

THE CITY OF GOLD



Johannesburg, South Africa.—Both, the famous Boer guerilla general, a British pioneer and feted in London; the Transvaal, after three years of warfare and five of military rule, once more a self-governing colony under Boer control—how strangely events reverse themselves! And yet Johannesburg, which created the Transvaal and is nine-tenths of it, goes on serenely, pouring forth gold in a continuous stream, unmindful of political change, and will continue, doubtless, to do so, till the last paying particle of the auriferous metal has been extracted. Then the mines will close down forever, the houses tumble to decay, and the myriads of migrating springbok will once more wander over the site of the great mining city.

Dumped down in the middle of a vast, rolling sea of barren uplands, crowned with strong granite hills, joined to the southern coasts, over a thousand miles away, by only two slender railway lines, Johannesburg is emphatically dependent for its existence on the gold output. Just one-and-twenty years ago a party of prospectors made a discovery of gold upon the farm of an ignorant Boer named Johann, who resided far from civilization in a desolate region where it had been stated officially that gold could not possibly be found. They offered him a price which seemed enormous for the sale of this property. The old man pocketed the money, packed his wife, children and household utensils inside his ponderous wagon, spanned his oxen and trekked away northward into the wilderness. To-day his farm is valued in billions; and now, where once the veld was blackened with antelope herds, stalked by the lion and leopard and a few adventurous frontiersmen, there stands a city of 150,000 souls, white, black, yellow and brown, known as Johannesburg.

The City To-Day.

It is a long, irregular, strung-out succession of mining villages, amalgamating into a fine town toward the center of their length, and stretching away for about 30 miles along the course of the famous reef—a series of tall chimneys, miners' huts, groups of stores, negro and Chinese compounds, huddled beneath the shadow of the great wheels which crown the headgear at the entrance to the shafts. From miles away, when everything is hidden under the noon haze, or floats a dancing mirage, between earth and sky, may be seen the immense heaps of "tailings," which is the name given to that refuse that remains after the gold has been extracted by cyanide or mercury from the pulverized ore, and shines, whiter than snow, in immense mounds along the whole course of the outcrop. So vast are these heaps that when, during the exciting days of revolution and the Jameson raid, Boer officials suspected that Maxim guns and rifles were hidden therein, they were searched systematically for days without their contents being discovered.

There is probably no city in the world which has seen so many eventful days or held such an assorted population. The fame which Johannesburg attained on the discovery there of the richest gold fields in the world, sustained by her constant prominence in the eternal Anglo-Dutch feud in South Africa, attracted thither adventurers and fortune-hunters from all corners of the earth. Here we may see the Englishman, recently arrived and superficially scornful of colonialism; the miner from Wales, speaking no tongue but Welsh, drawn thither by high wages; the Yankee, supreme in enterprise and slowly outgrowing all his competitors from business; the French investor, the German brewer and, of course the Scotch bank clerk, Indian coolies, Afghans with horses, Persians in round, embroidered caps; Syrians peddling and hawking, Greeks and Italians pushing great barrows laden with fruits and luscious grapes from the Cape orchards; Malay women with regular, oval features, carrying upon

their backs enormous bundles of washing; Boers with wagons and oxen, cracking their long whips round the market square; half-castes and natives from every tribe between the Zambesi and Table mountain, pass and repass, intent upon their business. There is the sturdy farmer from the back veld, making his first visit "to town," with his round fringe, veldschoen of untanned antelope hide and nautical trousers buttoning at the sides, and the Hebrew, predominant in everything, in the saloon trade, the factories, the general stores.

Before the war there existed in Johannesburg a syndicate, well organized, with wide ramifications, controlled by half a dozen millionaires, which sold liquor illegally to the natives at an enormous profit. The penalty for conviction of engaging in this traffic has now been made life imprisonment, and the stringency of the law has mended matters, but not ended them. Illegal whiskey and smuggled opium are now the desperate enterprise of a few smaller men, who stake their liberties against the 1,000 per cent. profits which can be made by them.

Illegal Liquor Sellers.

In the old days when Johannesburg was still a mining camp, when beer and champagne were both retailed at \$5 the bottle, in the corrupt and palmy days of the Kruger oligarchy, the liquor dealers had a monthly turnover of millions, the natives were debauched by Cape gin, and all work upon the mines had to be suspended between Saturday and Tuesday, until they had recovered from their intoxication. Vile alcohol, manufactured from potatoes at a cost of about two cents a gallon, was colored, bottled and retailed at 12 cents a drink. Usually the manager of the nearest mine received a salary from the syndicate to close his eyes to the affair; and the majority of the detective force likewise received a salary from two different and, theoretically, opposing powers. The bars in which the liquor was sold were simple rooms, adjoining some store, access being obtainable only through a single door. The liquors stood upon a disappearing sideboard, which, when a spring was pressed, sank through a trap door in the floor. Spies stood at every corner in the vicinity to keep watch against the approach of strangers of a suspicious nature; and should such draw near, an electric signal bell rang out its warning, so that the detective, rushing into the store, pistol in hand, would find nothing more exhilarating than a party of Kaffirs bargaining over a blanket, unless one of these same bargainers happened to be a confederate of the raiding party, and had retained the alcoholic beverage in his mouth through the medium of a small sponge, and had thus kept the evidence which was to send the shebeener down to Capt. Town for a number of years, to help in construction work on the breakwater.

Few to Enact Role of Spy.

But the vengeance of the liquor syndicate was no less far-reaching than that of the illicit diamond brokers at Kimberley, and thus it occurred that the role of Noah Claypole was never a popular one.

To-day the traffic is chiefly in opium. The importation of 50,000 coolies from China, accustomed to smoking it, has led to an insatiable demand for the product. Upon the Rand, the name given to the districts along the gold reef, there exists a yellow population of indentured servants—virtually serfs—equal in number to all the whites in Johannesburg. Lodged in overcrowded compounds, where they are confined like animals, liable to be flogged for any infraction of discipline by their white overseers, who have learned the summary ways of the Boers with natives, from time to time some of this seething horde overwhelms its guards, breaks out, and takes to a life of pillage and murder along the outlying districts.

South Africa is not an especially law-abiding country, and the punishment of the opium smuggler is usually summary. He is offered the choice between a flogging and a period of imprisonment, and, of course, chooses the former. Thereupon he is strapped tightly to a wagon wheel and receives 50 lashes from a whip of hippopotamus hide, wielded by half-castes. These men, delighted at taking their revenge upon one of the white race, do not spare the victim. His back is literally cut to pieces, and, at the end, half-dead and streaming with blood, he is flung out of the compound.

The Market Square.

Of course in Johannesburg there is the great market square, a feature common to all South African cities, which are built about them. When one of the frequent tornadoes comes along it becomes a reservoir of dust, which invades every corner of the town, compelling the housewife to engage in an additional "spring cleaning." Every morning the square is filled with great, ponderous ox wagons, something like the old prairie schooner of the type which has been used in South Africa for the past century, and has protected many a little settlement from massacre. When, during one of the continuous native risings, a hostile army of tribesmen menaces a town, the inhabitants at once go into "laager," forming an encampment behind a bulwark of wagons fastened together, the duesselboom, or center pole of each, against which the oxen are fastened in pairs, being locked into the hind wheels of the wagon adjacent, and the spaces between the wheels being piled high with sacks of maize. Seldom or never has such a barricade been overwhelmed. It was in such wise that, early in the last century, the Boers overcame the hordes of the treacherous Dingaan, the Zulu king, the men firing from behind these defenses with their elephant guns, while the women, in the inside of the square loaded and passed up the rifles. These wagons are more like caravans. The produce is stacked upon the front portion, behind which there is a sitting room, covered with a white, waterproof canvas, stretched upon hoops, beneath which is the karteel, or family bedstead, a wooden frame interlaced with strips of hippopotamus hide, on which the entire family sleep in their clothes.

At Night In the Square.

The farmer, arriving at Johannesburg about midnight, after a long day's trek, "outspans" in the great market square, and goes to sleep beside his wagon, while the native "boys," having fed and watered the animals, kindle a fire in the square, round which they crouch in their blankets until the morning, chanting and twanging upon their one-stringed lyres, or playing some cheap Swiss accordion. At break of day coffee is made, and breakfast prepared—the latter a haphazard mixture of hare, steimbok and partridge, or whatever else may have fallen to the farmer's rifle during his journey, stewed in the ubiquitous pot and eaten with a coarse porridge made from ground maize. Soon the square will be filled with a chattering crowd

accompanying illustrations. These "boys"—grown men, in fact—have tramped hundreds of miles northward from their kraals on the southeast coast of the continent to seek work in the City of Gold. Yet, so firmly bound are they to their tribal chiefs that a call to arms, as in the recent Zulu rebellion, will send them hurrying in hot haste homeward to enroll in their regiments. It is difficult to identify in their smiling faces the descendants of the fierce warriors who made the Zulu name a nightmare throughout South Africa for nearly a century. They hire their rickshaws from the owners, paying at the rate of about three shillings, or 75 cents, a day, and receiving all their earnings. The rickshaw is in general request in Johannesburg, being cheap, comfortable and just adaptable to two persons sitting rather closely together. Hence it plays a leading part in bringing about flirtations, and is requisitioned in dozens on moonlit nights in winter, when the band is scheduled to play at the Wanderers' club grounds, and the stifling heat and the dust storms are nullified by a brisk canter through the empty streets. The Zulu rickshaw boy would consider himself dishonored in the eyes of his brethren if he did not attire himself in garments of an esthetic value. The specimen shown in the illustration appears to have combined the horns of the Evil One with the wings of the seraphim. It is probable, however, that this combination possesses some weird, secret symbolism of its own, known only to the wearer. As he flies swiftly along the road toward his destination, uttering an occasional whoop of salutation to a passing comrade, or a shout of warning to pedestrians, his chocolate skin glistens with perspiration and the copperbangles round his knees and ankles glitter in the moonlight. He does not stop—usually—until he has deposited his fare, tilted down the vehicle and assisted the lady to alight; then, mopping his brow, he holds out his right hand for his legal fare, and his left—instinctive hackman that he is—for his extra "bosella."

Zulu as Serving Maid.

The Zulu is one of the mainstays of the housewife in South Africa. The maid of the up-country Boer woman is usually a yellow Hottentot girl; but the Zulu takes in the towns, the place filled in Northern countries by the serving maid. He is the housemaid, nursemaid, errand boy, a good cook and a fair coachman. To take care of the baby is, however, the chief pleasure of his existence. When he reaches this acme of confidence his life is one series of capacious smiles. It is an amusing sight to see small children in Joubert park, carefully tricked out in white sunbonnets and finery, attended by some stalwart Zulu of six feet and more, who, almost uncouth in the clothes, or rather, half-clothes of civilization, stalks proudly along, almost overcome by a sense of his importance, wheeling the go-cart or holding the tiny hand in his enormous, ebony fist.

Revel in Drunken Conflict.

From Saturday afternoon till Tuesday morning work is practically at a standstill upon the Rand. It is a



A ZULU RICKSHAW BOY

—farmers with vegetables and sacks of produce, anxious to dispose of them and to return; auctioneers holding forth with the ingenious patter of their tribe the world over, trying to dispose of second-hand furniture or worn-out "horses," which they vainly guarantee to be "salted"—that is, immune against horse sickness. There are Syrian women, with shawls across their faces, offering laces to the inspection of the voluble vrouws who have accompanied their husbands upon their journey, to take charge of the receipts, in fear that Hans, or Jan, or Paulus may happen to fall in with jolly companions; and, passing deftly among these, are the native attendants, leading horses to water, or herding oxen.

The Rickshaw "Boy."

One of the most picturesque sights in Johannesburg is the Zulu rickshaw "boy," one of whom is shown in the

WEATHER MAKING



REVOLVING KITE AND BALLOON CHIEF.

HARGREAVE-MARVIN BOX KITES

A knowledge of the coming weather enters so intimately into every contemplated human action that the question is often asked: What are the prospects for further improvement in the accuracy of weather forecasts, and can the seasons ever be foretold? The answer is that, while the government has a corps of forecasters who are now applying all of the knowledge of the atmosphere that has been revealed, little hope for material improvement in their work can be held out until a substantial addition is made to the pure science of the problem. This can only come through experiment, study and research. With 200 stations engaged in applying the science, it is a wise economy to devote at least one of them to the work of adding to the knowledge that is now costing us nearly a million and a half of dollars annually to apply. Accordingly, those in charge have endeavored to lay out a plan of study and research leading to an increase in our knowledge of the laws governing the atmosphere such as should eventually enable our successors, if not ourselves, to add to the accuracy of weather forecasts and to make them for a longer period in advance.

In order that this country may do its share toward the advancement of meteorology along the lines that specially relate to conditions in America, it is imperative that the weather bureau should establish an observatory for its own special research work. A piece of land has therefore been secured and work has been inaugurated at an establishment that is intended to respond to the present and prospective needs of meteorology. This establishment is called the Mount Weather Research observatory, and is organized on a broad and elastic basis.

In order to prosecute the researches contemplated at Mount Weather, a plant has been established there especially adapted to the investigation of the physical condition of the atmosphere at great elevations above the surface of the earth. Hitherto our knowledge of the conditions of temperature, pressure, humidity and wind velocity and direction has been based upon observations made at or near the surface of the earth or upon mountain peaks. Current conceptions of the laws of storms and of the general circulation of the atmosphere are based upon such observations almost entirely. Records obtained in recent years by means of balloons have demonstrated the existence of hitherto unsuspected variations and contrasts in temperature at very great elevations, and have shown that observations on mountain tops and at equal elevations in the free air vary widely.

The necessity for a better knowledge of temperature conditions at great elevations has directed the minds of many meteorologists to the study of the best methods for lifting self-recording instruments high above the earth's surface. The result has been the invention in recent years of ingenious forms of kites and of especially designed balloons for this purpose. The kite has again become an instrument for scientific research, and now enables us to bring down records of atmospheric conditions at elevations of two and three miles, and even of four miles, as was recently demonstrated at the German aeronautical observatory near Lindenberg. By means of small rubber balloons, marvelously light self-recording instruments have been carried up to the remarkable heights of ten to 15 miles, bringing back records of low temperatures and high velocities which have been a revelation to meteorologists—records which are compelling a reconstruction of existing ideas concerning the dynamics of the atmosphere.

Pioneer work along these lines was begun some years ago by means of kites, both at weather bureau stations and, under the direction of Mr. A. L. Rotch, at the Blue Hill observatory, near Boston. By experiments begun at St. Louis at the time of the world's fair in the summer of 1904, Mr. Rotch also initiated the practice in this country of sending up small rubber balloons.

The observatory at Mount Weather is now well equipped with the necessary plant for carrying on this new and promising work of aerial research, and has for nearly a year been cooperating with European institutions and with the Blue Hill observatory in sending up, on prearranged days, kites or captive balloons. These kites may be raised in winds varying from ten miles per hour to 35 or 40 miles at the surface. With winds of

less than ten miles per hour it is necessary to employ captive balloons. To attain great heights small free rubber balloons of two or three cubic yards capacity, called pilot balloons, are employed. The instrument carried by the kites and balloons vary in weight from one and one-half to three or four pounds and record variations in the temperature, the pressure, the humidity of the air, and the wind velocity.

The balloons are filled with hydrogen gas in order to secure the greatest lifting power. This necessitates the use of special apparatus for the manufacture of hydrogen. At the Mount Weather Research observatory a strong electric current is passed through water, breaking up the liquid into its constituent elements of hydrogen and oxygen. These gases are then collected and stored in appropriate tanks for future use as occasion may require.

As the small pilot balloons carry up their instruments to heights of many miles, where the prevailing temperatures are at all times very low (sometimes exceeding 100 degrees Fahrenheit below zero), it is necessary to test the accuracy of the thermographs at these low points. For this purpose the observatory is equipped with a plant for the manufacture of liquid air, by means of which the instrument may be tested to the lowest points likely to be reached at great elevations.

In the near future these small rubber pilot balloons, carrying with them to elevations of 30,000 to 50,000 feet the light self-recording instruments referred to, will be liberated simultaneously at 20 to 30 weather bureau stations surrounding typical storm centers. Observations obtained in this manner at various elevations when compared with the records made at the same time at the surface of the earth will doubtless throw much new light upon the mechanism of storms, cold waves, etc., and give to meteorologists a better understanding of the general circulation of the atmosphere.

So important to the study of the sun is a continuous record of the magnetic variations that one of the first steps in the establishment of the observatory was the installation of a magnetic plant consisting of the best modern instruments for the direct observation and for the continuous registration of the variations in the magnetism of the earth. The standard observatory instruments, both for continuous registration and direct measurement, are of the type devised by Wild for the model magnetic observatory at Paviorsk, Russia. These are supplemented by a set of Eschenhagen magnetographs, the extreme sensitiveness of which peculiarly fits them for recording minute fluctuations of the earth's magnetic force.

The principal application of the results of the observations will be to supplement the direct observations of the sun, and thus to carry on the record of the solar activity continuously day and night in all conditions of weather. Researches will also be carried on to determine the existence and measure the extent of probable direct relations between meteorological disturbances and magnetic variations. The magnetic records will also be specially studied in conjunction with the results of observations of the radioactivity and the electrical condition of the air.

The physical laboratory is not yet completed, and consequently it has not been possible to undertake investigations here in experimental physics. However, through the kindness of the authorities of the University of Virginia a good deal of spectroscopic work has been done at that institution. Some of the results have been published in the *Astrophysical Journal*, and there are many data yet on hand to be worked up at the earliest opportunity. An investigation, by the aid of a large telescope, of the causes and meteorological relations of the scintillation of stars is in progress at the University of Virginia along lines suggested by one of the Mount Weather officials. A special photometer has been devised for the purpose of measuring the relative densities of clouds, particularly when the entire sky is covered. As soon as the laboratory is completed and equipped investigations will be begun on atmospheric electricity, its origin, distribution, and laws, the causes and nature of precipitation, heat and light absorption, and other physical phenomena of importance to the meteorologist.

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