices of the Day, by breathing on their respective Coasts, they in the Evening do either withdraw from the Coast, or lye down to rest; Then the Land-Winds whose Office it is to breathe in the Night moved by the same order of Divine Impulse, do rouze out of their private recesses and gently fan the Air till the next Morning; and then their task ends and they leave the Stage.

"There can be no proper time set when they do begin in the Evening, or when they retire in the Morning, for they do not keep to an hour; but they commonly spring up between 6 and 12 in the Evening, and last till 6, 8, or 10 in the Morning. They both come and go away again earlier or later, according to the Weather, the Season of the Year, or some accidental Cause from the Land: For on some Coasts they do rise earlier, blow fresher, and remain later than on other Coasts. . . ."

Modern editions of the *Admiralty Weather Manual* describe land and sea breezes in a manner somewhat reminiscent of Dampier, but fortify their descriptions with scientific explanations, showing that the breezes result from differences of pressure, producing a flow of air

from sea to land during the day, and a gradual change of the balance of pressure, so that at night the flow of air is reversed.

Dampier was the first observer to remark that the hurricane of the West Indies differed in no detail from the typhoon of the China Coast: "For my part I know no difference between a Hurricane among the Carribee Islands in the *West Indies*, and a Tuffoon on the Coast of *China* in the *East Indies*, but only the Name: And I am apt to believe that both Words have one signification, which is a *violent Storm*."

Schmid in 1860 refers to Poey's list of 450 books and papers dealing with hurricanes, and from them selects a number of the most important and significant in the history of meteorology. Dampier's "Discourse of the Trade-Winds" heads the list. In our own day, Sir William Shaw in his standard four-volume *Manual of Meteorology* (Cambridge, 1942), gives considerable attention to Dampier, and quotes in full detail Dampier's now classic description of a typhoon. This description, as given in *A New Voyage Around the World*, reads as follows:

"We were afraid to lye in this place any longer, for we had some signs of an approaching Storm: this being the time of the year in which Storms are expected on this Coast; and here was no safe Riding. It was now the time of the year for the S.W. Monsoon, but the Wind had been whiffing about from one part of the Compass to another for two or three days, and sometimes it would be quite calm. This caused us to put to Sea, that we might have Sea-room at least; for such flattering weather is commonly the fore-runner of a Tempest.

"Accordingly we weighed Anchor, and set out: yet we

had very little Wind all the next night. But the day ensuing, which was the 4th day of *July*, about 4 a clock in the afternoon, the Wind came to the N.E. and freshned upon us, and the Sky look'd very black in that quarter, and the black clouds began to rise apace and move towards us; having hung all the morning in the Horizon. This made us take in our Top-sails, and the Wind still increasing, about 9 a clock we rift our Main-sail and Fore-sail; at 10 we furl'd our Fore-sail, keeping under a Main-sail and Mizzen. At 11 a clock we furl'd our Main-sail, and ballasted our Mizzen: at which time it began to rain, and by 12 a clock at night it blew exceeding hard, and the Rain poured down as through a Sieve. It thundered and lightned prodigiously, and the Sea seemed all of a Fire about us: for every Sea that broke sparkled like Lightning. The violent Wind raised the Sea presently to a great heighth, and it ran very short and began to break in on our Deck. One Sea struck away the Rails of our Head, and our Sheet Anchor, which was stowed with one Flook or bending of the Iron, over the Ships Gunal, and lasht very well down to the side, was violently washt off, and had like to have struck a hole in our Bow, as it lay beating against it. Then we were forced to put right before the Wind to stow our Anchor again; which we did with much ado: but afterwards we durst not adventure to bring our Ship to the wind again, for fear of foundring, for the turning the Ship either to or from the Wind is dangerous in such violent Storms. The fierceness of the weather continued till 4 a clock that morning; in which time we did cut away two Canoas that were towing astern.

After four a clock the Thunder and the Rain abated, and then we saw a *Corpus Sant* at our Main-top-mast head, on the very top of the truck of the Spindle. This sight rejoyc'd our Men exceedingly; for the height of the Storm is commonly over when the *Corpus Sant* is seen aloft: but when they are seen lying on the Deck, it is generally accounted a bad sign.

A *Corpus Sant* is a certain small glittering light: when it appears as this did, on the very top of the Main-mast or at a Yard-arm, it is like a Star; but when it appears on the Deck, it resembles a great Glow-worm. The *Spaniards* have another Name for it, (though I take even this to be a *Spanish* or *Portuguese* Name, and a corruption only of *Corpus Sanctum*) and I have been told that when they see them, they presently go to Prayers, and bless themselves for the happy sight. I have heard some ignorant Seamen discoursing how they have seen them creep, or as they say, travel about in the Scuppers, telling many dismal stories that hapned at such times: but I did never see any one stir out of the place where it first was fixt, except upon Deck, where every Sea washeth it about. Neither did I ever see any but when we have had hard rain as well as wind; and therefore do believe it is some Jelly: but enough of this.

We continued scudding right before wind and sea from 2 till 7 a clock in the morning, and then the wind being much abated, we set our Mizen again, and brought our Ship to the wind, and lay under a Mizen till 11. Then it fell flat calm, and it continued so for about 2 hours: but the Sky looked very black and rueful, especially in the S.W. and the Sea tossed us about like an Egg-shell, for want of wind. About one a clock in the afternoon the wind sprung up at S.W. out of the quarter from whence we did expect it: therefore, we presently brail'd up our Mizen, and wore our Ship: but we had no sooner put our Ship before the wind, but it blew a Storm again, and it rain'd very hard; though not so violently as the night before: but the wind was altogether as boysterous, and so continued till 10 or 11 a clock at night. All which time we scudded, or run before the wind very swift, tho only with our bare Poles, that is, without any Sail abroad. Afterwards the wind died away by degrees, and before day we had but little wind, and fine clear weather.

I was never in such a violent Storm in all my life; so said all the company. This was near the change of the

Moon: it was 2 or 3 days before the change. The 6th day in the morning, having fine handsome weather, we got up our Yards again, and began to dry our selves and our cloaths, for we were all well sopt. This Storm had deadned the hearts of our men so much, that instead of going to buy more Provision at the same place from whence we came before the Storm, or of seeking any more for the Island *Prata*, they thought of going somewhere to shelter before the Full Moon, for fear of another such Storm at that time: For commonly, if there is any very bad Weather in the Month, it is about 2 or 3 days before or after the Full, or Change of the Moon.”

In Dampier’s second book, *Voyages and Descriptions*, he gives still another vivid picture of the typhoon:

“*Tuffoons* are a particular kind of violent Storms, blowing on the Coast of *Tonquin*, and the neighboring Coasts in the months of *July*, *August*, and *September*. They commonly happen near the full or change of the Moon, and are usually preceded by very fair weather, small winds and a clear Sky. Those small winds veer from the common Trade of that time of the year, which is here at S.W. and shuffles about to the N. and N.E. Before the Storm comes there appears a boding Cloud in the N.E. which is very black near the Horizon, but towards the upper edge, it looks of a dark copper colour, and higher still it is brighter, and afterwards it fades to a whitish glaring colour, at the very edge of the Cloud. This Cloud appears very amazing and ghastly, and is sometimes seen 12 hours before the Storm comes. When that Cloud begins to move apace, you may expect the Wind presently. It comes on fierce, and blows very violent at N.E. 12 hours more or less. It is also commonly accompanied with terrible claps of Thunder, large and frequent flashes of Lightning, and excessive hard rain. When the Wind begins to abate it dyes away suddenly, and falling flat calm, it continues so an hour, more or less: then the wind comes

about to the S.W. and it blows and rains as fierce from thence, as it did before at N.E. and as long.”

Dampier's story of the *Corpus Sant* in the passage quoted above is one of the earliest descriptions of St. Elmo's Fire in English. Though there was then no available body of information regarding atmospheric electricity to guide him, Dampier, as Sir William Shaw points out, distinguished between the *Corpus Sant* on the mast-head and the luminosity washing about on the deck. Shaw's faith in Dampier's powers of observation was such that, nearly two hundred and fifty years later, he accepts the fact that there was some kind of a luminous phenomenon occurring on the deck, and explains it as probably due to "phosphorescence which in tropical seas can be very impressive."

Shaw contends that Dampier's report of the circumstances surrounding his China Sea typhoon is still reliable as a guide to the behavior of tropical revolving storms in any part of the world. Descriptions used today in the *Admiralty Weather Manual* also sound as if they may have come down in a direct line from the pages of Dampier. It seems strange that with descriptions of hurricanes and typhoons such as Dampier's available to them, students of the weather were so long in arriving at a true understanding of their nature. No "law of storms" was available before the 19th century, when Henry Piddington published his *Sailor's Horn-Book for the Law of Storms* in 1848, and coined the term "cyclone" to identify the whirlwinds. It is interesting to note that Piddington himself quotes Dampier second-hand from a letter of Benjamin Franklin to the Royal Society, on water-spouts. Piddington says that Dampier's passage is

“well worth quoting . . . , as shewing that water-spouts are really whirlwinds, and sometimes dangerous ones.”

Rain-storms in the tropics have long been a favorite topic of author-travellers in these regions. Few accounts are earlier, and none could be more colorful than one of Dampier’s experiences ashore in the West Indies:

“I have been at this Isle [Gorgonia] three times; and always found it very rainy, and the Rains very violent. I remember when we touch’d there in our return from Captain *Sharp*, we boiled a Kettle of Chocolate before we clean’d our Bark; and having every Man his Callabash full, we began to sup it off, standing all the time in the Rain; but I am confident not a Man among us all did clear his Dish, for it rained so fast and such great drops into our Callabashes, that after we had sup’d off as much Chocolate and Rain-water together as sufficed us, our Callabashes were still above half full; and I heard some of the Men swear that they could not sup it up so fast as it rained in; at last I grew tir’d with what I had left, and threw it away: and most of the rest did so likewise.”

Schmid remarks on Dampier’s apt description of the manner in which the “Rains follow the Sun and begin on either side of the Equator within a little while after the Sun has crossed the Equinox, and so continue till after his return back again.” He also notes Dampier’s comment that in the rainy season more rain falls at night than during the day. He challenges Dampier’s opinion that much less rain falls upon the sea than upon the land, at such times. Interestingly enough, he bases this challenge upon a recorded observation of Captain Wilkes, made nearly a century and a half after the time of Dampier, but Schmid seems almost reluctant to refute Dampier’s testimony with such data, so struck is he with the

clarity and reliability of his favorite pioneer in descriptive meteorology. According to some modern students of tropical weather, his reluctance may have been well founded, for I. E. M. Watts in his *Equatorial Weather* (New York, 1955) indicates that in equatorial regions there are seasonal variations in which the peak of maximum rainfall occurs after midnight, and that at sea maximum precipitation occurs during the night or early morning. Over the land, maximum precipitation occurs during the day, according to Watts, so Dampier's position is not altogether firm.

Dampier, in his chapter on "Tides and Currents", speaks of the curious opinion among contemporary seamen that the Isthmus of Darien was structured much like an arched bridge, under which there was a subterranean passage of waters from the Atlantic to the Pacific. He comments disapprovingly on Mr. Gage, a fellow-Englishman and author of an earlier book called *A New Survey of the West Indies*, which lent some support to this legend by reporting on continual and strange noises heard by the inhabitants of the Isthmus, and of ships "drawn or suck'd up, as 'twere, in a Whirl-Pool and ready to be carried under Ground into the North Seas, with all Sails standing". Our buccaneer had spent many years in the South Seas and many months in the Bay of Panama, and was in the Isthmus twice, "but yet . . . did never hear of any Noises under Ground there". Nor did he ever "meet with such strange Whirl-Pooles, but found as pleasant sailing there, as any where in the World." Of Mr. Gage he says, "I am afraid he took most of it upon trust from others; or else he was Sea-sick all that little Voyage . . . I should dislike his whole Book for that one stories sake,

if I did not know that he has written candidly upon other Matters. . . ." Dampier's fairness and honesty shine through this little passage, as does his quiet humor.

Dampier's observations on ocean currents were correct, but incomplete. He noted that where the trade winds blow he found a "Current setting with the Wind, which is not so perceptible in the wide Sea as nearer the Shores; yet even there the force of the Winds constantly blowing one way, may and probably does move the surface of the Water along with it. From hence it may be inferred, that the Southerly Winds on the Coast of *Africa*, and the true Trade between it and *Brazil*, gently move the surface of the Sea with it, and the Trade being mostly at S.E. drives the Sea to the Northward, slanting in on the Coast of *Brazil*. . . ." This is a fair description of the equatorial current in the Atlantic, which drives into the Gulf of Mexico and escapes again through the Florida straits. Dampier speaks of the South Atlantic currents building up "and racing through the Antillean narrows like a swift river." He was aware too, of the equatorial currents in the Pacific which flow west against the shores of the East Indies, and he speaks of the southerly winds which "do blow constantly all the year long, on both coasts of Peru and Africa; they are brisk and blow farther off from the Coasts than do any shifting Winds." These winds produce coastal currents, flowing north in both instances.

Nearly two centuries before Dampier, Leonardo da Vinci had suggested that differences in salinity and in the temperatures of various layers of the ocean might also be involved in the mechanism of the oceanic currents, but this was far beyond Dampier's comprehension, or that of

most of his contemporaries. Further, Isaac Vossius in 1663 had described the course of the Gulf Stream, and about the same time Athanasius Kircher had published the earliest charts of the warm Atlantic current, but these works were also unknown to Dampier. He was too early on the scene to recognize the effect of the earth's rotation on the ocean currents, and the time for such understanding was to come only with the arrival of Humboldt on the scientific stage in the early 19th century. But, as N. J. Berrill says of Dampier's observations, "this recording is the sort of thing which must come first, there must be some accumulation of knowledge to start with, before understanding can begin, and above all, that knowledge must be accurate and detailed, or it has little value." In this context, Dampier must be regarded as one of the important figures in the pre-scientific period of meteorology and oceanography, as he was in so many aspects of natural history.

Dampier concludes his "Discourse of the Trade-Winds, Breezes, Storms, Seasons of the Year, Tides and Currents of the Torrid Zone Throughout the World," with a characteristically modest statement:

"And thus have I finished what my own Experience, or Relations from my Friends, have furnished me with on this useful Subject of *Winds, Tides, Currents, &c.* which I humbly offer, not as a compleat and perfect Account, but as a rude and imperfect Beginning or Specimen of what may better be done by abler Hands hereafter. And I hope this may be useful so far as to give a few hints to direct the more accurate Observations of others."

That Captain Dampier's hope was a valid one is attested by the scores of references to his gifted observa-

tions, throughout two hundred and fifty years of literature dealing with the winds and storms. In a letter to the Editor of *Nature*, as late as October 7, 1922, a scientist, A. Mallock, writes that " 'Dampier's Voyages' are well-known, at any rate by name, but his 'Discourse of the Winds' is seldom referred to. It is however, well worth careful examination and so far as I can judge, contains as much information about the distribution of winds as any of the modern works on the same subject." This is a noteworthy tribute to a work published in 1699 from a scientist writing in 1922.

In his *New Voyage*, Dampier generalizes about deep seas near high lands, saying: "I have made it my general observation, that where the Land is fenced with steep Rocks and Cliffs against the Sea, there the Sea is very deep, and seldom affords anchor ground". To bolster this observation he names the coasts of Portugal and Norway, where, "as in those Countries from the *Andes*, that run along the shore, *there is a deep Sea*". To exemplify his "good anchoring near low Lands", he spends several pages cataloguing examples, from the Bay of Honduras to the islands of Borneo and the Celebes. More than a century later the great Humboldt was surprised to find shallow waters near a coast lined with high mountains and complains that "according to the rules established by Dampier we ought not to have expected so little depth."

Throughout his writings Dampier comments upon the unreliability of the charts and maps upon which he and the other mariners of his time were dependent. He mentions particularly the Galapagos Islands which the charts then placed at a longitude westward from England of about 68°, saying "but I believe our hydrographers do

not place them far enough to the westward." The Galapagos are actually about 90° westward of Greenwich.

Mary Blewitt in her history of British hydrography, *Surveys of the Seas* (London, 1957), quotes Dampier in her discussion of the "colossal errors" for which these faulty charts of the seventeenth century (and faultier tools of navigation) were responsible. Dampier was reporting on a run from Brazil toward a sounding of the Cape of Good Hope:

"I saw a large black Fowl, with a whitish flat Bill, fly by us; and took great notice of it, because in the *East-India Waggoner*, or Pilot-book, there is mention made of large Fowls, as big as Ravens, with white flat Bills and black Feathers, that fly not above 30 Leagues from the *Cape*, and are lookt on as a Sign of ones being near it. My Reckoning made me then think myself above 90 Leagues from the *Cape*, according to the Longitude which the *Cape* hath in the common Sea-Charts: so that I was in some doubt, whether these were the right Fowls spoken of in the *Waggoner*; or whether those Fowls might not fly farther off Shore than is there mentioned; or whether, as it prov'd, I might not be nearer the *Cape* than I reckoned my self to be: for I found, soon after, that I was not then above 25 or 30 Leagues at most from the *Cape*. Whether the fault were in the Charts laying down the *Cape* too much to the East from *Brazil*, or were rather in our Reckoning, I could not tell: but our Reckonings are liable to such Uncertainties from Steerage, Log, Currents, Half Minute-Glasses, and sometimes want of Care, as in so long a Run cause often a difference of many Leagues in the whole Account."

Dampier gives one careful daily record of a run from Cape Corrientes in Mexico to Guam, in 1686. His table shows the date, course, distance run, westing and lati-

tude, taken by observation. The "Summ of all the Westings" amounted to 7323 miles, and he estimated the longitude at 125 degrees 11 minutes west from Cape Corrientes, "allowing 58 to 59 Italian miles to a degree in these latitudes". The true figure is 110°.

Dampier's table also included the wind and the weather, and he would have added another column showing magnetic variation, except that it was likely to be small, few observations were made, and in any case "Captain Swan who had the Instruments in his Cabbin, did not seem much to regard it". He used his observations to argue that the "South Sea must be of a greater breadth by 25 degrees, than it's commonly reckoned by Hydrographers." He was convinced that the breadth of the Indian Ocean was considerably less than usually calculated to be, because of the records of many ships running aground when they thought themselves far off the coast of New Holland. The Dutch called that part of the coast the Land of Indraught, as if it drew ships magnetically to it. Dampier, with his usual common-sense and scorn for the superstitious, concluded: "But I rather think 'tis the nearness of the Land, than any Whirlpool, or the like, that surprizes them." As to the breadth of the Atlantic, he was likewise certain that it was commonly over-estimated as being 60 to 72 degrees in breadth. The correct breadth is about 44°.

It was at Mindanao in 1687 that Dampier noted a difference in the time kept by the natives and that of his own ship. He estimated that during his voyages, they had sailed west about 210°, and that therefore there should be a difference of time amounting to about 14 hours. In Mindanao and throughout the East Indies he

found both natives and Europeans reckoning a day ahead of his ship's time. His reasoning regarding this difference was that "the Europeans' coming Eastward by the Cape of Good Hope, in a course contrary to the Sun and us, where-ever we met they were a full day before us in their Accounts." On the other hand "we found the Spaniards of Guam keeping the same computation with our selves; the reason of which I take to be, that they settled that Colony by a course Westward from Spain; the Spaniards going first to America, and thence to the Ladrões [Guam] and Philipines." In some irritation, he makes a plea for all seamen to keep the differences of time as exactly as possible, in order to improve the calculation of longitude, and comments that carelessness in this matter was often due to ignorance of its real importance on the part of the ordinary able seaman (and, he might have added, of their Captains and Navigators).

Though compass variation had been known for a very long time, it was Columbus and Cabot who first noted that variation changed in different localities. Dampier's powers of observation and his unconquerable curiosity also permitted him to share in the slow development of new knowledge in this field. Developments were to be slow indeed, for it was another century before Flinders and Bain (and the British Admiralty itself) planned and carried out the basic investigations necessary for a full understanding of this phenomenon.

As early as 1683 Dampier recorded variation of the compass near Cape Horn. William Bain in his classic *Essay on The Variation of the Compass* (Edinburgh, 1817), cites Dampier's reading of variation at 23°10' west. Bain compares this figure with Vancouver's ob-

servation at approximately the same position in 1795, to demonstrate that the variation near Cape Horn had neither increased nor diminished in a perceptible manner in nearly a century. Bain also accepts Dampier's report that the variation from Acapulco in Mexico to Lima in Peru never exceeded 4° west.

Bain was especially interested in the curves of no variation, the lines separating the variation of an easterly from that of a westerly character. To illustrate the change in the position of this curve of no variation between 1699 and 1791, Bain used Dampier's table of variations in his *Voyage to New Holland* and compared it with Admiral M. d'Entrecasteaux's record of variations in his voyage in search of LaPerouse in 1791. D'Entrecasteaux's route coincided closely with Dampier's, providing Bain with an opportunity to demonstrate that "the curve of no variation must have advanced westward annually about 16' in the parallel of 34° South Latitude."

In one important chapter of his book, Bain discusses the variation of the compass which alters with particular variations of the ship's position in respect to the meridian, though the ship remains precisely in the same place, "or that a different variation will be observed on every point of the compass towards which the ship's head may be directed." On this point he refers to Dampier, "whose correct judgement, knowledge and experience renders his observations and suggestions of double weight." Dampier had said that "another thing that stumbled me here was the Variation, which, at this time, by the last Amplitude I had I found to be but 7 deg. 58 min. W. whereas the Variation at the Cape . . . was then computed, and truly, about 11 Deg. or more: And yet a while after this,

when I was got 10 Leagues to the Eastward of the Cape, I found the Variation but 10 deg. 40 min. W. whereas it should have been rather more than at the Cape. These Things, I confess, did puzzle me. . . .”

Bain comments about this peculiarity that “stumbled” Dampier, that had the pilot noted the direction of his ship’s head at the time he took the observations, it might have easily been explained, for it is probable that his ship’s head was at the time near the west point of the compass, and that therefore his observations were accurate. This explanation might have been easy for Bain, but it was beyond Dampier’s understanding, or that of any mariner of his time. To his great credit he recorded his observation, without venturing any explanation, since he knew of none.

It was the famous Captain Matthew Flinders, himself a great admirer of Dampier’s writings, who discovered the causes of the changes of variation on shipboard and introduced Flinders’ Bar, which utilized a vertical bar of iron, so placed as to correct the deviation in nearly all latitudes. But this was not until 1810.

By the time Dampier returned from his voyage in command of the ill-fated *Roebuck*, Halley had already published his first chart of lines of equal variation (1700). Dampier was gratified to learn that this chart confirmed his own observation that “the Line of no Variation in that Sea is not a Meridian Line, but goes very oblique, as do those also which shew the Increase of Variation on each side of it.” Humbly he adds, “For my part I profess my self unqualified for offering at any thing of a General Scheme; but since Matter of Fact, and whatever increases the History of the Variation, may be of use towards the

setling or confirming the Theory of it, I shall here once for all insert a Table of all the Variations I observ'd beyond the Equator in this Voyage, both in going out, and returning back; and what Errors there may be in it, I shall leave to be Corrected by the Observations of Others."

William Dampier circumnavigated the globe not once, but twice—some would say three times—no mean accomplishment in his day. The pioneer Magellan did not survive his voyage and it was Francisco Pigafetta who wrote the account which has come down to us. Sir Francis Drake was the first Englishman to follow in Magellan's footsteps, but it was his nephew who published the earliest and best edition of his voyage in 1577-1580. Thomas Cavendish in 1586-1588 was the second Englishman to sail round the world and to leave a record of his experiences, but his was chiefly a raiding expedition, in which he succeeded in capturing the famed Spanish treasure ship, the Manila Galleon; and he made no important geographical discoveries. A Dutch sailor, William Schouten, followed in 1615-1617, on an expedition fitted out by the merchants of the city of Hoorn and designed to break the monopoly of the East India Company in certain parts of the Far East. Schouten made many contributions to cartography, discovered the Straits of St. Maire, and named Cape Horn after the Dutch town which had backed his voyage. He published a deservedly famous account of his voyage of exploration.

Dampier's story of his first circumnavigation, in the years 1679 to 1691, chronicled the first English achievement of this sort since Cavendish, nearly a hundred years earlier. The fact that so many books of buccaneering ex-

ploration followed close upon the heels of Dampier's books, and were so often written by comrades, associates or rivals of his, such as Wafer, Davis, Blackwell, Funnell, Cowley, and Woodes Rogers, tends to obscure the fact that Dampier's books were the earliest and by far the best. He had no worthy successor in geography, in scientific observation or in writing skill, until the arrival of Captain Cook and his "suite of scientists" on the South Seas scene half a century later.

W. C. D. Dampier-Whetham, an historian of science and a remote relative of his namesake, has said that Captain Dampier's venture in the *Roebuck* was the "first attempt at a voyage planned for the deliberate purpose of scientific exploration, the progenitor of the voyages of Cook, of the *Beagle*, of the *Rattlesnake*, and of the *Challenger*."

Dampier's commission in command of the *Roebuck* directed him to "survey all islands, shores, capes, bays, creeks, and harbours, fit for shelters as well as defence, to take careful soundings as he went, to note tides, currents, winds and the character of the weather . . . to observe the disposition and commodities of the natives, etc." His competency for such an assignment had been well demonstrated in his *New Voyage*, and it is quite obvious that the Admiralty had no intention of placing Dampier in command of a freebooting cruise.

The specific goal of this voyage was the exploration of the coasts of Australia, and despite his miserable ship, his small and cantankerous ship's company, and his failure as a commander of men, he did explore the northern coasts of Australia and made many discoveries along the northern coasts of New Guinea and the neighboring

lands. He had been among the first group of Englishmen to land in Australia during his first voyage in 1688, and he led the next group of his countrymen to land the second time in 1699. As Clennell Wilkinson, his biographer, says, "the map is very largely his about here." Because his ship was deteriorating, his crew rebellious, and perhaps because of his old aversion to cold weather (dating back to his first experience at sea, which had taken him to Newfoundland), Dampier did not turn south along the Australian Coast, and therefore failed to find the more hospitable and attractive parts of the Australian continent. This was to be the task and accomplishment of Captain Cook's expedition several generations later.

Dampier encountered the Australian aborigines on both of his landings in New Holland. He could find practically nothing favorable about them to report, and his description of their appearance and behavior must be one of the gloomiest in the annals of world exploration:

"The Inhabitants of this Country are the miserablest People in the world. The *Hodmadods* [*Hottentots*] of *Monomatapa*, though a nasty People, yet for Wealth are Gentlemen to these; who have no Houses and Skin Garments, Sheep, Poultry, and Fruits of the Earth . . . and setting aside their humane shape, they differ but little from Brutes. They are tall, strait bodied, and thin, with small long Limbs. They have great Heads, round Foreheads, and great Brows. . . . They have great Bottle noses They are long visaged, and of a very displeasing aspect; having no one graceful feature in their faces. . . . They have no sort of Cloaths; but a piece of the rind of a Tree ty'd like a Girdle about their wastes, and a handful of long Grass, or 3 or 4 small green Boughs, full of Leaves, thrust under their Girdle, to cover their nakedness. They have no Houses, but lye in the open Air, without any

covering; the Earth being their Bed, and the Heaven their Canopy. . . . Their only food is a small sort of Fish. . . . they have no Instruments to catch great Fish, should they come. . . . they seek for Cockles, Muscles, and Periwinkles. . . . and what Providence has bestowed on them, they presently broil on the Coals, and eat it in common.”

This is far removed from the picture of the noble savage painted by the romanticists of the 18th Century, but, at least for the Australian aborigine, it bears a close resemblance to the truth. Dampier noted that their weapons, almost as primitive as their food and clothing, included wooden lances, hardened by heat, and wooden swords, “shaped somewhat like a cutlass.” His biographer, Clennell Wilkinson, assumes that Dampier never saw a boomerang, but a wooden sword shaped like a cutlass could well be a boomerang, especially if the observer had no opportunity to see the weapon in use.

Considering the small contact Dampier had with these natives during his two visits ashore, this first account of the Australian aborigine to appear in English contains a remarkable amount of accurate information. While his distaste for their general physical appearance is obvious, he did not fail to note that they were tall and “strait-bodied”, with lean limbs. Modern anthropologists mark these same characteristics, and their measurements show that the typical aborigine is the equal of the average European in height. The bones of his arms and legs are delicately formed, and the calf of the leg very slender, and they answer very well to Dampier’s description.

Another feature of the Australian scene which Dampier noted during his stay ashore was the kangaroo, or at

least some member of the marsupial family. The kangaroos of Australia were probably first seen by Francois Pelsaert in his Dutch ship, the *Batavia*, in 1629. The next sighting was Dampier's in 1699, at the time when the *Roebuck* first touched the west coast of Australia. Some would say that the animal he saw was the Dama Wallaby (*Macropus eugenii*) which is still found on the south-west coast of the island continent. Others believe that it was not a kangaroo at all, but the kangaroo rat; and still others say that it sounds very much like the Banded Hare-Wallaby (*Lagostrophus fasciatus*) which bears some resemblance to the raccoons Dampier had known in the Spanish Main. Dampier's description was surprisingly brief, considering that this was an animal which must have appeared strikingly different from any he had ever previously seen. He says, "The Land-Animals that we saw here were only a sort of Raccoons, different from those of the West-Indies, chiefly as to their Legs; for these have very short fore Legs; but go Jumping upon them as the others do, and like them are very good Meat". As usual, he was interested in the gastro-nomic merits of any unfamiliar animal and he may therefore have looked closely at this particular marsupial only at dinner. Moreover, his stay was so short, his experience with this odd creature so limited and his troubles so many at the time, that he failed to examine it, or later to describe it, with his customary thoroughness. His journal often suffered from these lapses throughout his voyage on the *Roebuck*.

Perhaps the most important geographical discoveries attributed to Dampier were made during the cruise which followed his leaving the inhospitable shores of

New Holland. New Guinea had been discovered and cursorily mapped by Spanish and Portuguese sailors in the early 16th century but the island was not fully charted for another two centuries. It was Schouten, Jacob Lemaire, Tasman, and Dampier who finally sailed along its coasts and determined its outline with any certainty. The Dutch had secured a virtual trade monopoly in the Spice Islands in the middle of the 17th century, and had vigorously opposed any exploration to the east of these Islands—at least by anyone other than their own countrymen. Navigation in these waters was also extremely difficult and hazardous, and this combination of obstacles had deterred even the most adventurous English seamen, until Dampier's arrival aboard the *Roebuck*. Dampier broke the Dutch monopoly, and he was quickly followed by many others, including his countrymen working for the East India Company, which had first reached the Spice Islands about 1600, only to retreat after 1623, in the face of Dutch naval superiority. Word of Dampier's success brought them back to stay.

Though he himself was not involved in the discovery, it may well be that Dampier also reported the first sighting of Easter Island to be recorded in the literature of exploration. In 1685 he parted with Captain Davis of the *Batchelors Delight* to join Captain Swan in the latter's voyage to the East Indies in the *Cygnets*. Captain Davis had sailed south after their parting, but later reported to Dampier "that after his Departure from us at the Haven of Ria Lexa . . . he went after several Travellers, to the Gallapagoes, and that standing thence Southward for Wind, to bring him about Terra del Fuego, in the Lat. of 27 South, about 500 leagues from

Copayapo, on the Coast of Chili, he saw a small sandy Island just by him; and that they saw to the Westward of it a long tract of pretty high Land, tending away toward the North West out of sight. This might probably be the Coast of Terra Australis Incognita." Dampier was of course far off the mark with his conjecture, but if it was truly Easter Island, it was indeed a *terra incognita*, and was to remain so until the final discovery of the island on Easter afternoon, April 5, 1722, by Jacob Roggeveen in his ship the *African Galley*.

In addition to Davis' account which Dampier reported in his *New Voyage round the World*, Lionel Wafer, surgeon's mate on the *Batchelor's Delight* and an old comrade of Dampier, later published a full description of the sighting of this mysterious land, where, unfortunately, Captain Davis would not permit the crew to go ashore. Jacob Roggeveen in his own story of the discovery, as recorded in his *Journal* (not published until 1838), indicates that the search for Easter Island was based on Dampier's account, though Roggeveen says that "it was not in the least in conformity with our find". The lack of conformity noted by Roggeveen was apparently in the appearance of the island as given to Dampier by Captain Davis, for the latitude and position were reasonably accurate.

Most of the great voyagers from Columbus onwards described the peoples, plants and animals which appeared strange or new to them. Few of the early circumnavigators and explorers, and fewer still of the privateers and buccaneers who succeeded them, were competent to chronicle with accuracy or faithfulness the flora and fauna of the Caribbean, the South Seas, New Guinea and

the Indies in all the exotic profusion afforded by these largely tropical or sub-tropical lands. These pioneers had few guide-lines or systematic schemes of classification which would permit them to identify and organize what they saw, for such became available only after the time of Ray, Willughby, and Linnaeus. Captain Cook in the late 18th century for the first time carried with him on his voyage a complement of naturalists and scientists trained in the new knowledge and in the new techniques, and only then did scientific exploration become possible. In many ways William Dampier was born a half century too early. His intense inborn curiosity, his capacity for detail, his sharp comprehension and intelligence, and above all his ability to express himself simply and clearly in English of considerable style would have won him a place in the distinguished company of explorer-scientists who followed him. He has his own niche, but it is a lonely one.

Since Darwin first visited the Galapagos Islands, that curious archipelago under the equator, scientists have probably lavished more attention on them than on any other group of islands in the world. Their position, far removed from the South American continent and the main lines of sea traffic, for long gave them a unique degree of isolation, for they were never seriously disturbed by visitors from the outside world—plant, animal or human. Darwin said of them: "The natural history is very remarkable: it seems to be a little world within itself, the greater number of its inhabitants, both vegetable and animal, being found nowhere else."

The Galapagos Islands were discovered, as was most of the land in equatorial and sub-equatorial America, by

the Spaniards, and were named after the great tortoises which have interested scientific visitors ever since. The islands were uninhabited, provided plenty of food, water and salt, and became on this account attractive to roving English buccaneers seeking a pleasant haven or a convenient retreat. As a result, some of the Galapagos Islands today bear such English names as Albemarle, Chatham, James, and Charles. Dampier in 1684 was fascinated by the islands, and his description of their unusual features is as pertinent and valid today as it was nearly three centuries ago. He described with his customary acuteness and detail the juicy cactus or "Dildo Tree," the great land tortoises and the "Guanoes" or Iguanas, which "are as fat and large, as any that I ever saw; they are so tame, that a man may knock down 20 in an hours time with a club." Of the tortoises he says: "One of the largest of these Creatures will weigh 150 or 200 weight, and some of them are 2 foot, or 2 foot 6 inches over the Callapee or Belly. I did never see any but at this place, that will weigh above 30 pound weight."

He mentions the turtle doves which were "so tame, that a Man may kill 5 or 6 dozen in a forenoon with a stick." Darwin found that this had changed by the time of his arrival in the 1830's and reported that while "Dampier says that a man on a morning's walk might kill six or seven dozen of these birds, that at present they do not suffer themselves to be killed in such numbers."

Since Dampier was always extravagantly fond of turtle soup, his interest in the Galapagos turtle was not entirely objective. He describes with considerable admiration Captain Davis' feat of extracting 60 jars of oil from the Galapagos land turtle, which "Oyl served instead of

Butter to eat with Doughboys or Dumplins in his return out of these Seas". On several occasions Dampier recommends the Islands as a good stopping-over place for ships bound for the East Indies, because of the "Refreshments". Lionel Wafer and Woodes Rogers also wrote attractive and somewhat fuller descriptions of these islands, but Dampier's earlier account is still most readable and accurate. Few naturalists who have visited in the Galapagos since the time of Darwin have been able to resist the temptation to add their own impressions to the long catalogue of contributions which began with Dampier.

Guam, New Guinea and the Philippine Islands, including the island of Mindanao, are such familiar names to modern readers that it is difficult to appreciate that Dampier was describing lands and places which were practically unknown to his countrymen in the late 17th century. Though Magellan discovered Guam in 1521, the Spanish did not succeed in conquering it until 1688, two years after Dampier's visit. He was much taken with the natives, the original Chamorro, who at that time were resisting a small company of Spanish soldiers established in a small fort in the West side of the Isle, armed with 6 cannons. An earlier Chamorro attack had succeeded in killing many Spaniards, but the survivors still had their guns and were successfully maintaining their position in defiance of the natives. Dampier says that the disappointed Chamorro had then destroyed their plantations and stock and had gone off to other islands in the Ladrone group, leaving only about 100 diehards on Guam. Some of these had urged Captain Swan to attack the Spaniards, but he had refused to join with them, for his crew was hungry, following a long and harrowing voyage

in which starvation had appeared so imminent that they had plotted mutiny and had talked ominously about eating both Captain Swan and Dampier. (The portly Captain, talking it over with Dampier, thought it quite unlikely that the seamen would have found the lean and saturnine pilot an attractive dish.) Crew and captain were therefore more interested in the plentiful bread-fruit, rice, and coconut, than in a fight with the Spanish garrison. After eating of the island's bounty, Dampier characteristically did not fail to include in his journal a description of the appearance, cultivation, and uses of the fruits of Guam. His lively and appreciative account of the bread-fruit was the first to appear in English, and later provided the basis for one of the best-known peacetime episodes in British naval history. Seventy-five years after Dampier's report, Captain Cook, remembering Dampier's recommendation, examined the bread-fruit with great interest, and in view of the fact that it was one of the most important food staples of the Pacific Islands, recommended that it be transplanted to the British West Indies, where favorable environmental conditions indicated that the bread-fruit could be successfully cultivated. The *Bounty* was commissioned for this purpose, and its commander was William Bligh. The story of the mutiny on the *Bounty*, the long trip by Bligh and some of his crew in an open boat, and the flight of the mutineers to Pitcairn Island is known to all. Perhaps less well known is the fact that the redoubtable Captain Bligh returned to his task in a new ship, and successfully completed the transplantation of the bread-fruit in 1792-1793.

Dampier in his *New Voyage round the World*, 1697, describes the bread-fruit in this way:

“The Bread-fruit (as we call it) grows on a large Tree, as big and high as our largest Apple-trees. . . . The Fruit grows on the boughs like Apples: it is as big as a Penny Loaf when Wheat is at 5 shillings the Bushel. It is of a round shape, and hath a thick tough rind. When the Fruit is ripe it is yellow and soft; and the taste is sweet and pleasant. The Natives of this Island [Guam] use it for Bread: they gather it when full grown, while it is green and hard; then they bake it in an Oven, which scorseth the rind and makes it black: but they scrape off the outside black crust, and there remains a tender thin crust, and the inside is soft, tender and white like the crumb of a Penny Loaf. There is neither seed nor stone in the inside, but all is of a pure substance like Bread: it must be eaten new; for if it is kept above 24 hours, it becomes dry, and eats harsh and choaky; but 'tis very pleasant before it is too stale. This Fruit lasts in season 8 months in the year, during which time the Natives eat no other sort of food of Bread kind. I did never see of this Fruit any where but here. The Natives told us, that there is plenty of this Fruit growing on the rest of the *Ladrone* Islands: and I did never hear of any of it any where else”.

The Philippines had become a Spanish monopoly by Dampier's time, though the Spaniards held in strength only Manila on “Luconia,” and some other islands to the southwards. The islands of St. John and Mindanao were still completely free of Spanish rule, and Dampier was much interested in the strange society he found there: largely Moslem, and only slightly influenced by the Spanish intruders to the North. He was surprised to find some of the native rulers, as well as some of their subjects, competent in Spanish, in Malayan, and in Arabic, as well as in the local dialects, and he was almost as surprised at their habit of bathing twice a day. Although sceptical of this outlandish custom he noted the general

good health which prevailed among them, and being at that time in poor health himself, he thought the regimen might be worth trying. The results were excellent and he somewhat apologetically reports that he continued this habit for many years, whenever and wherever it was possible. In many ways these Mindanao natives were the most cultivated and advanced people Dampier had encountered in his travels, and he was obviously perplexed by the juxtaposition of good manners, gentle behavior, polygamy, and occasional lapses of public or private hygiene which he noted among them. His description of their slight stature and characteristic physiognomy still fits the inhabitants of these islands remarkably well.

Dampier's *Voyage to New Holland* was a slender and indeed incomplete work, compared to his two earlier volumes. A feature of this third volume was the inclusion of engravings of "Divers Birds, Fishes, and Plants", for he had with him on this voyage a "Person skill'd in Drawing". Botanists and ornithologists have since pointed out that the artist was obviously skilled in neither of these sciences, but many of the engravings are nevertheless important because they represent the first known portrayals of Australian birds and plants. To the reader with perhaps little more botany or ornithology than Dampier and his artist possessed, the engravings have a quaint attractiveness of their own, which is independent of their scientific accuracy and fits the book very well.

His descriptions of some birds not shown in the plates are good enough to permit modern students to identify them. For instance: "The 30th of *July* [1699], being still nearer the Land we saw . . . a sort of Fowls the like of

which we had not seen in the whole Voyage, all the other Fowls having now left us. These were as big as Lapwings; of a grey Colour, black about their Eyes, with red sharp Bills, long Wings, their Tails long and forked like Swallows; and they flew flapping their Wings like Lapwings." Hubert Massey Whittell, author of a standard reference work on Australian ornithology, says that these were undoubtedly Caspian terns. On August the first, Dampier "saw several large Sea-fowls, like our Gannets on the Coast of *England*, flying three or four together; and a sort of white Sea-Mews, but black about the Eyes, and with forked Tails." Major Whittell believes these were probably Crested Terns. The four Australian birds pictured in Figures 3-6 of the *Voyage to New Holland* are the Australian Avocet, the Pied Oystercatcher which Dampier calls the "Crab-catcher", the Bridled Tern which he describes as "A Noddy of N. Holland"; and the Common Noddy. Major Whittell comments on another bird, called by Dampier the "Galden", which has long puzzled Australian ornithologists, but which is now believed to be a form of heron, perhaps the Reef Heron or Mangrove Heron, still to be seen around Shark Bay. Dampier's white "parrots" were undoubtedly little Corellas, also found today on the same coast. He caught several birds at this time, including the Bridled Tern from which the drawing of the "Noddy of N. Holland" was made. Since no one aboard the *Roebuck* had any knowledge of bird preservation, Dampier was unable to add bird specimens to the botanical specimens which he eventually returned to England.

W. L. Sclater, a distinguished British ornithologist, has also attempted to identify a number of the other

birds mentioned in Dampier's *Voyages* (*Ibis*, Series 14, Vol. 4 (1940), p. 657-663). In the *New Voyage Round the World* Dampier mentions the "Booby" which he found in the Isle of Aves in the Leeward Isles off Venezuela. According to Sclater, this was probably *Sula dactylatra*. On this island Dampier also saw "Man-of-War birds" (*Fregata magnificens*), and Sclater calls his description of this bird a commendable one. On Roca, another island in the Leeward group, Dampier found the Noddy (*Anous stolidus*) and the "Tropick-bird" (*Phaethon lepturus*).

A favorite bird of Dampier's was the flamingo (*Phoenicopterus roseus*). He found them on the Isle of Sal in the Cape Verde Islands, and described them as "a sort of large Fowl, much like a Heron in shape, but bigger, and of a reddish colour. They delight to keep together in great companies, and feed in Mud, or Ponds, or in such places where there is not much Water: They are very shy, therefore it is hard to shoot them. . . . They build their Nests in shallow Ponds, where there is much Mud, which they scrape together, making little Hillocks, like small Islands, appearing out of the Water, a foot and half high from the bottom. They make the foundation of these Hillocks broad, bringing them up tapering to the top, where they leave a small hollow pit to lay their Eggs in; and when they either lay their Eggs, or hatch them, they stand all the while, not on the Hillock, but close by it with their Legs on the ground and in the water, resting themselves against the Hillock, and covering the hollow Nest upon it with their Rumps. . . . They never lay more than two Eggs, and seldom fewer. The young ones cannot fly till they are almost full grown; but will run pro-

digiously fast. . . . The Flesh of both young and old is lean and black, yet very good meat, tasting neither fishy, nor any way unsavory. Their Tongues are large, having a large knob of fat at the root, which is an excellent bit: a Dish of *Flamingo's* Tongues being fit for a Prince's Table." Dampier was always too close to the practical realities of a harsh life to become a sentimentalizing naturalist.

These beautiful birds are apparently now gone from Sal Island, though Boyd Alexander (*Ibis*, 1898, p. 114) reports them as established on neighboring Bonavista Island in the Cape Verdes. On Bonavista, however, according to Alexander, the eggs are laid on the ground and not on the prepared hillocks. Dampier was wrong in assuming that the flamingo straddled the nest when setting on the eggs, for he failed to note that the bird tucked its legs underneath it during this operation. Even the *Cambridge Natural History* chides him for this slip.

In Lobos de la Mar, off the Chilean Coast, Dampier found the penguin, which Sclater identifies as *Spheniscus humboldtii*. Sclater believes, however, that the penguin reported by Dampier as living in the South Seas, at the Cape of Good Hope and on the coast of Newfoundland, may have been the Great Auk.

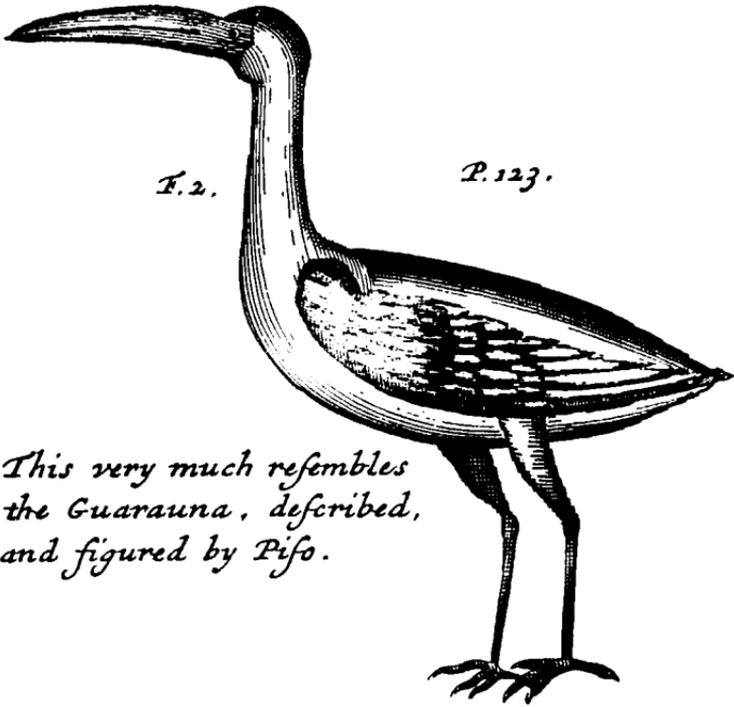
Dampier described "a sort of wild cocks and hens" at Pulo Condore in Cambodia, which Sclater says are undoubtedly the Jungle Fowl. Linnaeus assigned the name *Phasianus gallus* to the Jungle Fowl, giving Pulo Condore as the type-locality, but did not refer to Dampier as the authority. It is in fact more likely that Linnaeus used a description provided by one of his own correspondents,

reporting from the same Pulo Condore long after Dampier's time.

As Sclater notes, the birds described by Dampier in his *Voyage to New Holland* are much more numerous than those in the first two volumes of his writings. In this work, Dampier once again describes birds from the Cape Verde Islands, this time from Mayo Island where he observed the Guinea Fowl, which Sclater says is the *Numida galatea*, a migrant or settler from the mainland of Africa. Sclater is uncertain about several other birds, such as the "Crusia", which he believes may be the *Coruja* of Murphy (*Tyto alba detorta*), and the "Miniota", which he conjectures may be the Morinello, which is a local name for the Plover, *Squatarola*.

On the voyage out to Australia, Dampier kept the *Roebuck* at Bahia, in Brazil for a month, and as usual spent some of his time observing the wild-life ashore. Sclater found that the Brazilian birds Dampier described are in many cases vaguely done, and therefore particularly difficult to identify. The "Chattering Crow" is *Crotophaga Ani*; the "Bill-Bird" is the Toucan *Ramphastos*; the "Muscovy" is still called by that name, *Cairina moschata*; and the "Ostredge" is probably *Rhea americana*.

The first bird plate in the *Voyage to New Holland* shows two birds, one of which Dampier fails to label. The other bird is his "Pintado Bird" (*Daption Capense*), which Sclater says is poorly drawn, but excellently handled in the text by Dampier, who saw it among "millions of Sea-Fowls about the carcass" of a dead whale, during his approach to the Cape. The Pintado had with it on the carcass "another sort, black all over" (*Porcellaria aequinoctialis*), as well as the Petrel, which Sclater iden-



F. 2.

P. 123.

*This very much resembles
the Guarauna, described,
and figured by Piso.*



F. 1.

*The Pintado Bird
P. 96.*

tified as probably *Oceanites Oceanicus*. Dampier said that the bird pictured with the Pintado resembled Piso's Guarauna. He saw this water-fowl in Shark Bay and Sclater thinks it may have been the Glossy Ibis (*Plegadis falcinellus*), but he is uncertain, because the engraving in Dampier is rather poor.

Sclater agrees with Major Whittell in the identification of the birds illustrated in Figures 3-6 of Dampier's *Voyage to New Holland*, and gives them their Latin names: the Australian Avocet (*Recurvirostra Novae-hollandiae*); the Oyster-Catcher (*Haemalopus ostralegus longirostris*); the Sooty Tern (*Onychoprion fuscatus seratus*); and the Noddy (*Megalopterus mintus*). Sclater labels Dampier's "White Parrots" as the Cockatoo (*Kakatoe galerita*).

Sclater also mentions that Wallace in his *Malay Archipelago* (v. 1, p. 294) quotes Dampier's description of a "Ringing-Bird", without identifying it. Sclater believes that this bird may have been *Cyornis hyacinthina* (Temminck), and goes on to state that Dampier was undoubtedly the first to describe the Crowned Pigeon (*Goura Cristata*) of southwestern New Guinea, and that Dampier's description of the Hornbill (*Rhyticeros plicatus*) later served as the basis for the name given by Forster to this bird in his *Indische Zoologie* (1781).

The history of Dampier's little collection of plants made during the voyage to New Holland is a curious one. When the *Roebuck* sank off Ascension Island in February 1700, Dampier salvaged his specimens and safeguarded them throughout a precarious period in which he and his crew "liv'd on Goats and Turtle" and found their water high on a mountainside at a spot still called

"Dampier's Spring." Finally rescued by an East-Indian, Dampier returned safely to England, carrying with him little but the clothes he wore, his all-important journal, and his collection of dried plants.

In his preface to *A Voyage to New Holland*, Dampier mentions that "the Plants themselves are in the Hands of the Ingenious Dr. Woodward." Dr. John Woodward, a medical man and a geologist, was something of an eccentric, who was later to be expelled from the Royal Society for an unwarranted insult to its president, Sir Hans Sloane. Woodward was also a friend of John Ray, who at about that time was completing his last botanical work, the three-volume quarto edition of the *Historia Plantarum*. Woodward made some of Dampier's plants available to Ray, and a two-page description of them appears as an appendix (pp. 224-226) to the third volume of Ray's great work. This appendix is entitled "Plantae a D. Gulielmo Dampier in Brasilia, Nova Hollandia, Timor et Nova Guinea, observatae et collectae." The "Account of several Plants" contained in Dampier's *Voyage to New Holland* was probably written by Dr. Woodward, and amounts to a translation of the Latin descriptions in Ray's *Historia Plantarum*, with a few minor comments added.

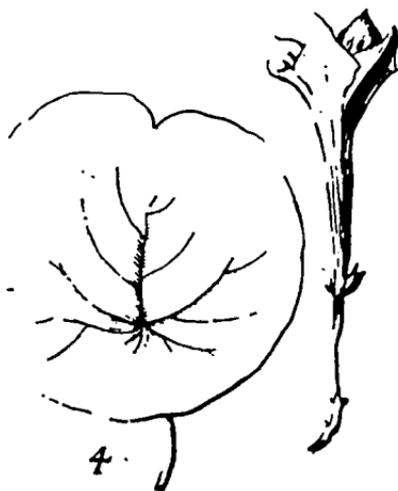
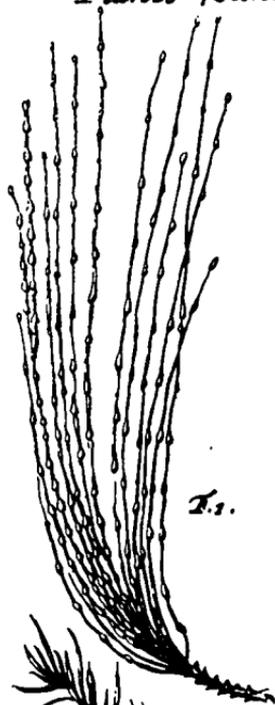
Apparently the only careful study ever made of the later history of Dampier's Australian plants appeared in an article by Professor T. G. B. Osborn and Mr. C. A. Gardner, in *Proceedings of the Linnean Society*, January 5, 1939 (pp. 44-50). The authors report that Dampier's collection amounted to about forty plants, and that it is now a part of the Sherardian Herbarium in the Department of Botany at Oxford. Neither Bentham or von

Mueller, who wrote the definitive works on Australian botany in the 19th century, ever examined these plants, though Osborn and Gardner state that von Mueller knew of them and had inquired about them, only to be dissuaded from examining them by their custodian, M. A. Lawson. Lawson was Sherardian Professor at Oxford at that time and apparently was quite unimpressed by the collection. Osborn and Gardner disagree strongly with this estimate, for they argue that "it contains one of the specimens on which Robert Brown formed the curious Rutaceous genus, *Diplolaena*, and the cotype of his species, *Dampiera incana*. . . . It contains the plants of Terra Australis Incognita which impressed the first Englishman who has left any record of his visit to these shores 71 years before Sir Joseph Banks landed with Captain Cook at Botany Bay". That John Ray, Plukenet, and William Sherard were also interested in Dampier's collection, lends considerable strength to Osborn and Gardner's position.

In addition to the 14 plants given to Ray, there were six other plants which Woodward made available to Plukenet, who later described them and illustrated them in his *The Almatheum Botanicum* (London, 1705). At some point the balance of the collection went to William Sherard, and Osborn and Gardner say that it was Sherard, rather than Woodward, who sent the specimens to Ray. Two of the plants described by Ray, and three used by Plukenet, are now missing from Sherard's Herbarium.

In their article, Osborn and Gardner identify the seventeen Australian plants credited to Dampier; list the proper Sherard Herbarium number; match the plants with Dampier's original engravings; and provide refer-

Plants found in New Holland & Timor.



ences to the works of Plukenet, Robert Brown and John Ray, so that the Dampier plants described or pictured in these works may be identified. Two of the plants which were illustrated in Dampier's own work are missing from the Sherard Herbarium, but this does not deter Osborn and Gardner, who identify one of them (*Voyage to New Holland*, Table 3, Figure 1) as probably *Gonostylis candidans* (Dampier's Scabiosa), and the second (Table 4, Figure 3) as almost certainly *Olearia axillaris* F. Muell. (Dampier's Rosemary).

The Sloane Herbarium at the British Museum includes two flowerless shoots which have also been assigned to Dampier. They are labelled H.S. 93 and 94, and came originally from Plukenet's Herbarium.

Robert Brown in his *Prodromus Florae Novae Hollandiae* 1810 (of which a facsimile edition appeared in 1960) commemorated Dampier by naming the genus *Dampiera* after him. Other genera, unknown before Dampier collected them, are *Clianthus Diplolaena* and *Hannafordia*.

Throughout Dampier's work he reports in detail on the plants and animals which seemed completely strange to him. Since other explorers had preceded him in most of the areas which he visited, and many Europeans had traded or settled in these far-flung outposts during the 16th and 17th centuries, not everything that he described was new. However, the number of observations which later proved to be the first, or the best early report, at least in English, is surprisingly large. His birds and flowers have already been commented upon. His discoveries among the fishes were only slightly less significant, as is evidenced by the number of genera and species

which bear his name: *Dampiera Castelnau*; *Dampiera Melanotaenia* (Blkr); *Dampiera trispilus* (Blkr); *Dampiera cyclophthalmus* (Mull & Trosch); and *Dampiera spilopterus* (Blkr).

Regardless of their claims to priority, his descriptions are uniformly vivid, colorful and charming, and many naturalists and biologists who followed in his footsteps have found that they can do little better than to quote him at length when they wish to describe a plant or an animal which he had reported. Dampier differs from his successors not so much in his accuracy, nor in his sharp appreciation of important details, but rather in his matter-of-fact acceptance of the things he saw. There is little sense of wonder, no awe, no why or how, in his narrative. The world he knew was filled with unknown things and plants and animals waiting to be seen and described. There was little or nothing of the marvellous about it.

Many observers, for instance, have been unable to accept the fact that the giant anteater or ant bear of Central and South America can live entirely on tiny creatures such as ants and termites. It is true that this animal does climb trees and occasionally feeds on immature birds and on eggs which it can lap up with its remarkable tongue, but its staple diet is still the ant, which it swallows in prodigious quantities. One of the earliest accounts of the way in which the giant-anteater feeds is found in Dampier, who once watched this animal feeding on army ants:

“It lays its Nose down flat on the Ground, close by the Path that the Ants travel in, (whereof here are many in this Country) and then puts out its Tongue athwart the Path: the Ants passing forwards and backwards continually, when they come to the Tongue, make a stop, and in

two or three Minutes time it will be covered all over with Ants; which she perceiving, draws in her Tongue, and then eats them; and after puts it out again to trapan more. They smell very strong of Ants, and taste much stronger; for I have eaten of them”.

Close observation could hardly be carried much further than “For I have eaten of them.”

Dampier’s account, written in the August of 1699, of the “hippopotomus” which he found in the maw of a shark caught in Shark’s Bay during the voyage to New Holland, has long been suspect. The hippopotamus is rarely found at sea (though it likes brackish water) and has never been found in Australia. In spite of this, many explorers and naturalists, taking Dampier at his word, searched the shores of the sub-continent for evidence of this great animal, but with no success. It seems obvious that the object he saw was something with a remarkable resemblance to the hippopotamus.

In his story, Dampier said, “Its Maw [the shark’s] was like a Leather Sack, very thick, and so tough that a sharp Knife could scarcely cut it: In which we found the Head and Boans of a *Hippopotomus*; the hairy Lips of which were still sound and not putrified, and the Jaw was also firm, out of which we pluckt a great many Teeth, 2 of them 8 Inches long, and as big as a Mans Thumb, small at one end, and a little crooked. . . .”

Bernard Heuvelmans in his *On the track of unknown animals* (London, 1958) states his opinion that Dampier’s hippopotamus was probably the head of a dugong, which is a large herbivorous water animal, with a mermaid-like tail and a head vaguely like that of a hippopotamus. The male dugong has two bevelled tusk-like

upper incisors, which correspond to Dampier's description in that they are much larger than the other teeth.

However, it is surprising that Dampier should not recognize a dugong, for he had described it many times before as the "Manatee". Indeed, he had found the "Manatee" good eating on many occasions and, as his writings show, he was not a man to neglect or forget such an important attribute.

There were few members of the animal kingdom, large or small, which failed to attract Dampier's attention in those widely dispersed regions of the world he knew at first-hand. On Campeachy he noted the land crabs, white and black, which eat "the Manchaniel Fruit, which neither Bird nor Beast will taste. . . . Yet these very Crabs that feed on Manchaneel, are venomous, both to Man and Beast that feeds on them". Ants of every variety interested him, and he describes their color, size, stings, habitations, and the "great Paths made by them in the Woods of three or four Inches broad beaten as plain as the Roads in *England*. . . . Sometimes a Band of these Ants would happen to march through our Huts, over our Beds . . . nay, sometimes into our Chests; and there ransack every part; and where-ever the foremost went, the rest all came after: We never disturbed them, but gave them free liberty to search where they pleased; and they would all march off before night. These Companies were so great, that they would be two or three hours in passing by, though they went very fast".

Though the basis of cochineal dyes were generally supposed to be plant seeds, Dampier described the Cochineal as a kind of insect before Leeuwenhoek correctly identified it with his microscope in 1703.

In his description of his experiences at Campeachy, Dampier mentions the oysters which grow on the roots and branches of the Mangrove tree, which were often immersed in water. One cannot help but wonder if he had here stumbled upon the fact in nature which had given rise to the Elizabethan legend of the "Barnacle Tree", which Gerarde and other herbalists had treated in such ludicrous detail in books which had enjoyed a considerable vogue in the early 17th century. On the shores of Campeachy, Dampier also found *Limulus*, the primitive horse-shoe crab which he says "were called by the English Horse Hoofs". On the mainland were a "sort of Spiders of a prodigious size, some near as big as a Man's Fist, with long small Legs like the Spiders in *England*: they have two Teeth, or rather Horns an Inch and a half, or two Inches long . . . which are black as Jett, smooth as Glass, and their small end sharp as a Thorn; they are not strait, but bending. These Teeth we often preserve. Some wear them in their tobacco-pouches to pick their Pipes. Others preserve them for Tooth-Pickers, especially such as were troubled with the Tooth-ach".

Though the Humming Bird was known to Oviedo, Gesner and Cardanus in the 16th century, and had been described in English by Thomas Morton as early as 1646, Dampier's paragraph on this interesting American bird, although lacking priority yet is as apt as any later description:

"The Humming Bird is a pretty little feather'd Creature, no bigger than a great over-grown Wasp, with a black Bill no bigger than a small Needle, and his Legs and Feet in proportion to his body. This Creature does not wave his Wings like other Birds when it flies, but

keeps them in a continued quick motion like Bees or other Insects, and like them makes a continual humming noise as it flies. It is very quick in motion, and haunts about Flowers and Fruit, like a Bee gathering Honey, making many near addresses to its delightful Objects, by visiting them on all sides, and yet still keeps in motion, sometimes on one side, sometimes on the other; as often rebounding a foot or two back on a sudden, and as quickly returns again, keeping thus about one Flower five or six minutes, or more."

And so the catalogue runs on: carrion crows, or turkey buzzards; alligators and crocodiles; the squash, or *coati mundi*; the spider monkeys—those most repulsive-looking and ill-behaved monkeys of the New World, with their distinguishing prehensile tails; the sloth, raccoon, opossum, armadillo, peccary, the Great Bats of Mindanao, cockles, crawfish, conies, galliwasps, mosquitoes and gnats.

The roster of plants which interested Dampier is perhaps even larger than the varieties of animal life which he observed, examined, or ate during his travels. His description of the Sapodilla was one of the first to appear in an English work. De Candolle in his *Origin of cultivated plants* (1886) gives America as the place of origin for this highly-esteemed tropical fruit, and he bases his judgement upon the fact that Dampier had seen it growing wild in the forests of Campeachy. The same author, in considering the original habitat of the coconut, mentions that Dampier had found it forming woods in the islands near Panama, at that time uninhabited, indicating to De Candolle that the coconut had not been transplanted, but had arrived by some other means. Dampier's practical eye caught a curious fact about the utiliza-

tion of the coconut. Whereas in the East Indies the coconut had a wide range of uses, in making oil, fermented liquor, dishes, broth from the kernel, cables and ropes from the husks, a kind of oakum and a coarse cloth for sails; yet in the West Indies few of these possibilities were known or realized. Unless buccaneering is to be defined in a very broad and sympathetic fashion, Dampier had little experience as a merchant or trader. However, his insatiable curiosity made him as alert to the possibilities of native crafts, industries and their commercial products as he was to everything else which caught his attention. His description of the process used in making sago starch, in which the starchy pith was removed from the felled tree, ground up with water, strained, made into a paste and rubbed through a sieve to bring about granulation, is in close agreement with modern descriptions. In his account of the lacquer factories in Tonquin, he did not fail to note the toxic hazards involved for the workers in this industry. He described the traffic in betel nuts and the chewing of betel nut, then widely practised in the East Indies, and correctly assumed that the habit was not harmful, saying that "it is accounted very wholesome for the Stomach". Modern observers agree that the alkaline juice may indeed be helpful in preventing over-acidity.

An interesting exercise with many of the names of plants and fruits mentioned in Dampier's *Voyages* is to check them against the record of their first, or early appearance in English sources as cited in the *Oxford English Dictionary*. In a surprising number of instances, Dampier affords the quotation used there. Among them would be the Mammee tree and fruit; the Pitch Munjack (Manjak); the Yam; Corn-wood; the Coco-plum; the

orange-red dye called Anatta (Otta); the Avogato-pear (Avocado); the Cabbage tree and fruit; the foul-smelling but wonderfully delicious Durian fruit; the Macaw tree and berry; the Maho tree and bark; the Mangastan (Mangosteen); the Sapodilla; the Lichee Nut, and the Kumquat.

Always a great believer in the adage that the "proof of the pudding is in the eating", Dampier tasted his new plants as readily as his strange animals, and carefully reported his impressions. About the plantain he said, "I take [it] to be the King of all Fruit, not except the Coco it self", but he had many slightly lesser enthusiasts, including the kumquat, the mangosteen and the sapodilla. Concerning the plantain he made another significant observation when he said that "these Trees are not raised from Seed, (for they seem not to have any) but from the Roots of other old Trees". Modern texts in economic botany support him when they report that while there are some 75 varieties of plantain (*Musa Paradisiaca*), all of them are so old that they have never been propagated by seed within recorded time.

It is a curious fact that the editors and biographers of William Dampier, while unanimous in their agreement about the eminent position of his *Voyages* in the literature of travel and exploration, have often found it difficult to explain the firm reputation and continued popularity of these works. The man who wrote them was of humble origin, poorly educated, and completely unknown until relatively late in life. As might be expected, many of his contemporaries seriously doubted that he wrote his own books. Men of heroic mold might have surmounted such difficulties and met such objections,

but Dampier never qualified as a hero. Indeed, Clarke Russell in his "English Men of Action" says that Dampier was not even "formed of the stuff of which explorers are made". J. K. Laughton, in the *Dictionary of National Biography*, concedes the "clear, easy, homely, common-sense style" of his writings, so marked as to be almost classical, yet emphasizes that he was not the "incarnation of all virtues"—as indeed he was not. The charge of cowardice has been leveled against him, and this may explain many of the flimsy and shadowy objections which have been raised about both the man and his work. However, his own close buccanering friends, Ringrose and Cowley, were by all accounts far from fearless adventurers, but they have been excused by historians of their period as "gentle buccaneers and reluctant robbers". Dampier was not included in this company, though a modern reader might conclude that if any buccaneer and robber deserved the description "gentle and reluctant", Dampier was the man.

Sir Albert Gray in his 1927 edition of Dampier's works suggests that the key to the puzzle might lie in the fact that Dampier was essentially a "gentleman", and that "though Dampier was with the buccaneers, he was never of them". There is certainly some truth in this observation, but put in just this fashion, it has a slightly stuffy implication. Gray made another comment which is much more perceptive and cogent, when he said that Dampier's "true distinction seems to me to be in the scientific and literary merits of his writings. There is scientific research in all his books".

Wilkinson, the best biographer of Dampier, readily admits that he is hardly competent to discuss the scien-

tific values of Dampier's books, and while he wishes that he could quote for the reader the many passages which demonstrate and illustrate these values, confesses that he found it almost impossible to do so effectively. This is indeed a strange comment about an author who has been so profusely and so readily quoted for nearly three centuries.

John Masefield, in his edition of Dampier's works (London, 1906), will not accept that the "faithful chronicling of minute natural detail", which was so typical of Dampier's work, "is the work of a great intellect". However, he does concede that "the supreme faithfulness and care of Dampier's chronicling can only be gauged by those who take the trouble to compare the work of even the very best of the chroniclers who have succeeded him with the perfect work done under such difficulties aboard the buccaneer cruiser". Masefield goes on to say that Dampier "judged nothing, not even himself; but his work has this supreme merit, that it surveys the lesser kingdoms with a calm, equable, untroubled, and delighted vision".

The professional sailors and the great navigators have always appreciated and valued Dampier. Byron, Cook, Broughton, Flinders, Carteret, Gower, Howe, Burney, and Nelson all expressed their admiration for him, but unfortunately their comments are known to few readers of Dampier's works. The scientists of his own day, as we have seen, knew and respected him, and later scientists, as distinguished as Darwin and Humboldt, made good use of his work. Humboldt generously commented that great European scholars and travelers such as Conda-

mine, Juan, and Ulloa added little to the observations made by this remarkable English buccaneer.

And yet, as W. C. D. Dampier-Whetham, himself a scientist, has said, "the true life of William Dampier, the man of science, remains to be written".

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